DAIHATSU

TERIOS

J100

Service manual

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SERVICE MANUAL

DAIHATSU

TERIOS

J100

FOREWORD

This service manual describes the maintenance and servicing procedures for the Model J100.

Applicable Model: J100
In this service manual, the entire portion is divided into 23 sections. Each section has an index along with a table of contents at the beginning. For easier reference, the upper part of each page bears the section title concerned.

All information used in this service manual was in effect at the time when the manual was printed. However, the specifications and procedures may be revised due to continuing improvements in the design without advance notice and without incurring any obligation to us.

Published in June, 1997

NO. 9710-JE

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TERIOS

J100

GI

GENERAL INFORMATION

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IMPORTANT SAFETY NOTICE

The vehicle is a machine comprising a great number of parts. Basically speaking, the vehicle is potentially hazard. However, one can handle it safely if he has the required knowledge.

Correct service methods and repair procedures are very vital for assuring not only the safety and reliability of a vehicle, but also the safety of service personnel concerned.

The methods and procedures contained in this manual describe in a general way the techniques which the manufacturer has recommended. Thus, they will contribute to ensuring the reliability of the products. The contents of the servicing operations come in a wide variety of ways. Moreover, techniques, tools and parts necessary for each operation are different widely from each other.

This manual does not cover all details of techniques, procedures, parts, tools and handling instructions which are necessary for these operations, for such coverage is impossible. Hence, any one who obtains this manual is expected first to make his responsible selection as to techniques, tools and parts which are necessary for servicing the vehicle concerned properly. Furthermore, he must assume responsibility for his actions in connection with his own safety.

Therefore, one should not perform any service if he is not capable of making responsible selection and/or if he can not understand the contents herein described, for this manual has been prepared for experienced service personnel.

WARNINGS, CAUTIONS AND NOTES

All these symbols have their specific purposes, respectively.

WARNING:
- This symbol means that there is the possibility of personal injury of the operator himself or the nearby workers if the operator fails to follow the operating procedure prescribed in this manual.

CAUTION:
- This symbol means that there is the possibility of damage to the component being repaired if the operator fails to follow the operating procedure prescribed in this manual.

NOTE:
- To accomplish the operation in an efficient manner, additional instructions concerning the operation are given in this section.

The following list describes general WARNINGS:

- Always wear safety glasses for eye protection.
- Use safety stands whenever a procedure requires you to be under the vehicle.
- Be sure that the ignition switch is always in the OFF position, unless otherwise required by the procedure.
- Set the parking brake when working on the vehicle.
- Operate the engine only in a well-ventilated area to avoid the danger of carbon monoxide.
- Keep yourself and your clothing away from moving parts, when the engine is running, especially from the fan and belts.
- To prevent serious burns, avoid contact with hot metal parts, such as the radiator, exhaust manifold, tail pipe, catalytic converter and muffler.
- Do not smoke while working on a vehicle.
- To avoid injury, always remove rings, watches, loose hanging jewelry, and loose clothing before beginning to work on a vehicle.
- Keep hands and other objects clear of the radiator fan blades! The electric cooling fan is mounted on the radiator and can start to operate at anytime by a rise in coolant temperature or turning ON of the air conditioner switch in the case of vehicles equipped with an air conditioner. The electric cooling fan is also mounted on the condenser for air conditioner and starts to operate anytime when the air conditioner switch is turned “ON”. For this reason care should be taken to ensure that the electric cooling fan motor is completely disconnected when working under the hood.

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The UNITS used in this manual are showed as the SI UNIT (International System of Unit), and alternatively showed in the metric system.

"Example"
24.5 - 34.3 N·m (2.5 - 3.5 kgf-m)

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HOW TO USE THIS MANUAL

CONTENTS OF EXPLANATION

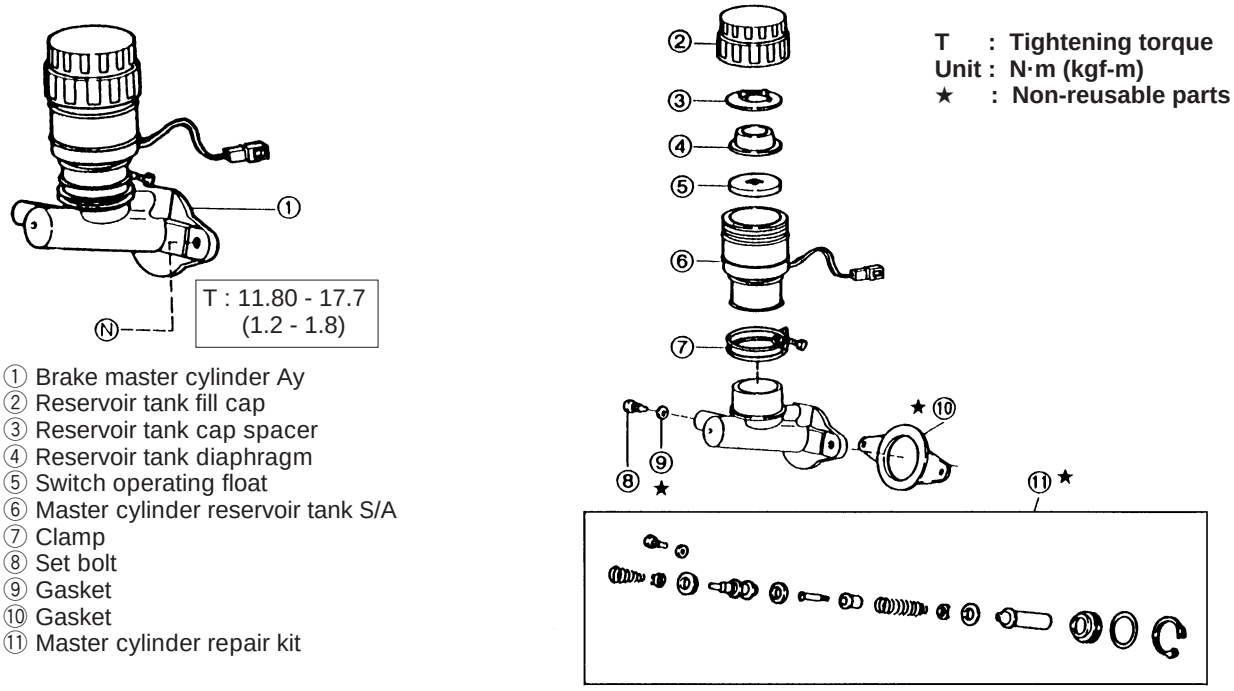
1. Schematic Diagram of Components

(1) The schematic diagram of components that appears at the beginning of each section describes the nomenclature and installed conditions of each component. Furthermore the tightening torque is posted in the figure.

(2) Those parts whose reuse is not permitted bear a "★" mark for an identification purpose. Be certain to replace these parts with new ones during the assembly.

(3) During the assembly, be sure to apply grease to those parts indicated by the mark in the figure.

(Example)



① Brake master cylinder Ay
② Reservoir tank fill cap
③ Reservoir tank cap spacer
④ Reservoir tank diaphragm
⑤ Switch operating float
⑥ Master cylinder reservoir tank S/A
⑦ Clamp
⑧ Set bolt
⑨ Gasket
⑩ Gasket
⑪ Master cylinder repair kit

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2. Servicing Procedure

(1) In principle, the servicing procedure is described in the following sequence given below: Removal → Inspection → Installation, and Disassembly → Inspection → Assembly.

(2) The explanation covers detailed servicing methods, specifications and notes.

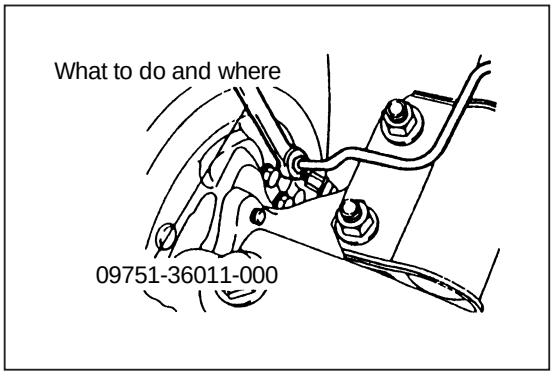
(3) The main point of each item explains the servicing section and servicing procedure, using illustrations.

(Example)

What to do

How to do it

3. Brake tube installation
   (1) Install the brake tube to the wheel cylinder temporarily by hands.
   (2) Tighten the brake tube to the wheel cylinder, using the following SST.
   SST: 09751-36011-000



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(4) The inspection in this manual describes only checking operation. Therefore, if you find any malfunction, replace any defective parts with new ones.

3. SST

For those operations which require the use of any SST, the SST numbers concerned are given in bold letters.

4. Service Specifications

Service specifications are indicated in bold letters or enclosed by heavy lines. Be certain to confirm the specifications concerned.

5. Tightening Torque

For those operations which require the control of tightening torque, the relevant tightening torque is given in bold letters. Be certain to confirm the tightening torque concerned.

6. Definitions of Terms

Specified Value …… A value which represents the allowable range during the inspection and adjustment.
Limit …… A maximum or a minimum limit which the value should not exceed or fall below.

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ABBREVIATION CODES

The abbreviation codes that appear in this workshop manual stand for the following, respectively.

Abbreviation code	Original word	Meaning
A/C	Air Conditioner	Refers to air conditioner.
A/T, AT	Automatic Transmission	Refers to automatic transmission
A/Y or Ay	Assembly	Refers to an assembled component comprising more than two single parts or sub-assembly parts.
API	American Petroleum Institute	The standards set forth by the American Petroleum Institute (abbreviated as API Classification) have been employed to evaluate and classify properties of various oils. Engine oils for gasoline engines are classified as SD, SE, SF and so on, whereas engine oils for diesel engines are classified as CC, CD and so on.
ECU	Electronic Control Unit	Refers to electronic control unit.
EFI	Electronic Fuel Injection	Refers to electronic fuel injection.
F/L	Fusible Link	Refers to fusible link.
L.H.D.	Left-Hand Drive	Left-hand drive vehicle.
LH	Left Hand	Refers to left side.
M/T, MT	Manual Transmission	Refers to manual transmission.
MP	Multipurpose	Means that the following item has multi-purposes.
O/S	Oversize	In instances where fitting becomes too loose due to wear resulting from use for a long period of time or due to frequent removal/installation operations, if the fitting part (e.g. piston) is replaced with a part having larger dimensions, the other mating part may be put into use again. “Oversized” parts denote those parts having larger dimensions compared with the standard parts.
PR	Ply Rating	Represents strength of tires. The larger the ply rating number, the stronger the tire strength.
R.H.D.	Right-Hand Drive	Right hand drive vehicle
RH	Right Hand	Refers to right side.
S/A	Sub-Assembly	Refers to a component comprising more than two single parts which are welded, staked, or studded to each other to form a single component.
SAE	Society of Automotive Engineers	For example, automotive oils are designated as SAE so and so number. These designation numbers have been set forth by the Society of Automotive Engineers in the United States of America (SAE). The larger the SAE number, the higher the oil viscosity. Conversely, the smaller the SAE number, the lower the oil viscosity.
SST	Special Service Tool	Refers to a tool designed for a specific purpose.
STD	Standard	When referring to automotive parts, “standard” represents those parts which have been installed originally by the manufacturer and which have standard dimensions.
T	Torque	Refers to tightening torque.
U/S	Under Size	In the same manner as with the “oversized” parts, if fitting part (e.g. bush and bearing) is replaced with a part having smaller bore dimensions, the other mating part may be put into use again. “Under sized” parts denote those parts having smaller dimensions compared with standard parts.
VSV	Vacuum Switching Valve	Refers to vacuum switching valve.
W/	With	Denotes that the following part is attached.
ETR	Electronic Tuning Radio	Radio which incorporates variable capacitance, etc. which varies the value according to an applied voltage or current.

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The abbreviation codes that appear in the figure stand for the following, respectively.

Ⓑ	Bolt	Ⓢ	Screw
Ⓝ	Nut	Ⓦ	Washer

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GENERAL SERVICE INSTRUCTION

1. Use fender covers, seat covers and floor sheets so that the vehicle may not get dirty or be scratched.

2. Jacking up
   (1) When only the front section or rear section of the vehicle is jacked up, be sure to place chocks at the wheels so as to insure safe operations.
   (2) When the vehicle has been jacked up, be sure to support the vehicle at the specified section using safety stands. (See page GI–9)

3. Handling instructions related to battery.
   (1) Before you start performing the electrical works, make certain to disconnect the battery ground cable terminal from the negative (–) terminal of the battery.
   NOTE:
   - Before disconnecting the battery ground cable terminal from the negative (–) terminal of the battery, be sure to read out the diagnosis code of the EFI, Airbag and immobilizer system etc., if the vehicle is equipped with such systems, when necessary.
   - After reconnecting the battery ground cable terminal to the negative terminal of the battery, be sure to reset the watch or radio, if the vehicle is equipped with such equipment.

   (2) When it becomes necessary to disconnect the battery power supply for the purpose of carrying out checks or repairs, always disconnect the battery ground cable terminal from the negative terminal of the battery first.
   (3) To avoid damaging battery plates, after the terminal nut has been loosened, pull out the battery ground cable terminal straight upward, rather than turning or prying the terminal.
   NOTE:
   - Be sure to employ a battery terminal puller (commercially available) to remove the battery ground cable terminal from the negative terminal of the battery, if encountered any difficulty.

   (4) Clean the battery terminal posts or battery ground terminals, using a cloth. Never use a file or other adhesive agents.
   (5) When connecting the battery ground cable terminal to the battery, first the battery ground cable terminal should be fitted onto the battery post with the attaching nut in a loose state.
   Then, tighten the nut. Never tap the terminal onto the battery post, using a hammer or spanner wrench or the like.
   (6) As for the cover at the positive (+) terminal side, be sure to install it at the correct position.

4. Repairs of fuel system
   (1) The EFI equipped vehicles employ a high fuel pressure. Therefore, the following notes should be observed.
      ① Be sure to prevent the fuel from splashing with a cloth or the like, when the union bolt or other connected section of the fuel line is loosened or slackened.
   (2) When connecting/disconnecting the fuel line.
      ① Tighten each connecting section to the specified torque.
      ② Attach new specified clips to each connecting section.
      ③ Be certain to place a suitable container or a cloth, etc. under the connected section of the fuel line before disconnecting the fuel line.
      ④ Before the fuel line is disconnected, be sure to release the inner pressure of the fuel tank by detaching the fuel filler cap.
      ⑤ Be sure to follow the instruction mentioned in the main text when disconnect or connect the quick type connectors.
   (3) Never work near open flames.

5. For increased work efficiency and improved accuracy, be sure to utilize SSTs (Special Service Tools) effectively.

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HANDLING INSTRUCTIONS ON CATALYTIC CONVERTER

WARNING:

- When a great amount of unburnt gas is admitted into the catalytic converter, overheating is prone to occur, resulting in a fire hazard.
  To avoid such trouble in advance, be certain to observe the following precautions. Also, be sure to explain such precautions to your customers.

1. Use only unleaded gasoline.

2. Avoid idling the engine for a prolonged length of time.
   Do not run the engine continuously at idle speed for more than 20 minutes.
   WARNING:
   - Immediately check and repair the vehicle if the fast idle speed or idle speed is unstable or the system exhibits malfunction. Failure to observe this warning may result in a fire hazard.

3. Be sure to observe the following points when performing the spark jump tests.
   (1) The spark jump test must be limited to cases where such test is absolutely necessary. Also, be sure to finish the test in the shortest possible time.
   (2) Be sure to shut off the fuel supply when performing the spark jump test in advance.

4. Do not run the engine when the fuel tank becomes nearly empty.
   Failure to observe this caution will cause misfiring. Also, it will apply excessive load to the catalytic converter, even leading to catalyst damage.

5. Do not dispose of the waste catalyst along with parts contaminated with gasoline or oil.

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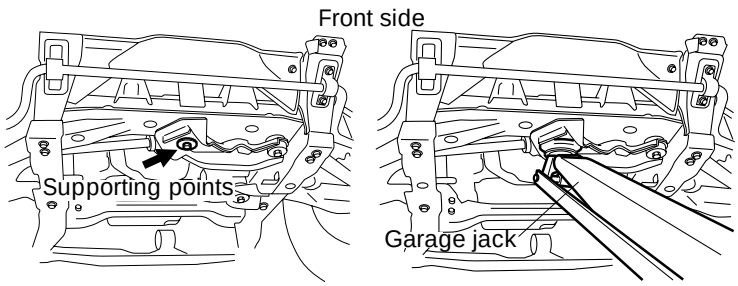
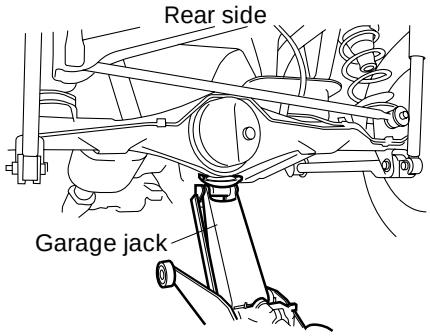
JACKING POINTS AND SUPPORTING POINTS OF SAFETY STANDS

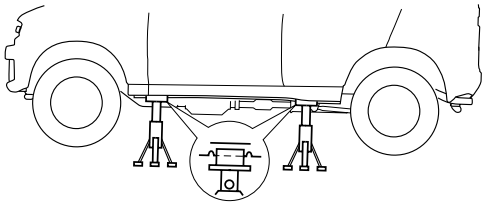
CAUTION:
- Be sure to support the vehicle at the flat surface of the rocker panel.
- Do not support the vehicle at the edge part rocker panel.

- **Jacking Points**
  Front side ..... Differential mount bracket
  Rear side ..... Rear axle housing

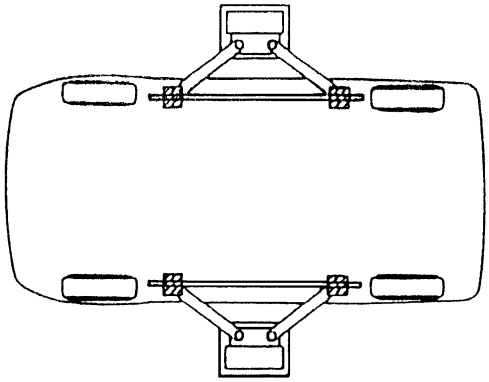




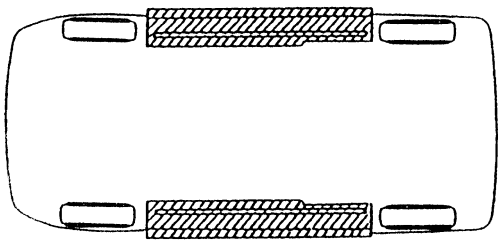
- **Supporting points of safety stands**
  Four supporting points are located at the right and left sides. (The supporting points have been strengthened by spot-welding reinforcements. Never support the vehicle at points other than the specified points.)



- **Supporting points of tow-post lift**
  Align the supporting pads of a two-post lift with the supporting points of safety stands, as indicated in the figure above.



- **Supporting points of plate supporting type lift**
  A vehicle should be placed at the center of the supporting plates of the lift.
  When lifting up the vehicle, be sure to support the front section of the vehicle.



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TOWING INFORMATION

When towing the model J100 follow the manner mentioned below.

CAUTION:
- Never perform towing, using sling type equipment.
  Failure to observe this caution may lead to severe damage on the vehicle body.

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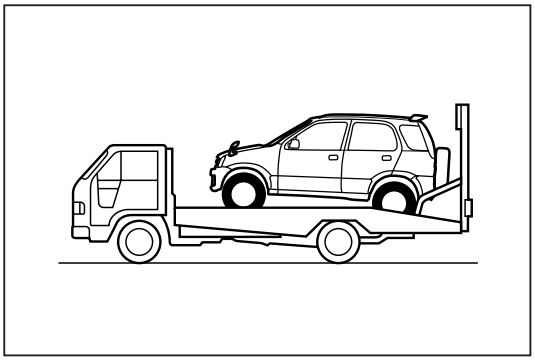
Flat bed type
We recommend this as the most desirable method.

CAUTION:
- Apply the parking brake securely.
- Be sure to tie-down the vehicle body to the carrier, using a tie-down wires. However, never apply excessive force to each hook on the vehicle body, for vehicle body may be severely damaged.

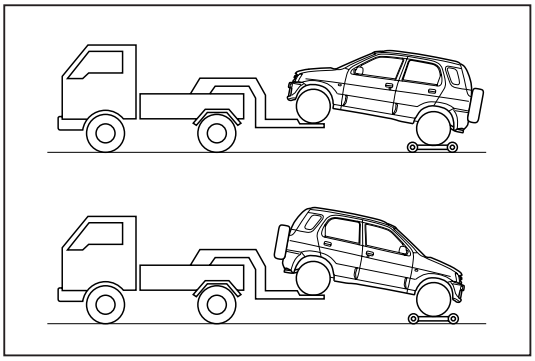


JGI00021-00008

Wheel lift type
Use a towing dolly when towing the vehicle with the front wheels or rear wheels on ground.

WARNING:
- Never allow anyone to be in the vehicle being towed.

CAUTION:
- Be sure to secure the front or rear tires on the towing dolly.
- Never perform the towing, using sling type equipment. Failure to observe this caution may severely damage the vehicle body.



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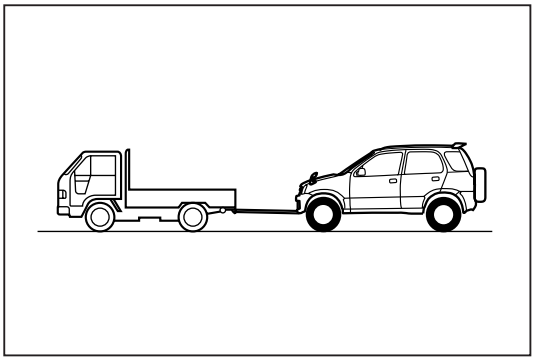
Emergency towing
This manner can be employed if the vehicle is equipped with a manual transmission and the road surface is hard and smooth. In this case, be certain to follow the WARNING and CAUTION mentioned below.

WARNING :
- The driver in the vehicle to be towed should always keep in mind that braking will require more force than usual when the engine is stopped, because the brake booster is not functioning when the engine is stopped.



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- Never tow the vehicle at speed more than 30 km/h.
- Turn the ignition switch of the vehicle to be towed in the “ACC” position during the towing. Never pull out the key or turn the ignition switch to the “LOCK” position during the towing. Failure to observe this warning will loose controllability, causing an accident.
- Never tow the vehicle in this manner unless the wheels, axles, drive train, steering, and brakes are in a good condition.

CAUTION:
- Never tow an automatic transmission vehicle in this manner. Be sure to always use a towing dolly.
- Always pull the hook in a straight-ahead direction to prevent it from being damaged. Never pull it from side or in a vertical direction. Also, never pull it sharply.
- Never connect the towing rope, cable or such to the parts other than the hooks provided on the vehicle shell. Connection of the towing rope, cable or such to other pants than hooks may damage these components
- Ensure that the hooks are installed on the vehicle shell securely before towing.

1. Attach a sturdy rope, towing strap or cable to the towing hook.
2. A driver must ride in the vehicle being towed and control it.
3. Release the parking brake and shift the shift lever of manual transmission to the neutral position.
4. Select the center differential lock switch in the free position.
   NOTE:
   - If you cannot start the engine, ensure that the center differential lock mechanism is free by jacking up one of the wheels and making sure that the wheel turns freely.
     Even if the indicator lamp in the combination meter shows that the differential lock is free, there is the possibility that it is not free actually.

5. Set the ignition switch to the “ACC” position.
6. Perform the towing.

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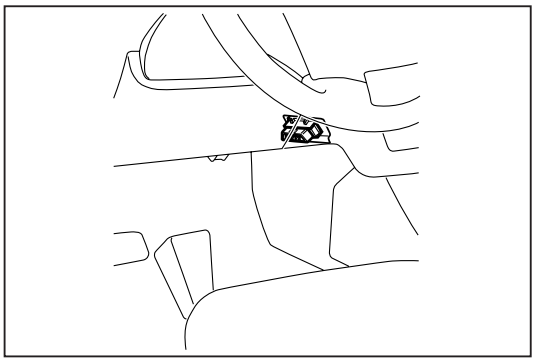
DIAGNOSIS CONNECTOR

The diagnosis connector is provided under the instrument panel at the driver’s seat side as shown.

Terminal table

Terminal number and name	
① IG For DS-21	⑨ T (ITC)
③ ABST	⑩ SIO For DS-21
④ ECUT	⑪ EFIT
⑧ REV	⑬ Body ground
	⑯ VF



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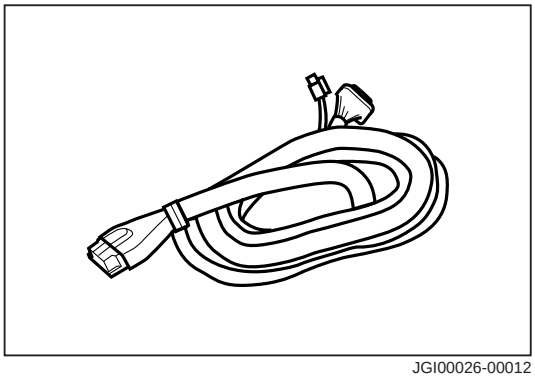
1. Be sure to connect the following SST when utilizing this connector, in order to prevent the terminals in the diagnosis connector from being damaged.
   The shape of the SST end is the same as the diagnosis connector.
   SST: 09991-87401-000



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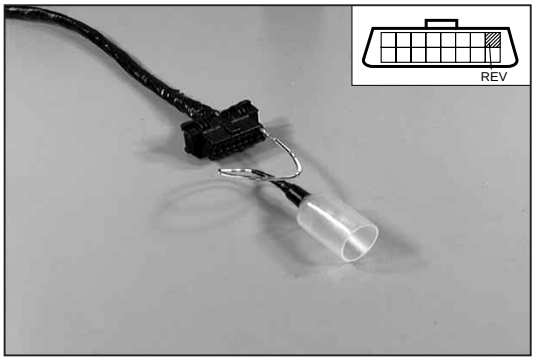
2. When measuring the engine tachometer, connect the following SST to the No.8 (REV) terminal of the above SST.
   SST: 09991-87402-000



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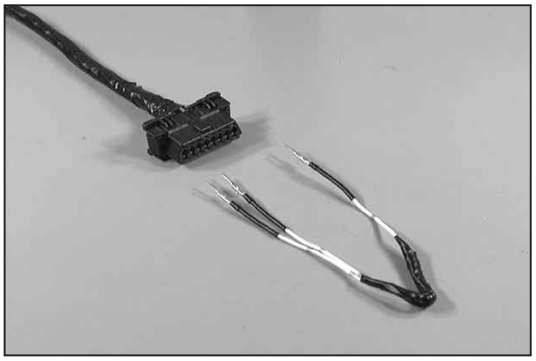
3. Utilize the following SST when connecting the terminals in the SST for the diagnosis connector which is specified in the main text.
   SST: 09991-87403-000

   CAUTION:
   - Never connect the terminals other than that specified in the main text in each section. Failure to observe this caution may lead to serlus damage or malfunction.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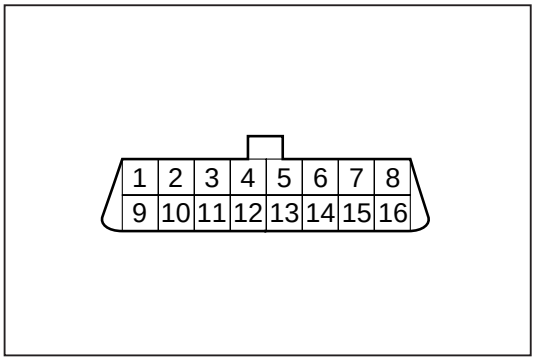
4. Reference
   (1) Output of diagnosis code of EFI system.
   Connect the 11(EFIT) and 13 (Body ground)
   (2) Output of diagnosis code of ABS system.
   Connect the 4(ECUT) and 13 (Body ground)
   (3) Switching to the test of ABS system.
   Connect the 3(ABST) and 13 (Body ground)
   (4) Vf output (oxygen sensor function)
   Connect the 16(VF) and 13(body ground)
   (5) Output of diagnosis code of air bag system.
   Connect the 4(ECUT) and 13 (Body ground)
   (6) To connect the tachometer
   Connect a tachometer to 8(REV) terminal.
   (7) Connection of the DS-21
   Connect the DS-21 utilizing the following SST. The following SST is provided with the terminal for DS-21.
   SST: 09991-87401-000

   CAUTION:
   - Never connect the DS-21 in another way than that manner specified.



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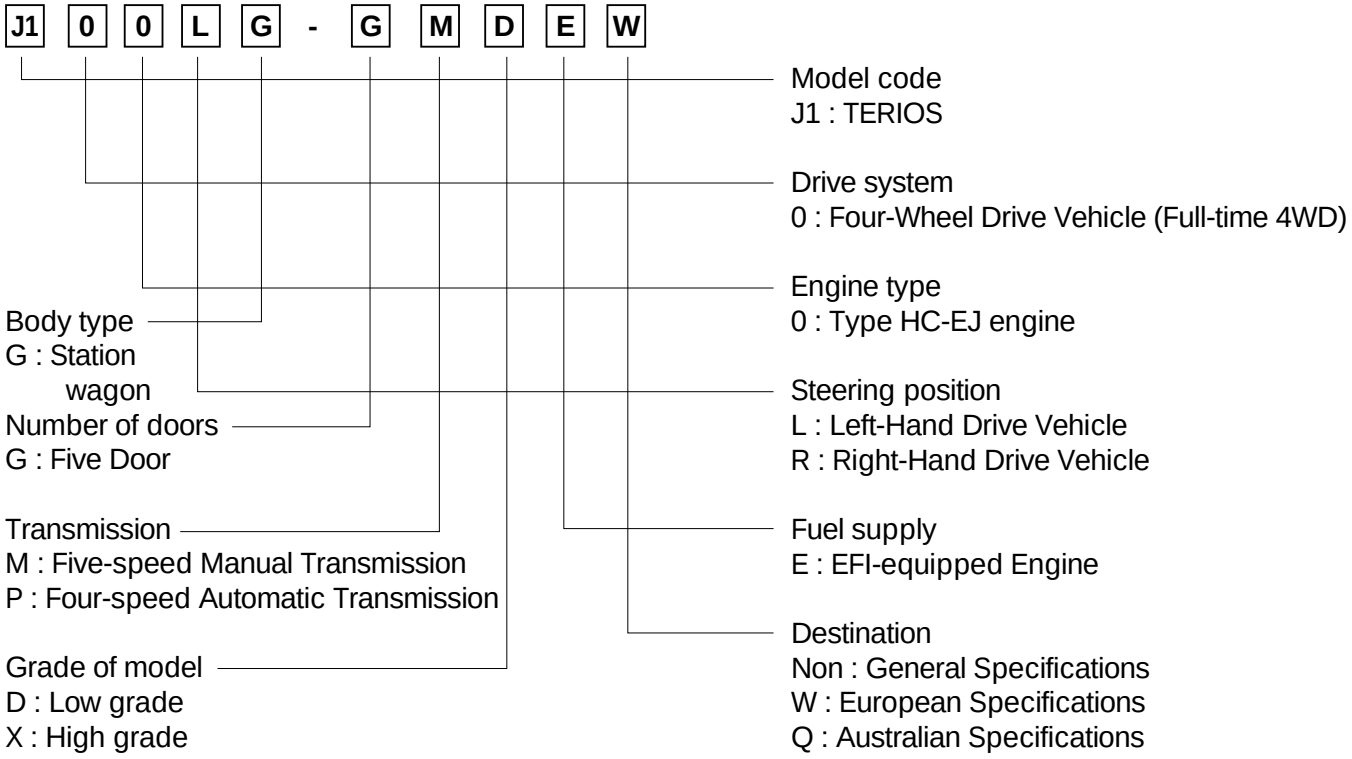
MODEL VARIATION

Engine	Specification	General				AUS		EC			
	Handle position	RHD		LHD		RHD		RHD		LHD	
	Grade	Lo	Hi	Lo	Hi	Lo	Hi	Lo	Hi	Lo	Hi
HC-EJ	Model code	J100RG		J100LG		J100RG		J100RG		J100LG	
	5MT	GMDE	GMXE	GMDE	GMXE	GMDEQ	GMXEQ	GMDEW	GMXEW	GMDEW	GMXEW
	4AT	GPDE	GPXE	GPDE	GPXE	GPDEQ	GPXEQ	GPDEW	GPXEW	GPDEW	GPXEW

JGI00011-00000

Explanation of vehicle model code



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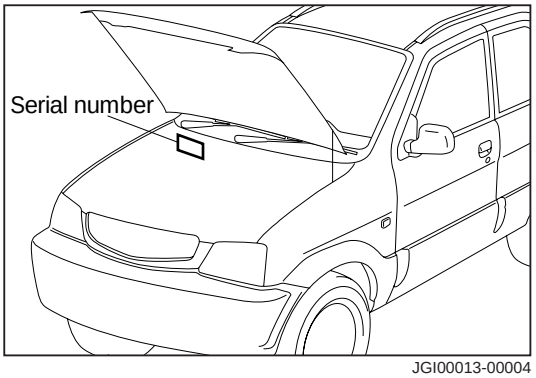
CHASSIS SERIAL NUMBER STAMPED POSITION

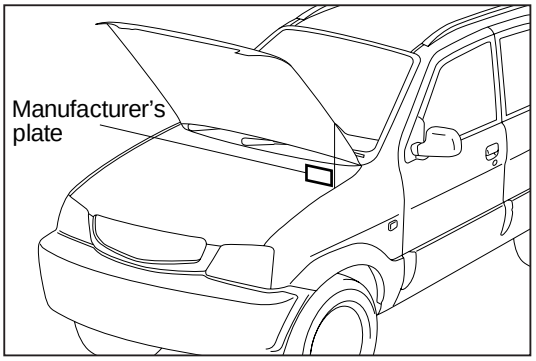
The chassis number is stamped on the cowl panel at the right side in the engine compartment.



JGI00013-00004

MANUFACTURER'S PLATE POSITION

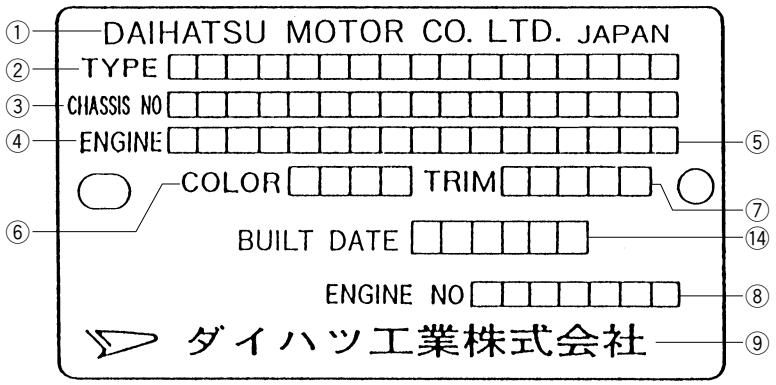
The manufacturer's plate is attached on the cowl panel.



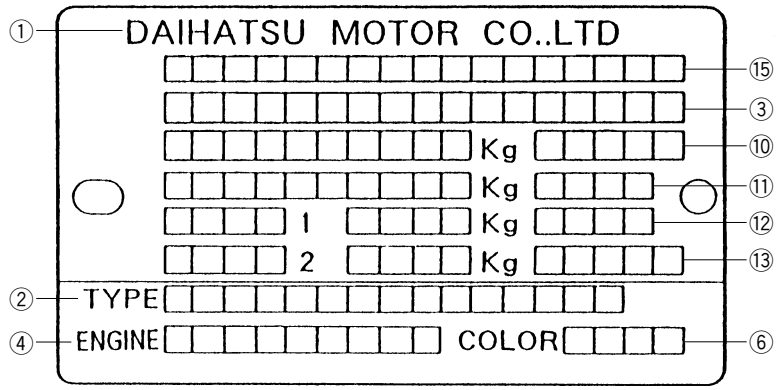
JGI00014-00005

CONTENTS OF MANUFACTURER'S PLATE

(1) General, Australian, Norwegian and Finnish specifications



(2) European Specification (except for Norway and Finland)



① Manufacturer's name, Country
② Vehicle model
③ Chassis No.
④ Engine type
⑤ Engine displacement
⑥ Body colors
⑦ Trim code
⑧ Engine number
⑨ Manufacturer's name in Japanese
⑩ Gross vehicle weight
⑪ Gross combination weight
⑫ Maximum permissible front axle weight
⑬ Maximum permissible rear axle weight
⑭ Production month-year (Only for AUS spec.)
⑮ Authorized number of W.V.T.A.
(Only for European specification.)

JGI00015-00006

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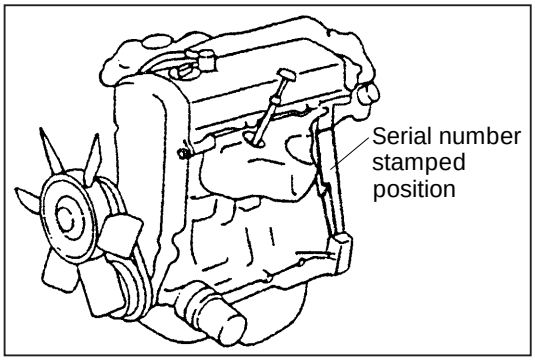
ENGINE NUMBER AND ENGINE TYPE STAMPED POSITIONS

- The engine number is stamped on the cylinder block.
- The engine type is indicated by embossed letters on the cylinder block.



JGI00016-00007

BODY COLOR INFORMATION

Body color name	Code
Silver metallic	S07
Black metallic	6A5
Red mica metallic	R24
Turquoise mica metallic	B36
Purplish blue mica	B38
Violet metallic	P05
Two-tone color Silver metallic / Silver metallic	NF7
Two-tone color Black metallic / Silver metallic	NF2
Two-tone color Red mica metallic / Silver metallic	NF0
Two-tone color Turquoise mica metallic / Silver metallic	ND9
Two-tone color Purplish blue mica / Silver metallic	NG1
Two-tone color Violet metallic / Silver metallic	NG2

JGI00017-00000

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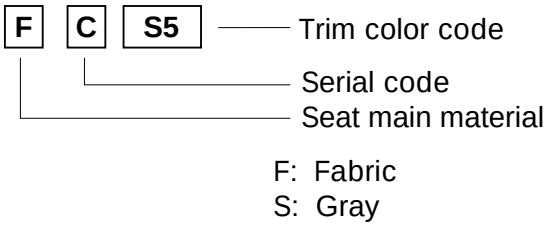
COLOR CODE IN THE WORLD

Color name	Color code					
	DAIHATSU	AKZO	DUPONT	ICI	SPIES HECKER	STANDOX
Silver metallic	S07	DAHS07	L8842	B127B	97076	S07
Black metallic	6A5	DAH6A5	G8742	A403B	96326	6A5
Red mica metallic	R24	DAHR24	F2213	FCN6B	33273	R24
Turquoise mica metallic	B36	DAHB36	F2855	HMG7B	55174	B36
Purplish blue mica	B38	DAHB38	F3425	JNE4B	55603	B38
Violet metallic	P05	DAHP05	F3426	JNE5B	40868	P05
White	W09	DAHW09	K9344	XM48	16461	W09
Two-tone color Silver metallic / Silver metallic	NF7 S07 / S07	DAHS07 / DAHS07	L8824 / L8842	B127B / B127B	97076 / 97076	S07 / S07
Two-tone color Black metallic / Silver metallic	NF2 6A5 / S07	DAH6A5 / DAHS07	G8742 / L8842	A403B / B127B	96326 / 97076	6A5 / S07
Two-tone color Red mica metallic / Silver metallic	NF0 R24 / S07	DAHR24 / DAHS07	F2213 / L8842	FCN6B / B127B	33273 / 97076	R24 / S07
Two-tone color Turquoise mica metallic / Silver metallic	ND9 B36 / S07	DAHB36 / DAHS07	F2855 / L8842	HMG7B / B127B	55174 / 97076	B36 / S07
Two-tone color Purplish blue mica / Silver metallic	NG1 B38 / S07	DAHB38 / DAHS07	F3425 / L8842	JNE4B / B127B	55603 / 97076	B38 / S07
Two-tone color Violet metallic / Silver metallic	NG2 P05 / S07	DAHP05 / DAHS07	F3426 / L8842	JNE5B / B127B	40868 / 97076	P05 / S07
Two-tone color White / Silver metallic	NC1 W09 / S07	DAHW09 / DAHS07	K9344 / L8842	XM48 / B127B	16461 / 97076	W09 / S07

JGI00018-00000

TRIM CODE



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DAIHATSU

TERIOS

J100

MA

MAINTENANCE

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WHEEL ALIGNMENT **MA–42**
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SUSPENSION ARM, CONTROL ARM & DUST COVER **MA–43**

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NO. 9710-JE

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MAINTENANCE REQUIREMENTS

The scheduled maintenance service is important to ensure trouble-free, safe and economical driving. Failure to perform the scheduled maintenance may cause an accident or serious damage.
If you conduct the periodical maintenance, Daihatsu car owners may reduce the chance of accidents or car problems. Furthermore, it becomes possible for you to find at an earlier stage malfunctions which may lead to serious damages. Consequently, potential vehicle damage can be prevented or the degree of the damage can be minimized.
Therefore, all of the persons who are concerned with servicing the Daihatsu vehicles should offer the periodical maintenance service to Daihatsu car owners in order that they may be protected from accidents or unexpected problems.
To prevent malfunctions in advance, however, conducting the periodical maintenance service only is insufficient. It is essential that owners themselves perform maintenance, such as the pre-starting check described in the owner's manual, so that the vehicle exhibits no abnormal change or phenomenon. Hence, please explain to owners about the necessity of maintenance performed by them. However, malfunction may occur on those vehicles which are always checked by their owners. For instance, if a part instructed to be replaced periodically should be used beyond the replacement intervals and the life of the part has expired, there are cases where malfunction occurs suddenly despite the fact that no malfunction has taken place until yesterday. To prevent such malfunction in advance, be sure to replace parts recommended to be replaced periodically at the specified replacement intervals.
This section describes those items of the scheduled maintenance service recommended by the Daihatsu and their intervals. Be sure to observe the maintenance schedule.

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MAINTENANCE SCHEDULE

NOTE:

- Perform the periodical maintenance at the specified mileage or the time whichever comes first, unless otherwise specified.
- Continue to perform the periodical maintenance after 100,000 km (60,000 miles) at the same intervals as before 100,000 km.
- If the vehicle should be operated under severe driving conditions, operated occasionally, operated in dusty areas, repeating short trip, operated under extremely cold climate and/or on salted roads, it is necessary to perform some maintenance items more frequently than the regular maintenance schedule.
- This maintenance schedule prepared based on requirements mentioned in the owner's manual which are to be performed by the Daihatsu owner thoroughly.

○···Check or inspect. ●···Change or replace.

Section	Item	What to do	Inspection interval												See page
			×1000 km	1	10	20	30	40	50	60	70	80	90	100	
			×1000 miles	0.6	6	12	18	24	30	36	42	48	54	60	
			Years	—	0.5	1	1.5	2	2.5	3	3.5	4	4.5	5	
Engine	Air cleaner element	Cleaning Check • Damage				○		●		○		●		○	MA–6
	Valve clearance	Check & adjustment						○				○			MA–18
	Engine oil & oil filter	Change (Use API: SG or higher grade)		Every 12,000 km											MA–13
	Fuel filter	Change		Every 100,000 km											MA–9
	Fuel line & connections (Including fuel hoses)	Check • Crack • Tightness • Leakage • Damage		Every 40,000 km											MA–8
	Coolant (Long-life coolant)	Change		Every two years											MA–23
	Drive belt (Alternator, water pump, power steering)	Check • Tension • Crack • Damage				○		○		○		○		○	MA–6
	Timing belt	Change		Every 100,000 km											Refer to EM section.
	Spark plug	Cleaning & check • Condition • Gap • Damage				○		○		○		○		○	MA–14
	Ignition timing	Check & adjustment				○		○		○		○		○	MA–21
Exhaust emission control system	Blow-by gas recirculation hose (Positive crankcase ventilation hose)	Check • Connection • Damage						○				○			MA–7
	Charcoal canister	Check • Function • Damage						○				○			MA–11
	Evaporative emission hoses	Change		Every eight years											MA–12
	Exhaust pipe & muffler mounting	Check • Tightness • Damage				○		○		○		○		○	MA–37

* Replace every 10,000 km when API SF grade oil is used.

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○···Check or inspect. ●···Change or replace.

Section	Item	What to do	Inspection interval												See page
			×1000 km	1	10	20	30	40	50	60	70	80	90	100	
			×1000 miles	0.6	6	12	18	24	30	36	42	48	54	60	
			Years	—	0.5	1	1.5	2	2.5	3	3.5	4	4.5	5	
Power train system	Clutch	Check • Free travel • Reserve travel • Damage				○		○		○		○		○	MA–38
	Manual transmission	Change • Oil						●				●			MA–39
	Automatic transmission	Change • Fluid	Every 80,000 km												MA–37
	Automatic transmission Oil cooler hose	Check • Crack, scratch, cut, twist and swelling	Every 40,000 km												MA–38
	Transfer	Change • Oil						●				●			MA–39
	Differential (Front & Rear)	Change • Oil						●				●			MA–39
	Propeller shaft	Check • Tightness • Rattle • Damage				○		○		○		○		○	MA–40
	Drive shaft boot	Check • Damage				○		○		○		○		○	MA–40
Suspen-sion system	Shock absorber	Check • Function • Oil leakage (Shock absorber) • Damage				○		○		○		○		○	MA–43
	Suspension arm (Front) Control arm (Rear) Dust boots	Check • Tightness • Damage						○				○			MA–43
Running system	Wheel bearing	Check • Tightness • Damage						○				○			MA–40
Steering system	Steering linkage, gear box	Check • Free play (Steering wheel) • Tightness • Rattle • Damage				○		○		○		○		○	MA–41
	Wheel alignment	Check • Toe-in						○				○			MA–42
	Fluid hose	Check • Crack, scratch, cut, twist and swelling	Every 4 years												MA–42

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○···Check or inspect. ●···Change or replace.

Section	Item	What to do	Inspection interval	×1000 km	1	10	20	30	40	50	60	70	80	90	100	See page
				×1000 miles	0.6	6	12	18	24	30	36	42	48	54	60	
				Years	—	0.5	1	1.5	2	2.5	3	3.5	4	4.5	5	
Brake system	Brake pedal & Parking brake	Check • Free play (Brake pedal) • Reserve travel (Brake pedal) • Working travel (Parking brake)					○		○		○		○		○	MA–27
	Disc pad	Check • Wear • Damage					○		○		○		○		○	MA–29
	Brake hose, tube and P & B valve	Check • Leakage (Fluid level, connection) • Loose clamp • Damage					○		○		○		○		○	MA–28
	Brake fluid	Change		Every 2 years												MA–26
	Brake lining	Check • Wear • Damage					○		○		○		○		○	MA–32
	Brake booster vacuum hose	Check		Every 4 years												MA–34
	Master & wheel cylinder	Check • Leakage		Every 2 years												MA–35
Chassis & body	Wheel hub nut, other bolts & nuts	Check • Tightness					○		○		○		○		○	MA–40

JMA00003-00000

SCHEDULE FOR SEVERE DRIVING

○···Check or inspect. ●···Change or replace.

Section	Item	What to do	Inspection interval	×1000 km	1	10	20	30	40	50	60	70	80	90	100	See page
				×1000 miles	0.6	6	12	18	24	30	36	42	48	54	60	
				Years	—	0.5	1	1.5	2	2.5	3	3.5	4	4.5	5	
Engine	Engine oil & oil filter	Change		Every 5,000 km												MA–13
	Air cleaner element	Check & cleaning • Damage Change		Check and cleaning: Every 5,000 km Replacement: Every 20,000 km												MA–6
Exhaust emission control system	Exhaust pipe and mounting	Check • Tightness • Damage				○	○	○	○	○	○	○	○	○	○	MA–37
Power train system	Manual transmission	Change • Fluid		Every 25,000 km												MA–39
	Automatic transmission	Change • Fluid		Every 50,000 km												MA–37
	Transfer	Change • Fluid		Every 25,000 km												MA–39
	Differential (Front & Rear)	Change • Fluid		Every 25,000 km												MA–39
Steering system	Steering linkage	Check • Tightness • Damage				○	○	○	○	○	○	○	○	○	○	MA–41
Brake system	Disc & disc pad	Check • Wear • Damage				○	○	○	○	○	○	○	○	○	○	MA–29
	Brake drum & lining	Check • Wear • Damage				○	○	○	○	○	○	○	○	○	○	MA–32

JMA00004-00000

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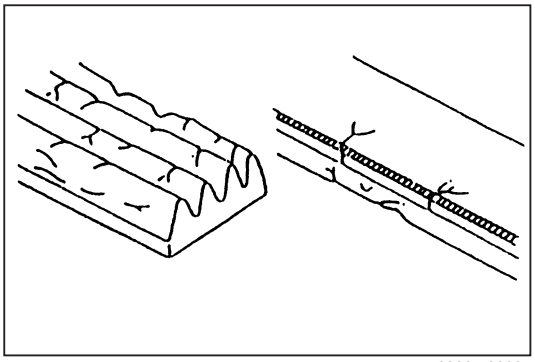
MAINTENANCE OPERATION

ENGINE

COLD ENGINE OPERATION

1. Inspection of drive belt

(1) Visual inspection of drive belt
Visually check the belt for separation of the adhesive rubber above and below the core, core separation from the belt side, severed core, separation of the rib from the adhesive rubber, cracks or separation of the ribs, torn or worn ribs or cracks in the inner ridges of the ribs. Replace the drive belt, if necessary.

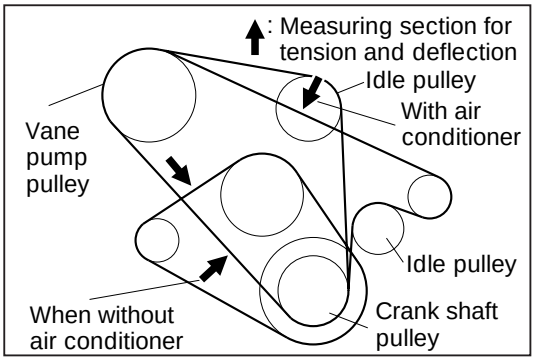


JMA00005-00001

(2) Inspection of drive belt tension
Measure the amount of the drive belt deflection when the midpoint of the drive belt between the alternator and the water pump pulley or between the crankshaft pulley and vane pump pulley is pushed with a force of 98 N (10 kgf).
Specified Belt Deflection

New Belt:	Alternator and water pump	4 - 5 mm
	Vane pump(Power steering)	8 - 11 mm
Used Belt:	Alternator and water pump	5 - 6 mm
	Vane pump(Power steering)	11 - 14 mm

If necessary, adjust the drive belt tension.
(Refer to the EM or SR section.)



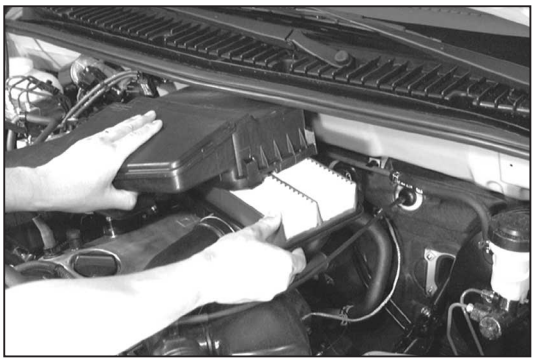
JMA00006-00002

2. Inspection of air filter element

(1) Removal of air filter element
① Unlock the four clips.
② Gradually open the air filter case cover.

CAUTION:
- Do not open the air filter case cover beyond what is necessary to remove the air filter element. Failure to observe this caution may lead to disconnection of the rubber hoses.

③ Take out the air filter element from the air filter case.



JMA00007-00003

(2) Replacement of air filter element
Replace the air filter element with a new one when the replacement time arrives.

(3) Inspection of air filter element
Visually inspect the air filter element for being excessively dirty, damage or oily.
Replace the air filter element, if necessary.

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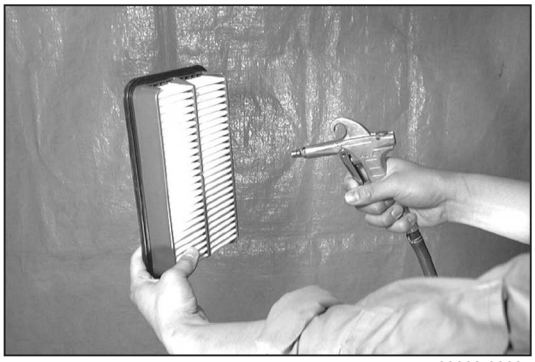
(4) Cleaning of air filter element
Clean the air filter element with compressed air.
First, blow compressed air from the back side of the element thoroughly. Then, blow off the upper side of the element.


JMA00008-00004

WARNING:
- Protect your eyes with safety goggles during the cleaning operation.

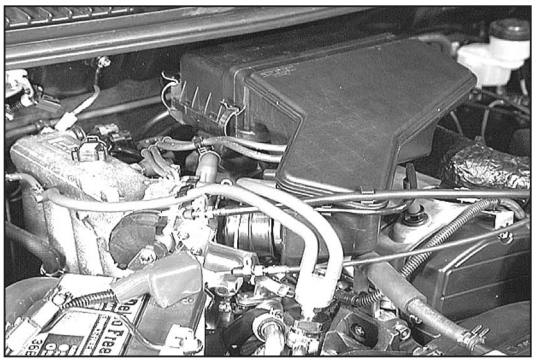
CAUTION:
- The air pressure to be used for this cleaning operation should not exceed 392.3 kPa (4.0 kgf/cm^2).

Replace the air filter element, if the element is excessively dirty.

(5) Installation of air filter element
① Install the air filter element in the air filter case cover.

NOTE:
- Ensure that the air filter element faces in such a direction that the wider protrusion side comes to the air filter case cover side.

② Close the air filter case cover.
③ Latch the four clips properly.

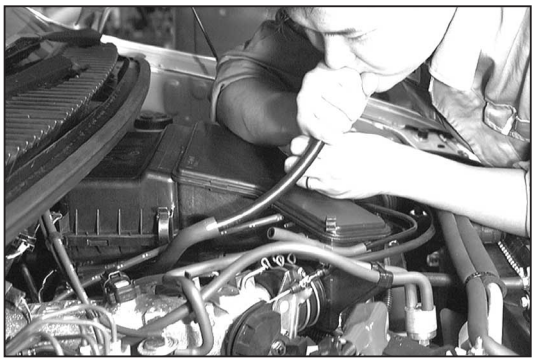

JMA00009-00005

3. Inspection of blow-by gas recirculation device

(1) Visually inspect the hoses for improper connections, cracks, leak and damage.

NOTE:
- Replace parts which exhibit damage as necessary.

(2) Remove the oil filler cap.
(3) Disconnect the blow-by gas hose from the throttle body.
(4) Ensure that no resistance exists when you blow your breath to the disconnected hose end (which was connected to the throttle body).
If resistance is felt or no air continuity exists, check blow-by gas hose and the cylinder head cover.


JMA00010-00006

(5) Connect the blow-by gas hose to the throttle body.
(6) Install the oil filler cap securely.
(7) Disconnect the PCV hose which is connected to the throttle body at the throttle body side.
(8) Ensure that heavy resistance exists when you blow your breath from the disconnected hose end.
If no continuity exists or no resistance for air continuity exists, replace or repair the cylinder head cover.
(Refer to the EM section for the cylinder head cover replacement.)

JMA00011-00007

NOTE:
- The orifice is built in the cylinder head cover. This procedure is required for ensuring the orifice function in the cylinder head. If this orifice is plugged, correct engine idle speed will not be obtained.

(9) Connect the PCV hose to the throttle body properly.

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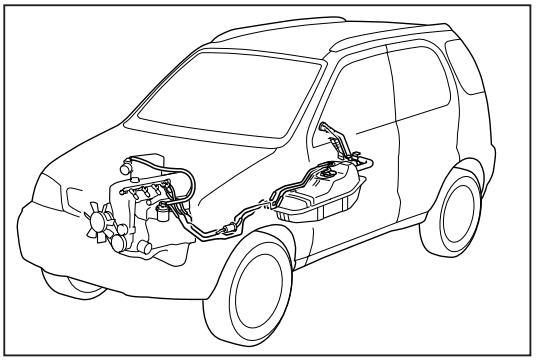
4. Inspection of fuel line and connection

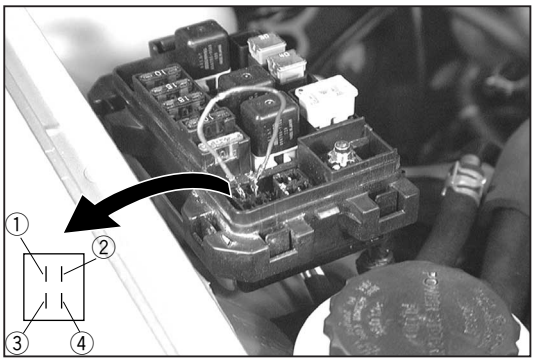


JMA00012-00008

(1) Visually inspect the fuel line including the fuel hose for connecting condition, cracks, tightness, leakage and damage.
If cracks or any other damage exists, repair or replace the part as required.
(2) Check the connecting section of the fuel line for looseness and leakage.
If looseness or leakage exists on the connected sections of the fuel line, repair or replace the parts as required.
(3) Ensure that the ignition switch is turned OFF.
(4) Open the relay box cover in the engine compartment.
(5) Remove the fuel pump relay from the relay box.

CAUTION:

- Prevent dust or water, etc. from entering the connector.
Entering of dust, water or contamination of the terminals in the fuel pump relay connector may cause fuel pump malfunction or other serious malfunctions, due to lowered insulation of each terminal.



JMA00013-00009

(6) Connect the No. 1 and No. 2 terminals of the fuel pump relay in the relay box with suitable wires or the like as shown.

CAUTION:

- Never deform or damage the terminals during the connection.
- Never make connection on a terminal except for those specified.
Even slight contact of the other terminal causes serious trouble.
- Prevent dust or water, etc. from entering the relay box.
Entering of dust, water or contamination of the terminals in the relay box causes serious malfunction, due to lowered insulation of each terminal.

(7) Turn ON the ignition switch.
(8) Ensure that no fuel leakage exists on the fuel line.
If fuel leakage exists, repair or replace the part as required.
(9) Turn OFF the ignition switch.

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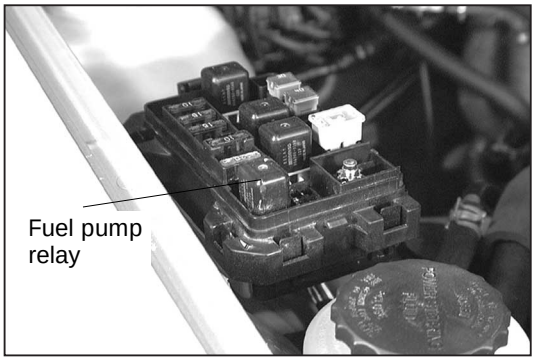
(10) Remove the wire from the fuel pump relay terminal in the relay box.

CAUTION:

- Never deform or damage the terminals during operation.
- Never make connection between terminals except for those specified.
  Even slight contact of the other terminal causes serious trouble.
- Prevent dust or water, etc. from entering the relay box.
  Entering of dust, water or contamination of the terminals in the relay box causes serious malfunction, due to lowered insulation of each terminal.



JMA00014-00010

(11) Install the fuel pump relay into the relay box.
(12) Close the relay box cover.

5. Replacement of fuel filter

WARNING:

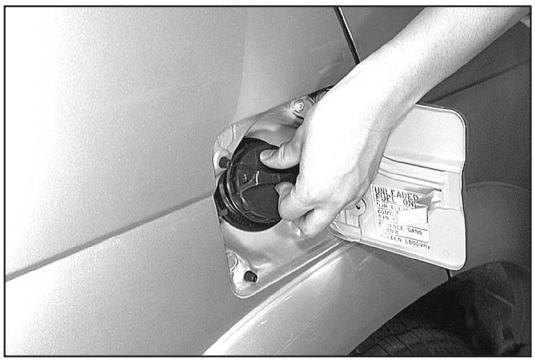
- Never smoke or work near open flame.
  Failure to observe this warning will cause fire.

Removal

(1) Ensure that the ignition switch is turned OFF.
(2) Open the fuel filler cap to release the inner pressure of the fuel tank.
(3) Remove the fuel pump relay from the relay box in the engine compartment. (See illustration above.)

CAUTION:

- Never make connection on a terminal except for those specified.
  Even slight contact of the other terminal causes serious trouble.
- Prevent dust or water, etc. from entering the relay box.
  Entering of dust, water or contamination of the terminals in the relay box causes serious malfunction, due to lowered insulation of each terminal.


JMA00015-00011

JMA00016-00000

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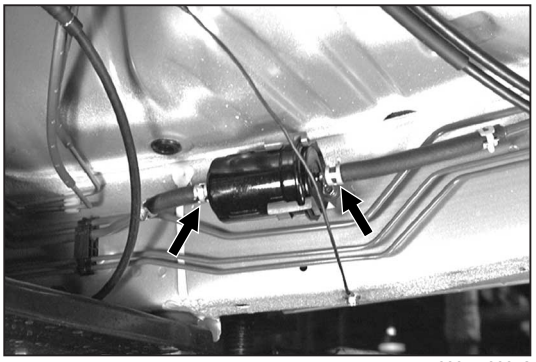
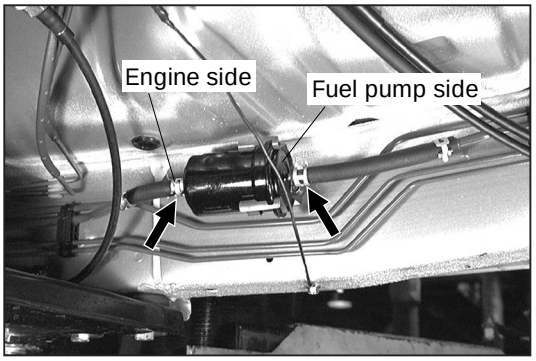
(4) Start the engine and wait for a little while until the engine stops.
(5) Turn off the ignition switch.
(6) Jack-up the vehicle and support it with safety stands. (Refer to the GI section.)
(7) Detach the fuel hose clips.
WARNING:
- Never reuse the used hose clips. Failure to observe this warning may lead to fire.


JMA00017-00012

(8) Disconnect the fuel hoses from the fuel filter and plug the disconnected hoses and fuel pipes of the fuel filter with a suitable plug or the like.
CAUTION:
- Quite a large amount of fuel will flow out during fuel hose disconnection. Therefore, be sure to plug the disconnected hose and pipes properly.

(9) Remove the fuel filter from the fuel filter clamp.

Installation
(1) Install the fuel filter to the fuel filter clamp as shown.
CAUTION:
- Be sure to install the fuel filter in such direction that the “IN” mark of fuel filter faces to fuel pump side and “OUT” mark faces to fuel pump side.
- Failure to observe this caution may lead to fuel filter malfunction.



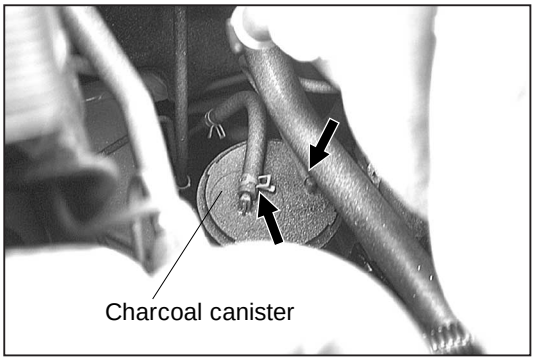
JMA00018-00013

(2) Insert new hose clips to the fuel hoses.
(3) Connect the fuel hoses to the fuel filter until the fuel hose end comes in contact with the fuel filter body .
(4) Place the new fuel hose clips at each point between the pipe end and the spool. Then remove the clip holder to secure the fuel hoses.
CAUTION :
- Never reuse the used hose clips.

(5) Install the fuel filler cap.
(6) Checking of fuel leakage
Perform the inspection described in the “Inspection of fuel line and connection”.

6. Inspection of charcoal canister
(1) Removal of charcoal canister
① Detach the hose bands from the hoses connected to the charcoal canister.
CAUTION:
- Never reuse the removed hose bands.

② Disconnect the rubber hoses from the upper side of the charcoal canister.
NOTE:
- Prior to the disconnection of the rubber hoses, put a tag on each of the rubber hoses so that they may be reconnected correctly to the original position.



JMA00019-00014

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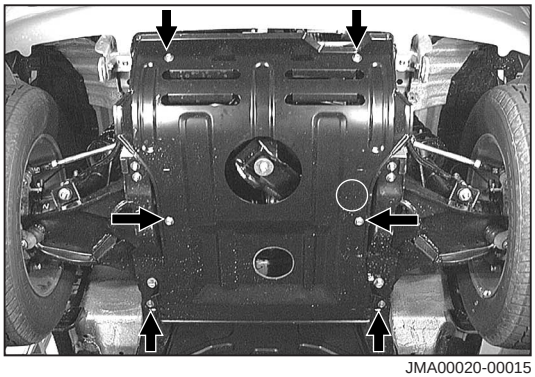
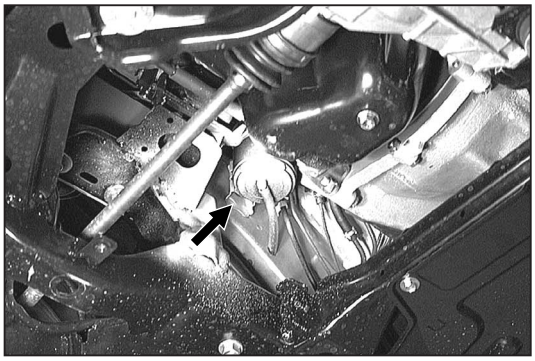
③ Remove the engine undercover by removing the six attaching bolts.



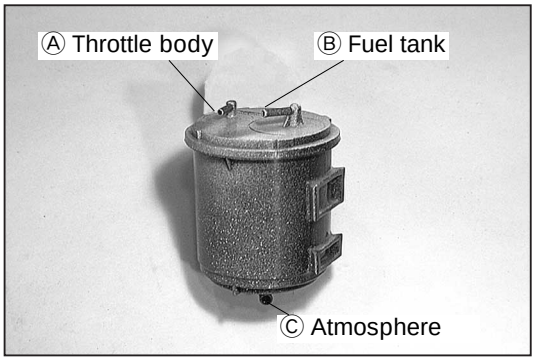
JMA00020-00015

④ Disconnect the atmosphere side hose from the frame.
⑤ Remove the charcoal canister from the vehicle by pulling up the charcoal canister case to unlock it from the bracket.
⑥ Remove the atmosphere side hose from the charcoal canister.



JMA00021-00016

(2) Inspection of charcoal canister
① Visually inspect the charcoal canister case for cracks or damage. If any damage is found, replace the charcoal canister with a new one.
② Check the charcoal canister for air leakage. Ensure that no air leakage exceeding 0.3 ml/min is present when applying compressed air of 29.4 kPa (0.3 kgf/cm^2) into the fuel tank side pipe Ⓑ with the throttle body side Ⓐ and atmosphere side Ⓒ pipes plugged.
If air leakage exceeding the above-specified value is present, replace the charcoal canister with a new one.
③ Ensure that no air continuity exists when you blow into the purge side A pipe of the charcoal canister.
If air continuity exists, replace the charcoal canister with a new one.
④ Check of charcoal canister for restriction
a. Ensure that air continuity exists to the atmosphere side Ⓒ pipe, when you blow into the fuel tank side pipe Ⓑ while the purge side Ⓐ pipe is plugged.
If no air continuity exists, replace the charcoal canister with a new one.
b. Ensure that air continuity exists when applying a negative pressure to the purge side pipe Ⓐ by a MityVac.
If no air continuity exists, replace the charcoal canister with a new one.



JMA00022-00017

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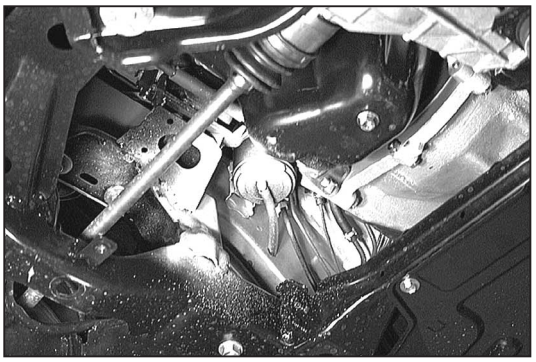
⑤ Cleaning of charcoal canister
Clean the charcoal canister by blowing compressed air of 294.2kPa (3.0 kg/cm^2) into the fuel tank side pipe Ⓑ while holding the purge side of the canister pipes Ⓐ closed.

CAUTION:
- Never attempt to wash the charcoal canister.
  No activated carbon should come out during the test.
  If activated carbon comes out, replace the charcoal canister.

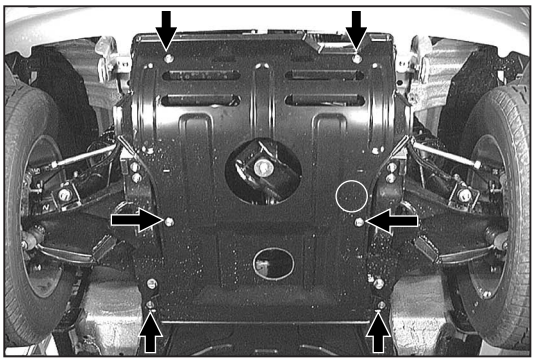
JMA00023-00000

(3) Installation of charcoal canister
The installation procedure is basically reverse to the removed procedure. Therefore, no illustration is given in this installation procedure.
① Install the charcoal canister to the charcoal canister holder and lock it securely.
② Connect the atmosphere side hose to the charcoal canister.



JMA00024-00018

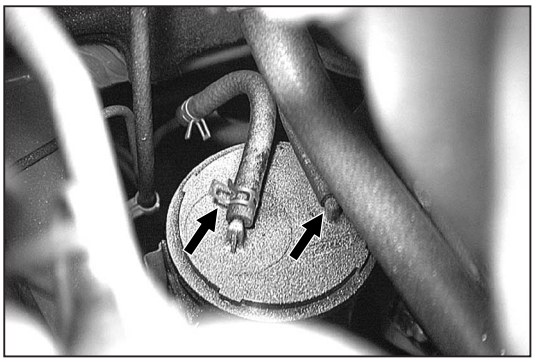
③ Install the engine undercover with the six attaching bolts and tighten them securely.



JMA00025-00019

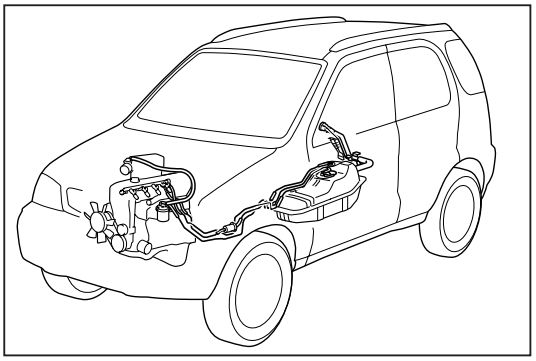
④ Connect the rubber hoses and attach new hose bands.

CAUTION:
- Never reuse the removed hose band.



JMA00026-00020

7. Replacement of evaporative emission control hose
Replace the fuel evaporative emission control hoses with new ones when the replacement interval arrives.
WARNING :
- Replace the hose bands and clips with new ones. Never reuse the removed hose bands and clips.



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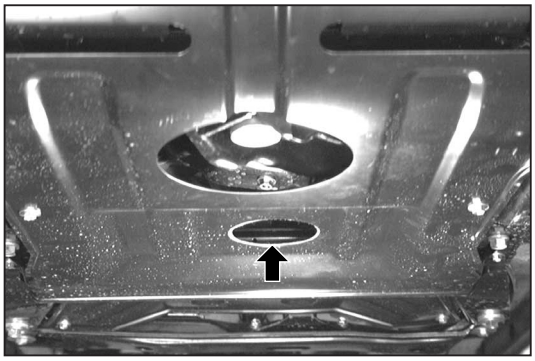
HOT ENGINE OPERATION

1. Change of engine oil and oil filter

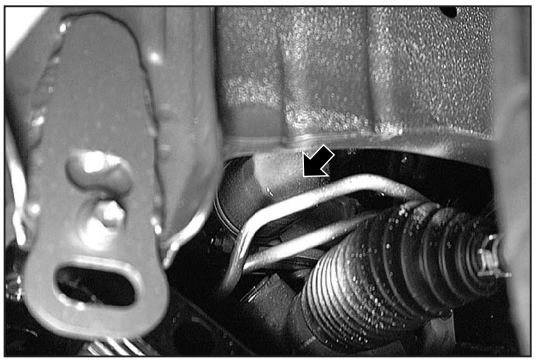

JMA00028-00022

WARNING:
- Protect your eyes by wearing safety goggles.
- Never burn yourself with hot engine oil or hot engine components during operation.

(1) Park the vehicle on a level surface.
(2) Check the oil level.
(3) Start the engine.
(4) Warm-up the engine to normal operating temperature.
(5) Place a suitable container under the oil drain plug.
(6) Remove the drain plug and gasket. Then, drain the engine oil into the placed container completely.
(7) Remove the oil filler cap.
(8) Place a suitable container or such to under the oil filter.
(9) Slacken the oil filter with an oil filter wrench.

CAUTION:
- Care must be exercised, for quite a large amount of engine oil may flow out.

(10) Remove the oil filter by hand.
(11) Wipe off the engine oil from the oil filter attaching part of the engine oil filter bracket.
(12) Thinly apply engine oil to the O-ring of a new oil filter.
(13) Screw in the oil filter by hand, until the O-ring of the oil filter comes in contact with the oil filter installing surface of the oil filter bracket.


JMA00029-00023

(14) Tighten the oil filter three fourths to one complete turn, by hand or using the following SST.
SST: 09228-87201-000

CAUTION:
- Never tighten the oil filter excessively. Failure to observe this caution will cause oil leakage or damage to the oil pump, or the oil filter.

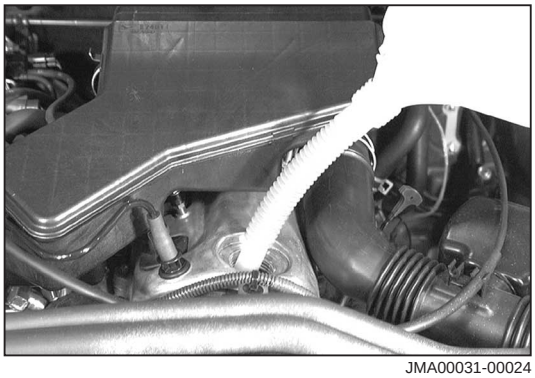
(15) Tighten the drain plug to the specified tightening torque with a new gasket interposed.
Tightening Torque: 19.6 - 29.4 N·m (2.0 - 3.0 kgf-m)

JMA00030-00000

(16) Pour engine oil to the engine.

CAUTION:
- Use API grade SG or higher grade oil.

Oil Capacity
With Oil Filter: 3.6 liters
Without Oil Filter: 3.4 liters


JMA00031-00024

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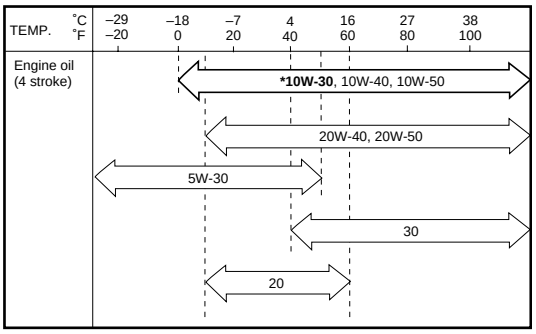
(17) Pull out the oil level gauge and wipe off the engine oil.
(18) Reinsert the oil level gauge as far as it will go.
(19) Pull out the oil level gauge again.
(20) Ensure that the engine oil level is between the “L” and “F” levels on the oil level gauge.
If the engine oil level is below the “L” level, replenish the specified engine oil to the “F” level.
(21) Close the oil filler cap.
WARNING:
- Securely close the oil filler cap to the cylinder head cover. Failure to observe this warning will cause engine seizure and fire.



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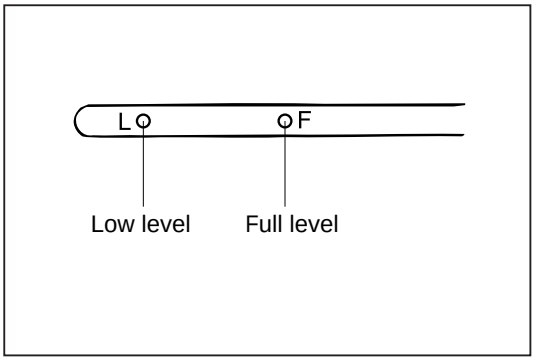
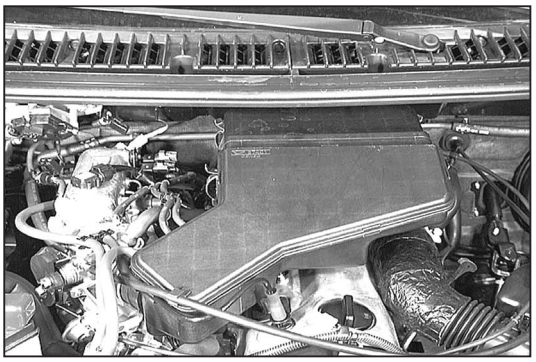


JMA00000-00026

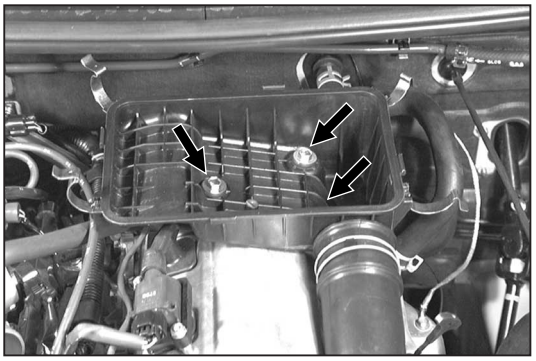
(22) Start the engine.
(23) Warm up the engine to normal operating temperature.
(24) Stop the engine.
(25) After a few minutes, slowly pull out the oil level gauge and wipe off the engine oil.
(26) Reinsert the oil level gauge as far as it will go.
(27) Pull out the oil level gauge again and check to see if the oil level is between “F” and “L” levels.
If the engine oil level is low, replenish the specified engine oil to the “F” level of the oil level gauge.
(28) Reinsert the oil level gauge as far as it will go.

JMA00034-00000

2. Inspection of spark plug
Inspection of electrode
When a megger is available:
(1) Removal of air cleaner
① Disconnect the hoses connected to the air cleaner case cover.
NOTE:
- Prior to the disconnection of the rubber hose, put a tag on each of the rubber hoses so that it may be reconnected correctly to the original position.


JMA00035-00027

② Displace the hose band of the air duct connected to the throttle body.
③ Unlock the four clips of the air cleaner case cover.
④ Remove the air cleaner element.
⑤ Remove the air cleaner case by removing the three attaching bolts.


JMA00036-00028

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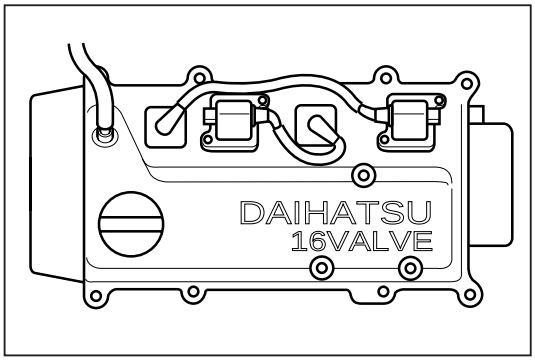
(2) Removal of resistive cords and ignition coils
① Disconnect the resistive cord from the ignition coil.
② Remove the No. 1 and No. 3 resistive cords by disconnecting the connectors from the ignition coils and spark plugs.

CAUTION:
- Never disconnect the resistive cords by holding the cord section of the resistive cords.



JMA00037-00029

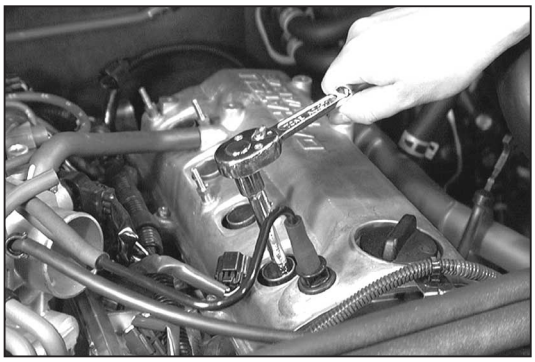
③ Disconnect the connectors from the ignition coils.
④ Remove the ignition coils on the spark plugs of No. 2 and No. 4 cylinders by removing the attaching nuts.

(3) Measurement of insulation resistance
Measure the insulation resistance of each spark plug, using a megger (Insulation resistance meter) and ensure that the measured insulation resistance of each spark plug is more than the specified value.
Minimum Insulation Resistance: 20 MΩ

If the measured insulation resistance is less than 15 MΩ proceed to the step (4) onward.
If the measured insulation resistance is more than the specified value, proceed to the step (4) onward except the step (8).

JMA00038-00030

When a megger is not available:
① Start the engine. Warm up the engine completely.
② Race the engine at 4000 rpm for five seconds.
③ Stop the engine.
④ Remove the air cleaner.(Refer to the removal of the air cleaner.)
⑤ Remove the resistive cords and ignition coils.
(Refer to the check and adjustment of the valve clearance section for the removal of the ignition coil and resistive cord.)
⑥ Remove the spark plug, using a suitable spark plug wrench or the following SST.
SST: 09268-87703-000


JMA00039-00031

WARNING:
- Be very careful not to get scalded with hot spark plugs, since spark plugs are hot.

⑦ Visually inspect the spark plug.
If the electrode is dry: Proceed to the step (6) (Satisfactory)
If the electrode is wet: Proceed to the step (5).

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(4) Removal of spark plug
(Refer to the step (3)–6 above.)

(5) Visual inspection of spark plug
Visually inspect the spark plug for electrode wear, damage in threads or insulation.
Replace the spark plug if it exhibits any damage.
Recommended Spark Plug:

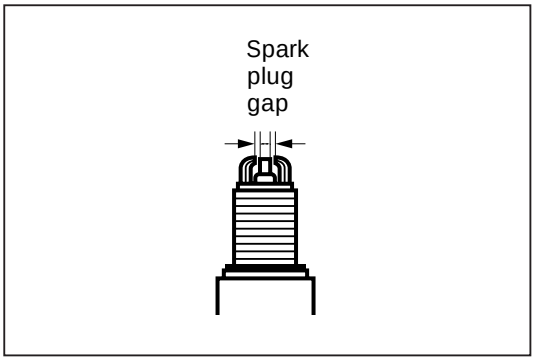
DENSO	NGK
K20TNR-S	BKUR6EK
K22TNR-S	BKUR7EK

CAUTION:
- All four spark plugs used for one engine should have the same heat range and be ones manufactured by the same manufacturer.
- Follow the information label in the engine compartment for selecting the spark plugs. Failure to observe this caution may cause problems.

JMA00040-00000

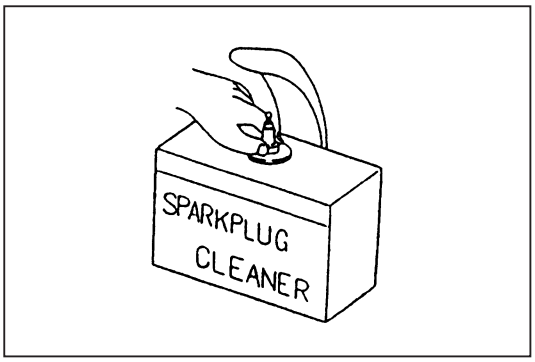
(6) Inspection of electrode gap
Measure the electrode gap, using a plug gap gauge.
Electrode Gap: 0.9 - 1.0 mm

If the electrode gap of a used spark plug is not within the specification, replace the spark plug with a new one.
If the electrode gap of a new spark plug is not within the specification, adjust the gap by bending the base of the ground electrode, being careful not to touch the tip.



JMA00041-00032

(7) Cleaning of spark plug
If the electrode has traces of wet carbon, dry the electrode and clean it with a spark plug cleaner.
Air Pressure: Not to exceed 588.4 kPa (6 kgf/cm^2)
Duration of Cleaning: Not more than 20 seconds.

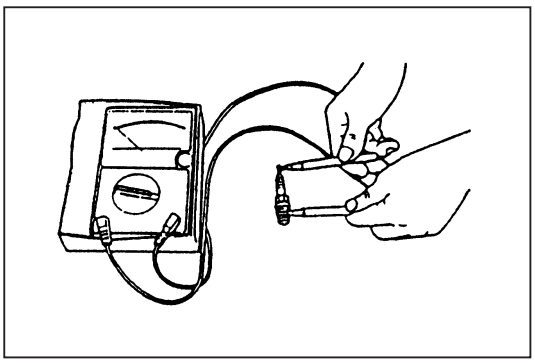


JMA00042-00033

NOTE:
- If there is trace of oil, remove it with gasoline before the spark plug is cleaned by the spark plug cleaner.

(8) Inspection of spark plug insulation resistance
Ensure that the insulation resistance of the spark plug is more than the specified value.
Minimum Insulation Resistance: More than 20 MΩ

If the insulation resistance is less than the specified value, replace the spark plug with a new one.



JMA00043-00034

CAUTION:
- All four spark plugs used for one engine should have the same heat range and be ones manufactured by the same manufacturer.

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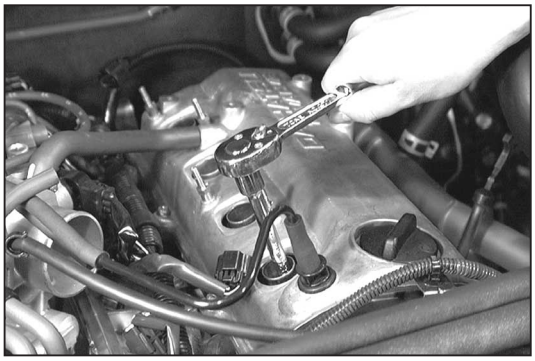
(9) Installation of spark plug
Install the spark plugs. Tighten them to the specified tightening torque, using a suitable spark plug wrench or the following SST.
SST: 09268-87703-000
Tightening Torque: 14.7 - 21.6 N·m (1.5 - 2.2 kgf-m)

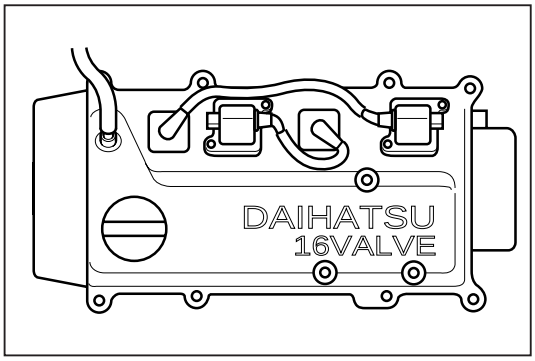

JMA00044-00035

NOTE:
- Since the insulator strength of a small spark plug is comparatively smaller than that of a regular spark plug, when tightening, be sure to use the tool exclusively used for this application. Also, when tightening, never use the wrench in a crooked way.

(10) Installation of ignition coils
Install the ignition coil on the No. 2 and No. 4 spark plugs with the attaching nuts and tighten the nuts to the specified tightening torque.
Tightening Torque: 8.5 N·m (0.85 kgf-m)

CAUTION:
- Never damage the boot section of the ignition coils by interfering with the cylinder head cover.

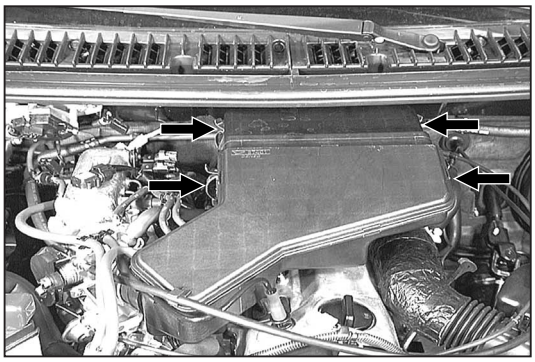
(11) Connect the ignition coil connectors to the ignition coils properly.
(12) Connect the resistive cords to the spark plugs and ignition coils properly as shown in the figure.



JMA00045-00036

NOTE:
- Never interfere the resistive cord with the ignition coils and attaching nuts of the ignition coils.
- Never bend or twist the resistive cord beyond what is necessary.

(13) Clamp the resistive cord to a clamp provided on the ignition coil as shown.
(14) Installation of air cleaner
① Install the air cleaner case to the cylinder head cover and throttle body with the three attaching bolts and tighten the attaching bolts properly.
② Attach the hose band of the air cleaner duct which is connected to the throttle body.
③ Install the air cleaner element on the air cleaner case.
④ Install the air cleaner case cover and secure the four clips.
⑤ Connect the rubber hoses to the air cleaner case cover.


JMA00046-00037

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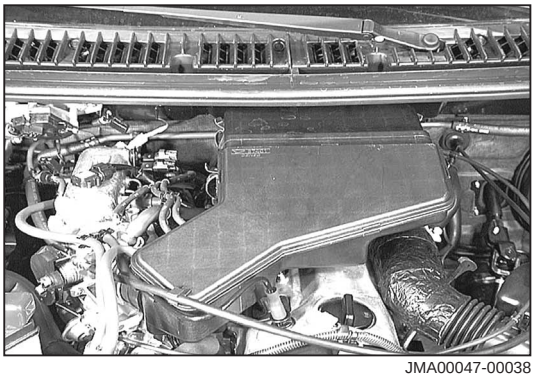
3. Inspection and adjustment of valve clearance

The measurement and adjustment of the valve clearance are carried out when each piston of the No. 1 and No. 4 cylinders is set to the top dead center at the end of compression stroke.

WARNING:

- Never burn yourself with hot engine components,etc. during operation.

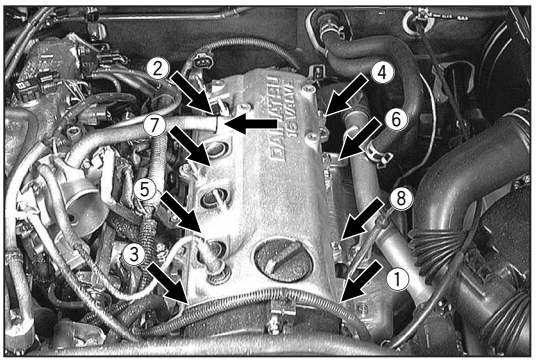


JMA00047-00038

CAUTION:

- The valve clearance adjustment is performed normally when the engine is in a hot condition.
- “HOT engine condition” denotes a condition in which the cooling water temperature is 75 - 85°C and the engine oil temperature is above 65°C.
  However, when the engine has been overhauled, it is necessary to adjust the valve clearances while the engine is cold and to readjust the valve clearance in a hot condition after warming up the engine.

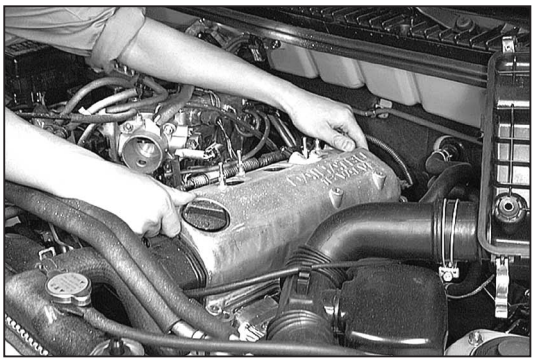
(1) Warm up the engine thoroughly. (Only when necessary.)
(2) Remove the air cleaner.
  (Refer to the Inspection of spark plug section for removal.)
(3) Remove the resistive cords and ignition coils.
  (Refer to the removal of resistive cords and ignition coil in the inspection of the spark plug section.)
(4) Disconnect the PCV hoses(blow-by gas hose) from the cylinder head cover.
(5) Remove the bolt attaching the timing belt cover to the cylinder head cover.
(6) Loosen the eight attaching bolts (6 mm) shown in the figure over two or three stages in the sequence in the right figure.
(7) Remove the cylinder head cover by removing the attaching bolts.



JMA00048-00039

CAUTION:

- Never damage the spark plug grommets of the spark plug tubes and cylinder head cover gasket during the removal of the cylinder head cover.



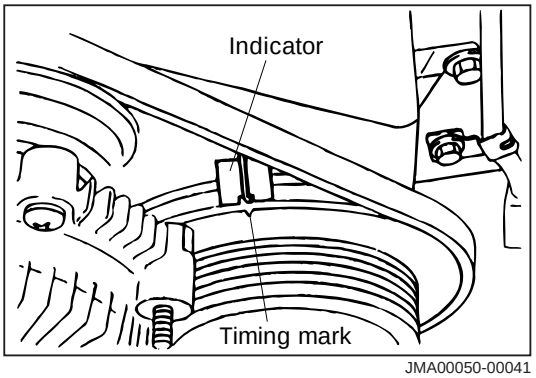
JMA00049-00040

(8) Inspection and adjustment of valve clearances

CAUTION:

- Before the adjusting screw is tightened with lock nuts, apply engine oil to between the lock nut and the valve rocker arm.

  ① Remove the engine undercover by removing the six attaching bolts.
  ② Turn the crankshaft until the recessed mark on the crankshaft pulley is aligned with the indicator mark on the timing belt cover.



JMA00050-00041

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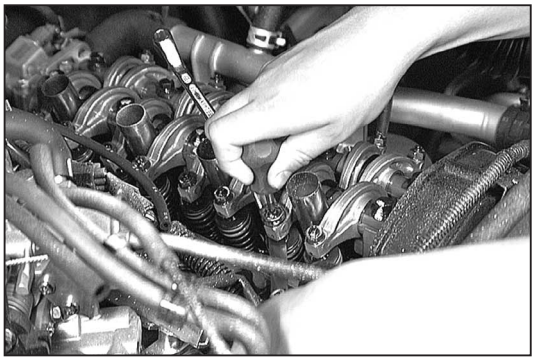
③ Check to see if the valve rocker arms of the No. 1 cylinder are free or are being pushed. According to the table below, check and adjust the valve clearance, using a thickness gauge.



JMA00051-00042

Pistion position		1	2	3	4
When valve rocker arms of No. 1 cylinder are free: (Piston of No. 1 cylinder is at top dead center under compression stroke)	Inkate	○	○		
	Exhaust	○		○	
When valve rocker arms of No. 4 cylinder are free: (Piston of No. 4 cylinder is at top dead center under compression stroke)	Inkate			○	○
	Exhaust		○		○

NOTE:
- The “O” mark denotes those valves that can be adjusted under that setting.

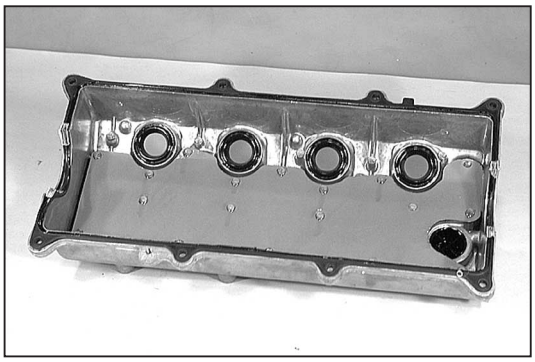
Valve Clearance (HOT)
Intake: 0.25 ± 0.05 mm
Exhaust: 0.33 ± 0.05 mm

(Reference)
Valve Clearance (COLD)
Intake: 0.18 mm
Exhaust: 0.25 mm
Tightening Torque (Lock nut): 16.7 - 22.6 N·m (1.7 - 2.3 kgf-m)

④ Turn the crankshaft 360 degrees (one turn).
⑤ Proceed to check and adjust the remaining valve clearances.

JMA00052-00000

(8) Installation of cylinder head cover
① Wipe off the oil from the gasket attaching surface of the cylinder head.
② Check the cylinder head cover gasket for evidence of damage.
Replace the gasket, as required.



JMA00053-00043

CAUTION:
- Install the cylinder head gasket in such a direction that the identification mark may come at the intake side.

③ Check the rubber grommets of the spark plug tubes for evidence of damage.
Replace the rubber grommet, as required.
(For replacement of the rubber grommet, refer to the EM section of the service manual.)
④ Install the cylinder head cover gasket on the cylinder head.

NOTE:
- Install the cylinder head cover gasket in such a direction that the identification mark may come at the intake side.

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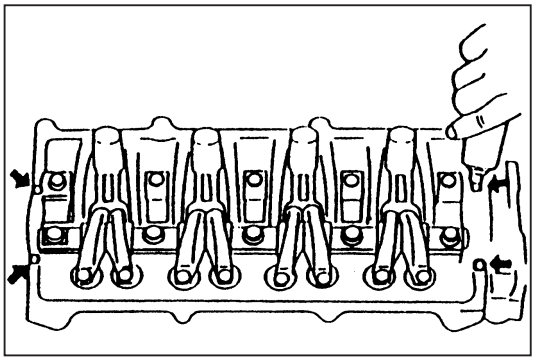
⑤ Apply the Three Bond® 1104 to the four points on the cylinder head, as indicated in the figure.

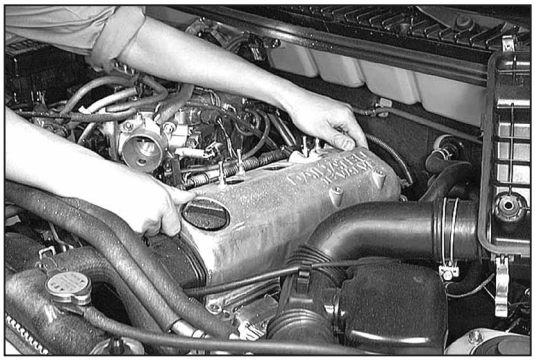


JMA00054-00044

⑥ Install the cylinder head cover on the cylinder head.

NOTE:

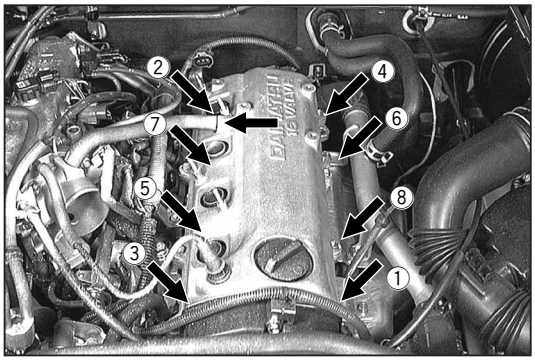
- Never damage the rubber grommets for the spark plug tubes during the installation of the cylinder head cover.
- Make sure that the rubber grommet is fitted over the spark plug tube properly.



JMA00055-00045

⑦ Install the attaching bolts of the cylinder head cover and tighten them to the specified tightening torque over two or three stages in the sequence shown in the right figure.

Tightening Torque: 2.9 - 4.9 N·m (0.3 - 0.5 kgf-m)



JMA00056-00046

⑧ Install the timing belt attaching bolts with wire clamp and tighten them to the specified tightening torque.

Tightening Torque: 2.0 - 3.9 N·m (0.2 - 0.4 kgf-m)

⑨ Connect the PCV hoses(blow-by gas hose) to the cylinder head cover.

⑩ Install the ignition coils and resistive cords to the spark plugs and ignition coils.
(Refer to installation procedure described in the inspection of spark plug section.)

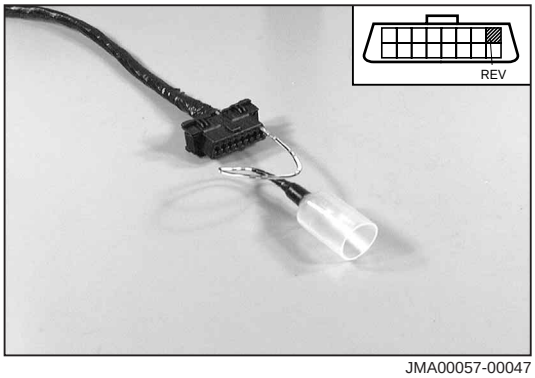
⑪ Install the air cleaner assembly.
(Refer to installation procedure described in the inspection of spark plug section.)

4. Inspection and adjustment of ignition timing

(1) Start the engine.
(2) Warm up the engine.
(3) Stop the engine.
(4) Connection of tachometer

① Connect the following SST to the diagnosis connector.

SST: 09991-87401-000



JMA00057-00047

② Connect the tachometer to the REV (⑧) terminal of the SST, in combination with the following SST.

SST: 09991-87402-000

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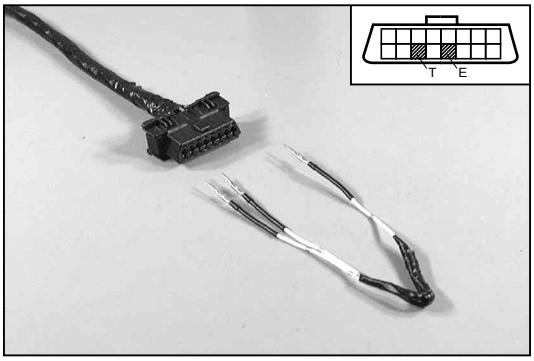
CAUTION:
- Never allow the tachometer terminal to touch ground. It could result in damage of the ignition system.
- As some tachometer are not compatible with this ignition system, it is recommended to confirm the compatibility with your unit before its use.
- Care must be exercised to ensure that no connection is made on terminals except for those specified.
  Even slight contact of the other terminal causes serious malfunction.

JMA00058-00000

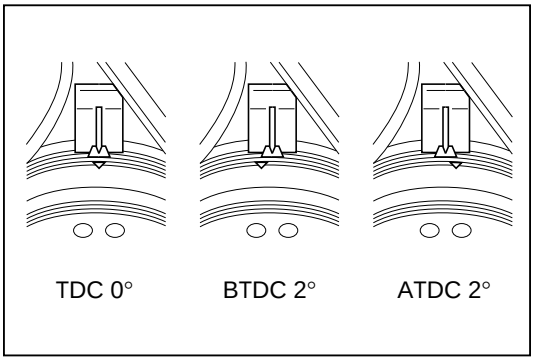
(5) Connect a timing light to the resistive cord of the No. 1 cylinder (at the timing belt side)
(6) Connect the T (⑪) terminal and E (⑬) terminal in the SST which was connected, using the following SST.
  SST: 09991-87403-000



JMA00059-00048

CAUTION:
- Care must be exercised to ensure that no connection is made on terminals other than that specified.
  Even slight contact of the other terminal causes serious malfunction.

(7) Start the engine.
(8) Ensure that the engine revolution speed is stable.
  If the engine revolution speed becomes unstable, proceed to check ISC system.
  (Refer to the EM section.)
(9) Check to see if the ignition timing mark of the crankshaft pulley is aligned with the indicator provided on the timing belt cover, using a timing light.
  If the ignition timing mark on the crankshaft pulley is not aligned with the indicator provided on the timing belt cover, adjust the ignition timing by turning the cam angle sensor attaching position.



JMA00060-00049

(10) Adjustment of ignition timing
  ① Loosen the cam angle sensor attaching bolt.
  ② Adjust the ignition timing to the specified timing by turning the cam angle sensor.
  ③ Tighten the cam angle sensor attaching bolt to the specified tightening torque.
  Tightening Torque : 14.7 - 21.6 N·m (1.5 - 2.2 kgf-m)

  ④ Ensure that the ignition timing is not disturbed by tightening of the attaching bolts of the cam angle sensor.
  Readjust the ignition timing, if the timing is not in the specified position.
(11) Stop the engine.
(12) Remove the tachometer.
(13) Remove the SST from the diagnosis connector.
CAUTION:
- Care must be exercised to ensure that no connection is made on terminals except for those specified.
  Even slight contact of the other terminal causes serious malfunction.

(14) Check the idle speed.
  (See the check of the idle speed procedure in this service manual.)

JMA00061-00000

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5. Inspection of dashpot

(For automatic transmission-equipped model only)

Preparation to be made prior to idle speed adjustment

- Check and adjust the ignition timing.
- Check and adjust the idle speed.
- Apply the parking brake fully.
- Warm up the engine thoroughly.
- All accessory switches are turned OFF.
  (On those vehicles equipped with a day-light system, set the light control switch to the first stage, in order to turn OFF the head lights.)
- The air element is installed.
- All vacuum hoses are connected properly.
- Ensure that the intake system exhibits no gas leakage or air admission.
- Ensure that there is no gas leakage.
- Place the shift lever in the “N” or “P” range.
- Place the steering wheel to the straight ahead position and do not operate it during the inspection.

JMA00062-00000

(1) Connection of tachometer
(Refer to the “Inspection and adjustment of ignition timing” section for the connection of tachometer.)

CAUTION :

- Never allow the tachometer terminal to touch ground. It could result in damage of the ignition system.
- As some tachometers are not compatible with this ignition system, it is recommended to confirm the compatibility with your unit before its use.

(2) Start and warm up the engine.

(3) Ensure that the adjusting screw of the dashpot is not in contact with the dashpot shaft when the engine revolution is held at about 2400 ± 100 rpm.
If the adjusting screw of the dashpot is in contact with the dashpot shaft, adjust the height of the adjusting screw.

(4) Ensure that the duration of time from dash pot adjusting screw contacts to the dash pot shaft to engine revolution returns to idle speed is within specified value when the throttle lever released slowly from the engine revolution at 3500 rpm.
Specified Duration: 0.5 - 5.0 seconds.

If the measured duration of time fails to meet with the specified value, replace the dashpot with a new one.
(Refer to the EC section.)

JMA00063-00000

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6. Change of engine coolant

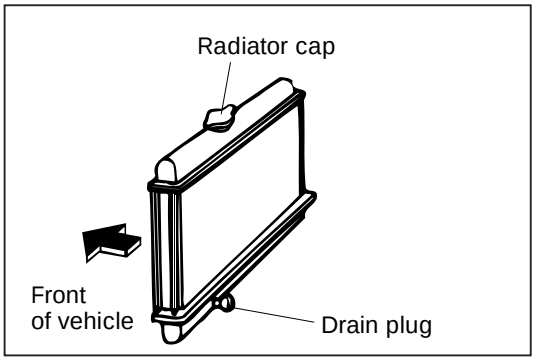
JMA00064-00050

WARNING:
- Never open the radiator cap when the engine is still hot.

CAUTION:
- As regards water to be used as cooling water, use soft water which does not contain salts of minerals, calcium, magnesium, and so forth.
- If the coolant gets to the vehicle body, immediately flush away the coolant, using fresh water.

(1) Ensure that the coolant temperature is nearly the ambient temperature.
(2) Turn the radiator cap one step in an opening direction (counterclockwise direction) until you feel the first clicking.
(3) Lightly press the radiator cap two or three times to release the inner pressure of the radiator.
(4) Close the radiator cap.
(5) Place an adequate container under the drain plug.
(6) Drain the coolant by loosening the drain plug.
(7) Remove the radiator cap.
(8) Drain the coolant in the reserve tank.
(9) Close the drain plug, after draining the coolant.
(10) Fill the water to the radiator and reserve tank.
(11) Start the engine.

NOTE:
- If the water level in the radiator drops, replenish the water.



JMA00065-00051

(12) Close the radiator cap.
(13) Warm up the engine.
(14) Stop the engine.
(15) Cool down the water temperature to the ambient temperature.
(16) Repeat the steps (1) through (15) two or three times.
(17) Ensure that the coolant temperature is nearly the ambient temperature.
(18) Turn the radiator cap one step in an opening direction (counterclockwise direction) until you feel the first resistance.
(19) Lightly press the radiator cap two or three times to release the inner pressure of the radiator.
(20) Close the radiator cap.
(21) Place an adequate container under the drain plug.
(22) Drain the water by loosening the drain plug.
(23) Remove the radiator cap.
(24) Drain the water in the reserve tank.
(25) Replace the O-ring of the radiator drain plug with a new one, after draining the water.
(26) Install the radiator drain plug to the radiator securely.

JMA00066-00052

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(27) Slowly pour a proper amount of antifreeze solution into the radiator in accordance with the instruction of the manufacturer of antifreeze solution.

CAUTION:

- Use a good brand of ethylene-glycol base antifreeze solution.

Coolant Capacity:

Automatic Transmission: 5.3 liters
Manual Transmission: 5.4 liters

NOTE:

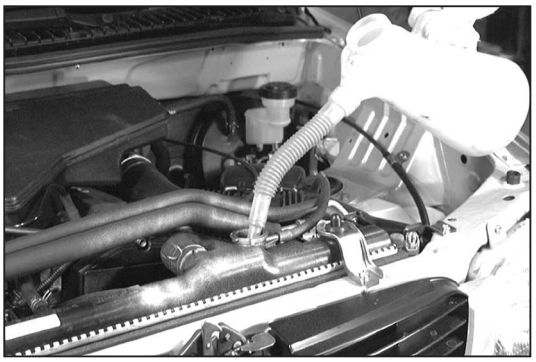
- The amount above includes 0.6 liter for the reserve tank.

JMA00067-00000

(28) Fill the water to the radiator and reserve tank.
(29) Start the engine.

NOTE:

- If the water level in the radiator drops, replenish the water to the full level.



JMA00068-00053

(30) Close the radiator cap.
(31) Ensure that no water leakage is present.
If water leakage is present, repair the water leakage.
(32) Warm up the engine thoroughly.
(33) Stop the engine.
(34) Cool down the coolant temperature to the ambient temperature.
(35) Ensure that the coolant level in the reserve tank will not decrease.
If the coolant level in the reserve tank decreases excessively or no coolant remains in the reserve tank, check the coolant level in the radiator to see whether the coolant in the radiator is full or not. If not, replenish the water to the radiator, and repeat the steps (30) through (35) again.
(36) Turn the radiator cap one step in an opening direction (counterclockwise) until you feel the first resistance.
(37) Lightly press the radiator cap two or three times to release the inner pressure of the radiator.

JMA00069-00000

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(38) Remove the radiator cap.
(39) Ensure that the concentration of antifreeze solution in the radiator meets the instruction of the manufacturer of antifreeze solution by a densitometer.
Adjust the concentration of the antifreeze solution in the radiator according to the instruction of the manufacturer of the antifreeze solution, if the concentration does not meet the instruction of the manufacturer of the antifreeze solution.

JMA00070-00054

(40) Secure the radiator cap.
(41) Drain the water in the reserve tank.
(42) Pour the coolant which is mixed with antifreeze solution and water in accordance with the instruction of the manufacturer of the antifreeze solution.
(43) Secure the reserve tank cap.

JMA00071-00055

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CHASSIS

BRAKE FLUID

CHANGE

WARNING:

- Do not mix the different kind and manufacture of brake fluid.
  Recommended brake fluid:
  FMVSS116 DOT3 or SAE J1703

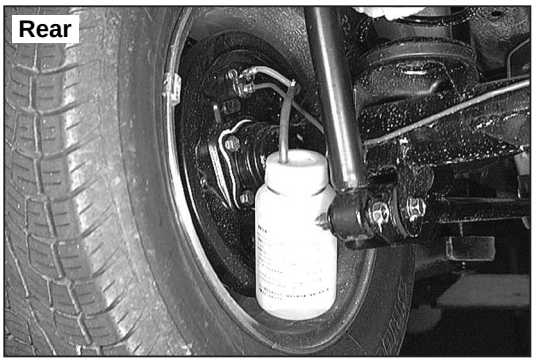
CAUTION:

- If the brake fluid is spilled inadvertently over the paint finish surface of the vehicle or the resin made part, immediately wipe off the brake fluid and flush with fresh water.
- Be sure to follow the draining order of each wheel cylinder. The draining should be performed from the farthermost wheel cylinder from the brake master cylinder, one by one.

JMA00072-00000

1. Remove the brake bleeder plug cap.
2. Connect the suitable bleeder hose to the bleeder plug.
3. Prepare a suitable container and connect one end of the bleeder hose in the container.
4. Depress the brake pedal and have a person hold it in a depressed state.
5. Slacken the bleeder plug to drain the brake fluid by another person and tighten the bleeder plug temporarily.
6. Repeat the steps 4 to 5 until the brake fluid in the reservoir tank becomes zero.
   However, at this state be very careful not to suck the air into the brake line, except cases where draining of the brake fluid is required.

JMA00073-00056



JMA00074-00057

7. Replenish the new brake fluid into the reservoir tank and maintain the brake fluid level in the reservoir tank at the MAX level during the following operation.
8. Drain the old brake fluid or air from each brake line starting from the farthest wheel cylinder from the master cylinder one by one following the manner mentioned in the steps 4 to 5 repeatedly.
9. Tighten the air bleeder plugs to the specified tightening torque.
   Tightening Torque: 6.9 - 9.8 N·m (0.7 - 1.0 kgf-m)
10. Ensure that no air exists in the brake line by depressing the brake pedal firmly.
    If air is remaining in the brake line, perform the air bleeding by following the procedure described in the steps 4 to 5 repeatedly, until air will be discharged. Then, tighten the bleeder plug to the specified tightening torque.
11. Install the brake bleeder plug cap.

JMA00075-00058

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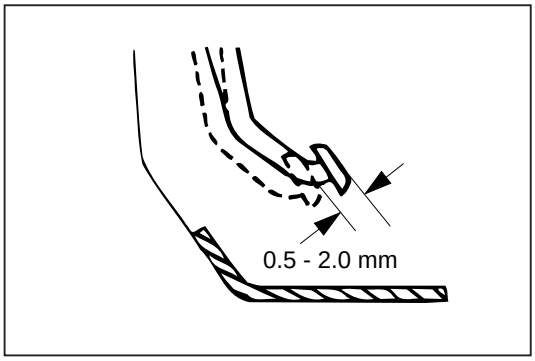
BRAKE PEDAL

FREE PLAY

1. Ensure that the ignition switch is turned OFF.
2. Depress the brake pedal more than five times to release the vacuum saved in the brake booster.
3. Ensure that the specified free play exists on the brake pedal by pushing the brake pedal lightly by hand.
   Free Play: 0.5 - 2.0 mm

   If the free play is not within the specified value, adjust the free play by adjusting the push rod length.
   (Refer to the BR section.)

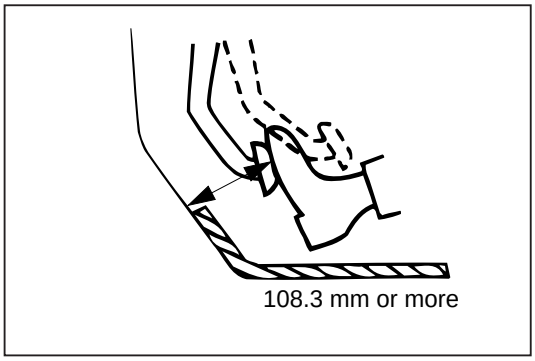


JMA00076-00059

RESERVE TRAVEL

1. Place chocks at the wheels.
2. Place the transmission in the neutral position.
3. Start the engine.
4. Depress the brake pedal with an applying force of 300 N (30 kgf).
   CAUTION:
   - At this stage the hand brake should not be applied.
5. Measure the distance between the position where the brake pedal pad upper surface is depressed and the floor panel as shown.
6. Ensure that the reserve travel meets with the specification.
   Reserve Travel: 108.3 mm or more

   If the reserve travel fails to meet with the specification, check/ adjust or repair the brake shoe clearance as necessary.
   (Refer to the BR section.)



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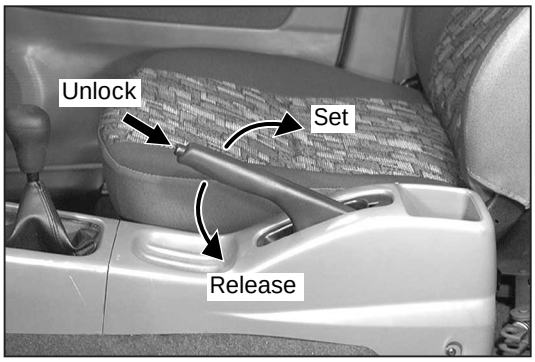
JMA00078-00000

PARKING BRAKE HANDLE

WORKING TRAVEL

1. Chock the wheels.
2. Ensure that the number of notches is within the specified value when the parking brake handle is pulled with a force of 196 N (20 kgf) by hand.
   Specified Number of Notches: 5 to 7

   If the working travel fails to meet with the specification, adjust the parking brake handle working travel to the specified value.
   (Refer to the BR section in this service manual.)
3. Ensure that the parking brake handle rachet operates properly and retains the handle at each notch position properly and will not be skipped or jumped.
   If any trouble exists, replace the parking brake handle with a new one.
   (Refer to the BR section.)



JMA00079-00061

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INSPECTION OF EFFECTIVENESS

Check to see if the vehicle can be retained in a stationary state on a dry slope with a grade of 1/5 when the parking brake is applied fully.
If not, check and repair the rear brake system.

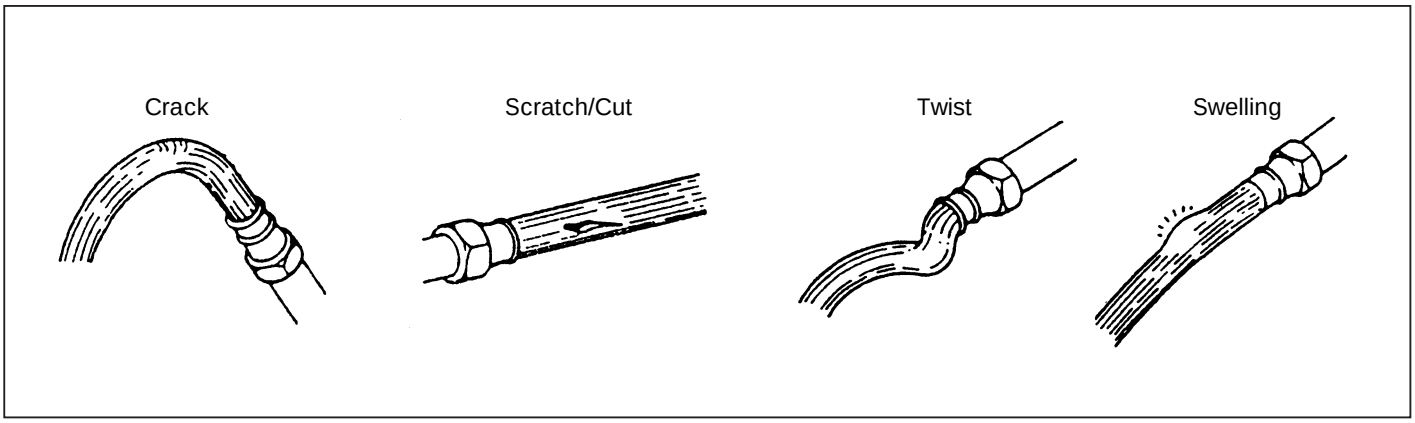
JMA00080-00000

BRAKE HOSE & TUBE

LEAKAGE, LOOSE CLAMP AND DAMAGE

Inspect the following points. If any problem is found, repair them, as required.

1. Hoses and tubes for scratches or cracks.
2. Hoses for aging such as deformation or swelling.
3. Tubes for corrosion or rusting.
4. Tube clamps and related parts for tightness, rattle or damage.
5. Connection for fluid leakage.
6. Hoses for extreme bending, twisting or pulling.



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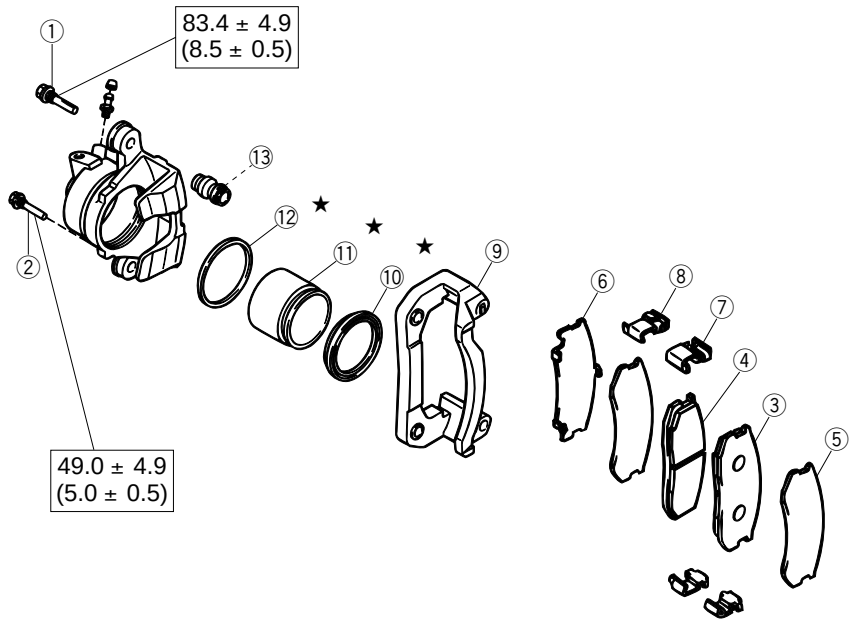
FRONT BRAKE

COMPONENTS



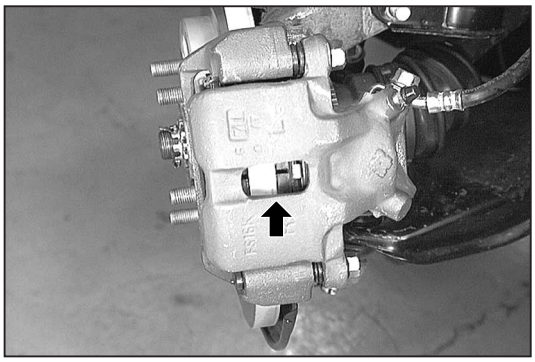
① Cylinder slide main pin
② Cylinder slide sub-pin
③ Disc brake No. 1 pad
④ Disc brake No. 2 pad
⑤ Anti-squeal shim
⑥ Shim
⑦ Disc brake pad guide No. 2 plate
⑧ Disc brake pad guide plate
⑨ Disc brake cylinder mounting (R, L)
⑩ Cylinder boot
⑪ Front disc brake piston
⑫ Piston seal
⑬ Pin boot

JMA00082-00063

INSPECTION OF BRAKE PAD THICKNESS

1. Jack up the vehicle and support the vehicle with safety stands.
   (Refer to the GI section.)
2. Remove the front wheel.
3. Check the brake pad thickness through the inspection hole provided on the caliper as shown.
   Brake Pad Thickness:
   Standard Thickness: 10 mm
   Minimum Thickness: 1 mm

   If the brake pad thickness is less than the specified value or the wear indicator emits a warning sound, replace the brake pad with a new one.
   (Refer to the BR section.)
   CAUTION:
   - Be sure to replace the right and left side brake pads as a set. Failure to observe this caution may lead to side pull of the brake function.



JMA00083-00064

4. Install the front wheel.
   (Refer to FS section.)

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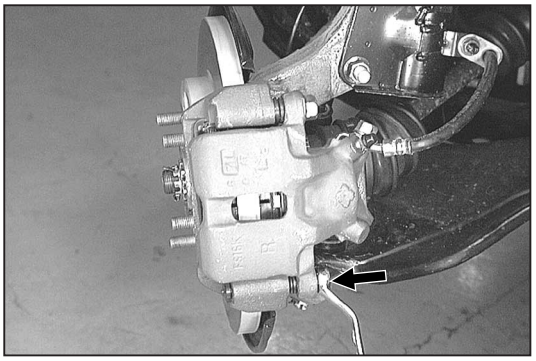
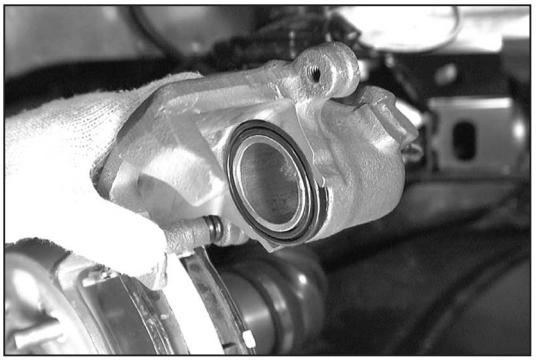
INSPECTION OF FRONT BRAKE RUBBER PARTS AND BRAKE PAD FOR DAMAGE

1. Jack up the vehicle and support the vehicle with safety stands.
2. Remove the front wheel.
3. Remove the sub-cylinder slide pins.



JMA00084-00065

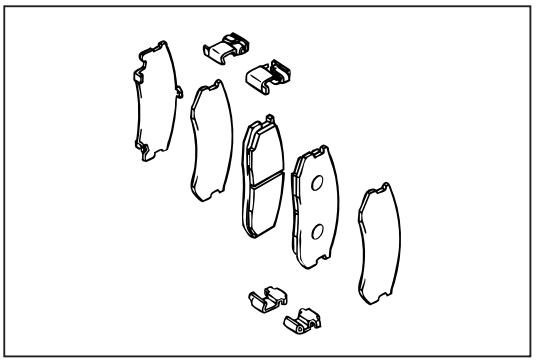
4. Turn up the disc brake assembly as shown.
   CAUTION :
   - Never pull the brake hoses not more than necessary.



JMA00085-00066

5. Ensure that no damage exists on the cylinder boot.
   If any damage exists, replace the cylinder boots and piston seal with new ones as a set.
   (Refer to the BR section.)
6. Ensure that no leakage of brake fluid exists from the disc brake cylinder, piston and around the cylinder boot.
   If any leakage exists, replace the piston seal and cylinder boot with new ones.
   (Refer to the BR section.)

7. Inspect the disc pads and disc brake pad-related parts for damage.
   If any damage is found, replace the damaged part, as required.
   (Refer to the BR section for details.)
8. Ensure that no damage exists on the disc brake pad guide plates, disc brake pad guide No. 2 plates, disc pads, shims and anti-squeal shims.
   If any damage exists, replace the damaged parts with new ones.
9. Install the disc brake pad guide plates, disc brake pad guide No. 2 plates, disc pads, shims and anti-squeal shims as shown.
   CAUTION :
   - Prior to installation, apply brake grease to the sliding surface of the component parts.



JMA00086-00067

10. Ensure that no damage exists on the pin boots.
    If any damage is present, replace the pin boots with new ones.
    (Refer to the BR section.)

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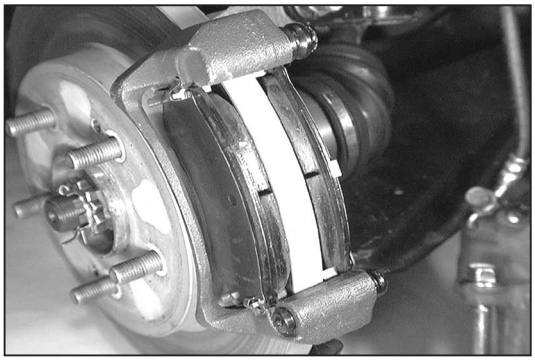
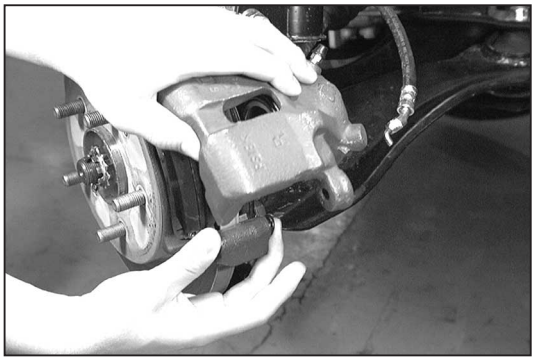
11. Ensure that the brake pads, anti-squeal shims and pad guide plates are installed properly.
    CAUTION:
    - Be very careful not to deform or lose the anti-squeal shims.

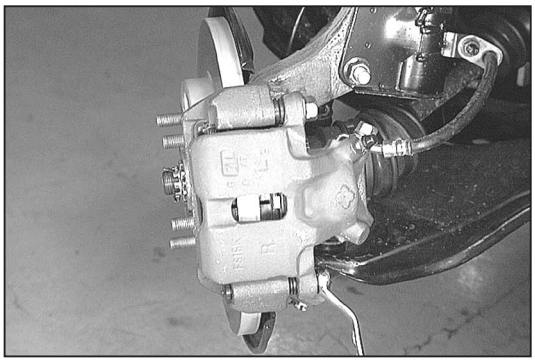

JMA00087-00068

12. Thinly apply the brake rubber grease to the sub-cylinder slide pin boot.

13. Turn over the disc brake assembly onto the disc brake pads while pushing the pin boots of the sub-cylinder slide pin by finger.
    CAUTION :
    - Never pull the brake hoses not more than necessary.
    - Never damage the pin boots during the operation.
    - Never interfere with the disc brake cylinder assembly with the brake pads and anti-squeal shims during the installation


JMA00088-00069

14. Thinly apply the brake rubber grease to the sliding surface of the sub-cylinder slide pin.
15. Install the sub-cylinder slide pin of the disc brake cylinder assembly to the disc brake mounting.
    CAUTION:
    - Be very careful not to damage the pin boot during the assembly.


JMA00089-00070

16. Tighten the sub-slide pin to the specified tightening torque.
    Tightening Torque: 44.1 - 53.9 N·m (4.5 - 5.5 kgf-m)
17. Depress the brake pedal more than 10 times.
18. Check to see if the brake disc can rotate smoothly.
19. Ensure that no abnormal sound is emitted or no drag exists when the wheel is rotated.
20. Install the front wheels with the attaching nuts and tighten them evenly in two or three stages to the specified tightening torque.
    Tightening Torque: 88.2 - 117.6 N·m
    (9.0 - 12.0 kgf-m)

21. Check effectiveness of the brake with a brake tester.

JMA00090-00000

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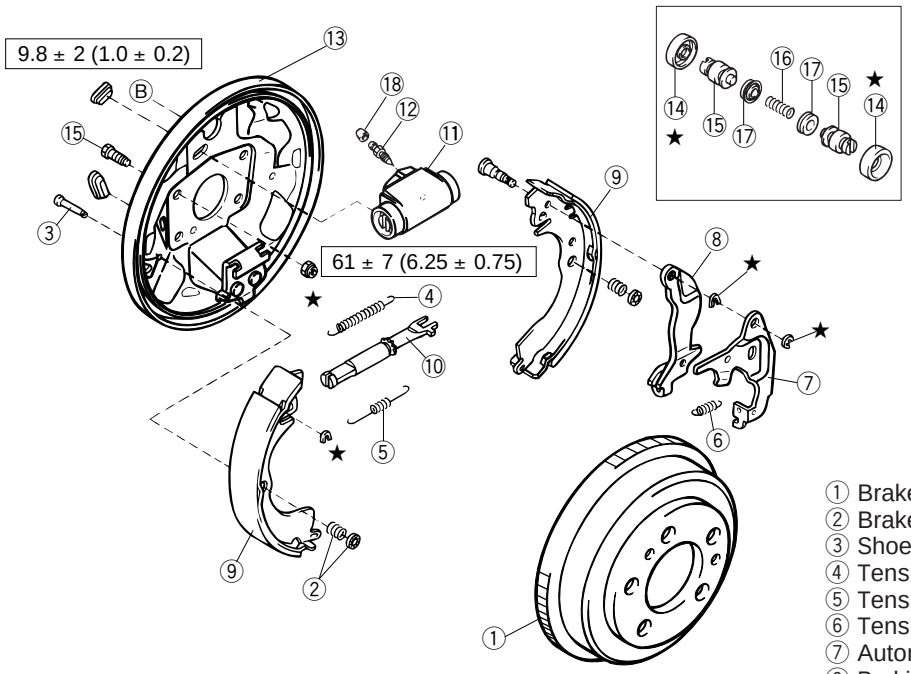
REAR BRAKE
COMPONENTS



□ : Tightening torque
Unit : N·m (kgf-m)
★ : Non-reusable parts

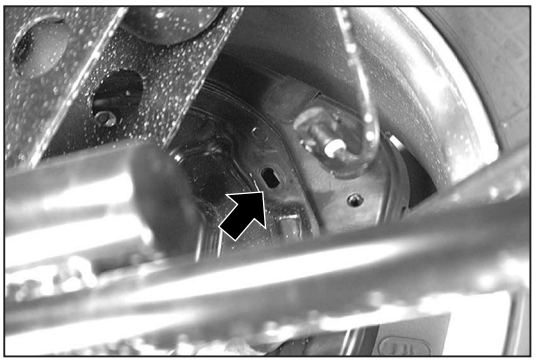
① Brake drum subassembly
② Brake shoe hold down spring
③ Shoe hold down spring pin
④ Tension No. 4 spring
⑤ Tension No. 3 spring
⑥ Tension spring
⑦ Automatic adjust lever (R, L)
⑧ Parking brake shoe lever subassembly (R, L)
⑨ Brake shoe assembly
⑩ Parking brake shoe strut
⑪ Rear wheel brake cylinder assembly
⑫ Bleeder plug
⑬ Brake backing plate subassembly
⑭ Wheel cylinder boot
⑮ Wheel brake cylinder piston
⑯ Compression spring
⑰ Cylinder cup
⑱ Bleeder plug cap

JMA00091-00071

INSPECTION OF BRAKE LINING THICKNESS

1. Jack up the vehicle and support it with safety stands. (Refer to the GI section.)
2. Remove the hole plug provided on the backing plate as shown in the figure.
3. Inspect that the thickness of the brake shoe lining is more than the specified value through the inspection hole.
   Thickness of Brake Lining
   Standard Thickness: 5 mm
   Minimum Thickness: 1 mm

   Replace the brake shoe, if the lining thickness is less than the specified value.
   If the brake lining is less than the specified value, check the brake drum inner diameter. (Refer to the BR section.)
4. Install the hole plug securely.
   CAUTION:
   - Be sure to install the hole plug securely. Failure to observe this caution may lead to rear brake problems owing to admission of dust, mud, water, etc.



JMA00092-00072

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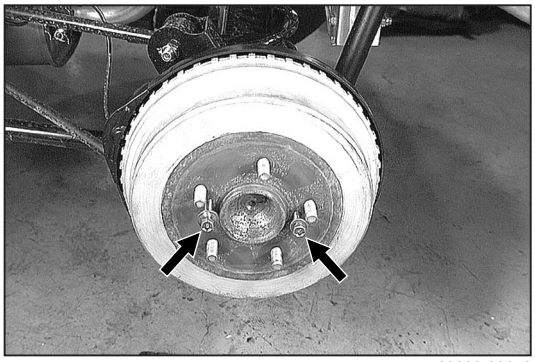
INSPECTION OF WHEEL CYLINDER FOR LEAKAGE

1. Jack up the vehicle and support it with safety stands.
   (Refer to the GI section.)
2. Remove the wheels.
3. Release the parking brake fully.
4. Remove the rear brake drum from the rear axle hub by pulling it out.
   NOTE:
   - If any difficulty is encountered in removing the brake drum, screw in the 8 mm bolts to the brake drum evenly.
   - The bolt hole is of the offset type. Therefore, after tightening the bolt to a certain extent, make the brake drum float evenly by lightly tapping the brake drum with a plastic hammer or the like.



JMA00093-00073

5. Ensure that no damage exists on the brake shoe lining surfaces.
   If any damage is found, replace the brake shoes with new ones.
   (Refer to the BR section.)
   CAUTION :
   - Replacement should be performed for the right and left side shoes as a set.

JMA00094-00074

6. Ensure that no brake fluid leakage exists around the wheel cylinder boots.
   Replace the piston cups and cylinder boots if brake fluid leakage exists.
   (Refer to the BR section.)

JMA00095-00000

7. Clean the attaching surface of the brake drum and rear axle hub.
8. Install the brake drum on the rear axle hub.
9. Clean the attaching surface of the brake drums and wheels.
10. Install the wheels and tighten the attaching bolts to the specified tightening torque.
    Tightening Torque: 103.0 ± 14.7 N·m (10.5 ± 1.5 kgf-m)

JMA00096-00075

11. Apply the brake pedal fully several times until the clicking sound is emitted.
12. Ensure that the brake drum turns lightly without being caught.
13. Check effectiveness of the rear brake with a brake tester.

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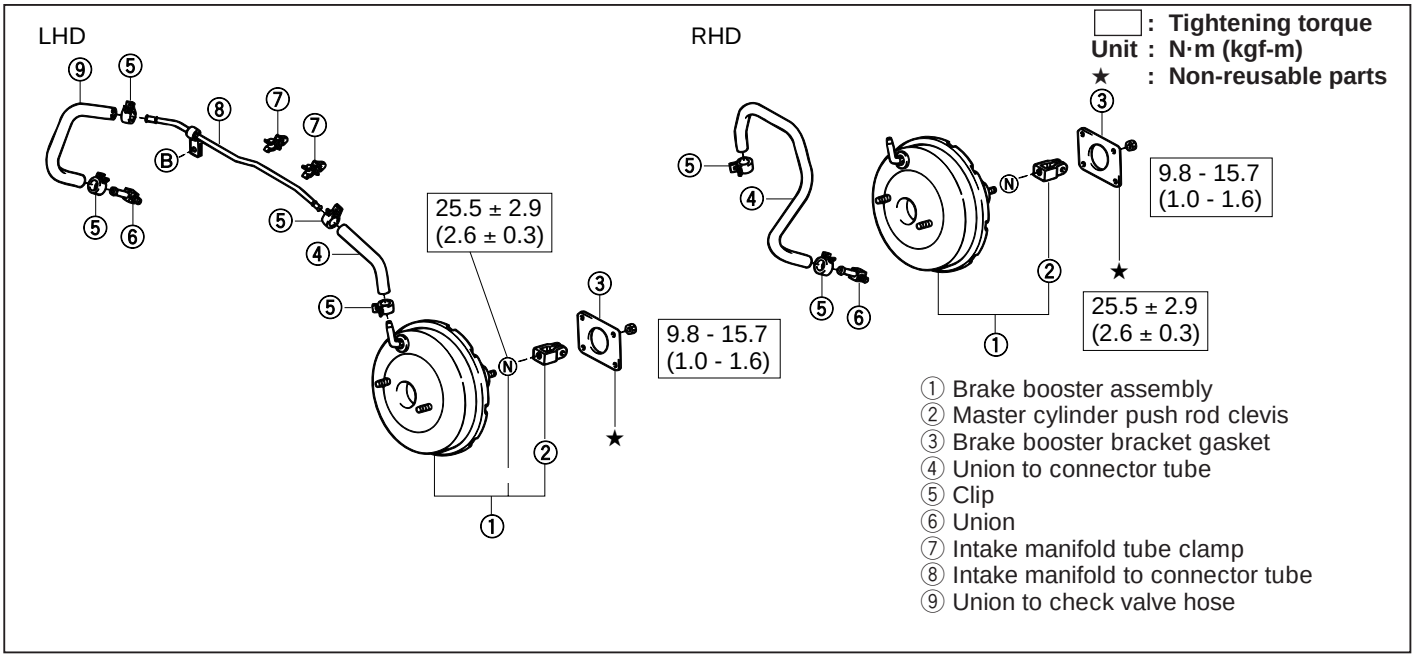
BRAKE BOOSTER HOSE

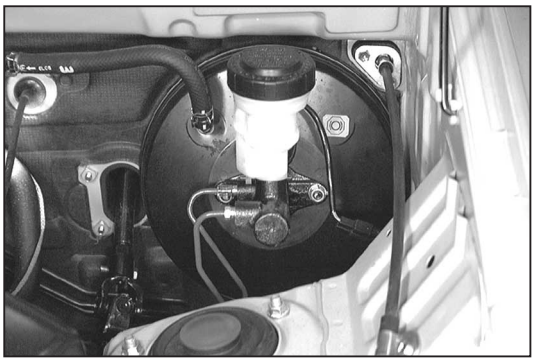
COMPONENTS



JMA00097-00076

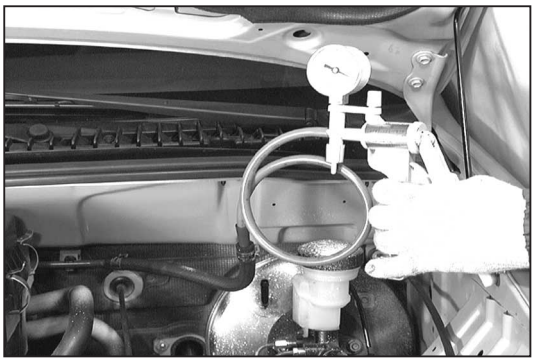
CHECK OF VACUUM HOSE

1. Visually check vacuum hose for aging, cracks, scratches or cut.
   If any damage exists, replace the vacuum hose with a new one.
2. Disconnect the vacuum hose from the brake booster.
3. Ensure that the negative pressure is retained when applying negative pressure to the disconnected hose.
   If not, replace the vacuum hose with a new one.



JMA00098-00077

4. Ensure that the air continuity exists when air is blown into the vacuum hose from the brake booster side.
   If not, replace the vacuum hose with a new one.
5. Connect the vacuum hose to the brake booster.
6. Install new hose bands.
   CAUTION :
   - Never reuse the removed hose bands.
   - Insert the vacuum hose up to the spool of the brake booster.



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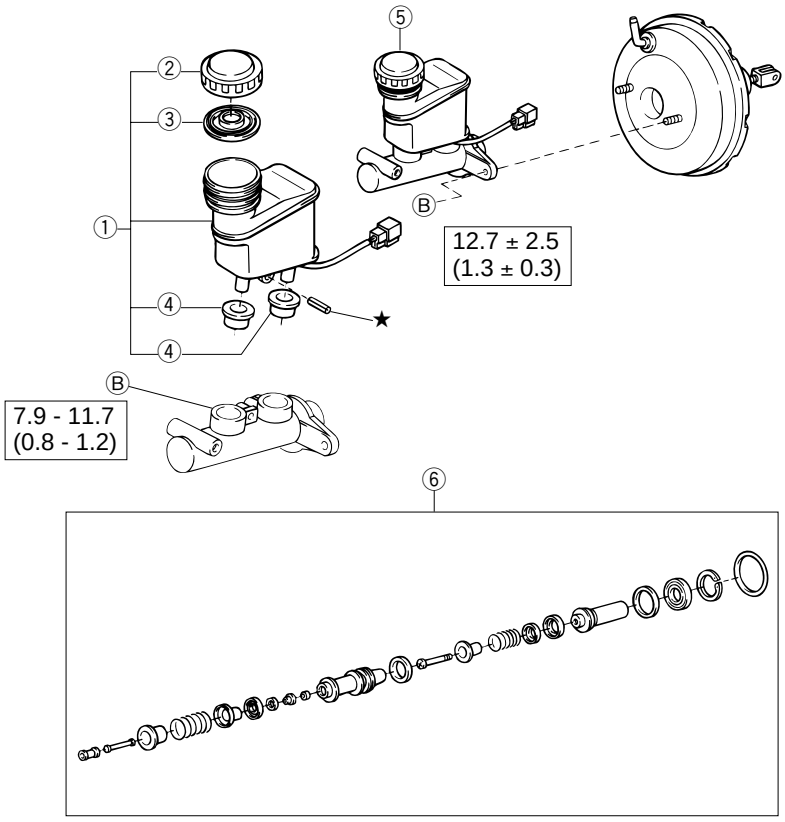
BRAKE MASTER CYLINDER

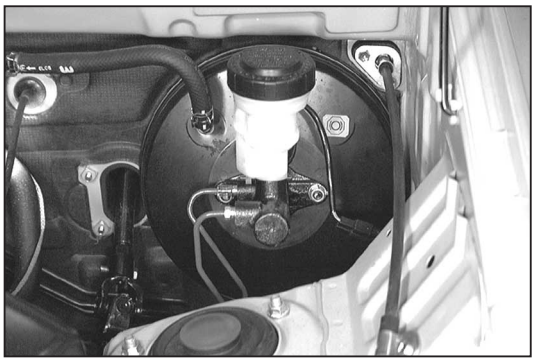
COMPONENTS



JMA00100-00079

INSPECTION OF BRAKE MASTER CYLINDER FOR FLUID LEAKAGE

1. Ensure that no brake fluid leakage exists from the grommet sections on the brake master cylinder.
   If leakage exists, replace the grommet with a new one.
   (Refer to the BR section.)
2. Disconnect the connecter of the brake fluid level switch.
3. Drain the brake fluid from the master cylinder.
   (Refer to the “brake fluid change” section.)
4. Place a suitable piece of cloth under the master cylinder to prevent the brake fluid from being splashed on the painted surface.
5. Disconnect the brake pipes from the master cylinder.
   CAUTION:
   - If the brake fluid is spilled inadvertently over the paint-finish surface of the vehicle or resin made parts, immediately wipe off the brake fluid and wash with fresh water.
6. Remove the master cylinder by removing the attaching nuts.



JMA00101-00080

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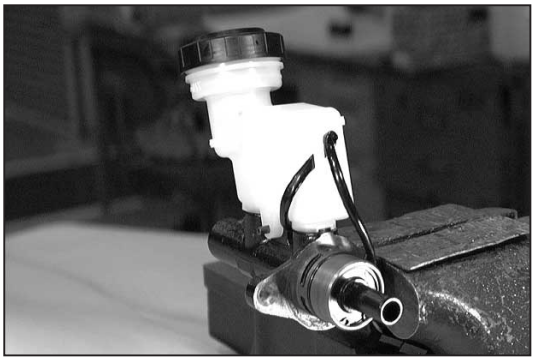
7. Secure the master cylinder in a vise.
8. Ensure that no brake fluid leakage exists around the piston guide section of the brake master cylinder.
   If any brake fluid leakage exists, replace the brake master cylinder pistons with piston cups(repair kit) with new ones. (Refer to the BR section.)
9. Clean the master cylinder attaching surface of the brake booster.
10. Replace the O-ring of the brake master cylinder with a new one.
    CAUTION:
    - Never make scratches on the O-ring during the installation.

11. Thinly apply brake rubber grease to the O-ring on the brake master cylinder.
12. Install the master cylinder to the brake booster with the attaching nuts. Then, tighten the attaching nuts evenly to the specified tightening torque.
    Tightening Torque: 12.7 ± 2.5 N·m (1.3 ± 0.26 kgf-m)

    WARNING:
    - Be sure to perform the adjustment of the brake booster push rod height if any inner part of the master cylinder has been replaced. (Refer to the BR section.)
      Failure to observe this warning may lead to damage or malfunction of the brake system.

13. Connect the brake pipes to the master cylinder and tighten the flare nuts to the specified tightening torque.
    Tightening Torque: 13 - 18 N·m (1.3 - 1.8 kgf-m)

14. Connect the brake fluid level switch connector.
15. Perform the air bleeding of the brake system.
    (Refer to the “Brake fluid change” section.)
16. Perform the brake performance test with a brake tester.



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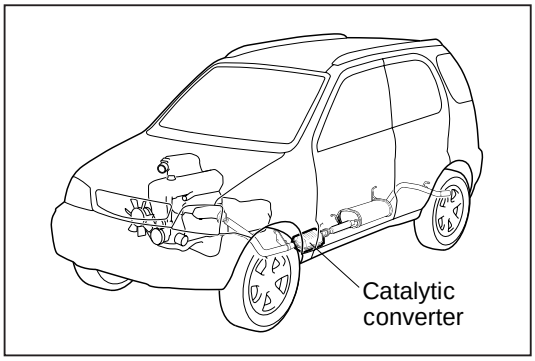
MUFFLER AND EXHAUST PIPE

DAMAGE & TIGHTNESS



JMA00104-00083

1. Visually check that the exhaust pipes and mufflers for damage and exhaust gas leakage. Also ensure that there is no possibility of interference with any other parts.
   WARNING
   - Never perform this check when the exhaust system is hot.

   If any damage or gas leakage exists, repair or replace the parts as necessary.
2. Check that the muffler support of the exhaust pipe and muffler as well as their connecting section for looseness, using a suitable wrench or rock them by hand.
   WARNING:
   - Never perform this check when the exhaust system is hot.
   - Be careful not to burn yourself during inspection.

   If any damage or looseness is found, repair or replace parts as necessary.

JMA00105-00000

AUTOMATIC TRANSMISSION

FLUID CHANGE

JMA00106-00084

1. Place a suitable container under the drain plug.
2. Drain the transmission fluid by removing the drain plug.
3. Install the drain plug with a new gasket interposed and tighten the drain plug with the specified tightening torque.
   Tightening Torque: 19.6 - 29.4 N·m (2.0 - 3.0 kgf-m)

   CAUTION:
   - Never reuse the used gasket.

4. Fill the specified automatic transmission fluid to the automatic transmission.
   Specified Automatic Transmission Fluid:
   DEXRON® Ⅱ or Ⅲ
   Capacity: 1.7 liters (Drain and refill)

5. Check the fluid level.
   CAUTION:
   - Inspection should be performed when the fluid temperature is between 70 - 80°C.
     Be very careful not to scald yourself with hot transmission fluid or other parts in the engine compartment.

   (1) Park the vehicle on a level surface and apply the parking brake fully.
   (2) With the engine idling, move the shift lever from the P range to the L range, and return it to the P range.
   (3) Pull out the dipstick and wipe it clean. Then insert the dipstick and pull it out again. Ensure that the fluid level is between the upper and lower levels in the hot range of the oil level gauge.
   If the fluid level is less than the lower level, add the specified automatic transmission fluid to the upper level of the dipstick. Then, recheck the fluid leakage.

JMA00107-00000

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CHECK OF OIL COOLER HOSE

Inspect the following points. If any problem is found, repair them, as required.

1. Hoses and tubes for scratches or cracks.
2. Hoses for aging such as deformation and swelling.
3. Tubes for corrosion or rusting.
4. Tube clamps and related parts for tightness, rattle or damage.
5. Connection for fluid leakage.
6. Hoses for extreme bending, twisting or pulling.

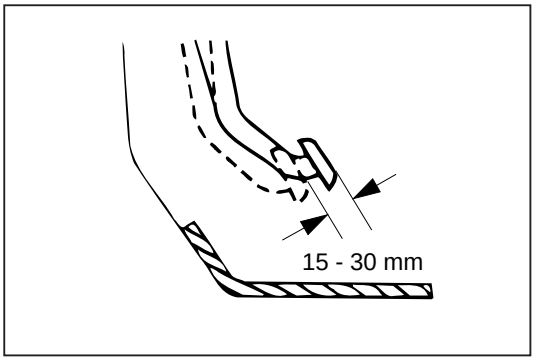
CLUTCH

FREE PLAY

1. Lightly depress the clutch pedal by hand,until you feel resistance. Then, measure the free play.
   Specified Clutch Pedal Free Play: 15 - 30 mm

   If the clutch pedal free play fails to meet with the specification, adjust the clutch pedal free play to the specified value.
   (Refer to the CL section.)

JMA00108-00000

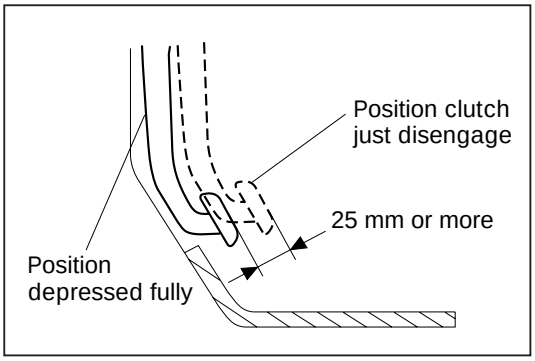


JMA00109-00086

RESERVE TRAVEL

1. Start the engine.
2. Ensure that the difference of clutch pedal upper surface height at clutch pedal depressed fully and clutch pedal positioned at point where the clutch just disengage is conforms to the specified value.
   Specified Reserve Travel: 25 mm or more

   If the reserve travel fails to conform to the specification, adjust the reserve travel by adjusting the free play or replace the clutch disc, clutch cover and related damaged parts, as required.
   (Refer to the CL section.)



JMA00110-00087

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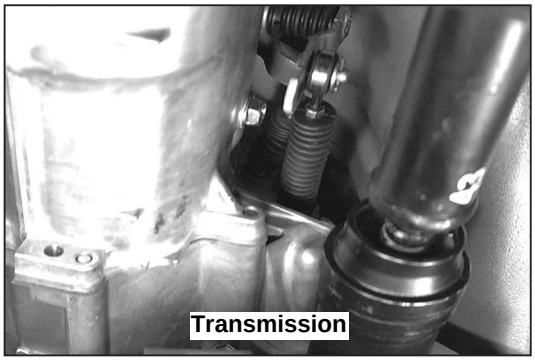
MANUAL TRANSMISSION, TRANSFER, FRONT AND REAR DIFFERENTIAL

OIL CHANGE

1. Place a suitable container under the drain plug.
2. Drain the oil by removing the drain plug.
3. Remove the filler plug.
4. Reinstall the drain plug with a new gasket interposed and tighten it to the specified tightening torque.
    - Tightening Torque
        - Manual Transmission:
            - 30 - 49 N·m (3.0 - 5.0 kgf-m)
        - Transfer:
            - 30 - 49 N·m (3.0 - 5.0 kgf-m)
        - Front Differential:
            - 49 ± 9.8 N·m (5.0 ± 1.0 kgf-m)
        - Rear Differential:
            - 53.9 - 68 N·m (5.5 - 7.0 kgf-m)

5. Fill the specified oil, until the oil begins to overflow from the oil filler hole.
    - Specified Oil:
        - Manual Transmission
            - Grade: API GL-3 or GL-4
            - Viscosity: SAE 75W-85 or 75W-90
            - Capacity: 2.2 liters (With transfer)
        - Transfer (For automatic transmission)
            - Grade: API GL-3 or GL-4
            - Viscosity: SAE 75W-85 or 75W-90
            - Capacity: 1.6 liters
        - Front Differential
            - Grade: API GL-5
            - Viscosity: SAE 80W-90
            - Capacity: 0.7 liter
        - Rear Differential (Conventional)
            - Grade: API GL-5
            - Viscosity: SAE 80W-90
            - Capacity: 1.55 liters
        - Rear Differential (LSD)
            - Grade: API GL-5
            - Viscosity: SAE 80W-90 LSD
            - Capacity: 1.55 liters

6. Install the filler plug with a new gasket interposed and tighten it to the specified tightening torque.
    - Tightening Torque
        - Manual Transmission:
            - 30 - 49 N·m (3.0 - 5.0 kgf-m)
        - Transfer:
            - 30 - 49 N·m (3.0 - 5.0 kgf-m)
        - Front Differential:
            - 49 ± 9.8 N·m (5.0 ± 1.0 kgf-m)
        - Rear Differential:
            - 53.9 - 68 N·m (5.5 - 7.0 kgf-m)



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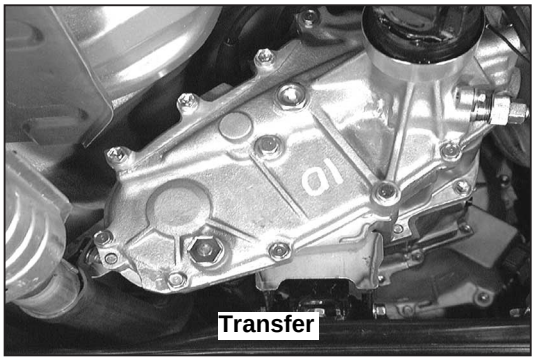

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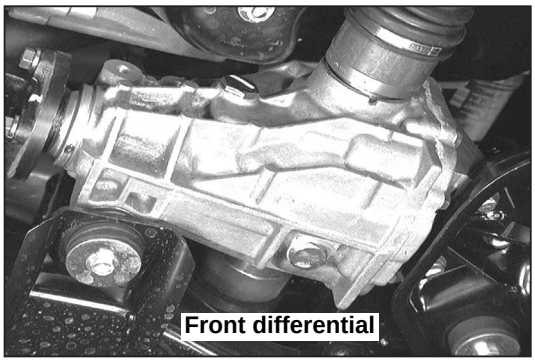

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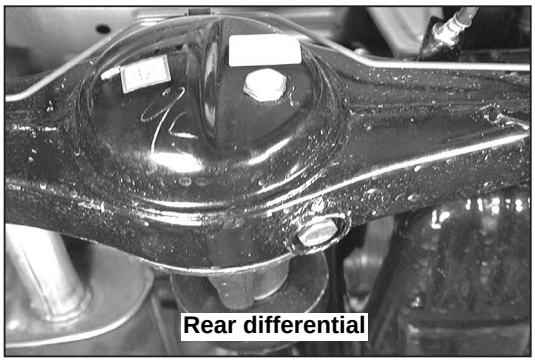

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PROPELLER SHAFT

CHECK OF PROPELLER SHAFT

1. Ensure that no looseness exists on the attaching bolts of the universal joint flange yokes which were connected to the front, rear differential and propeller shaft, using a torque wrench.
   Tightening Torque: 51.0 - 69.6 N·m (5.2 - 7.1 kgf-m)

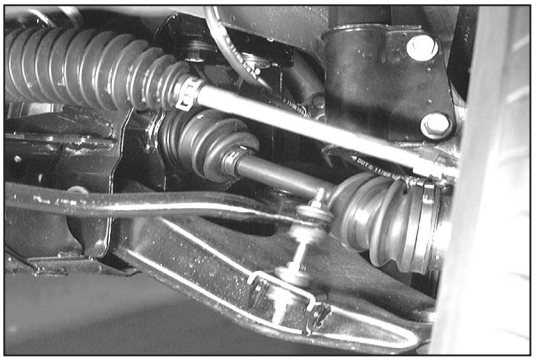
   If any looseness exists, retighten the attaching bolts as required.
   (Refer to the PR section.)
2. Ensure that no excessive play exists on the universal joints.
   If any excessive play exists, repair the universal joint by replacing the spider kit or replace the propeller shaft with a new one.
   (Refer to the PR section.)
3. Ensure that no excessive play exists between the propeller shaft and the transfer output shaft.
   If excessive play is found, replace the front propeller shaft and/or transfer output shaft as required.
   (Refer to the PR section.)

JMA00112-00092

DRIVE SHAFT

CHECK OF DUST BOOT

1. Inspect that the dust boot is free from damage or cracks.
   If any damage exists, replace the boot with a new one.
   (Refer to the FS section.)
2. Inspect that the dust boot bands are securely installed in position properly.
   If not, replace the boot bands with new ones.
   (Refer to the FS section.)


JMA00113-00093

WHEEL HUB NUT

Inspect the wheel hub nuts for looseness, using a wheel hub nut wrench.
Tightening Torque: 90 - 120 N·m (9.0 - 12.0 kgf-m)

JMA00114-00094

WHEEL BEARING

RATTLE

1. Ensure that the wheel bearings exhibit no excessive play by rocking the tire in and out, up and down or forward and backward while holding the tire by hands.
   If excessive play is found, replace the wheel bearing with a new one.
2. Ensure that no abnormal sound is emitted when the wheel is rotated by hand.
   If abnormal sound is emitted, perform a repair so that no abnormal sound may be emitted.

JMA00115-00095

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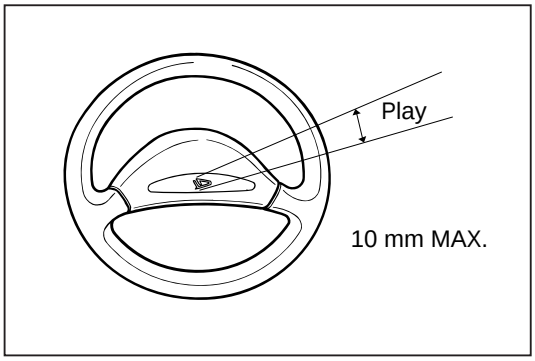
STEERING SYSTEM

STEERING WHEEL FREE PLAY

1. Set the vehicle in a straight-ahead condition.
2. Inspect the steering wheel free play by turning it lightly with your fingers.
   Specified Value: 10 mm MAX.

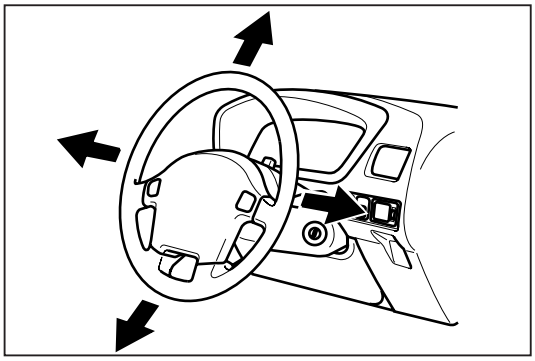
   If the free play fails to meet with the specification, adjust the free play to the specified value.
   (Refer to the SR section.)



JMA00116-00096

STEERING WHEEL RATTLE

Hold the steering wheel by your hands. Ensure that the steering wheel exhibits no excessive looseness or play by moving it in an up-&-down direction, a right-&-left direction as well as in a fore-&-aft direction.
If excessive play is found, repair the steering system.
(Refer to the SR section.)



JMA00117-00097

TIGHTNESS OF STEERING LINKAGE

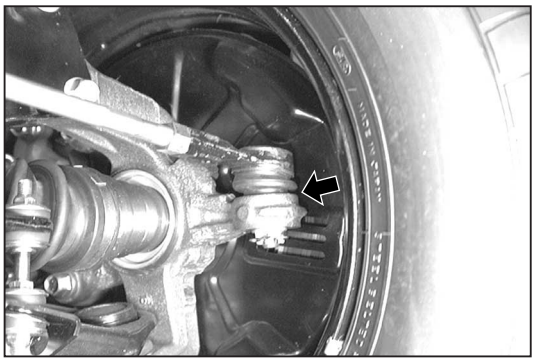
Inspect the attaching sections for tightness or damage.

Tightening Torque:
- Steering Wheel/Steering Main Shaft:
  28 - 41 N·m (2.8 - 4.2 kgf-m)
- Steering Main Shaft/Universal Joint:
  25 - 34 N·m (2.5 - 3.5 kgf-m)
- Universal Joint/Steering Pinion:
  25 - 34 N·m (2.5 - 3.5 kgf-m)

JMA00118-00000

DAMAGE OF STEERING LINKAGE BALL JOINT DUST BOOT

Inspect the dust boot of the tie rod end ball joint for cracks or damage.
If any cracks or damage exists, replace the dust boot as necessary.
(Refer to the SR section.)



JMA00119-00099

FLUID LEAKAGE OF STEERING GEAR BOX

1. Inspect the power steering device for fluid leakage.
2. Inspect the tightness of the power steering device.

TIGHTNESS OF STEERING GEAR BOX

Inspect the bolts of the gear box for looseness.

Tightening Torque: 53.9 - 81.4 N·m (5.5 - 8.3 kgf-m)

JMA00120-00000

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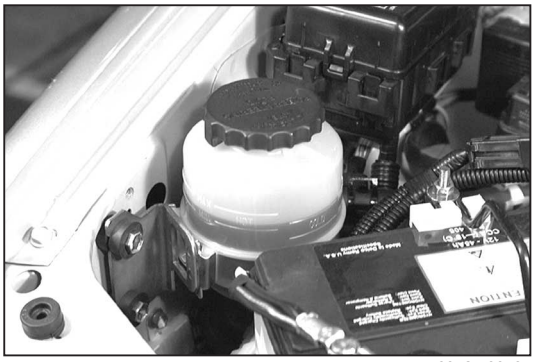
POWER STEERING FLUID HOSE

Inspect the power steering fluid hose for aging, deformation, cracks, scratches, cut, twist and swelling.
If any problem is found, replace the fluid hose with a new one. (Refer to the SR section.)

CAUTION:

- Never reuse the removed hose bands.

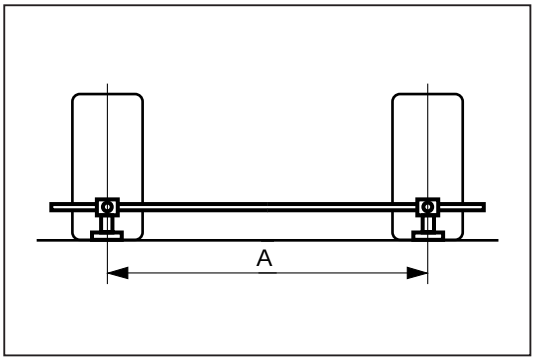


JMA00121-00101

WHEEL ALIGNMENT

TOE-IN CHECK

1. Ensure that the tires have been inflated with the specified pressure.
   (Refer to the Owner's manual.)
2. Place the vehicle on a flat floor and place the steering wheel to a straight ahead direction.
3. Attach a toe-in gauge to the rear side at the center point of each front tire at a height of tire center and put a mark on each tire.

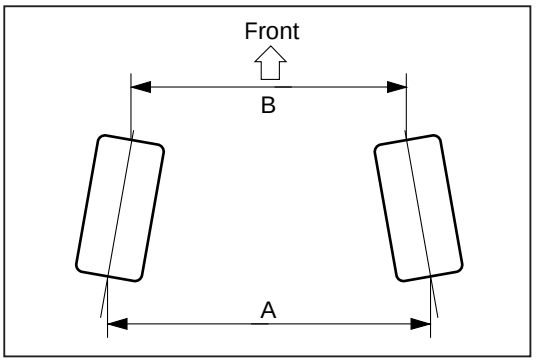


JMA00122-00102

4. Move the vehicle forward in a straight ahead direction gradually until the marks put on the tires come to the front side.
5. Attach the toe-in gauge to the front side, at the center point of each front tire. Determine the difference in the mark-to-mark distance between the first measurement and the second measurement. This difference constitutes the toe-in.
6. Ensure that the measured difference is within the specified value.

   Specified Value: 0 ± 1.5 mm

   If the measured difference(toe-in) fails to meet with the specification, adjust the toe-in to the specified value.
   (Refer to the FS section.)



JMA00123-00103

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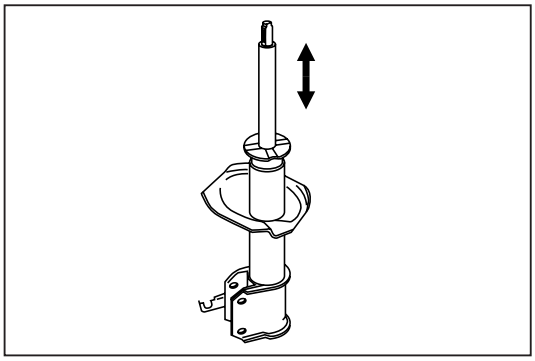
SHOCK ABSORBER

DAMAGE AND OIL LEAKAGE

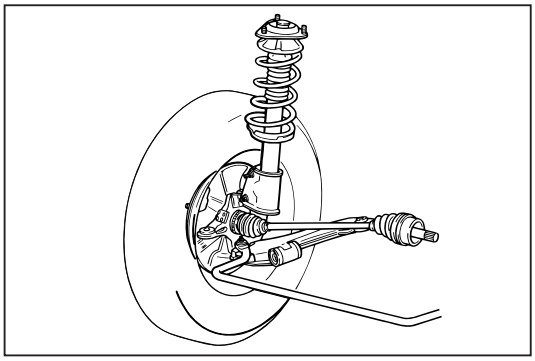
Visually inspect each shock absorber for damage and oil leakage.
If damage or oil leakage exists, replace the damaged part with a new one.
(Refer to FS or RS section.)



JMA00124-00104

FUNCTION

Rock the vehicle in an up-&-down direction. Ensure that the vehicle emits no abnormal noise and the shake will finish within a few times.
If not, replace the shock absorber with a new one.
(Refer to FS or RS section.)

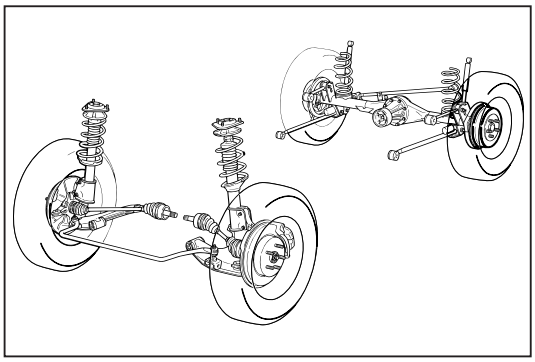


JMA00125-00105

SUSPENSION ARM, CONTROL ARM & DUST COVER

DAMAGE OF SUSPENSION ARMS AND DUST COVER

Visually inspect the suspension arms and dust cover for damage.
If damage exists, replace the damaged part with a new one.
(Refer to the FS section.)



JMA00126-00106

TIGHTNESS OF SUSPENSION ARMS

Check the suspension arm connecting bolts and nuts for tightness.
If any looseness exists, tighten the attaching bolts and nuts to the specified tightening torque.
(Refer to the FS section.)

DAMAGE AND TIGHTNESS OF CONTROL ARMS

1. Visually inspect the control arms for damage.
   If damage exists, replace them with new ones.
   (Refer to the RS section.)
2. Inspect the attaching bolts and nuts for tightness.
   If any looseness exists, tighten the attaching bolts and nuts to the specified tightening torque.
   (Refer to the RS section.)

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EM

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JEM00001-00000

NO. 9710-JE

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ENGINE TUNE-UP

NOTE:

- The adjustments or checks of this section is performed normally when the engine is in a hot condition.
- “Hot engine condition” denotes a condition in which the cooling water temperature is 75 - 85°C and the engine oil temperature is above 65°C.
- Warm up the engine thoroughly. However, do not perform the adjustment while the idle-up VSV is still functioning.
- Ensure that all accessory switches are turned OFF.
- On the automatic transmission vehicle, the gear shift lever is placed in the [N] or [P] range.
- On the manual transmission vehicle, the gear shift lever is placed in the neutral range.
- Connect the engine revolution meter for measuring the engine revolution speed. If your engine revolution meter is of such a type as to be connected to the negative terminal of the ignition coil, connect the following SST to the diagnosis connector.
  SST: 09991-87402-000

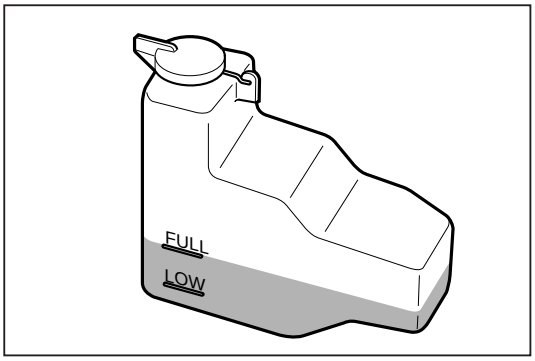
- Apply the parking brake fully.
- Set the steering wheel to the straight ahead direction.
- Be sure that the removed parts for adjustment or checks should be reinstalled.

JEM00002-00000

1. Inspection of engine coolant

Check to see if coolant level is between the LOW and FULL lines of the reserve tank.
If coolant level is near the LOW level or bellow the LOW level, add the coolant up to the full level.
WARNING:

- Never open the radiator cap when the engine is still hot.
  Failure to observe this caution will cause you to get scalded.



JEM00003-00001

NOTE:

- If no coolant is present in the reserve tank or the coolant level is very low, check for water leakage, using a radiator cap tester.
- Here, the coolant refers to the coolant having an adequate freezing protection rating.

Coolant Capacity:
Manual Transmission Vehicle: 5.4 liters
Automatic Transmission Vehicle: 5.3 liters

CAUTION:

- Use a good brand of ethylene-glycol-base antifreeze solution.

NOTE:

- The amount above includes liter for reserve tank.

JEM00004-00000

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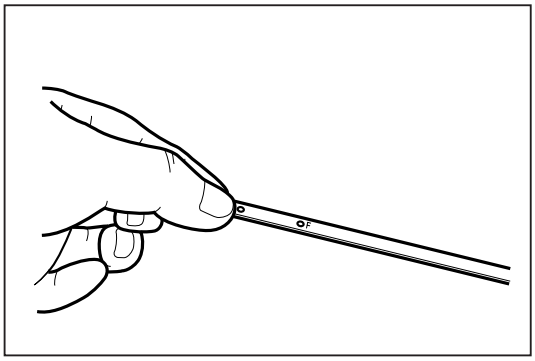
2. Inspection of engine oil

(1) Oil quality check

Check the engine oil for deterioration, ingress of water, discoloring and dilution.

NOTE:

- Park the vehicle or a level surface.
- The amount of oil between the “L” level and the “F” level equals around one liter.



JEM00005-00002

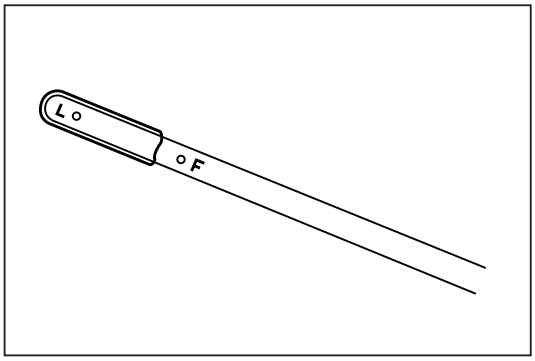
(2) Oil level check

Ensure that the engine oil level should be between the “L” and “F” level an the dipstick.

If the engine oil level is below the “L” level, replenish the specified oil to the “F” level after oil leakage has been checked.

Oil Capacity: Unit: liter

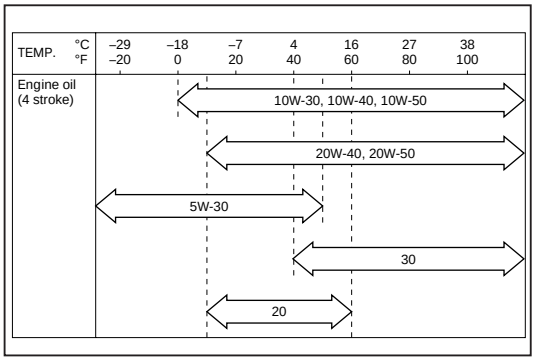
“F” level	3.3
“L” level	2.3
Oil capacity when oil filter replaced	3.5
Full capacity	3.6



JEM00006-00003

NOTE:

- Use API grade SF or higher multigrade viscosity, fuel efficient oil.
- The amount of oil between the “L” level and the “F” level equals around one liter.



JEM00000-00004

3. Inspection of spark plugs

Recommended Spark Plug:

DENSO	NGK
K20TNR-S, K22TNR-S	BKUR6EK, BKUR7EK

NOTE:

- All spark plugs should have the same head range and be ones manufactured by the same manufacture.

JEM00007-00000

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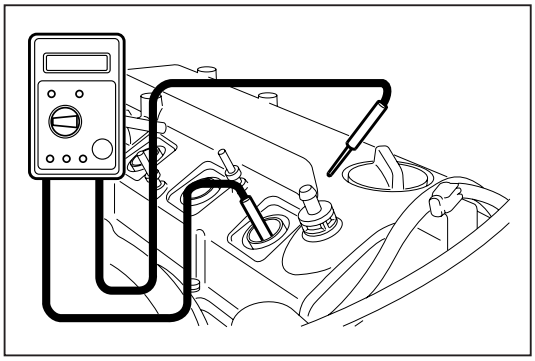
(1) Inspection of electrode
Measure the insulation resistance of the spark plug.
Minimum Insulation Resistance: 15 MΩ

If the measured insulation resistance is less than the specified value, replace the spark plug with a new one after checking the electrode gap and cleaning the spark plug.

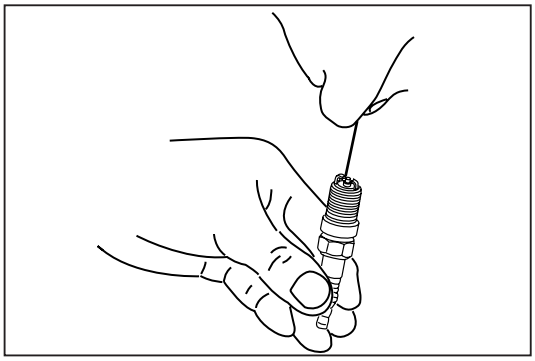
WARNING:

- Since the spark plugs are hot, care must be exercised to avoid getting scalded.


JEM00008-00005

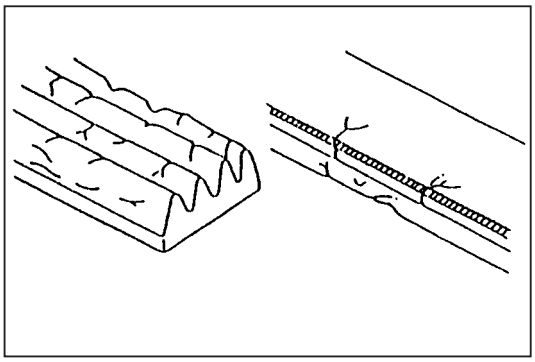
(2) Inspection of electrode gap
Measure the electrode gap, using a plug gap gauge.
Electrode Gap: 0.9 - 1.0 mm

If the electrode gap of a used spark plug is not within the specification, replace the spark plug with a new one.


JEM00009-00006

4. Inspection of drive belt

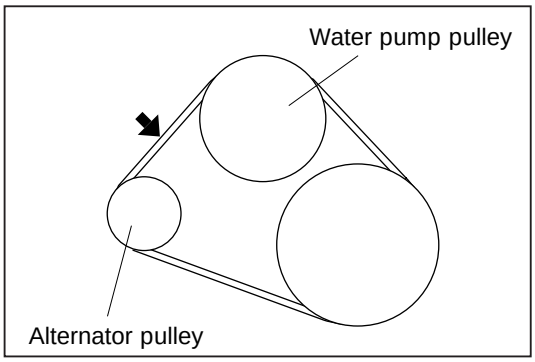
(1) Visual inspection of the drive belt
Visually check the belt for separation of the adhesive rubber above and below the core, core separation from the belt side, severed core, separation of the rib from the adhesive rubber, cracks or separation of the ribs, torn or ribs or cracks in the inner ridges of the ribs.
Replace the drive belt, if necessary.


JEM00010-00007

(2) Inspection of the drive belt tension
Measure the amount of the drive belt deflection when the midpoint of the drive belt between the alternator and the water pump pulley is pushed with a force of 98 N (10 kgf).
Specified Belt Deflection

New Belt: 4 - 5 mm
[with a force of 10 kg applied at the point shown in the figure.]

Used Belt: 5 - 6 mm
[with a force of 10 kg applied at the point shown in the figure.]

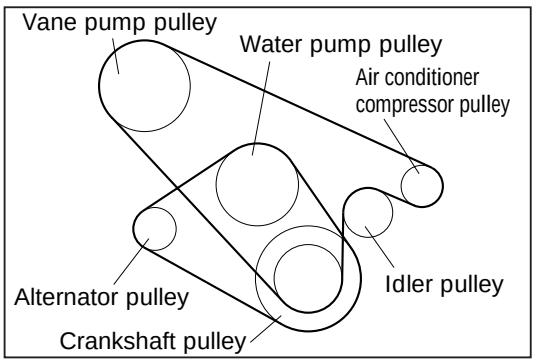


JEM00011-00008

If necessary, adjust the drive belt tension.

NOTE:

- “New belt” refers to a belt which has been used on a running engine for less than five minutes.
- “Used belt” refers to a belt which has been used on a running engine for more than five minutes or more.
- After replacing the drive belt, check that it fits properly in the ribbed grooves, especially in the places difficult to see.
- After installing a new belt, run the engine for about five minutes and then recheck the tension.



JEM00012-00009

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5. Inspection and adjustment of valve clearances

The measurement and adjustment of valve clearance are carried out when each of the piston of the No. 1 and No. 4 cylinders is set to the top dead center at the end of compression stroke.

NOTE:

- The valve clearance adjustment is performed normally when the engine is in a hot condition.
  “Hot engine condition” denotes a condition in which the cooling water temperature is 75 - 85°C and the engine oil temperature is above 65°C.
  However, when the engine has been overhauled, it is necessary to adjust the valve clearances while the engine is cold and to readjust the valve clearance in a hot condition after warming up the engine.

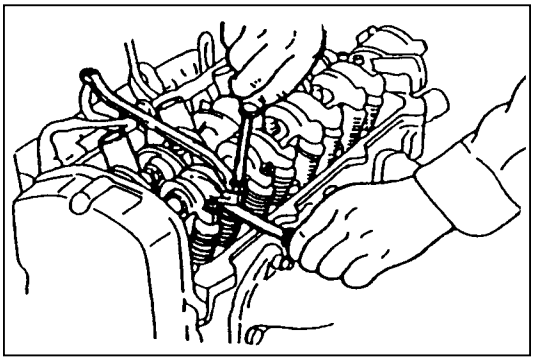
JEM00013-00000

NOTE:

- The “O” mark denotes those valves that can be adjusted under that setting.

  Valve Clearances (Hot)
  Intake: 0.25 ± 0.05 mm
  Exhaust: 0.33 ± 0.05 mm
  (Reference)
  Valve Clearances (Cold)
  Intake: 0.18 mm
  Exhaust: 0.25 mm

Tightening Torque (Lock nut): 16.7 - 22.6 N·m



JEM00014-00010

Piston positions		1	2	3	4
When valve rocker arms of No. 1 cylinder are free: (Piston of No. 1 cylinder is at top dead center under compression strok)	Intake	○	○		
	Exhaust	○		○	
When valve rocker arms of No. 4 cylinder are free: (Piston of No. 4 cylinder is at top dead center under compression strok)	Intake			○	○
	Exhaust		○		○

JEM00015-00000

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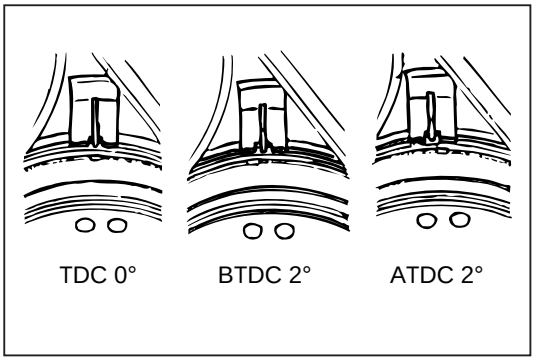
6. Inspection and adjustment of ignition timing

Check to see if the ignition timing mark of the crankshaft pulley is aligned with the indicator of the timing belt cover by using a timing light under the condition that the T terminal has been connected with the ground terminal in the diagnosis connector by the following SST.

SST: 09991-87403-000



JEM00016-00011

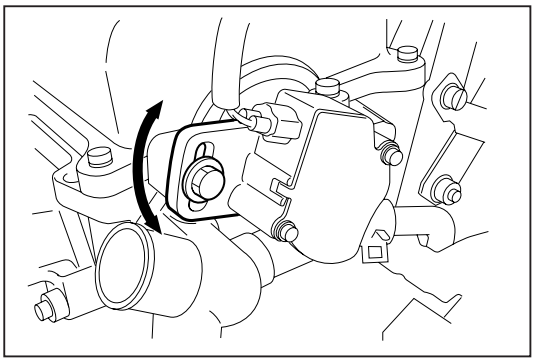
NOTE:

- The ignition timing inspection or adjustment is performed normally when the engine is in a “Hot” condition.
  The “Hot engine condition” denotes a condition in which the cooling water temperature is 75 - 85°C and the engine oil temperature is above 65°C.
- Care must be exercised to ensure that no connection is made on terminals except for those specified.
  Even a slight contact with the other terminals will cause serious malfunction.

If the ignition timing mark is not aligned with the indicator of the timing belt cover, adjust the ignition timing by turning the cam angle sensor.

REFERENCE:

- If the cam angle sensor is turned clockwise, the timing will be advanced. Conversely, if the can angle sensor is turned counterclockwise, the ignition timing will be retarded.



JEM00017-00012

7. Inspection and adjustment of idle speed

Preparation to be made prior to idle speed adjustment.

- Check and adjust the ignition timing.
- Apply the parking brake fully.
- Warm up the engine thoroughly.
- All accessory switches are turned OFF.
- The air cleaner element is installed.
- All vacuum hoses are connected.
- Ensure that the intake system exhibits no air leakage.
- Ensure that the exhaust system exhibits no air leakage.
- On the automatic transmission vehicle, the shift lever is placed in the [N] or [P] range.
- On the manual transmission vehicle, the shift lever is placed in the neutral range.
- Position the steering wheel to the straight-ahead direction.

NOTE:

- Do not perform the engine idle speed adjustment, while the idle-up VSV is operating.
  Prior to the adjustment of the idle speed, be sure to check that the idle-up VSV is not operating.

JEM00018-00000

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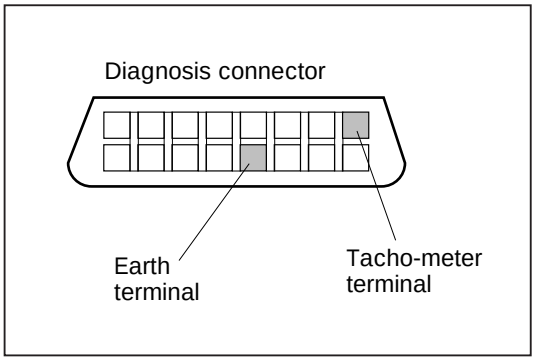
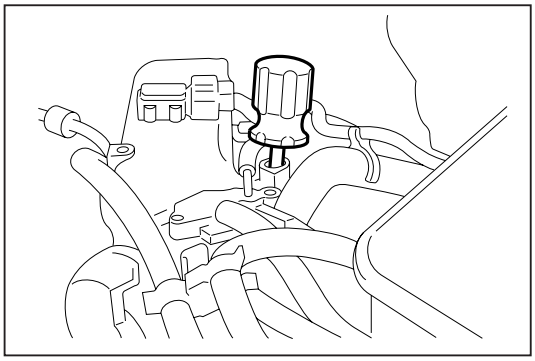
Measure the engine idle speed, using a tachometer which is connector to the “REV” terminal of the diagnosis connector.
NOTE:
- Never allow the “REV” terminal to touch the ground. It could result in damage of the ignition system.
- As some tachometers are not compatible with this ignition system, it is recommended to confirm the compatibility with your unit before its use.

Specified Idle Speed:
MT: 800 ± 50 rpm
AT: 850 ± 50 rpm



JEM00019-00013

If the measured engine idle speed is not within the specified value, adjust the engine idle speed by turning the idle adjusting screw placed at the throttle body.
NOTE:
- When the idle adjusting screw is turned clockwise, the idle speed will be decreased, whereas when the idle adjusting screw is turned counterclockwise the idle speed will be increased.


JEM00020-00014

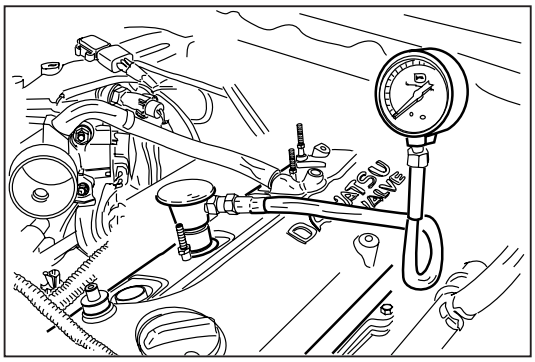
8. Compression check

NOTE:
- After completion of the engine tune-up, if the engine exhibits lock of power, excessive oil consumption or poor fuel economy, measure the cylinder compression pressure.

JEM00021-00000

Measure the cylinder compression pressure for each cylinder, using a compression gauge which is inserted into the spark plug hole.
NOTE:
- Depress the accelerator pedal fully while measuring the compression pressure.
- Always use a fully charged battery so that at least a revolution speed of 300 rpm may be attained.

Compression Pressure:
1373 kPa (14 kgf/cm^2)/at 300 rpm
Minimum Pressure:
1030 kPa (10.5 kgf/cm^2)/at 300 rpm
Difference in Reading Between Cylinders:
147 kPa (1.5 kgf/cm^2)/at 300 rpm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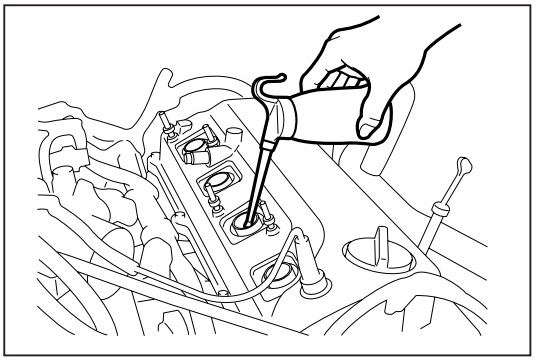
If the compression of one or more cylinders is low, pour a small amount of engine oil into that cylinder through the spark plug hole and measure the cylinder compression again.

- If adding oil helps the compression to improve, chances are that the piston rings and/or cylinder bores are worm or damaged.
- If the pressure remains low after the operation has been performed, the valves may be sticking or seated un properly, or there may be leakage post the gasket.



JEM00023-00016

9. Checking of CO/HC concentrations

Preparation to be made prior to check of CO/HC concentrations.

- Apply the parking brake fully.
- Check and adjust the ignition timing.
- Check and adjust the idle speed.
- Warm up the engine thoroughly.
- All accessory switches are turned OFF.
- The air cleaner element is installed.
- All pipes and vacuum hose are connected.
- Ensure that the intake system exhibits no air leakage.
- Ensure that the exhaust system exhibits no gas leakage.
- On the automatic transmission vehicle, the shift lever is placed in the [N] or [P] range.
- On the manual transmission vehicle, the shift lever is placed in the neutral position.
- Position the steering wheel to the straight-ahead direction.
- Be sure to prepare the CO/HC meter by following the instruction of its manufacturer, before it is put into use.

NOTE:

- This check is used only to determine whether or not the idle HC/CO emission complies with the regulations.

Measure the HC/CO emission by inserting a sampling pipe of the HC/CO meter into the exhaust pipe.
Wait at least one minute before the measurement so as to allow the concentrations to stabilize.
Complete the measurement within three minutes.
If the HC/CO concentrations do not conform to the regulations, see the following table for possible causes.

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Trouble Shooting List

HC	CO	Problems	Possible causes
High	Normal	Rough idle	1. Faulty ignition • Incorrect ignition timing • Fouled, shorted or improperly gapped spark plugs • Open or crossed high tension cords 2. Incorrect valve clearance 3. Leaky exhaust valves 4. Leaky cylinder
High	Low	Rough idle (Fluctuation in HC reading)	1. Lean mixture causing misfire
High	High	Rough idle (Black smoke from exhaust)	1. Restricted air filter 2. Faulty EFI system • Faulty pressure regulator • Clogged fuel return line • Defective water temp. sensor • Defective air temp. sensor • Faulty throttle position sensor • Faulty pressure sensor • Faulty ECU • Faulty oxygen sensor

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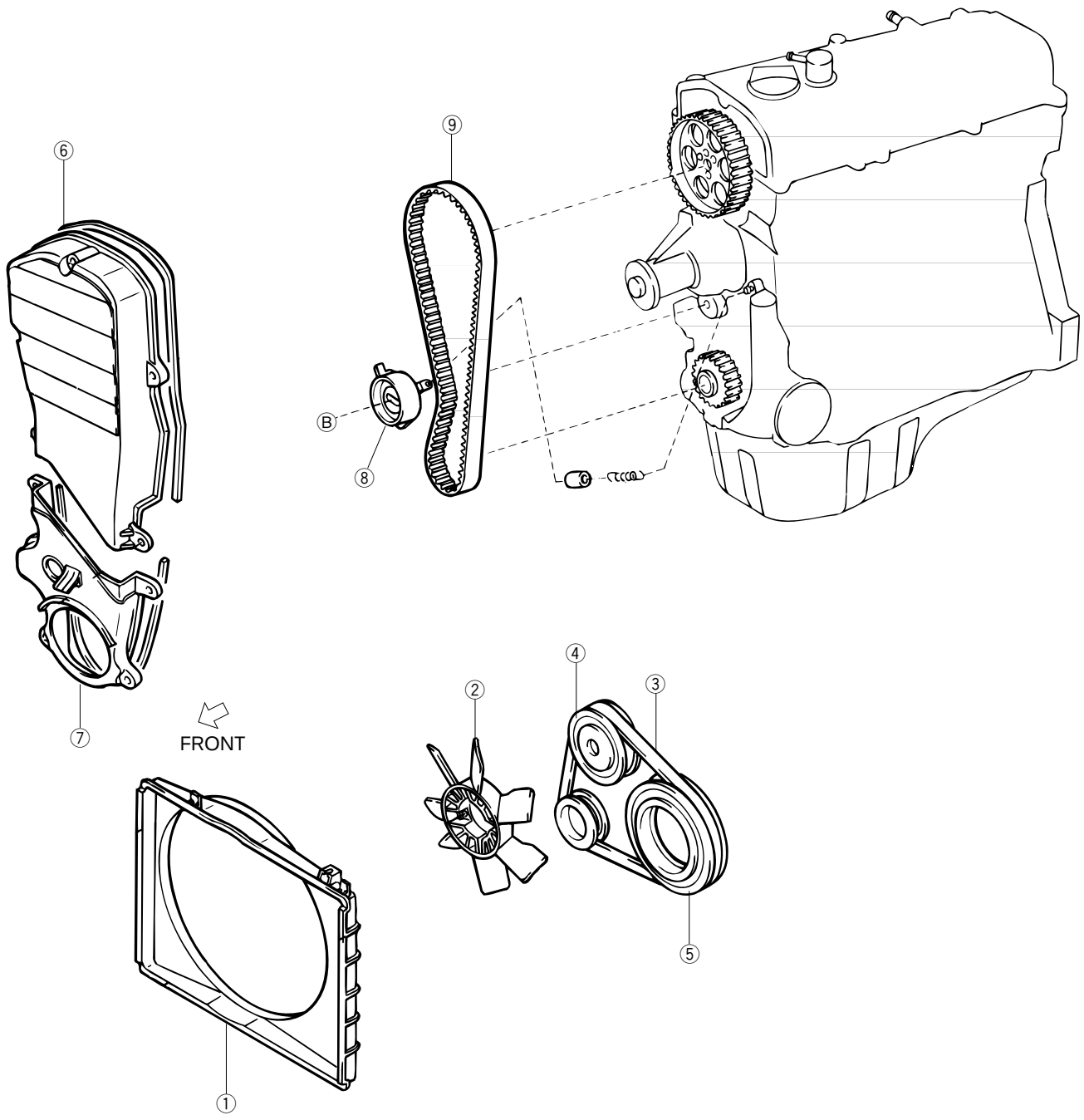
TIMING BELT

COMPONENTS



① Fan shroud
② Fan & fluid coupling
③ V-ribbed belt
④ Water pump pulley
⑤ Crankshaft pulley assembly
⑥ Timing belt upper cover
⑦ Timing belt lower cover
⑧ Timing belt tensioner subassembly
⑨ Timing belt

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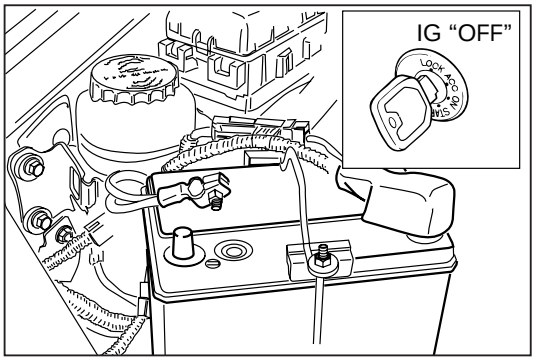
REMOVAL

1. Disconnect the battery ground cable from the negative (–) terminal of the battery.



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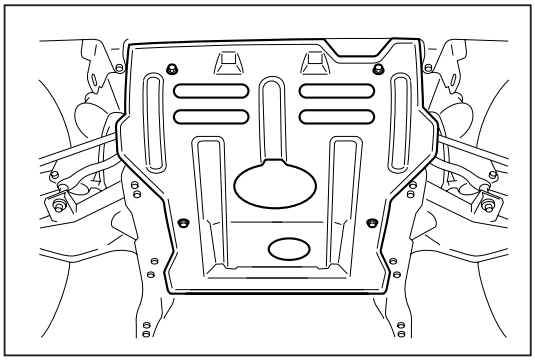
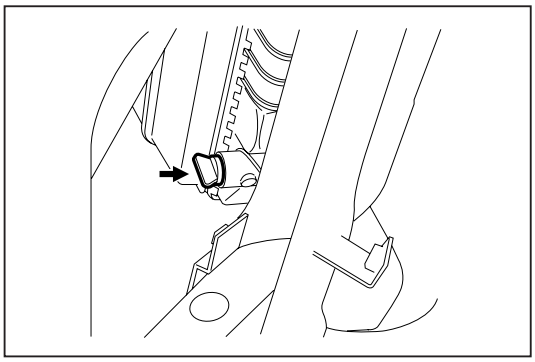
2. Remove the engine undercover.



JEM00027-00019

3. Removal of fan and fluid coupling
   (1) Drain the coolant by loosening the drain plug and the radiator cap.
   WARNING:
   - Never open the drain plug and the radiator cap when the coolant is still hot.
     Failure to observe this caution will cause you to get scalded.



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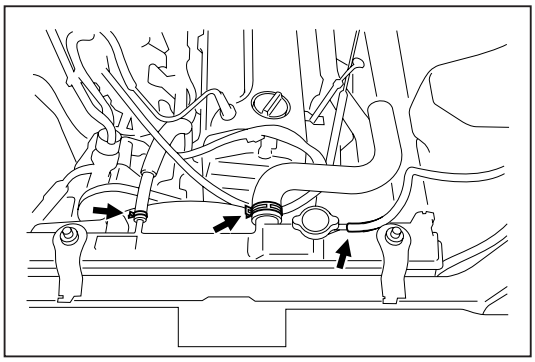
   (2) Disconnect the water hose from the radiator upper side.



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   (3) Loosen the attaching nuts of the fluid coupling.
   (4) Remove the fan and the fluid coupling together with the fan shroud by loosening the attaching bolts.

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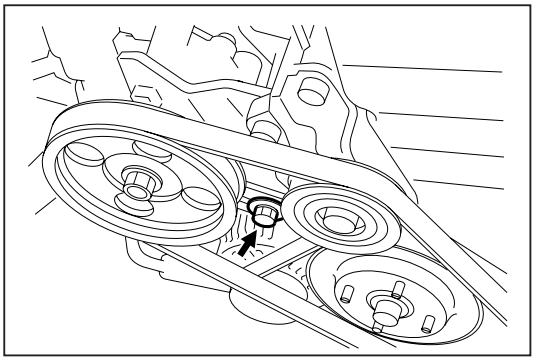
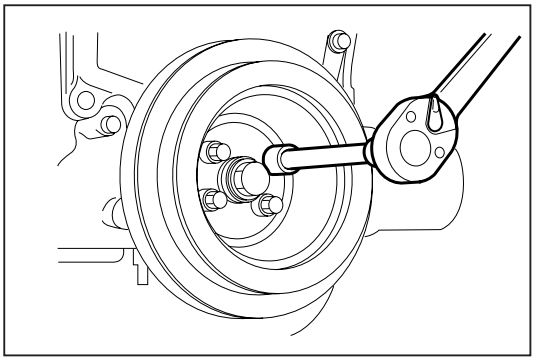
4. Remove the power steering vane pump drive belt by loosening the power steering vane pump attaching bolts.
5. Remove the alternator drive belt.



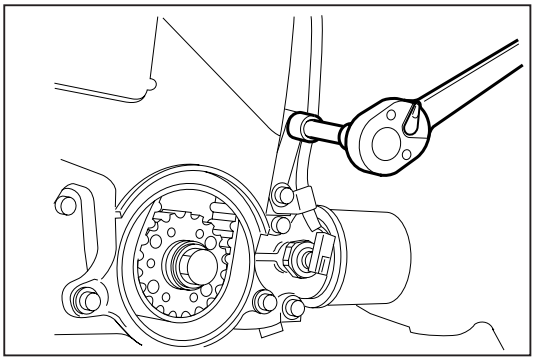
JEM00031-00022

6. Remove the crankshaft pulley.
   NOTE:
   - Place the shift lever in the 4th gear position so as to prevent the rotation of the crankshaft in the case of manual transmission-equipped model.
   - On the automatic transmission vehicle, prevent the crankshaft from being rotated by inserting a screwdriver or the like into the ring gear at the rear end section of the cylinder block.



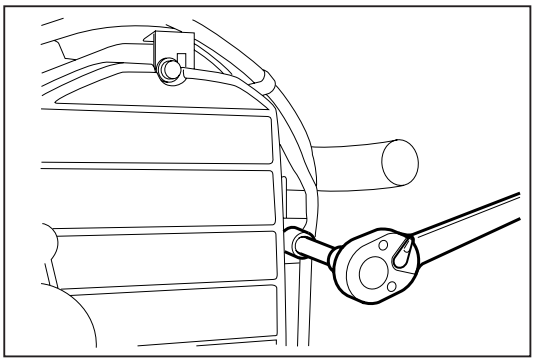
JEM00032-00023

7. Disconnect the connector of the oil pressure switch and loosen the attaching bolt of the oil pressure switch wire bracket.



JEM00033-00024

8. Remove the timing belt cover by removing the attaching bolts.



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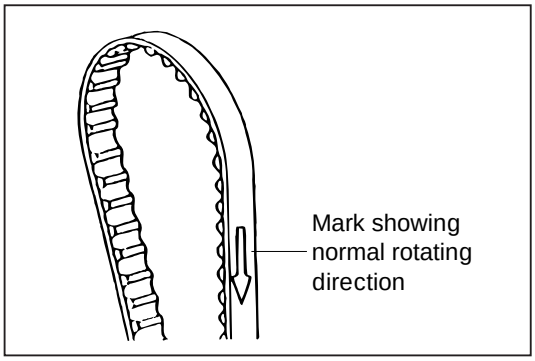
9. Removal of timing belt

NOTE:

- Prior to removal of the timing belt, put an arrow mark indicating the normal rotating direction on the belt, using a chalk or the like.

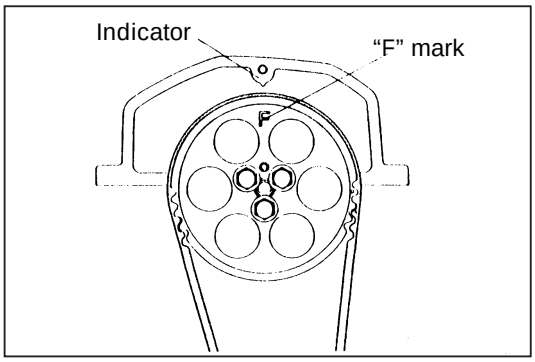


JEM00035-00026

CAUTION:

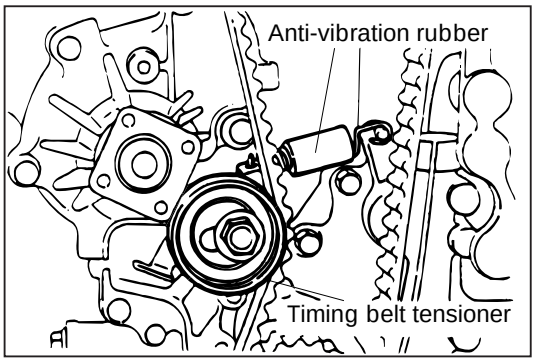
- Do not try to pry the timing belt with a screwdriver or the like during the removal or installation.
- Do not allow the belt to come into contact with oil, water or dust.
- Do not bend the belt at a sharp angle or turn the belt inside out, for it is very vulnerable to bending.
- Do not utilize the tension of the timing belt pulley when loosening the set bolt of the camshaft timing belt pulley.

(1) Rotate the crankshaft until the “F” mark of the crankshaft timing belt pulley is aligned with the indicator of the cylinder head cover.



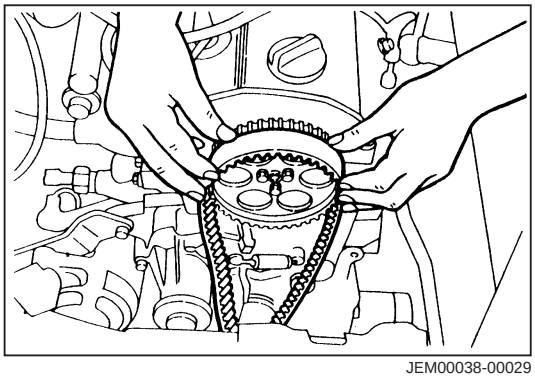
JEM00036-00027

(2) Loosen the attaching bolt of the timing belt tensioner. Move the tensioner to the left as far as it will go and tighten the bolt temporarily.



JEM00037-00028

(3) Remove the timing belt.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10. Removal of camshaft timing belt pulley
    (1) Remove the timing belt.
    (2) Remove the cylinder head cover.

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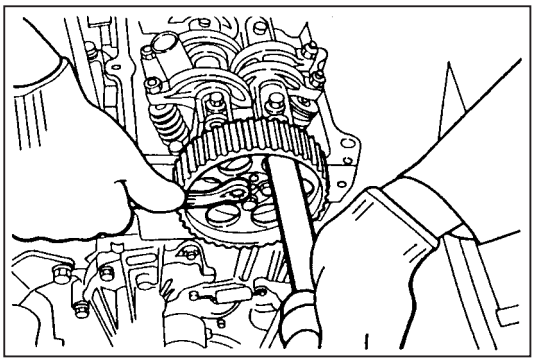
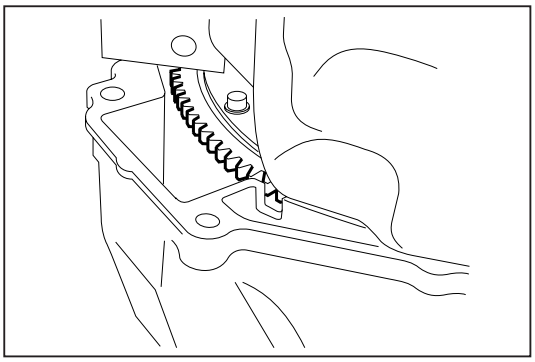
    (3) Removal of camshaft timing belt pulley
    While preventing the camshaft timing belt pulley from turning using a suitable iron rod, remove the three attaching bolts.
    Then, remove the camshaft timing belt pulley.



JEM00040-00030

11. Removal of crankshaft timing belt pulley
    (1) Remove the timing belt.
    (2) Removal of crankshaft timing belt pulley
        ① Remove the power train stiffener and prevent the ring gear from turning with a suitable screwdriver or the like.



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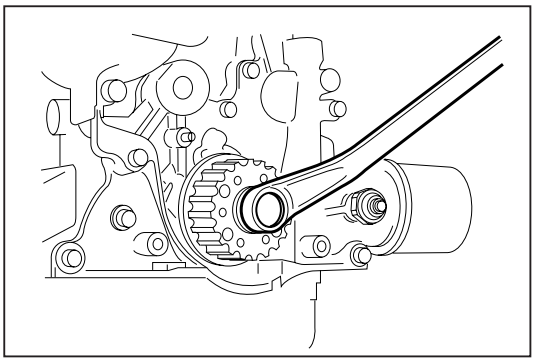
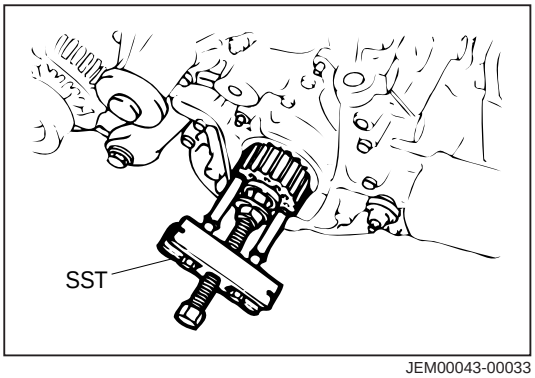
        ② While performing the operation described in the step ①, remove the set bolt of the crankshaft timing belt pulley.



JEM00042-00032

        ③ Remove the crankshaft timing belt pulley.

NOTE:
- If any difficulty is encountered in removing the crankshaft timing belt pulley, lightly screw in the set bolt of the crankshaft timing belt pulley. Then, remove the pulley, using the following SST.
  SST: 09609-20011-000



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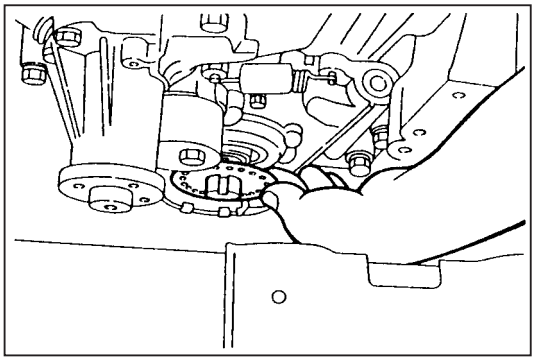
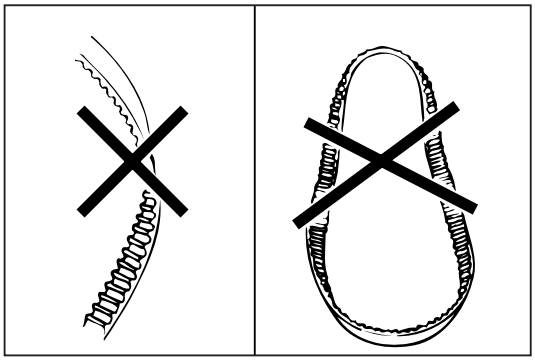
(3) Remove the timing belt pulley flange.



JEM00044-00034

INSPECTION

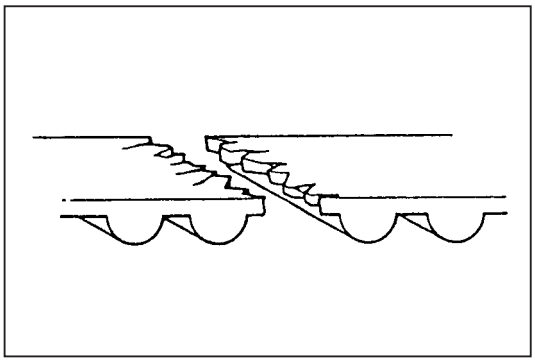
1. Inspection of timing belt
   CAUTION:
   - Do not bend, twist or turn the belt inside out.
   - Do not allow the belt to come into contact with oil, water or steam.



JEM00045-00035

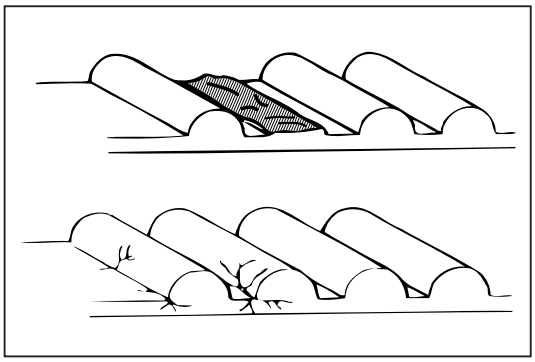
If there are damages, as shown in the figures, check the following points and replace the timing belt, if necessary.

(1) Premature separation
- Check for proper installation.
- Check the timing belt cover gaskets for damage and check for correct installation.



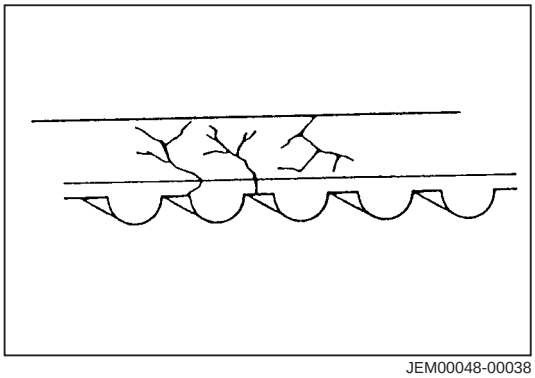
JEM00046-00036

(2) If the belt teeth are cracked or damaged, check to see if the camshaft is seized.



JEM00047-00037

(3) If there is noticeable wear or cracks on the belt surface, check to see if there are nicks on one side of the idler pulley lock.



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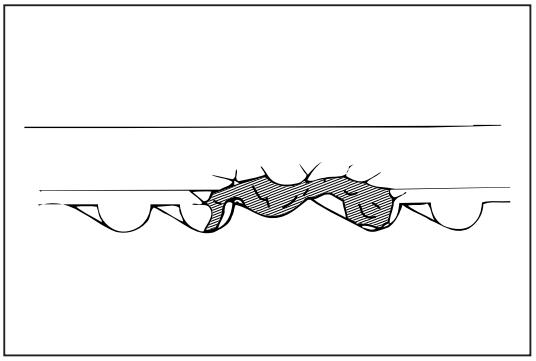
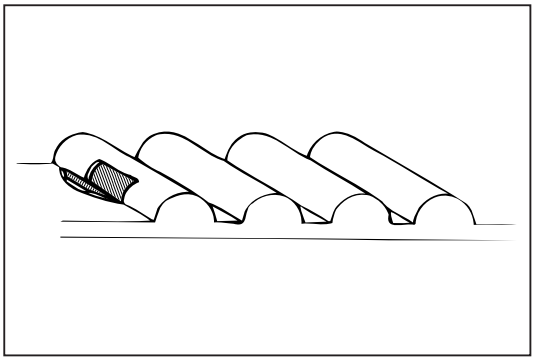
(4) If there is wear or damage on only one side of the belt, check the pulley flange.



JEM00049-00039

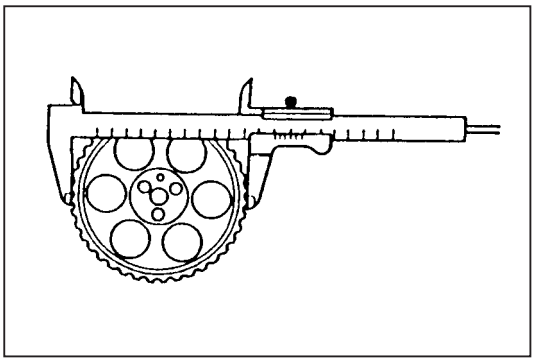
(5) If there is noticeable wear on the belt teeth, check the timing cover gasket for damage and check for correct gasket installation. Check for foreign material on the pulley teeth.



JEM00050-00040

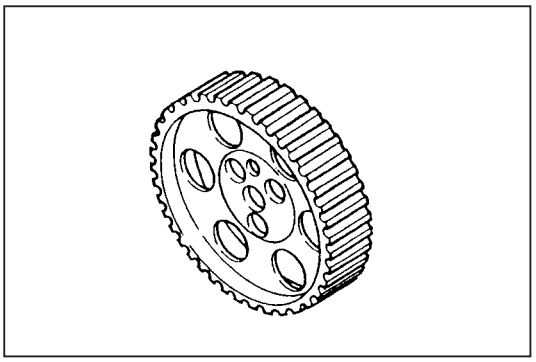
2. Inspection of camshaft timing belt pulley
   (1) Measure the maximum width of the timing belt pulley, using vernier calipers.
   Wear Limit of Camshaft Timing Belt Pulley: 119.8 mm

   If the measured value is less than the specified value, replace the timing belt pulley with a new one.



JEM00051-00041

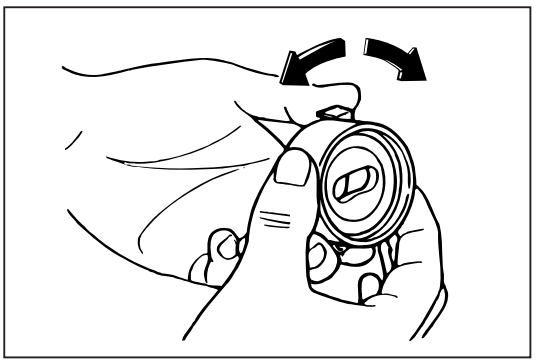
   (2) Visually inspect the timing belt pulley for damage.
   If any damage is present, replace the timing belt pulley with a new one.



JEM00052-00042

3. Inspection of timing belt tensioner
   If the timing belt tensioner is damaged, check to see if the bearing exhibits an excessive play.
   NOTE:
   - Check the timing belt pulleys for smooth turning.
   - Check the belt contact surface for damage.

   If necessary, replace the idler pulley.
   CAUTION:
   - Never wash the timing belt tensioner.



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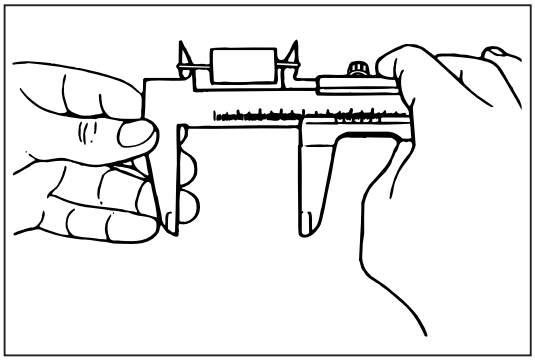
4. Inspection of tension spring
   (1) Check the free length of the spring
   Free Length: 46.5 mm or less

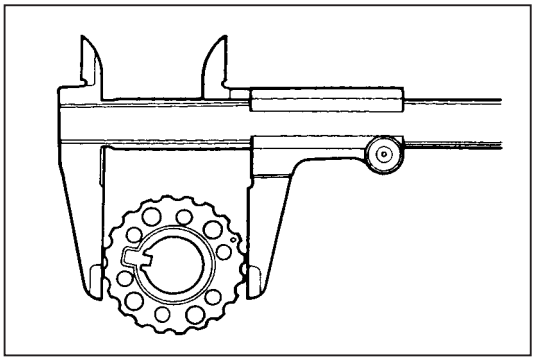
   (2) Check the tension of the spring at the specified installation length.
   Specified Value:
   29.4 ± 3 N at 50.9 mm

   If the tension does not conform to the specification, replace the spring.

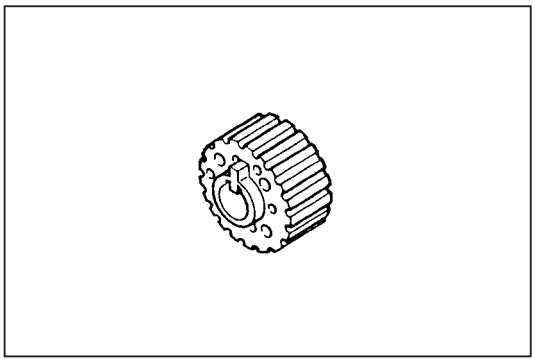

JEM00054-00044

5. Inspection of crankshaft timing belt pulley and flange
   (1) Measure the maximum width of the timing belt pulley, using vernier calipers.
   Wear Limit of Crankshaft Timing Belt Pulley: 59.3 mm

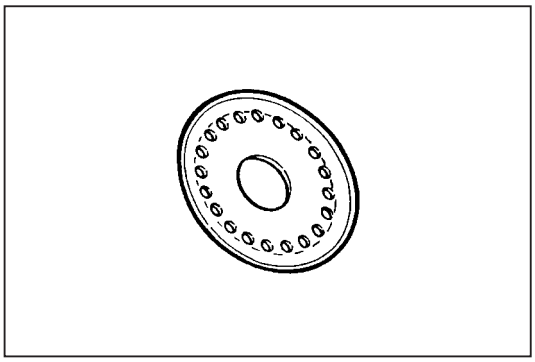
   If the measured value is less than the specified value, replace the timing belt pulley with a new one.


JEM00055-00045

   (2) Visually inspect the crankshaft timing belt pulley for damage. If any damage is present, replace the crankshaft timing belt pulley.


JEM00056-00046

   (3) Visually inspect the crankshaft timing belt pulley flange for bend, wear and other damage.
   If any damage is present, replace the crankshaft timing belt pulley flange.


JEM00057-00047

INSTALLATION

1. Installation of camshaft timing belt pulley
   (1) Install the camshaft timing belt pulley on the camshaft in such a way that the “F” mark can be seen and the locating pin hole is aligned.

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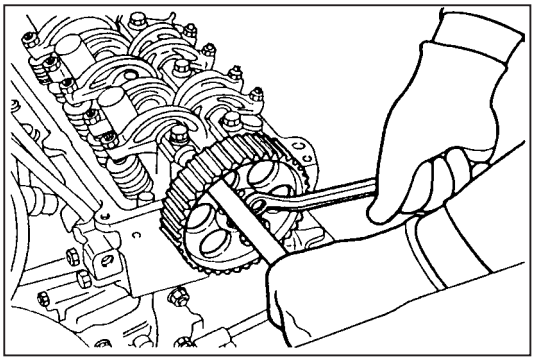
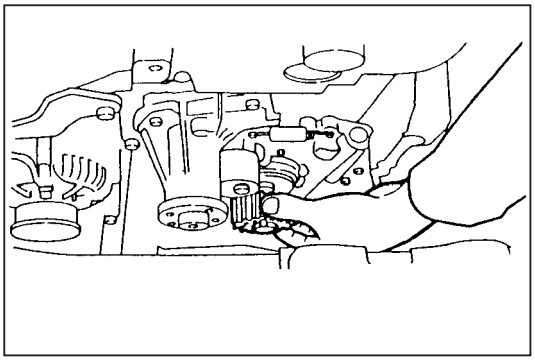
(2) Install the attaching bolts of the camshaft timing belt pulley, while preventing the pulley from turning by inserting an iron rod into the hole of the pulley.
Tightening Torque: 14.7 - 21.6 N·m

NOTE:
- Do not turn the camshaft independently.
- Be very careful not to damage the gasket attaching surface of the cylinder head.
- The bolts and bolt holes should be dry during the tightening.

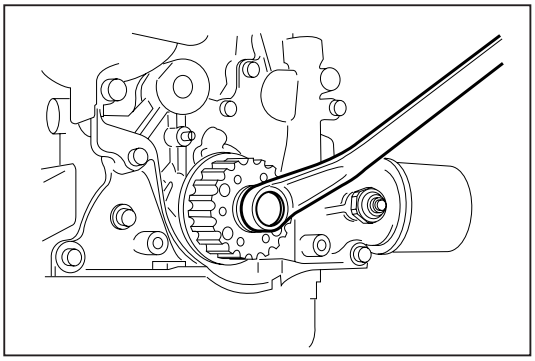

JEM00059-00048

2. Installation of crankshaft timing belt pulley
(1) Install the crankshaft timing belt pulley flange with its recessed side facing toward the oil pump side (Protrusion side facing toward the crankshaft timing belt pulley side).
(2) Install the crankshaft timing belt pulley on the crankshaft by aligning it with the key groove.
(3) Install the set bolt of the crankshaft timing belt pulley.

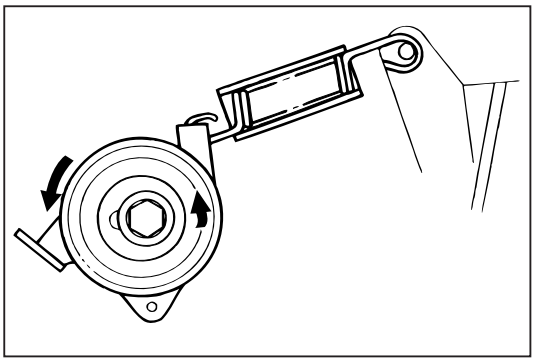

JEM00060-00049

(4) Tighten the set bolt of the crankshaft timing belt pulley, while preventing the ring gear from turning with a suitable screwdriver or the like.
Tightening Torque: 88.3 - 98.0 N·m

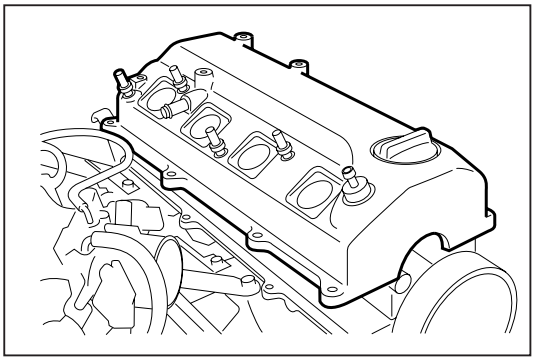
NOTE:
- Never allow the crankshaft to turn.


JEM00061-00050

3. Attach the tension spring to the timing belt tensioner.
Hang the tension spring hook on the pin. Assemble the timing belt tensioner in place and install the bolt.
CAUTION:
- Hang the spring hook securely on the pin groove.
- Ensure that the pin at the oil pump is fitted into the pin hole of the timing belt tensioner.


JEM00062-00051

4. Installation of timing belt
(1) Temporarily install the cylinder head cover.


JEM00063-00052

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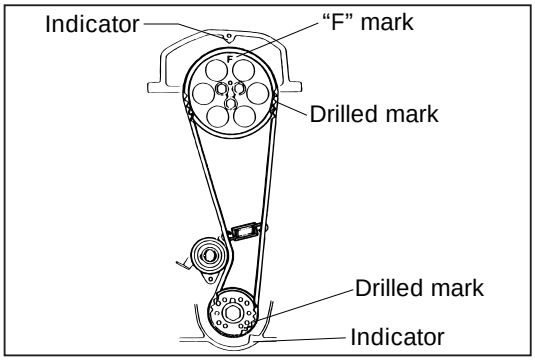
(2) Align the drilled mark of the camshaft timing belt pulley with the top surface line of the cylinder head.
(3) Align the drilled mark of the crankshaft timing belt pulley with the indicator.
(4) Assemble the timing belt in such a way that the two mating marks on the timing belt may be aligned with the corresponding drilled marks on the crankshaft timing belt pulley and camshaft timing belt pulley.

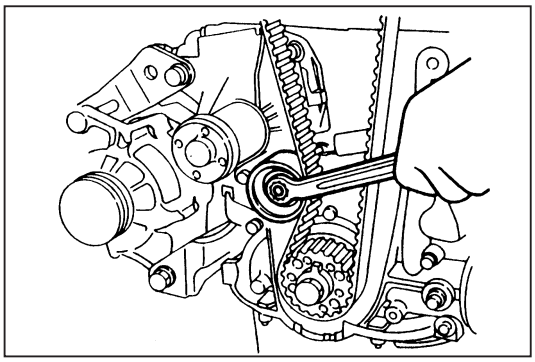
CAUTION:
- Do not allow the belt to come into contact with oil, water or dust.
- Do not try to pry the timing belt with a screwdriver or the like.
- When the timing belt is reused, there should exist 35 teeth of the belt between the drilled marks of the crankshaft timing belt pulley and camshaft timing belt pulley.
- When the timing belt is reused, the arrow mark which was put during the disassembly comes in a rotational direction of the timing belt.



JEM00064-00053

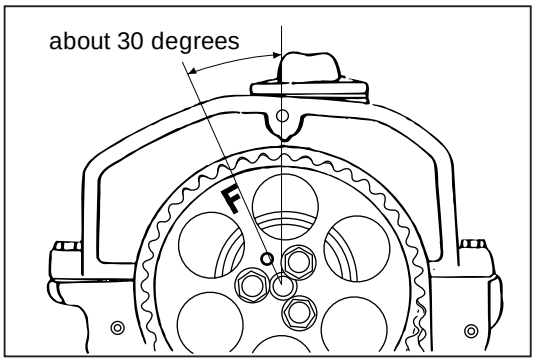
(5) Loosen the attaching bolt of the timing belt tensioner. Apply tension to the timing belt. Temporarily tighten the attaching bolt.

NOTE:
- Ensure that the belt exhibits no slack at the tension side of the belt (the side opposite to the tensioner).


JEM00065-00054

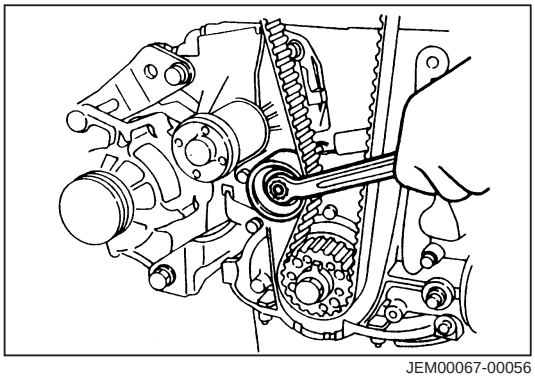
(6) Rotate the crankshaft 1.9 turns in the normal direction so that the "F" mark of the camshaft timing belt pulley comes at a point three teeth in the camshaft timing belt pulley before the indicator of the cylinder head cover.

NOTE:
- At this time, never turn the crankshaft reversely.
- Make sure that the belt is not tilted between the crankshaft timing belt pulley and the camshaft timing belt pulley.
- If the crankshaft should be reversed or the timing belt should be tilted, turn the crankshaft two more turns.



JEM00066-00055

(7) Make the tensioner free by loosening the attaching bolt of the timing belt tensioner.


JEM00067-00056

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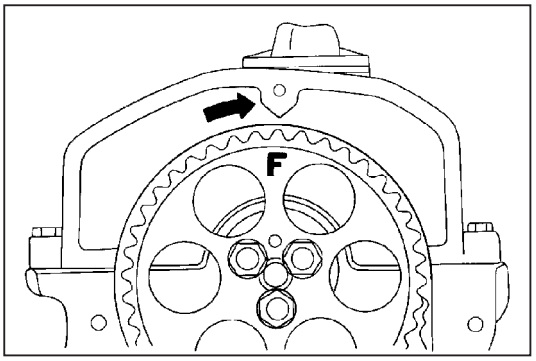
(8) Turn the crankshaft further in the normal direction until the “F” mark of the camshaft timing belt pulley is aligned with the indicator of the cylinder head cover.

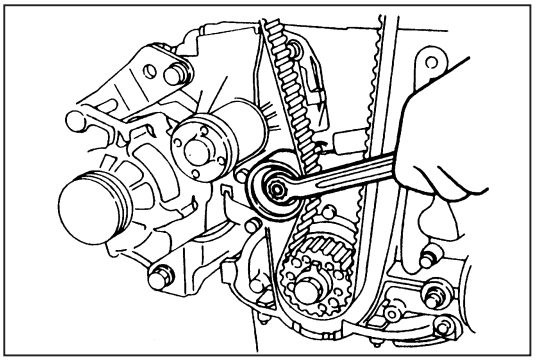
NOTE:

- Never turn the crankshaft reversely.
- Never turn the crankshaft beyond the point where the “F” mark of the camshaft timing belt pulley is aligned with the indicator.
- If the crankshaft should be reversed or turned beyond that point, temporarily tighten the tensioner attaching bolt and repeat the operations from the step (5) onward.



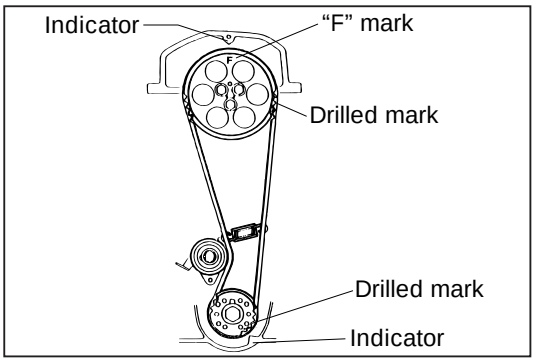
JEM00068-00057

(9) Tighten the attaching bolt of the timing belt tensioner to the specified torque.
Tightening Torque: 29.4 - 44.1 N·m


JEM00069-00058

(10) Ensure that the drilled marks of the crankshaft timing belt pulley and camshaft timing belt pulley are aligned with the corresponding indicators.

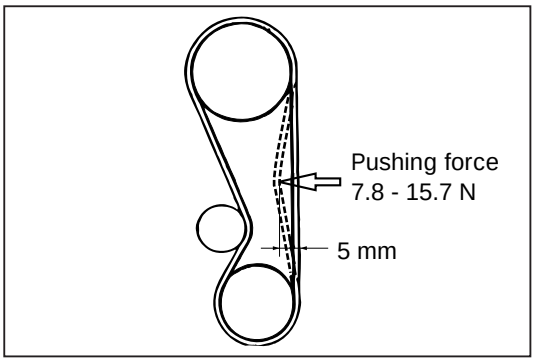
If the drilled mark is not aligned with the indicator, repeat the operations from the step (2) onward.



JEM00070-00059

5. Checking of timing belt tension
When the midpoint of the belt at the tension side is pushed 5 mm, ensure that the pushing force is within the specified value.
Specified Pushing Force:
7.8 - 15.7 N When belt is deflected 5 mm

If the belt does not conform to the specification, repeat the operations from the step 13 (4) onward.

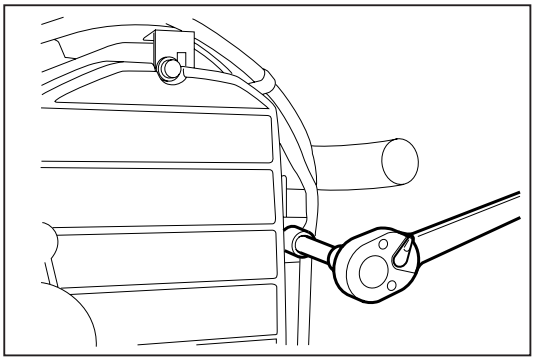


JEM00071-00060

6. Install the timing belt lower cover and upper cover.
Tightening Torque: 2.0 - 3.9 N·m

CAUTION:

- Care must be exercised as to the length of each bolt.


JEM00072-00061

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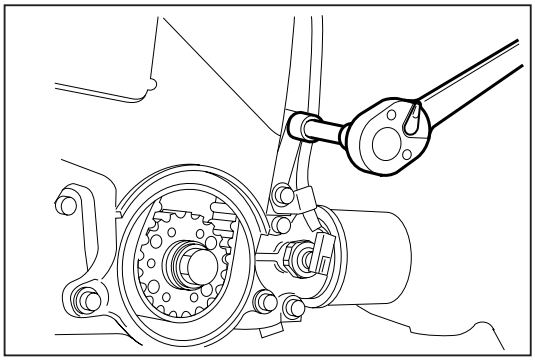
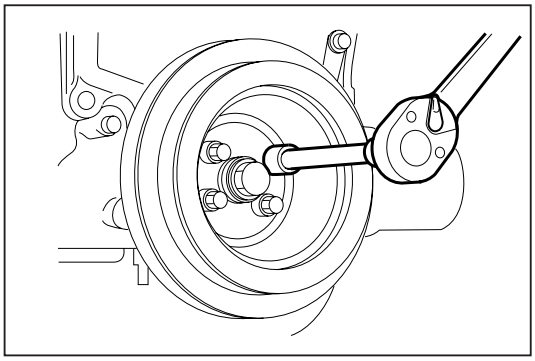
7. Install the oil pressure switch wire and tighten the wire clamps.
8. Connect the oil pressure switch connector.



JEM00073-00063

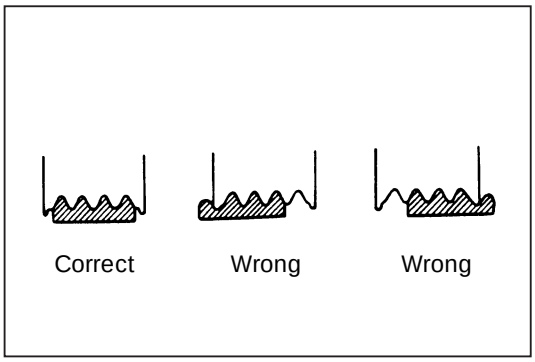
9. Install the crankshaft pulley with the attaching bolt. Tighten the bolt to the specified torque.
   Tightening Torque: 19.6 - 29.4 N·m

   NOTE:
   - Place the gear shift lever in the 4th gear position so as to prevent the rotation of the crankshaft in the case of manual transmission equipped model.
   - On the automatic transmission vehicle, prevent the crankshaft from being rotated by inserting a screwdriver or the like into the ring gear at the rear end section of the cylinder block.



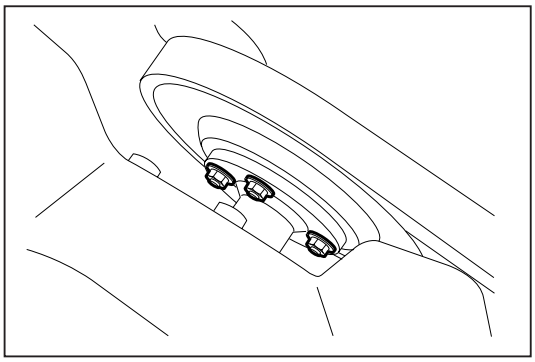
JEM00074-00062

10. Temporarily install the water pump pulley and the drive belt.
11. Install the power steering vane pump drive belt and adjust the belt tension.
    NOTE:
    - Make sure that the V-ribbed belt is fitted properly in the groove of each pulley.



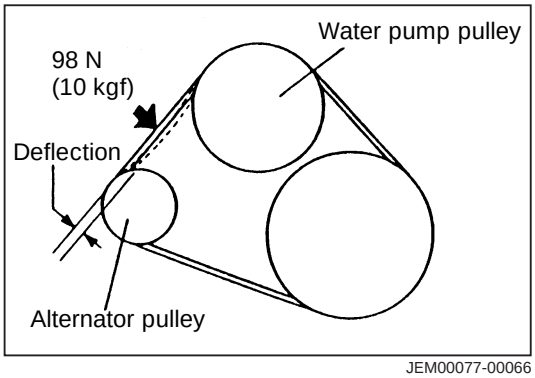
JEM00075-00064

12. Install the fan and the fluid coupling together with the fan shroud.
13. Tighten the fluid coupling attaching nuts.
    Tightening Torque: 9.8 - 17.7 N·m



JEM00076-00065

14. Tension adjustment
    (1) Screw in the adjusting bolt, until the deflection of the drive belt meets the specification when you push the midpoint of the drive belt between the water pump pulley and the alternator pulley by applying a force of 98.1 N (10 kgf).



JEM00077-00066

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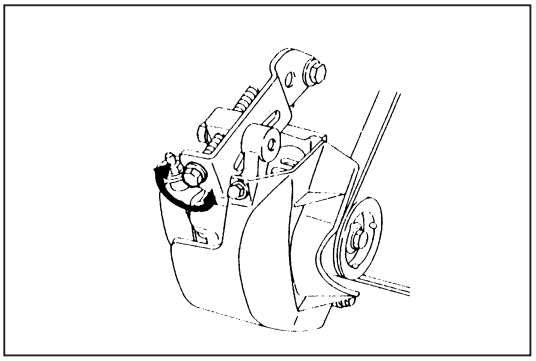
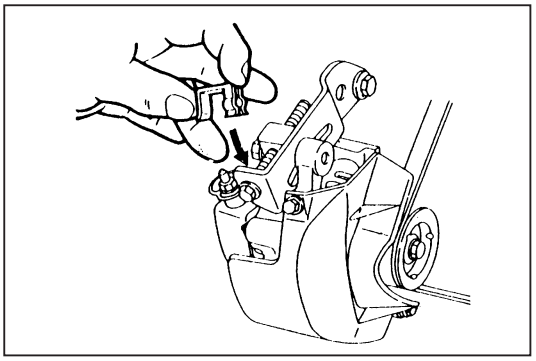
Specified Belt Deflection:
New Belt: 4.0 - 5.0 mm
With a force of 98.1 N (10 kgf) applied to point indicated in figure
Used Belt: 5.0 - 6.0 mm
With a force of 98.1 N (10 kgf) applied to point indicated in figure

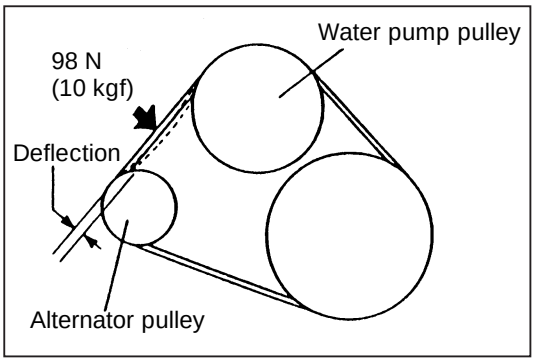

JEM00078-00067

NOTE:
- The used belt denotes a belt which has been used for more than five minutes after it was put into use.

(2) Tighten the alternator attaching bolts.
(3) Install the locking plate of the adjusting bolt.
CAUTION:
- Be sure to install the locking plate securely. Failure to observe this caution could cause falling of the adjusting bolt.

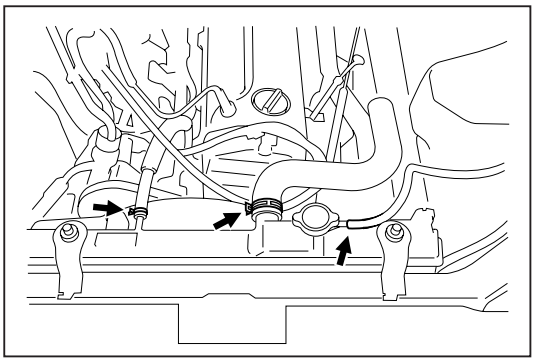

JEM00079-00068

15. Ensure that the belt deflection meets the specification when the midpoint between the water pump pulley and the alternator is pushed with a force of 98.1 N (10 kgf). (See step 14.)
If the deflection does not conform to the specification, perform the adjustment so that the specification may be satisfied.

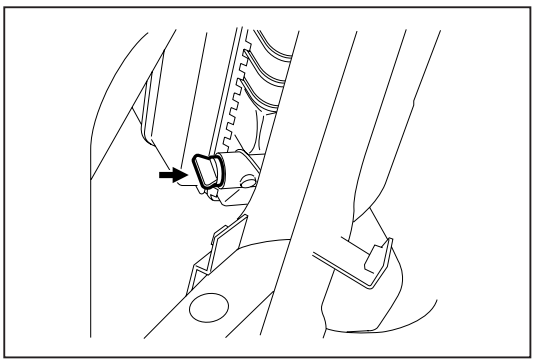


JEM00080-00069

16. Tighten the fan shroud attaching bolts.
17. Connect the water hoses to the radiator.


JEM00081-00070

18. Tighten the drain plug and fill the coolant to the radiator and reserve tank.


JEM00081-00071

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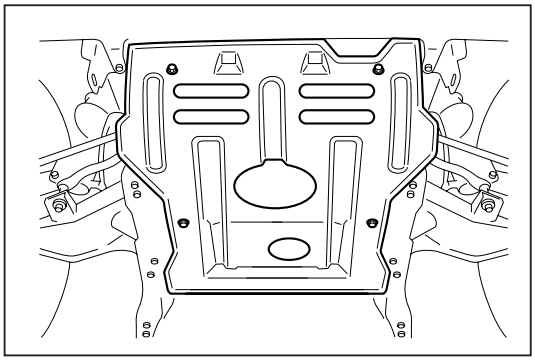
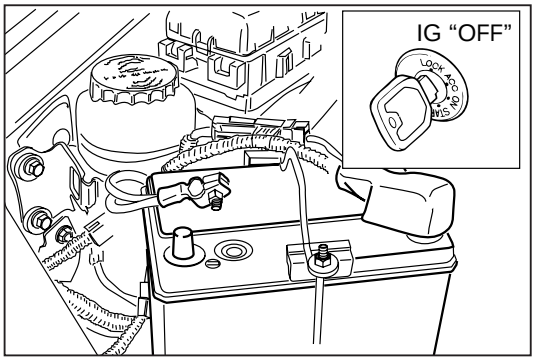
19. Install the engine undercover and tighten the attaching bolts.



JEM00083-00072

20. Connect the ground cable to the negative (–) terminal of the battery.



JEM00084-00073

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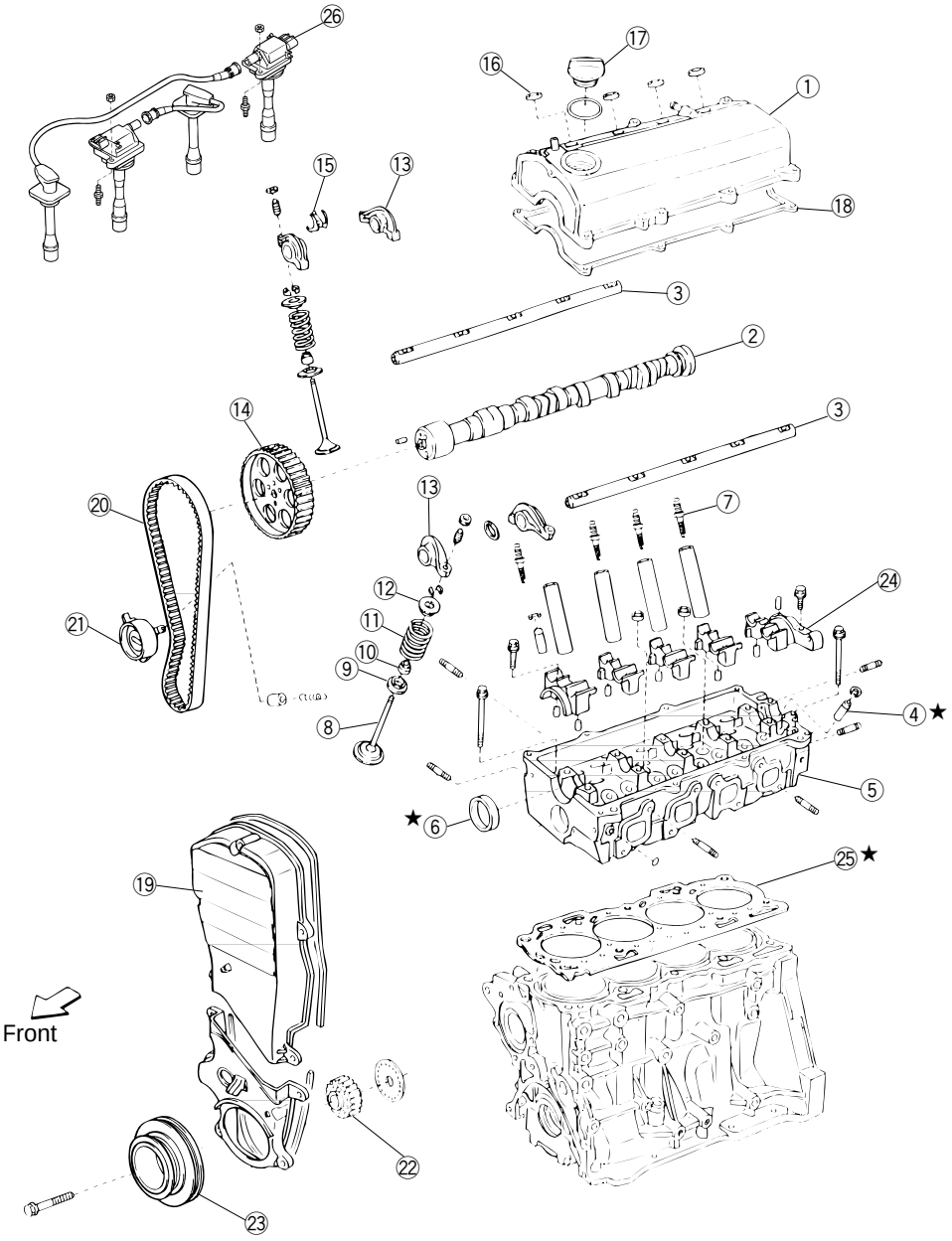
CYLINDER HEAD

COMPONENTS

★ : Non-reusable parts



① Cylinder head cover
② Camshaft
③ Valve rocker shaft
④ Valve guide
⑤ Cylinder head
⑥ Oil seal
⑦ Spark plug
⑧ Valve
⑨ Spring seat
⑩ Valve stem oil seal
⑪ Valve spring
⑫ Valve spring retainer
⑬ Valve rocker arm
⑭ Camshaft timing belt pulley
⑮ Spacer
⑯ Grommet
⑰ Oil filler cap
⑱ Gasket
⑲ Timing belt upper cover
⑳ Timing belt
㉑ Timing belt tensioner
㉒ Crankshaft timing belt pulley
㉓ Crankshaft pulley
㉔ Camshaft cap
㉕ Cylinder head gasket
㉖ Ignition coil

JEM00085-00074

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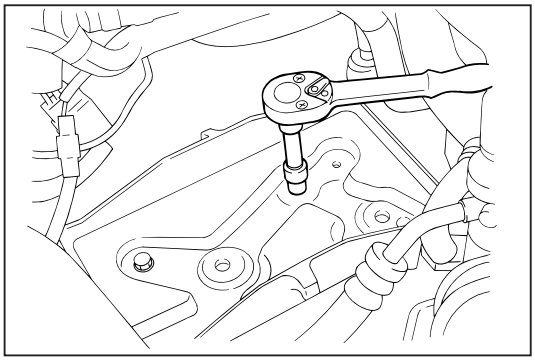
INSTRUCTION PRIOR TO OPERATION

- Install the fender cover to the fenders so that so scratch may be made to the fenders.
- Be sure to read the general information section of the service manual.

JEM00086-00000

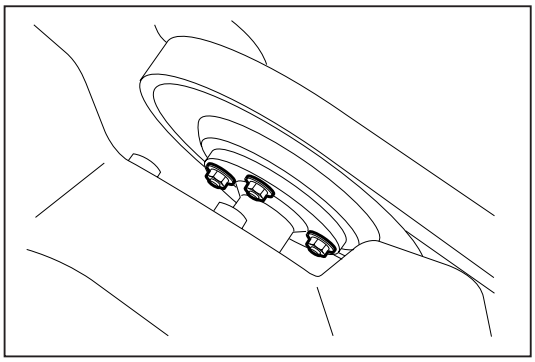
CYLINDER HEAD REMOVAL

1. Remove the battery and the battery carrier.



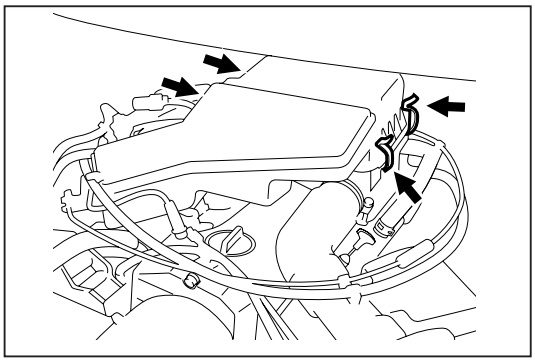
JEM00087-00075

2. Drain the coolant.
3. Remove the cooling fan with the fluid coupling and the fan shroud.
4. Remove the radiator by loosen the attaching bolts.



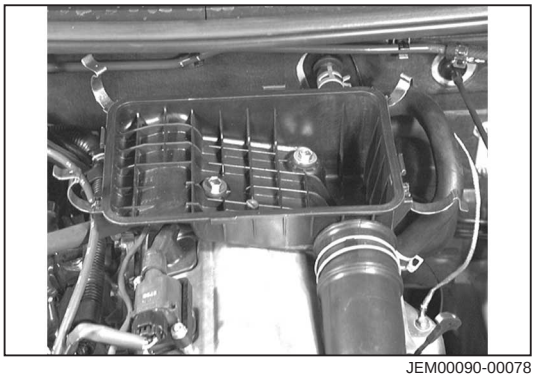
JEM00088-00076

5. Removal of air cleaner.
   (1) Remove the attaching bolt of the air intake hose.
   (2) Remove the accelerator cable and the rubber hoses from the throttle body.
   (3) Release the clips of the air cleaner and remove the air cleaner lower case with air intake hose and the filter element.



JEM00089-00077

   (4) Remove the air cleaner lower case by loosen the attaching bolts.



JEM00090-00078

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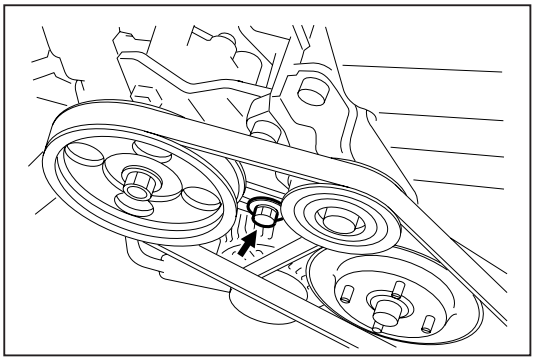
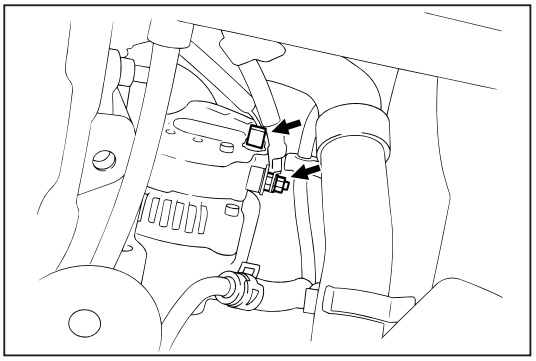
6. Remove the power steering vane pump from the engine. Suspend the removed steering vane pump at body side, using an adequate rope.



JEM00091-00079

7. Removal of alternator
   (1) Remove the connector and the cable at the rear side of the alternator.
   (2) Remove the alternator with the belt tension adjusting bar.

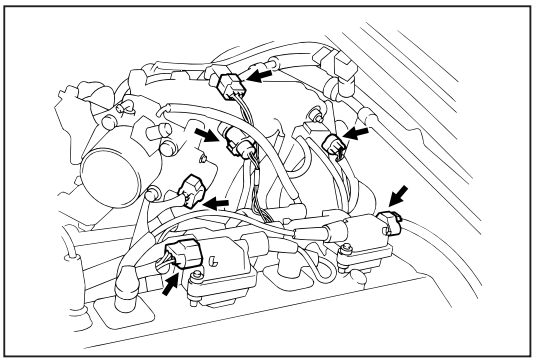


JEM00092-00080

8. Remove the timing belt.

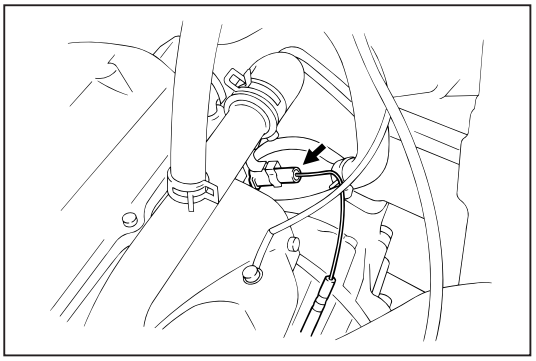
JEM00093-00000

9. Removal of engine wire from cylinder head.
   (1) Disconnect the connector of the engine wire from the following parts.
      ① Ignition coils
      ② Injectors
      ③ Pressure sensor
      ④ Throttle position sensor



JEM00094-00081

      ⑤ Intake air temperature sensor
      ⑥ Idle-up VSV
      ⑦ Water temperature sensor
      ⑧ Oxygen sensor
      ⑨ Cam angle sensor



JEM00095-00082

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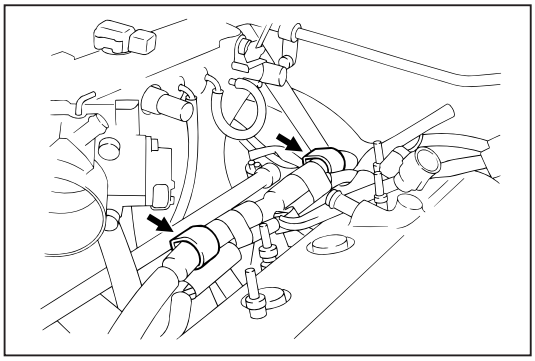
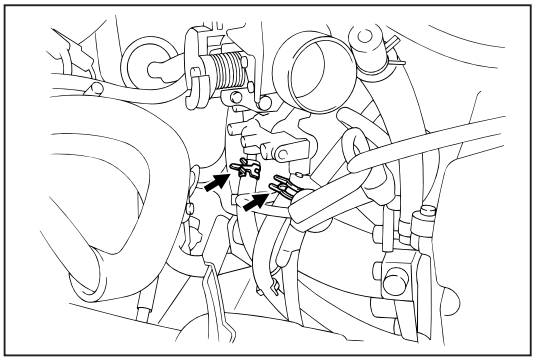
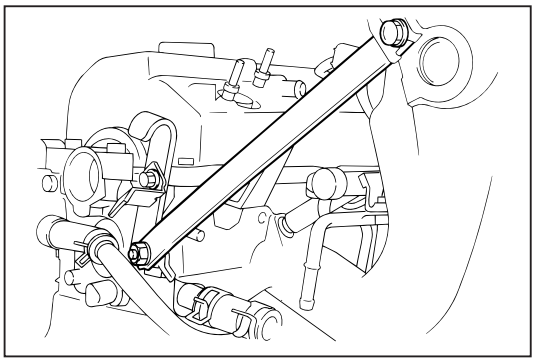
(2) Disconnect the harness clamps by unlocking the clamps.
(3) Remove the engine harness from the cylinder head.


JEM00096-00083

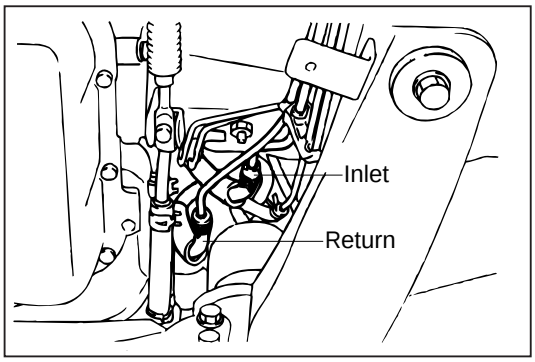
10. Disconnect the water hoses


JEM00097-00084

11. Remove the surge tank stay No. 1, No. 2 and No. 3.

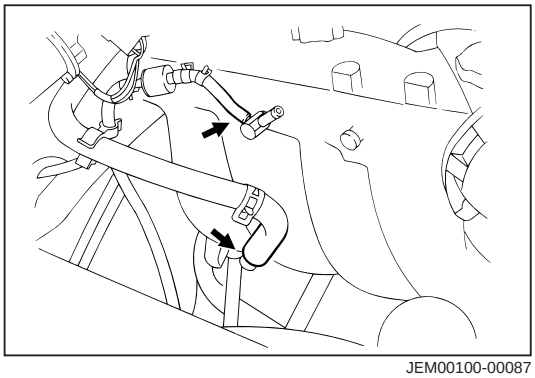

JEM00098-00085

12. Disconnect the fuel inlet hose and return hose.
CAUTION:
- The fuel pressure at inside of the fuel line is approximately 284 kPa higher than the atmospheric pressure.
- Therefore, be sure to gradually pull out the rubber hose so as to prevent fuel from splashing.



JEM00099-00086

13. Disconnect the rubber hoses for brake booster and VSV.


JEM00100-00087

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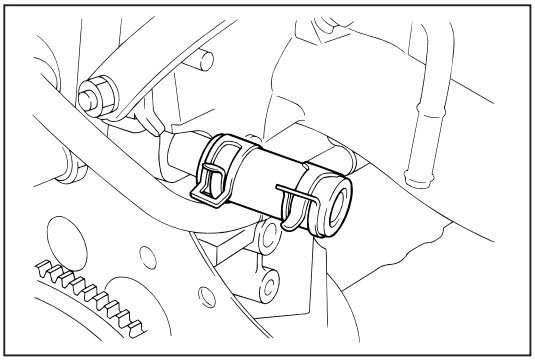
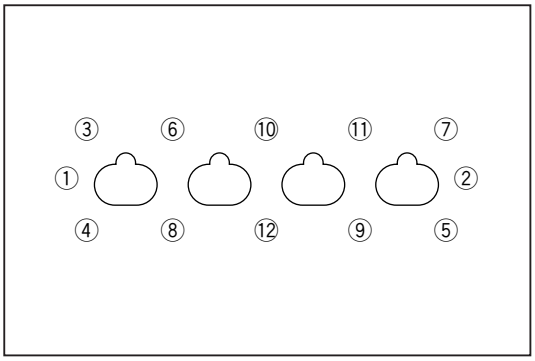
14. Removal of intake manifold
    (1) Disconnect the plugged hose at the cylinder head.



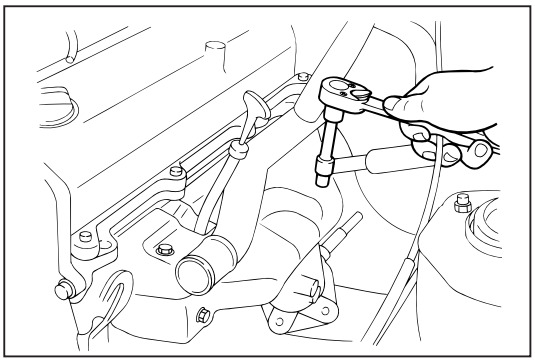
JEM00101-00088

    (2) Remove the attaching bolts and nuts of the intake manifold by loosen them evenly over two or three stage, following the sequence shown in the right figure.
    (3) Slowly detach the intake manifold from the cylinder head while preventing the interference with other parts.



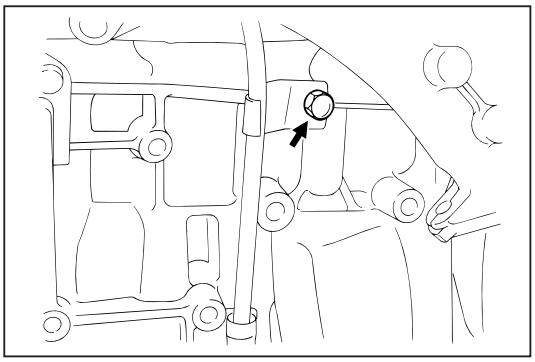
JEM00102-00089

15. Removal of exhaust manifold
    (1) Remove the heat insulator by loosen the attaching bolts.



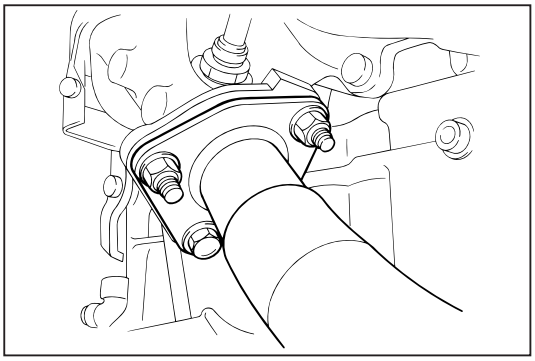
JEM00103-00090

    (2) Remove the oil level gauge.
    (3) Remove the oil level gauge guide by loosen the attaching bolt.



JEM00104-00091

    (4) Remove the front exhaust pipe from the exhaust manifold.



JEM00105-00092

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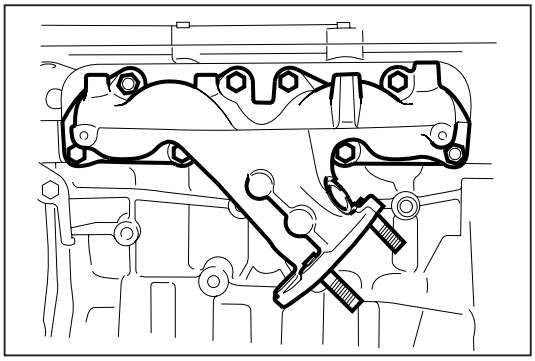
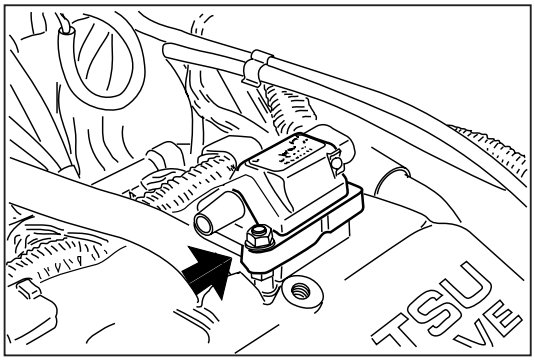
(5) Loosen the exhaust manifold attaching bolts and nuts evenly over two or three stages in the sequence shown in the right figure.
(6) Remove the exhaust manifold from the cylinder head while preventing the interference with other parts.



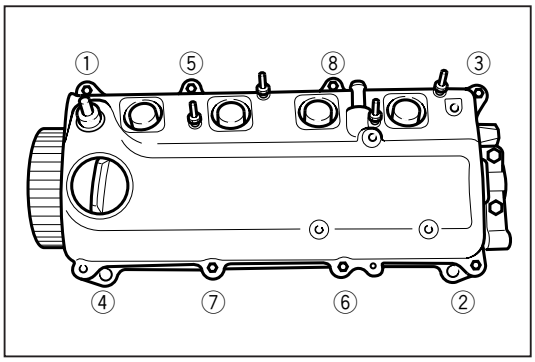
JEM00106-00093

16. Remove the ignition coil and resistive cords from the cylinder head cover.



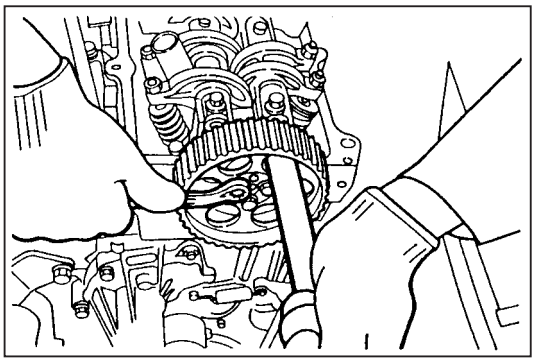
JEM00107-00094

17. Loosen the cylinder head cover attaching bolts evenly over two or three stages in the sequence shown in the right figure.
18. Remove the cylinder head cover.



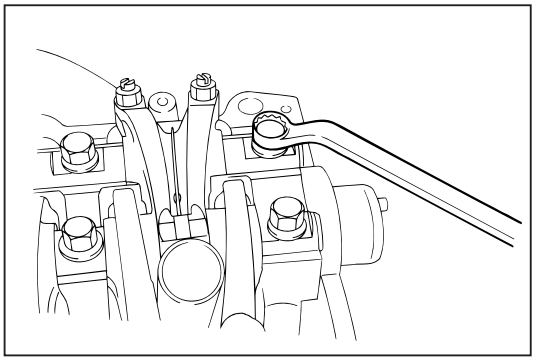
JEM00108-00095

19. Remove the camshaft pulley and cam angle sensor.
CAUTION:
- Do not turn the camshaft independently.
- Do not damage the cylinder head cover gasket surface.



JEM00109-00096

20. Loosen the valve rocker shaft attaching bolts.
21. Remove the valve rocker shaft together with rocker arms from the cylinder head.



JEM00110-00097

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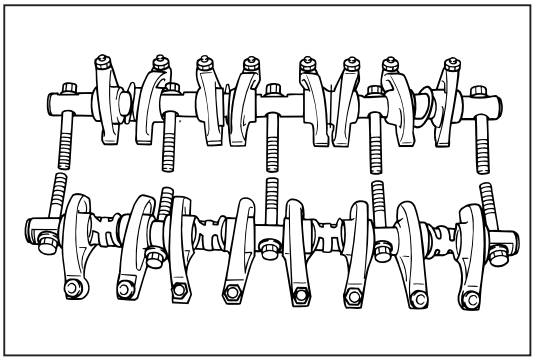
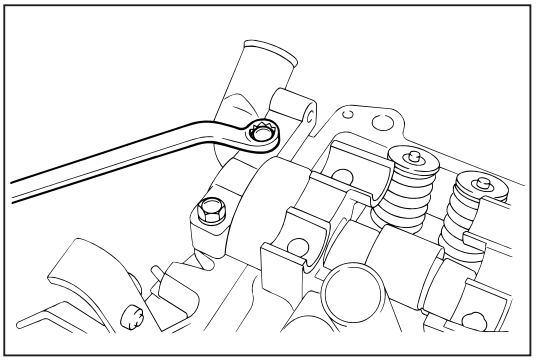
22. Remove the rocker arms, spacers and wave washers from the removed valve rocker shaft.
    NOTE:
    - Arrange the removed parts in oder to so that their respective original installation positions may be known readily.



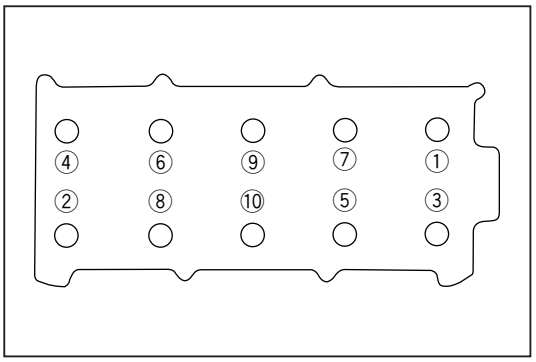
JEM00111-00098

23. Remove the camshaft bearing caps by removing the attaching bolts.
24. Remove the camshaft from the cylinder head.



JEM00112-00099

25. Loosen the cylinder head bolts evenly over two or three stages in the sequence shown in the right figure.
    NOTE:
    - Be certain to loosen the cylinder head bolts. Failure to observe this caution will cause cracks or distortion of the cylinder head, even leading to engine seizure.

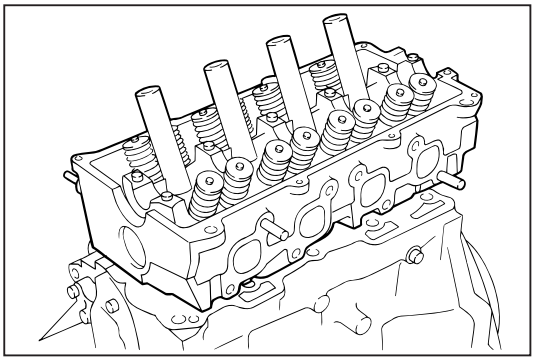


JEM00113-00100

26. Remove the cylinder head bolts.
    REFERENCE:
    - The bolts ① and ③ are shorter the other bolt
      Nominal Length of ① and ③: 110 mm
      Nominal Length of other Bolts: 155 mm

JEM00114-00000

27. Remove the cylinder head from the cylinder block.
    NOTE:
    - Place the cylinder head on two suitable wooden blocks in oder that the cylinder head gasket surface may not be damaged.



JEM00115-00101

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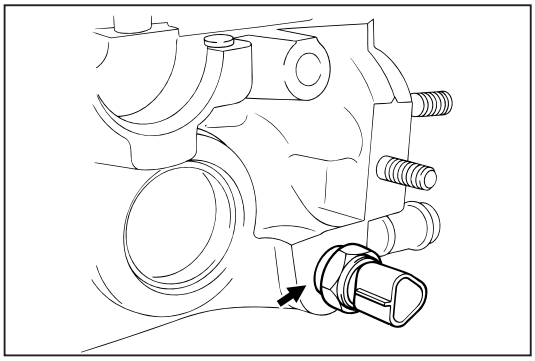
OVERHAUL OF CYLINDER HEAD

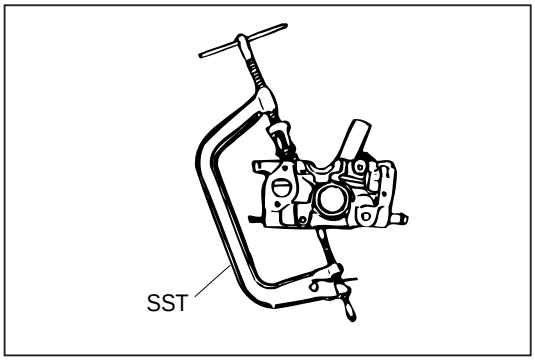
DISASSEMBLY OF CYLINDER HEAD

1. Remove the water temperature sensor gauge from the cylinder head.
2. Remove the engine hanger.



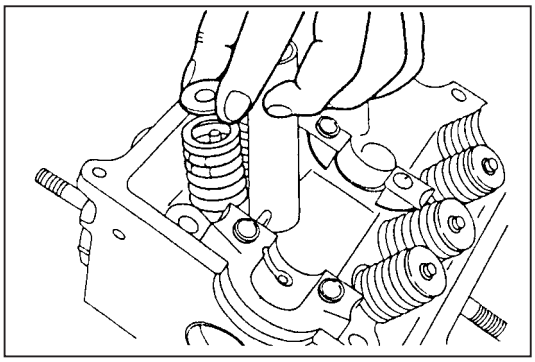
JEM00116-00102

3. Remove the valve spring retainer locks, using the following SST.
   SST: 09202-87002-000



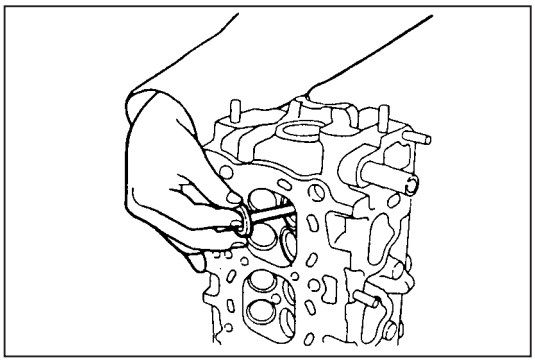
JEM00117-00103

4. Remove the valve springs.
   NOTE:
   - Arrange the removed parts in order so that their installing positions may be known easily.



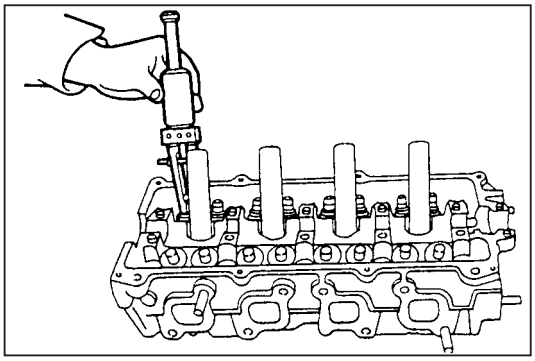
JEM00118-00104

5. Remove the valves.
   NOTE:
   - Arrange the removed parts in order so that their installing positions may be known easily.



JEM00119-00105

6. Remove the valve stem oil seal by your hand or using the following SST.
   SST: 09201-87704-000



JEM00120-00106

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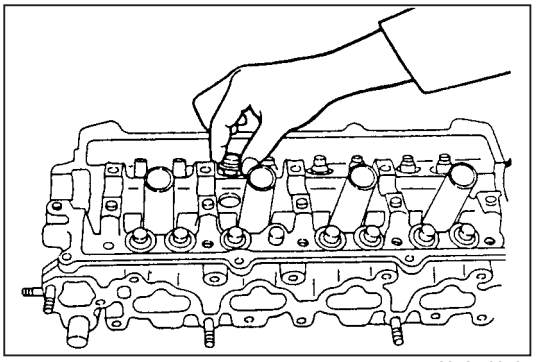
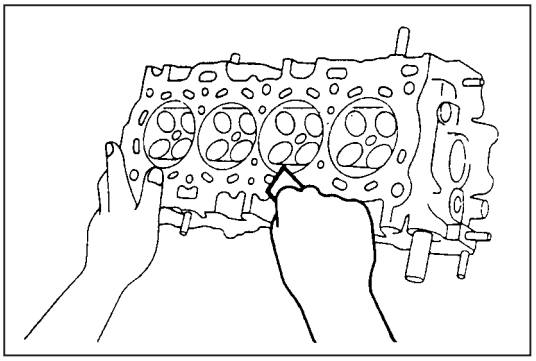
7. Remove the valve spring seats.
   NOTE:
   - Arrange the removed parts in order so that their installing positions may be known easily.


JEM00121-00107

8. Wash the disassembled parts except for electrical parts, plastic parts and grease sealed bearings. Dry them by blowing compressed air.

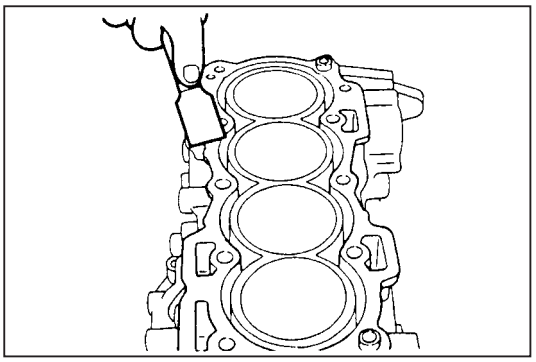

JEM00122-00108

INSPECTION, CLEANING AND REPAIRS OF CYLINDER HEAD COMPONENTS

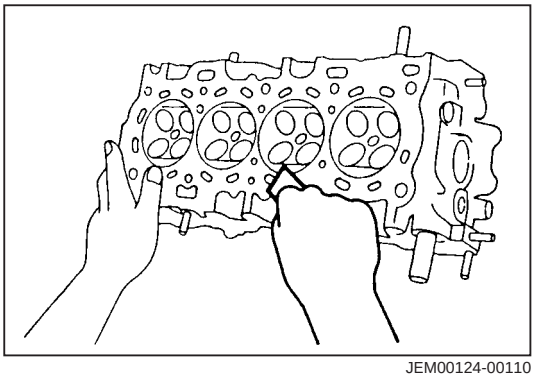
1. Cleaning of top of each piston and cylinder block
   (1) Turn the crankshaft until each piston is brought to the top dead center.
   Using a gasket scraper, remove all carbon deposits from the piston tops.
   (2) Using a gasket scraper, remove any remaining gasket material from the top of the cylinder block.
   Blow carbon deposits, water and oil from the bolt holes.
   WARNING:
   - Protect your eyes during the cleaning operation using compressed air.

   CAUTION:
   - Do not scratch the gasket surfaces of the piston and cylinder block.

   (3) Set the piston No. 1 to the top dead center.


JEM00123-00109

2. Removal of gasket material
   Using a gasket scraper, remove any remaining gasket material from the cylinder head and manifold surfaces.


JEM00124-00110

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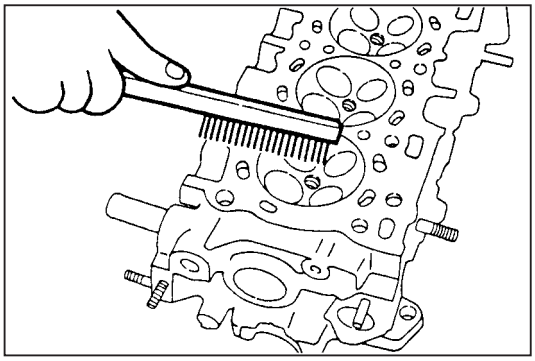
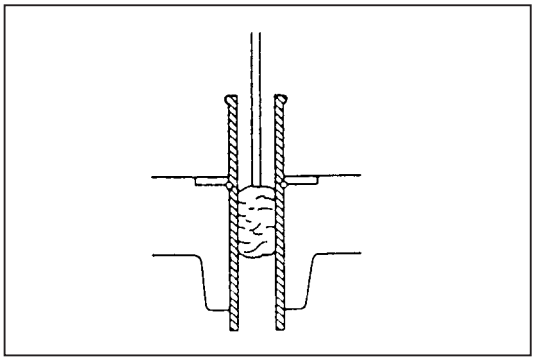
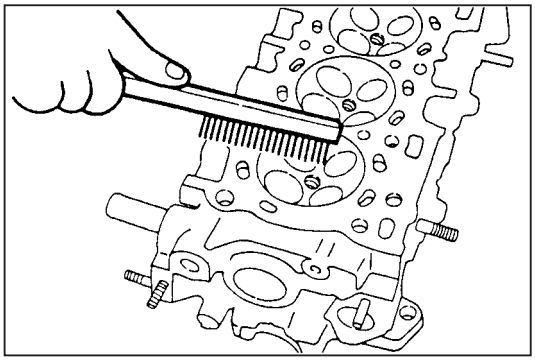
3. Cleaning of combustion chamber
   Using a wire brush, remove all carbon deposits from the combustion chambers.
   CAUTION:
   - Be careful not to scratch the cylinder head gasket contact surfaces.


JEM00125-00111

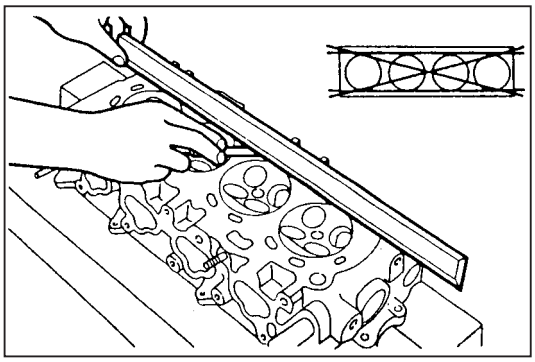
4. Cleaning of valve guide bushings
   Using a valve guide brush and solvent, clean all the valve guide bushings.


JEM00126-00112

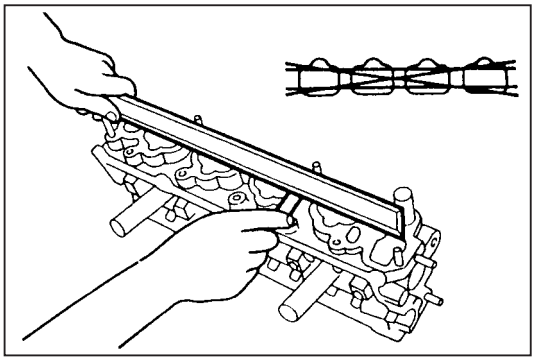
5. Cleaning of cylinder head
   Using a soft brush and solvent, thoroughly clean the cylinder head.


JEM00127-00113

6. Inspection of cylinder head for flatness
   Using a precision straight edge and a feeler gauge, check the gasket surfaces contacting the cylinder block and manifolds for warpage.
   Maximum Surface Warpage
   Cylinder Block Side: 0.10 mm
   Intake Manifold Side: 0.10 mm
   Exhaust Manifold Side: 0.10 mm


JEM00128-00114

   If surface warpage of the cylinder block side exceeds the maximum limit, replace the cylinder head.


JEM00129-00115

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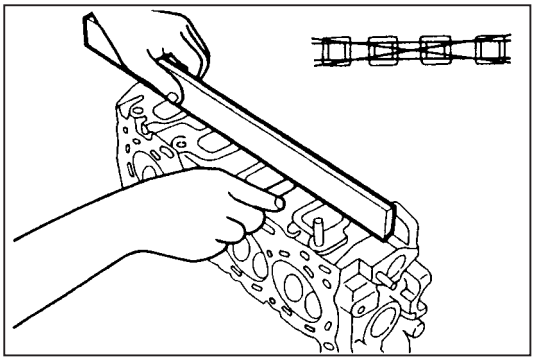
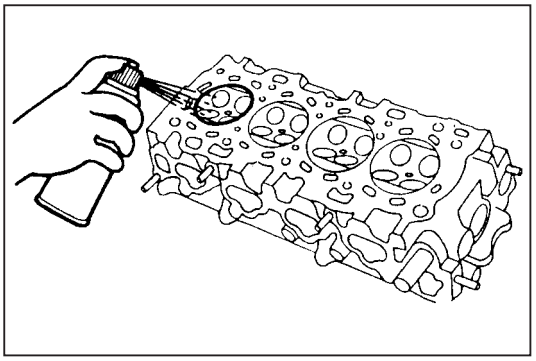


JEM00000-00116

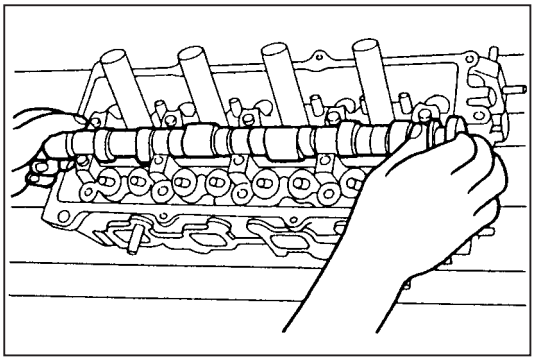
7. Inspection of cylinder head for cracks
   Using a dye penetrant, check the combustion chamber, intake and exhaust ports, cylinder head surface and top of the cylinder head for cracks.
   If a crack is found, replace the cylinder head.



JEM00130-00117

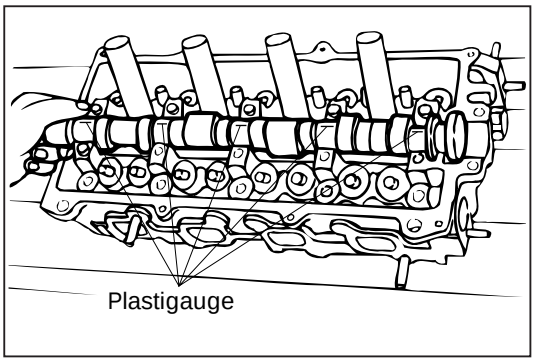
8. Inspection of camshaft oil clearance
   NOTE:
   - Prior to this oil clearance check, the camshaft should be checked for bend in advance.

   (1) Install the camshaft to the cylinder head.



JEM00131-00118

   (2) Place a plastigage on each bearing.



JEM00132-00119

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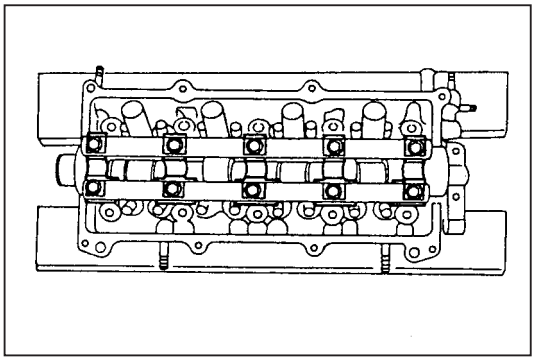
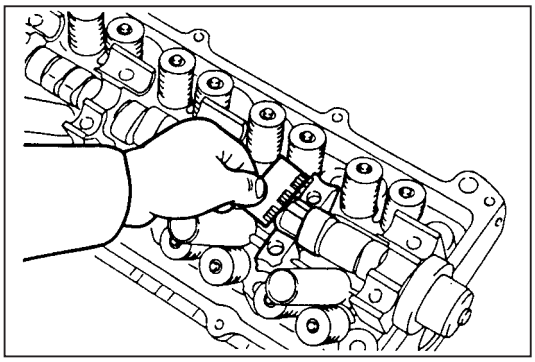
(3) Install the bearing caps and rocker shafts. Tighten them to the specified torque.
Tightening Torque
M10 Bolt: 28.4 - 36.3 N·m/Dry
M8 Bolt: 12.7 - 16.7 N·m/Dry


JEM00133-00120

NOTE:
- Each bearing cap bears a cap number.
- The intake valve rocker shaft can be identified by the recessed sections on it.
- The valve rocker shaft should be installed in such a direction that the side having a wider chamfer comes at the timing belt side.
- Ensure that the bolt holes and bolts are dry when tightening the bolts. (Ensure that no oil or the like gets to the bolt holes and bolts.)

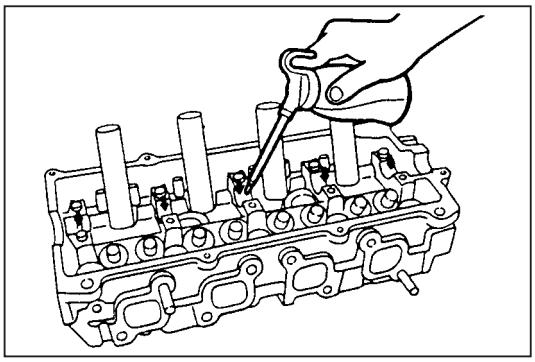
(4) Remove the bearing caps and measure the oil clearance.
Clearance
Specified Value: 0.035 - 0.076 mm
Allowable Limit: 0.17 mm


JEM00134-00121

If the oil clearance exceeds the allowable limit, replace the cylinder head and camshaft as a set.

NOTE:
- After completion of the check, remove the plastigages. Wash the camshaft and bearing caps in cleaning solvent.

9. Inspection of camshaft thrust clearance
(1) Apply engine oil to the camshaft journals.


JEM00135-00122

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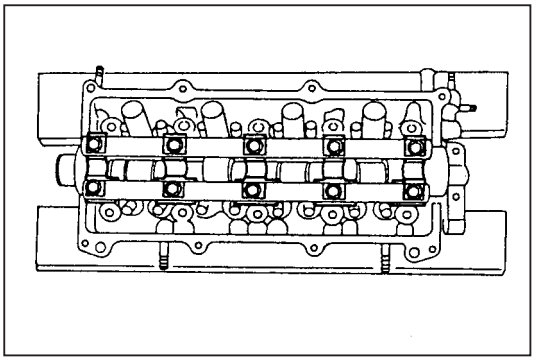
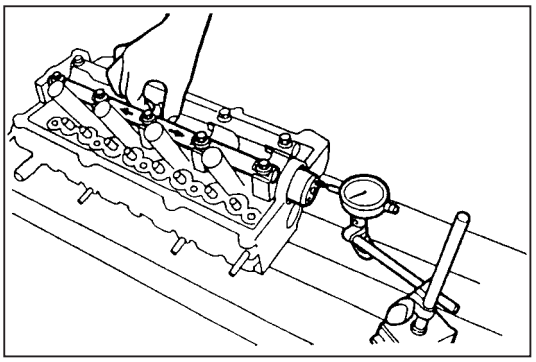
(2) Install the camshaft to the cylinder head. Install the bearing caps and rocker shafts and tighten them to the specified torque.
Tightening Torque
M10 Bolt: 28.4 - 36.3 N·m/Dry
M8 Bolt: 12.7 - 16.7 N·m /Dry


JEM00136-00123

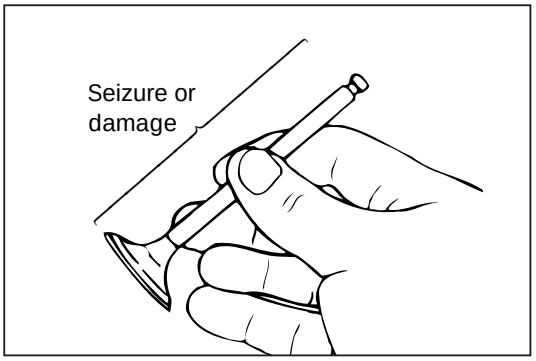
NOTE:
- Each bearing cap bears a cap number.
- The intake valve rocker shaft can be identified by the recessed sections on it.
- The valve rocker shaft should be installed in such a direction that the side having a wider chamfer comes at the timing belt side.
- Ensure that the bolt holes and bolts are dry when tightening the bolts. (Ensure that no oil or the like gets to the bolt holes and bolts.)

(3) With a dial gauge attached to the camshaft, measure the thrust clearance.
Thrust Clearance
Specified Value: 0.1 - 0.25 mm
Allowable Limit: 0.45 mm

If the camshaft thrust clearance exceeds the allowable limit, replace the camshaft and cylinder head as a set.
Reference:
Cylinder Head Thrust Surface Width:
4.10 - 4.20 mm
Camshaft Thrust Surface Width:
3.95 - 4.00 mm


JEM00137-00124

10. Inspection and grinding of valves
(1) Visually inspect the valve stem for seizure or damage.
NOTE:
- If seizure or damage is found, replace the valve and valve guide bush as a set.
- However, this replacement should be performed only after the checks for the valve seat, valve stem and guide bush have been finished.
- The valve guide bush hole must be used for refacing the valve seat. Hence, if the valve guide bush hole exhibits any roughness due to seizure, etc., rectify the hole with an adjustable reamer.



JEM00138-00125

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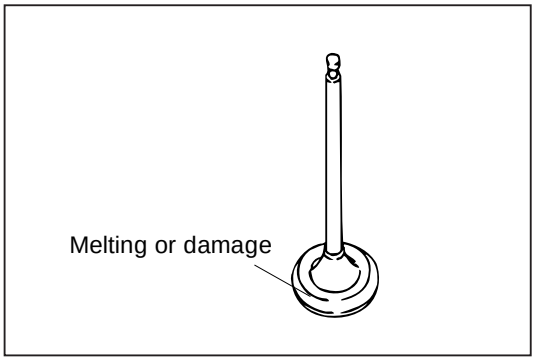
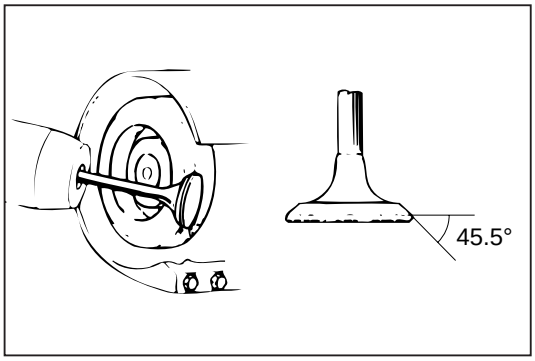
(2) Visually inspect the valve head for melting or damage.
If the valve head exhibits any melting or damage, replace the valve.
If the roughness on the contact surface can be corrected, grind the valve seat contact surface with a valve refacer.



JEM00139-00126

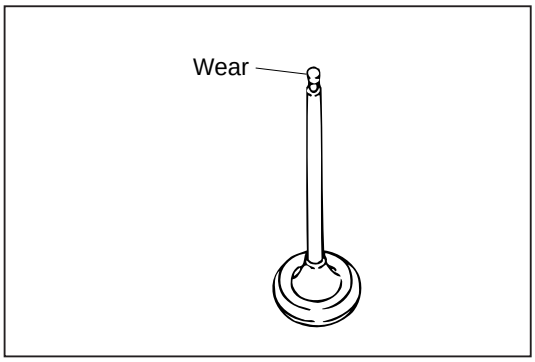
(3) Grind the valves only enough to obtain a smooth contact surface with the valve seat.
Valve Face Angle: 45.5°

NOTE:
- Make sure the valves are ground to the correct valve face angle.



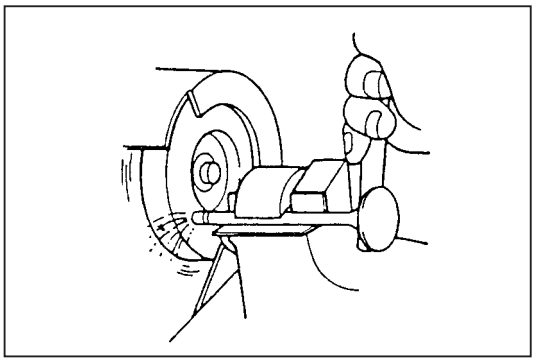
JEM00140-00127

(4) Visually inspect the valve stem end for abnormal wear.



JEM00141-00128

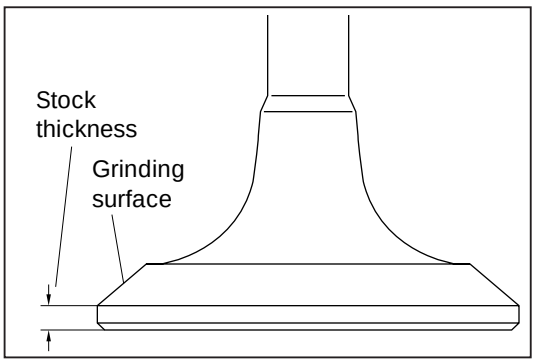
If the valve stem end exhibits abnormal wear, correct the stem end with a valve refacer. However, this correction should be made within a limit of 2 mm from that of standard length.
Reference:
Valve Length (STD)
Intake Valve: 112.8 mm
Exhaust Valve: 114.5 mm


JEM00142-00129

NOTE:
- Be very careful not to allow the valve to be overheated during grinding.

(5) Inspect the valve head for its stock thickness.
Minimum Stock Thickness
Intake Valve: 0.8 mm
Exhaust Valve: 1.0 mm

If the stock thickness of the valve head is less than the minimum stock thickness, replace it with a new one.



JEM00143-00130

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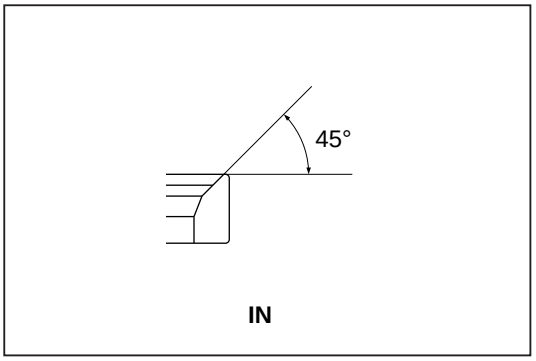
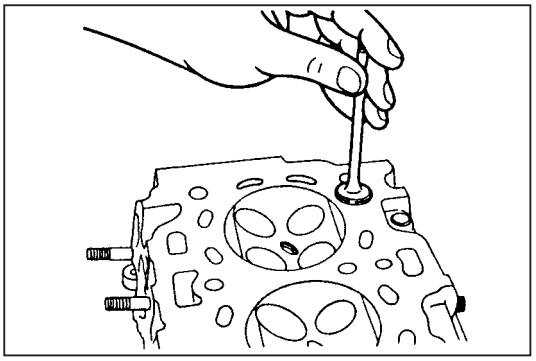
11. Inspection and cleaning of valve seats
    (1) Using a 45-degree valve seat cutter, reface the valve seats. Remove only enough metal stock to clean the seats.
    (2) Apply a thin film of red lead (or white lead) to the valve seat.
    (3) Let the valve drop by its own weight onto the valve seat two or three times.
    (4) Take out the valve.



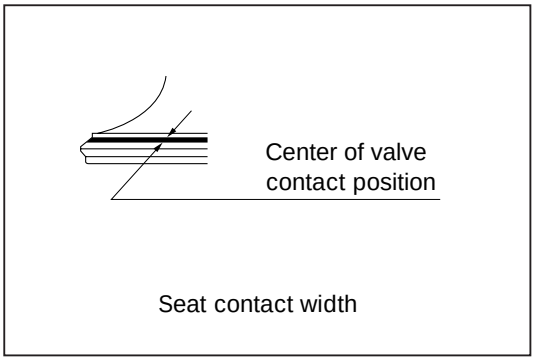
JEM00144-00131

    (5) Inspect the valve face and seat for the following items.
        ① Ensure that the valve seat contact surface of the valve is continuous over the whole circumference. If not, replace the valve.
        ② Ensure that the valve contact surface of the valve seat is continuous over the whole circumference. If not, reface the valve seat.


JEM00145-00132

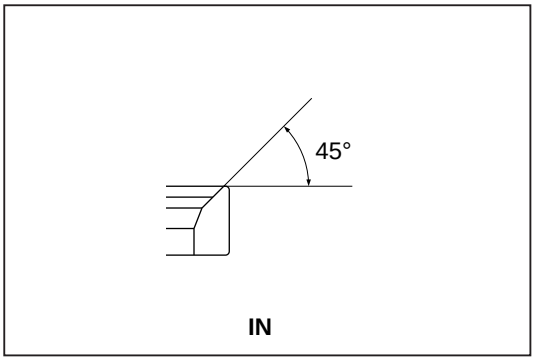
        ③ Measure the width of the contact surface of valve seat.
        Contact Surface of Valve Seat: 1.2 - 1.6 mm

        If not, reface the valve seat.



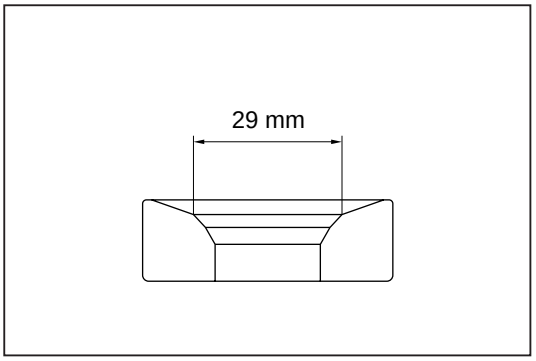
JEM00146-00133

12. Refacing of valve seat
    (1) Refacing procedure for intake valve seats
        ① Using a 45-degree cutter, recondition the roughness on the valve-to-valve seat contact surface, only enough to obtain a smooth surface.



JEM00147-00134

        ② Using a 30-degree cutter, cut the valve seat in such way that the circumference of the surface refaced by the 45-degree cutter may become 29 ± 0.1 mm



JEM00148-00135

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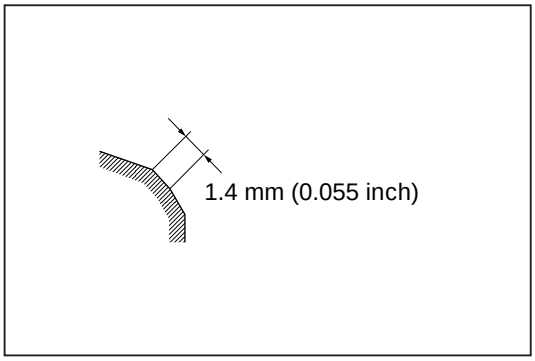
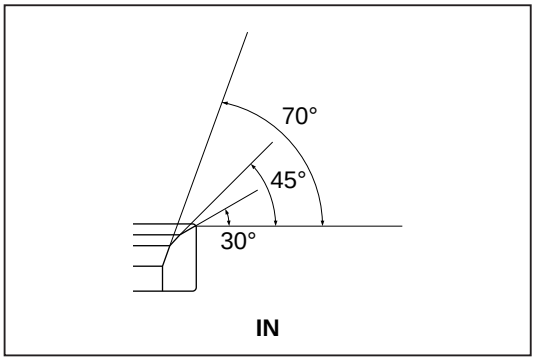
③ Using a 70-degree cutter, cut the seat in such way that the width, of the surface refaced by the 45-degree cutter may became 1.4 mm.



JEM00149-00136

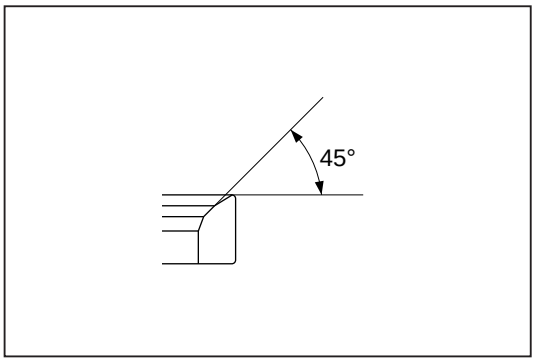
④ Using the 45-degree cutter, remove burrs produced during the refacing by the 30-degree and 70-degree cutters.



JEM00150-00137

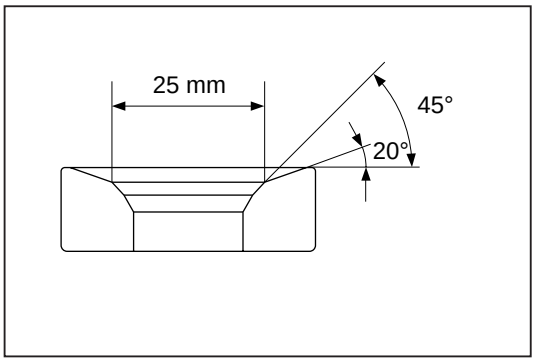
(2) Refacing procedure for exhaust valve seats

① Using a 45-degree cutter, recondition the roughness on the valve-to-valve seat contact surface, only enough to obtain a smooth surface.



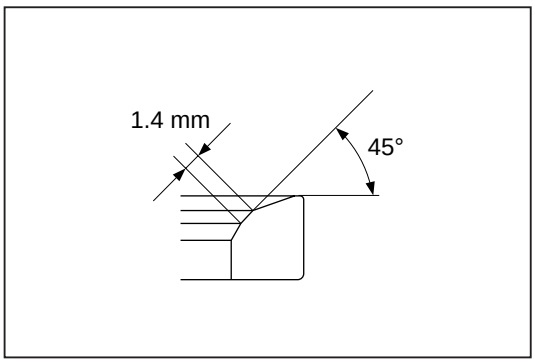
JEM00151-00138

② Using a 20-degree cutter, cut the valve seat in such a way that the circumference of the surface refaced by the 45-degree cutter may become 25 mm.



JEM00152-00139

③ Using a 70-degree cutter, cut the valve seat in such a way that the width of the surface refaced by the 45-degree cutter may become 1.4 mm.



JEM00153-00140

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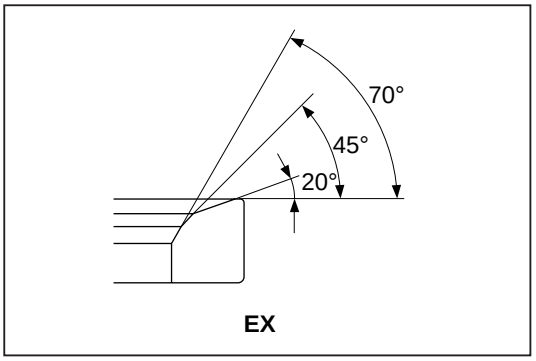
④ Using the 45-degree cutter, remove burrs produced during the refacing by the 20-degree and 70-degree cutters.



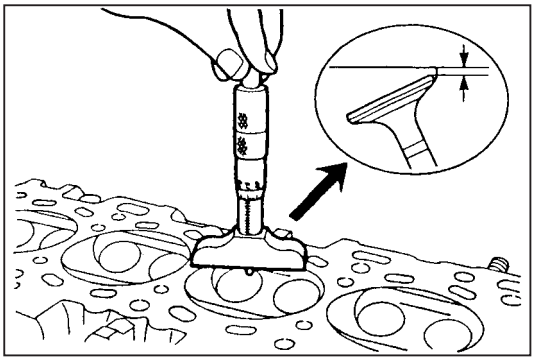
JEM00154-00141

13. Hand lapping of valves
(1) Perform hand lapping of the valves and valve seats, using an abrasive compound.
(2) Clean the valves and valve seats after the hand lapping of the valves.

JEM00155-00000

14. Inspection of valve recession
After the valve seat has been refaced, install the new valve. Measure the distance between the cylinder attaching surface of the cylinder head (attaching surface of the cylinder head gasket) and the upper most section of the valve. Ensure that the distance does not exceed the following maximum limit.

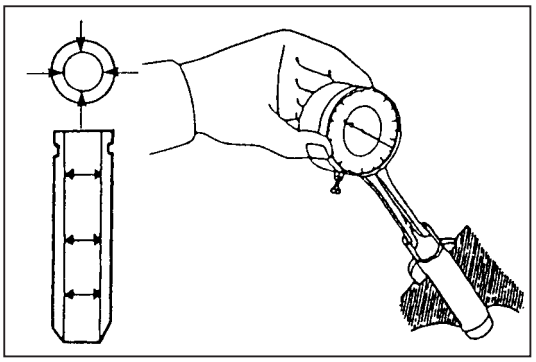
Maximum Limit
Intake Valve: 2.775 mm
Exhaust Valve: 6.026 mm



JEM00156-00142

If the recession exceeds the maximum limit, replace the cylinder head.

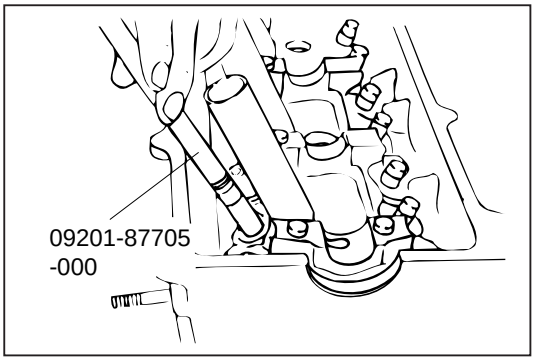
15. Inspection of valve stem-to-guide bushing oil clearance
(1) Using a caliper gauge, measure the inner diameter of the valve guide at six points.
Record the measured values.



JEM00157-00143

① Drive a new valve guide bush into position, until the snap ring contacts the cylinder head, using the following SST.

SST: 09201-87705-000



JEM00158-00144

CAUTION:
- Be very careful not to give an excessive impact during the installation. Failure to observe this caution will result in valve guide bush cracks.
- Care should be exercised not to detach the snap ring due to driving the valve guide bush excessively.

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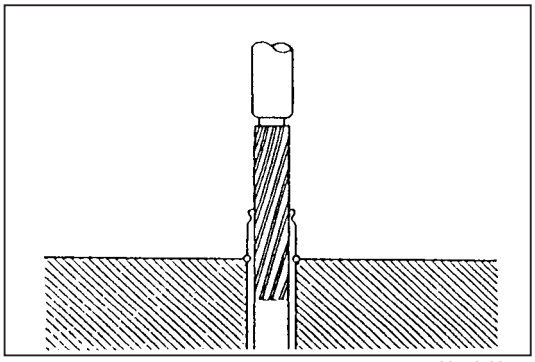
② Using an adjustable reamer, ream the valve guide bush to remove any burr or the like.

NOTE:

- This reaming should be made only enough to remove the burr or the like.



JEM00159-00145

③ Inspection of oil clearance

Ensure that the oil clearance meets the specifications.

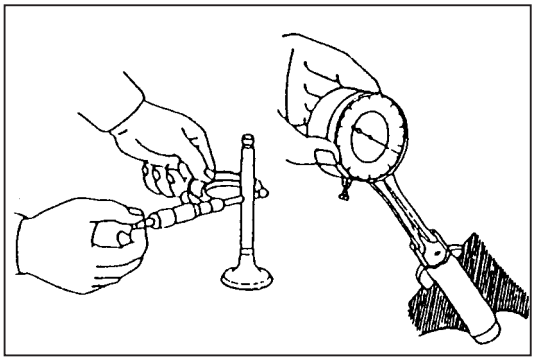
Oil Clearance

Specified Value:

Intake 0.030 - 0.055 mm

Allowable Limit:

Intake 0.08 mm

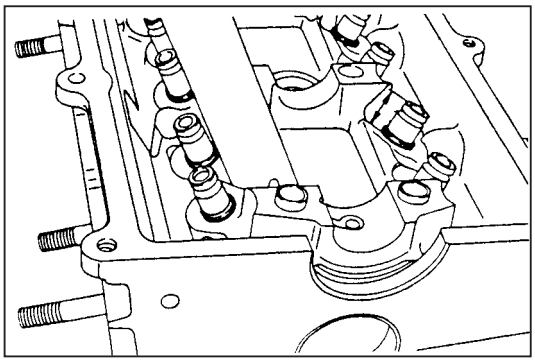


JEM00160-00146

(2) Exhaust valve guide bush

NOTE:

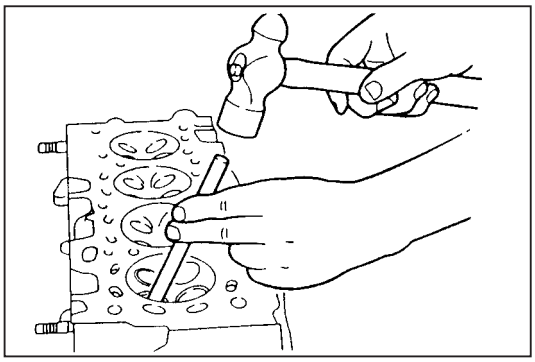
- When the locating ring for the valve guide bush is located 14 mm from the upper end of the valve guide bush, replace the cylinder head.



JEM00161-00147

① Drive out the valve guide bush from the combustion chamber side, using the following SST.

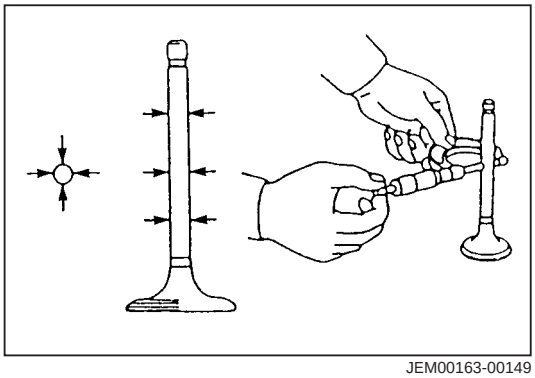
SST: 09201-87705-000



JEM00162-00148

(3) Using a micrometer, measure the diameter of the valve stem at six points.

Record the measured values.



JEM00163-00149

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(4) Calculation of oil clearance
Calculate the oil clearance of each valve according to the following formula.
Oil clearance = Inner diameter of valve stem guide – Outer diameter of valve stem
Specified Oil Clearance
Intake Valve Side: 0.030 - 0.055 mm
Exhaust Valve Side: 0.035 - 0.060 mm
Allowable Limit
Intake Valve Side: 0.080 mm
Exhaust Valve Side: 0.090 mm

If the calculated oil clearance exceeds the allowable limit, replace the valve guide bush and valve as a set.

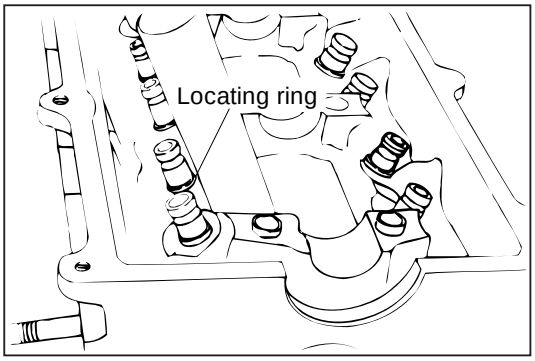
JEM00164-00000

16. Replacement of valve guide bush
CAUTION:
- Removal and installation of the valve guide bush should be carried out while the cylinder head temperature is 80°C - 100°C after heating it gradually.

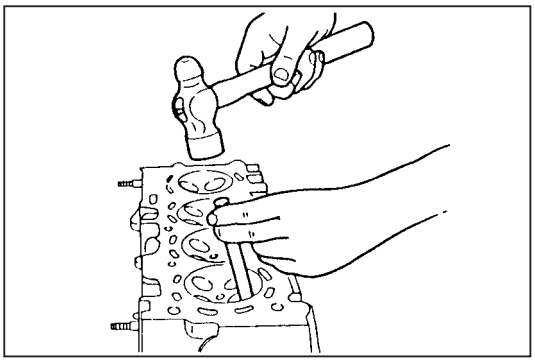
(1) Intake valve guide bush
NOTE:
- If the intake valve guide bush has been already installed with a locating ring, replace the cylinder head.

① Drive out the valve guide bush from the combustion chamber side, using the following SST.
SST: 09201-87705-000

NOTE:
- Be very careful not to tap the cylinder head.

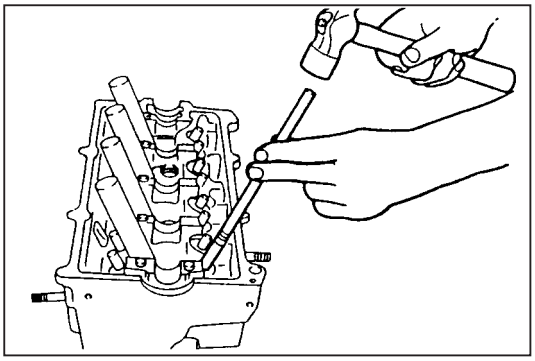


JEM00165-00150


JEM00166-00151

② Drive a new valve guide bush into position, until the snap ring contacts the cylinder head, using the following SST.
SST: 09201-87705-000

CAUTION:
- Be very careful not to give an excessive impact during the installation. Failure to observe this caution will result in valve guide bush cracks.
- Care should be exercised not to detach the snap ring due to driving the valve guide bush excessively.


JEM00167-00152

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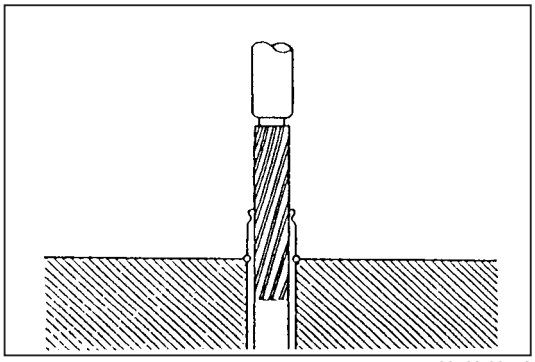
③ Using an adjustable reamer, ream the valve guide bush to remove any burr or the like.

NOTE:

- This reaming should be made only enough to remove the burr or the like.



JEM00168-00153

④ Inspection of oil clearance

Ensure that the oil clearance meets the specifications.

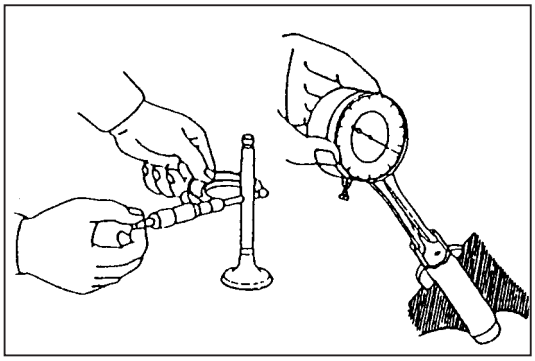
Oil Clearance

Specified Value:

Exhaust 0.035 - 0.060 mm

Allowable Limit:

Exhaust 0.09 mm



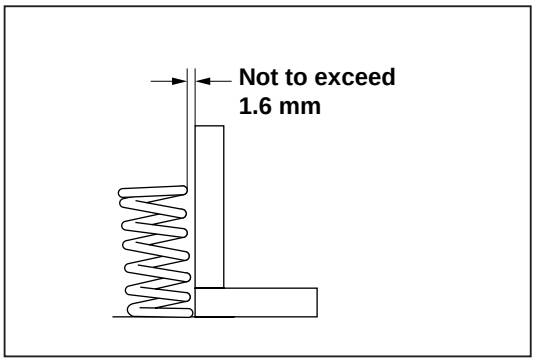
JEM00169-00154

17. Inspection of valve springs

(1) Check the valve spring for squareness, using a steel square.

Maximum Squareness: 1.6 mm

If the squareness exceeds the maximum limit, replace the valve spring.



JEM00170-00155

(2) Measure the valve spring for free length and spring tension, using a spring tester.

Minimum Free Length

Pink Marked Spring: 43.9 mm

Orange Marked Spring: 46.1 mm

Minimum Tension/Installation Height

Pink Marked Spring: 244.9 N/38.0 mm

Orange Marked Spring: 208.9 N/38 mm

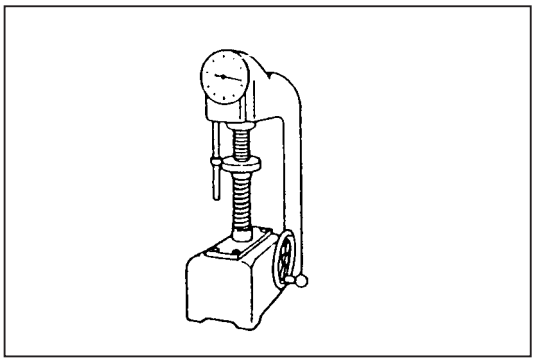
If the minimum free length and/or minimum tension is less than the minimum limit, replace the valve spring.

Reference:

Standard Free Length

Pink Marked Spring: 45.2 ± 0.5 mm

Orange Marked Spring: About 47.4 mm



JEM00171-00156

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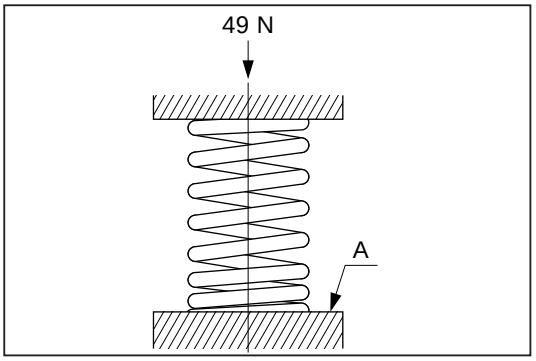
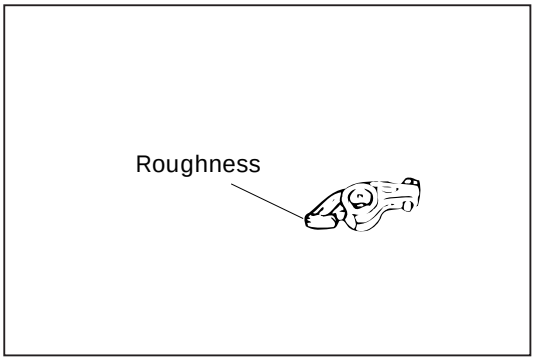
(3) Check of valve spring edge surface for levelness
① Apply a load of 49 N to the valve spring on a spring tester.
② Under the condition ① above, insert a thickness gauge at the arrowheaded point “A” at the right figure.
Here, the thickness gauge should measure 0.07 mm in thickness and 12.5 mm in width. Ensure that the tip-end of the thickness gauge will not reach the center of the coil spring.
If the tip-end of the thickness gauge reaches the center of the coil spring, replace the coil spring with a new part.



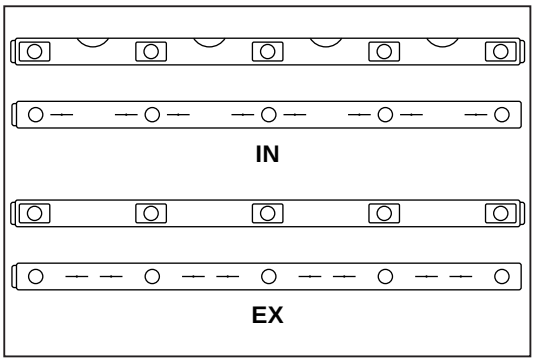
JEM00172-00157

18. Inspection of valve rocker arms and valve rocker shaft
(1) Visually inspect the valve rocker arm for cracks, seizure or wear.
Replace the valve rocker arm, if necessary.
(2) If the valve rocker arm-to-cam contact surface is worn excessively, replace the rocker arm.



JEM00173-00158

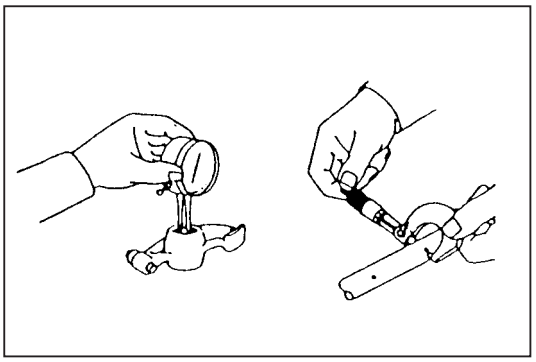
(3) Visually inspect the valve rocker shaft for cracks, seizure or wear.
Replace the valve rocker shaft, if necessary.



JEM00174-00159

(4) Valve rocker shaft-to-valve rocker arm
- Using a dial gauge, measure the inner diameter of the valve rocker arm in two directions, 90 degrees apart from each other.
- Using a micrometer, measure the outer diameter of the valve rocker arm attaching position of the valve rocker shaft in two directions, 90 degrees apart from each other.
- Calculate the oil clearance by subtracting the rocker shaft diameter from the rocker arm diameter.

Oil Clearance
Specified Value: 0.012 - 0.053 mm
Allowable Limit: 0.08 mm


JEM00175-00160

NOTE:
- The measurement of the rocker shaft outer diameter must be performed at the assembling position of each rocker shaft.

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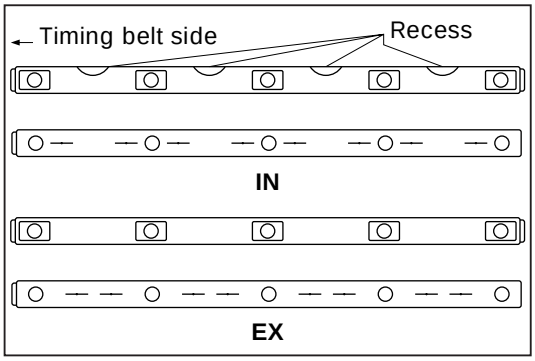
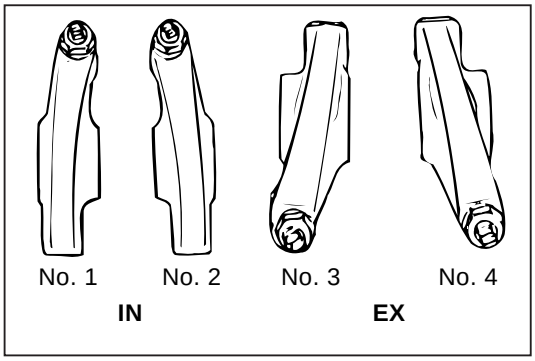
Reference:

- Identification of valve rocker shafts
- On the intake valve rocker shaft, recesses for the spark plug tube are provided.
- Also, the oil grooves are provided very closely to the bolt holes.
- On the exhaust valve rocker shaft, the oil grooves are located near the midpoint of the bolt holes.
- Installing direction of valve rocker shaft
  The valve rocker shaft should be installed in such a way that the side having a wider chamfer comes at the timing belt side.
- Identification of valve rocker arm
  The valve rocker arm comes in four kinds; two kinds each for the intake side and exhaust side, as shown in the right figure.
- Specified dimensions of valve rocker shaft and valve rocker arm
  Outer Diameter of Valve Rocker Shaft:
  19.468 - 19.488 mm
  Bore Diameter of Valve Rocker Arm:
  19.500 - 19.521 mm



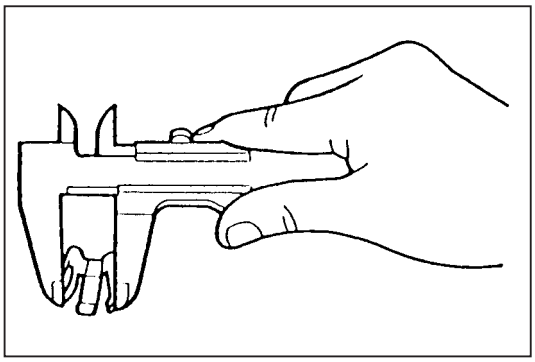
JEM00176-00161



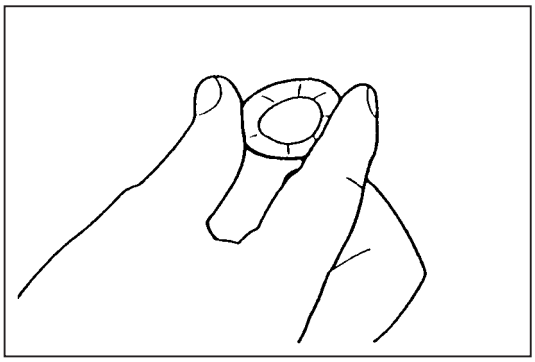
JEM00177-00162

19. Inspection of valve rocker arm, spacer and wave washer
    (1) Measure the free width of the spacer, using vernier calipers.
    Minimum Free Width: 22.0 mm

    Replace the spacer whose free length is less than the minimum free width.

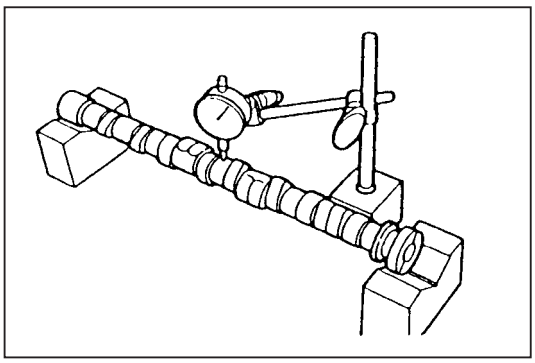

JEM00178-00163

    (2) Visually inspect the wave washer for flattened condition or damage.
    Replace the wave washer, if necessary.


JEM00179-00164

20. Inspection of camshaft
    (1) Checking camshaft for runout
    Support the camshaft at its both ends with V-shaped blocks. Set a dial gauge to the mid-point of the center journal section of the camshaft. Turn the camshaft one turn, making sure that the camshaft will not move in the axial direction. Take a reading on the dial gauge during the turning. Calculate the maximum runout, i.e. the difference between the maximum and minimum readings.
    Maximum Runout: 0.03 mm

    If the runout exceeds the maximum limit, replace the camshaft.


JEM00180-00165

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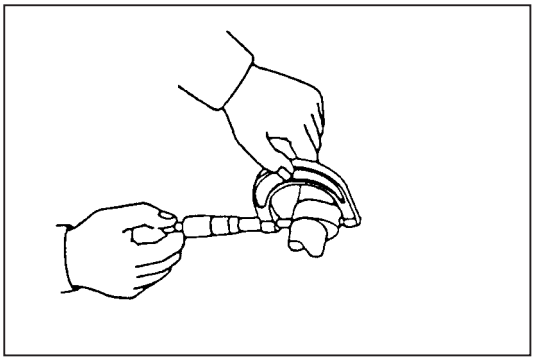
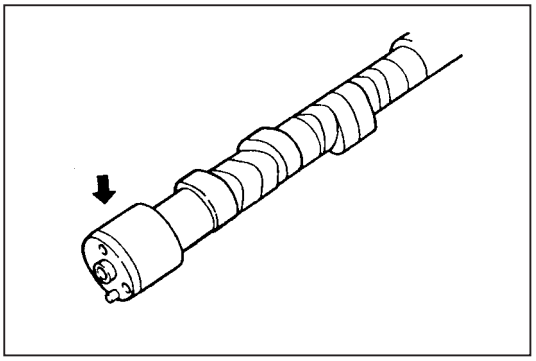
(2) Checking of cam lobe height
Measure the cam lobe height, using a micrometer.
Specified Cam Lobe Height:
Intake: 33.434 - 33.634 mm
Exhaust: 33.17 - 33.37 mm
Minimum Limit:
Intake: 33.2 mm
Exhaust: 33.0 mm

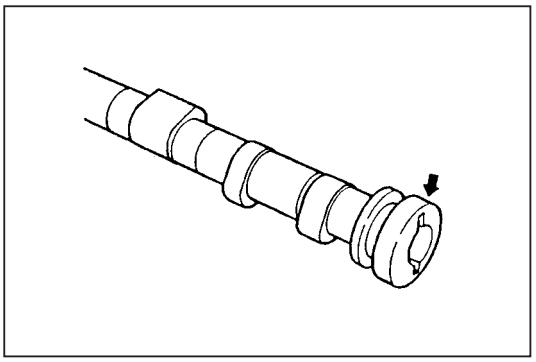

JEM00181-00166

(3) Inspection of oil seal contact surface
Inspect the oil seal contact surface for abnormal wear.
Replace the camshaft if the contact surface exhibits any abnormal wear.


JEM00182-00167

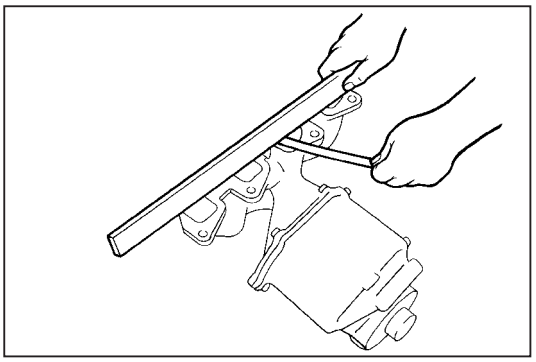
(4) Inspection of groove for driving cam angle sensor
Visually inspect to see if any damage is present at the groove for driving the cam angle sensor.
Replace the camshaft if the groove exhibits any damage.

NOTE:
- If any damage is present, check the cam angle sensor side, too.

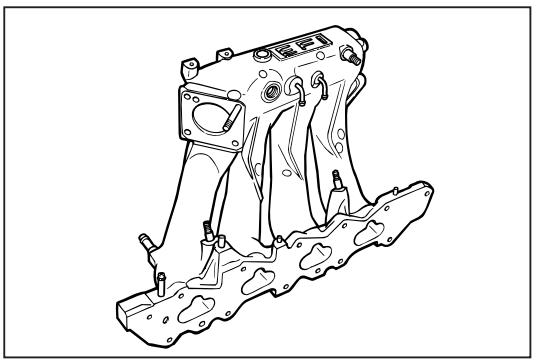

JEM00183-00168

21. Inspection of manifold and surge tank
(1) Check the cylinder head attaching surface of the exhaust manifold for warpage, using a straightedge and a thickness gauge.
Maximum Warpage Limit: 0.1 mm

If the warpage exceeds the maximum limit, replace the exhaust manifold No. 1.


JEM00184-00169

(2) Check the contact surface of the intake manifold with the cylinder head.
Maximum Warpage: 0.1 mm


JEM00185-00170

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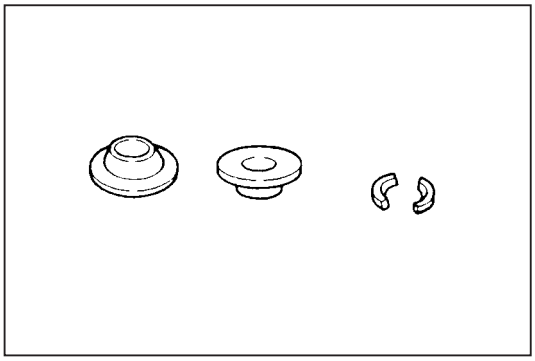
22. Check the valve spring seats, valve spring retainers and valve retainer locks for damage and cracks.
If any damage is present, replace such faulty parts.

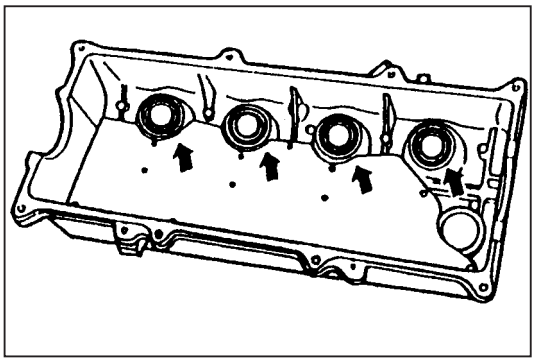


JEM00186-00171

23. Inspection of cylinder head cover
(1) Visually inspect the cylinder head cover gasket for damage.
If any damage is present, replace the cylinder head gasket with a new one.
Install the cylinder head gasket to the cylinder head cover in such a direction that the identification mark may face toward the intake manifold side.

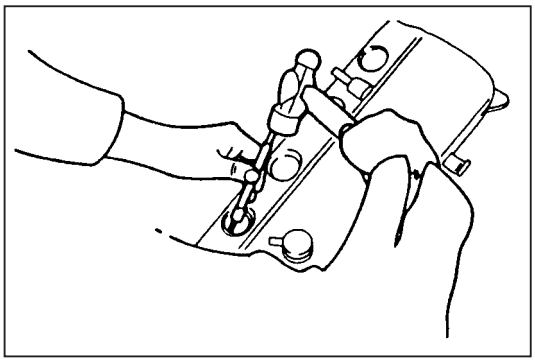
JEM00187-00000

(2) Visually inspect the rubber grommets of the spark plug tubes for damage.
Replace the rubber grommets, as required.



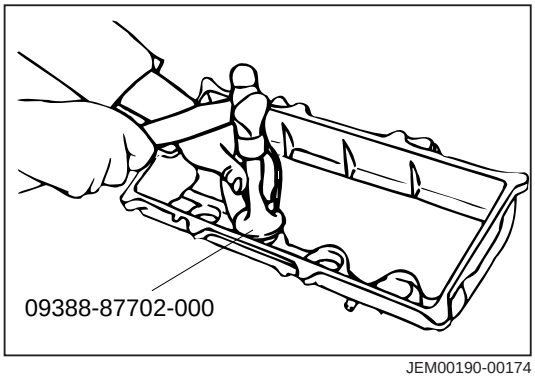
JEM00188-00172

Replacement of spark plug grommet
① Drive out the spark plug grommets, using the slotted pin puller.



JEM00189-00173

② Install a new spark plug grommet, using the following SST.
SST: 09268-87702-000



JEM00190-00174

NOTE:
- Make sure that the grommet is not tilted when it is driven into position.
- Be sure to use a suitable wooden piece so as to prevent the cylinder head cover from damage.
- Be very careful not to damage the lip section of the grommet.

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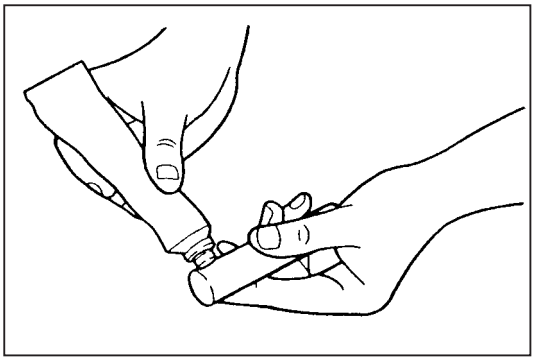
ASSEMBLY OF CYLINDER HEAD

NOTE:
- Thoroughly clean all parts to be assembled.
- Before installing the parts, apply new engine oil to all sliding and rotating surfaces.
- Replace all gaskets and oil seals with new ones.

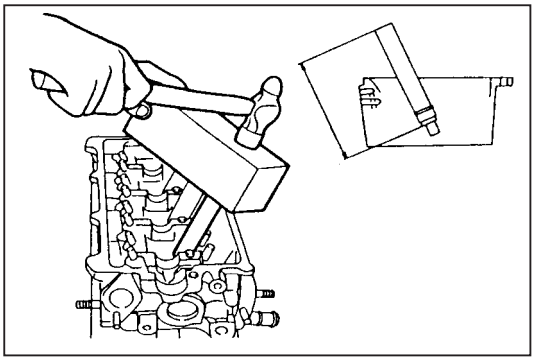
JEM00191-00000

1. Assembly of cylinder head (When a new cylinder head is installed:)
   When a new cylinder head is installed, spark plug tubes and a heater outlet tube have been furnished separately. Assemble these parts, following the procedure given below.
   (1) Wash the cylinder head in cleaning solvent and dry it with compressed air.
   (2) Apply a thin film of the Three Bond 1377B to the cylinder head attaching surfaces for the spark plug tubes.



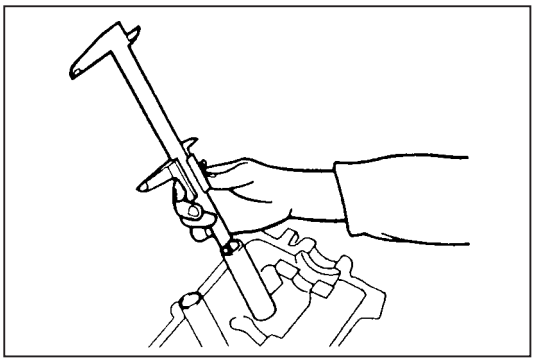
JEM00192-00176

   (3) With a wooden piece or the like placed on the upper end of the spark plug tube, drive the spark plug tube into the cylinder head in such an extent that the distance between the spark plug tightening surface and the upper end of the spark plug tube becomes 139 mm.



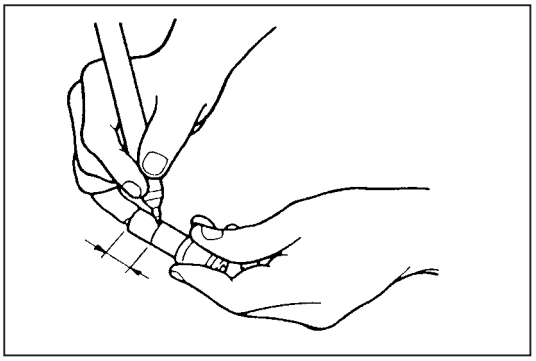
JEM00193-00177

   NOTE:
   - Be very careful not to drive the spark plug too deeply.
   - Be very careful not to damage the upper end of the spark plug tube.
   - When driving the spark plug tube into position, make sure that the tube will not tilt in relation to the cylinder head tube hole.



JEM00194-00178

   (4) Put a mark at a point 45.0 ± 1.0 mm from the forward end of the heater outlet tube.



JEM00195-00179

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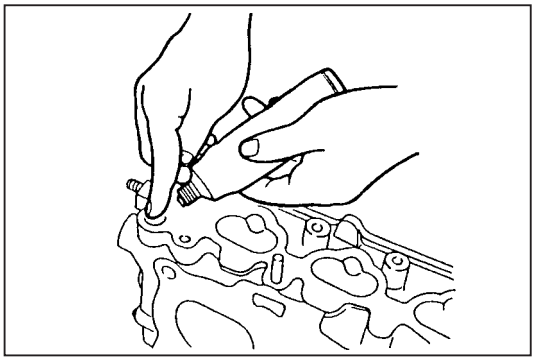
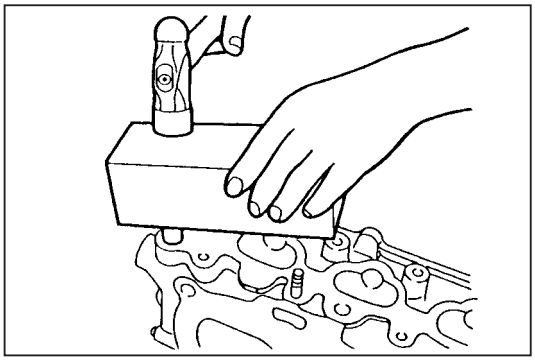
(5) Apply a thin film of the Three Bond 1377B to the attaching section for the heater outlet tube on the cylinder head.



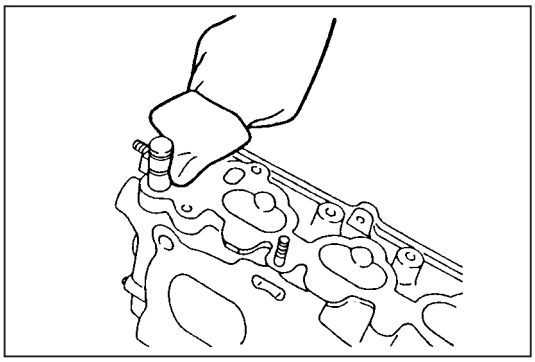
JEM00196-00180

(6) With a wooden piece interposed, drive the heater outlet tube to the point marked in Step (4).



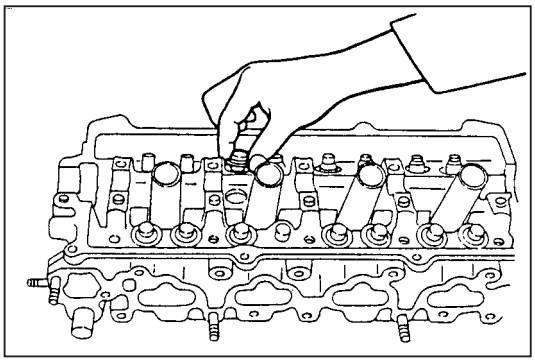
JEM00197-00181

(7) After completion of the operation, remove any oozed bond, wooden chips and so forth.



JEM00198-00182

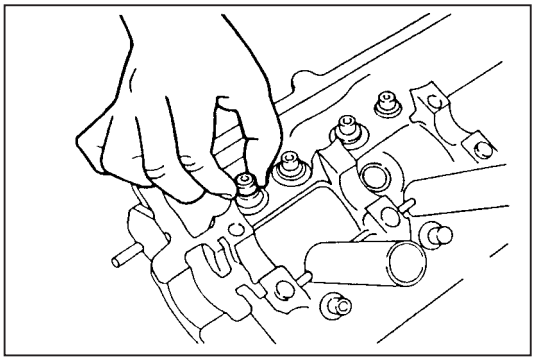
2. Install the valve spring seats to the cylinder head.



JEM00199-00183

3. Installation of valve stem oil seal
   (1) Apply engine oil to the bore of the valve stem oil seal.
   (2) Drive the valve stem oil seal into the valve stem guide bush by hand.

   NOTE:
   - When driving the oil seat, make sure that the oil seal is not tilted.
   - Do not reuse any oil seal which was tilted or driven diagonally.
   - Hold the frame of the oil seal. Do not touch the rubber section of the oil seal.



JEM00200-00184

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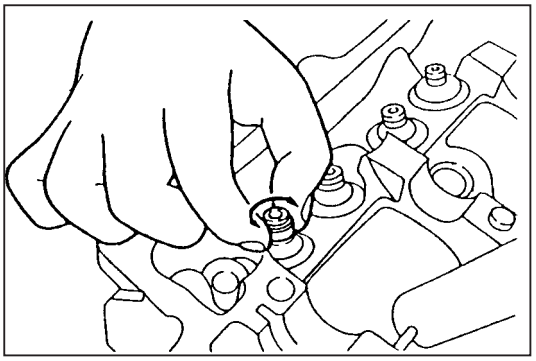
(3) Turn the oil seal slightly by hand to see if it can be turned.

NOTE:

- Never rotate the oil seal more than one turn, because excessive turning may cause scratches on the oil seal.
- If the oil seal can not be turned by hand, it means that the oil seal has been tilted, driven diagonally or press-fitted improperly.
- Do not reuse any oil seal which was tilted or driven diagonally.



JEM00201-00185

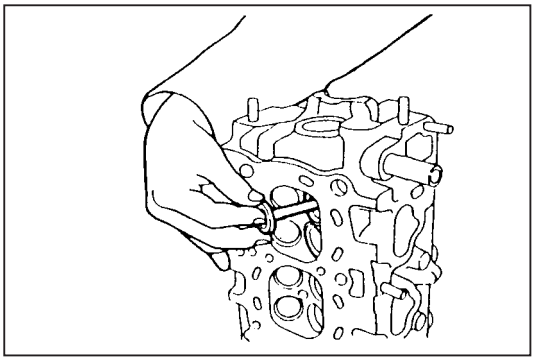
4. Apply oil to the valve stem. Install the valve to the cylinder head.

NOTE:

- Care must be exercised as to the installing position. Do not pull out the valve once it has been inserted.
- If the inserted valve should be pulled out, replace the valve stem oil seal with a new one.

Reference:
Identification of Valves

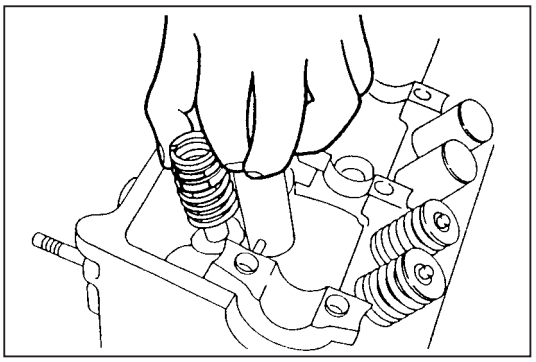
Engine	Identification No.
HC-EJ	④



JEM00202-00186

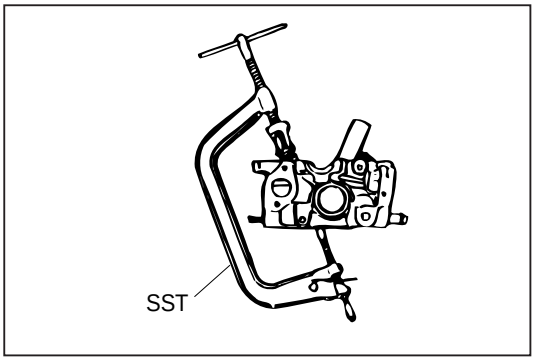
5. Assembly of valve springs, valve spring retainers and valve spring retainer locks

(1) Assemble the valve spring in such a way that the painted side (the side having a larger pitch) comes at the valve spring retainer.



JEM00203-00187

(2) Install the valve spring retainer to the valve spring. Install the valve spring retainer locks while compressing the valve spring retainer, using the following SST.
SST: 09202-87002-000



JEM00204-00188

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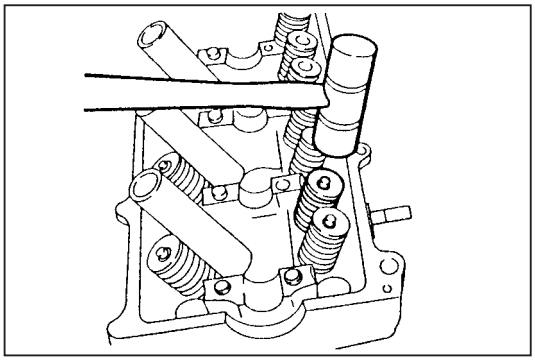
(3) After installing the valve spring retainer lock, lightly tap the valve spring retainer with a hammer or the like so as to ensure that the valve spring retainer locks are installed securely.

WARNING:

- During this operation, care must be exercised to ensure that the valve spring retainer or retainer locks may not be jumped out.
- Protect your eyes with safety goggles during this operation.

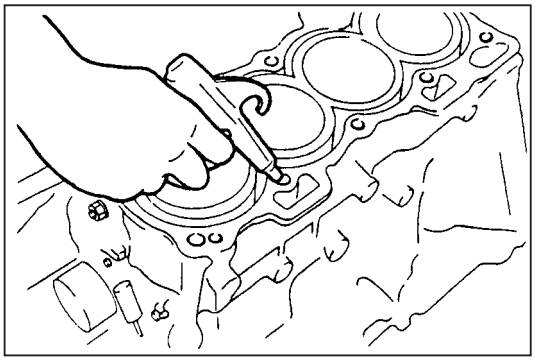


JEM00205-00189

6. Clean and dry the cylinder block head bolt holes.

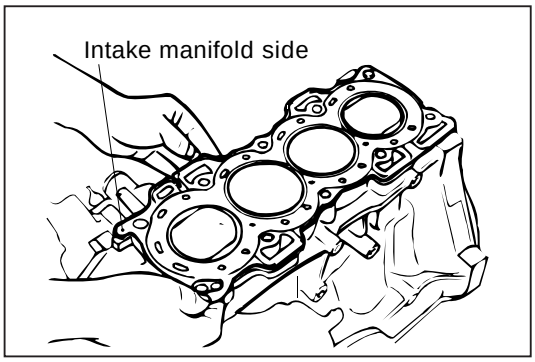
WARNING:

- Protect your eyes with goggles when using compressed air.



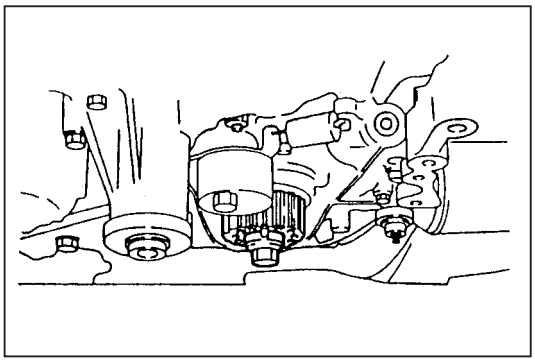
JEM00206-00190

7. Clean the cylinder block upper gasket surface. Install the cylinder head gasket, while aligning it with the pin ring for locating use.



JEM00207-00191

8. Turn the crankshaft so that the crankshaft key groove may come at the top position.



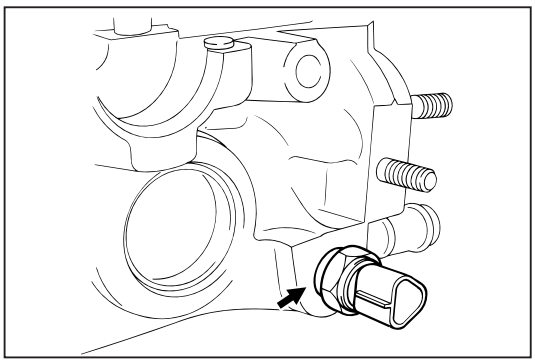
JEM00208-00192

9. Clean the threaded portion of the water temperature sensor. Wind seal tape around the threaded portion and install the sensor to the cylinder head.

Tightening Torque: 24.5 - 34.3 N·m

NOTE:

- The new water temperature sensor is coated with sealer. Therefore, if the sensor is replaced with a new one, remove the sealer thoroughly before winding seal tape. Moreover, be sure to clean the cylinder head side threaded holes.



JEM00209-00193

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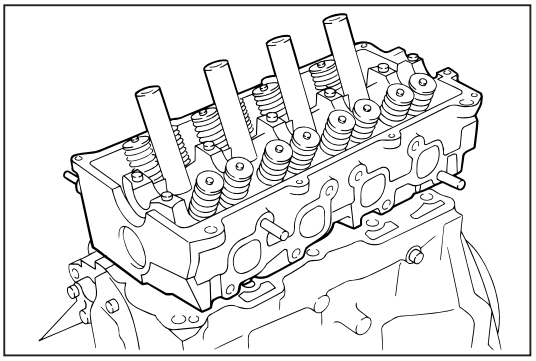
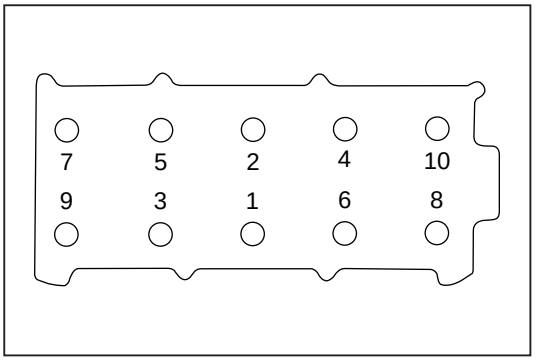
10. Install the cylinder head on the cylinder block.



JEM00210-00194

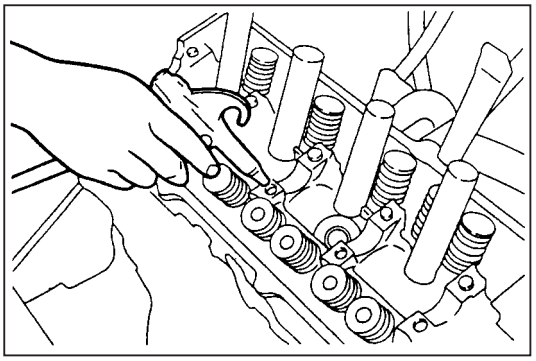
11. Coat each cylinder head bolt with a thin film of engine oil. Using these bolts, install the cylinder head to the cylinder block. Tighten the bolts evenly over two or three stages, following the sequence shown in the right figure.
    Tightening Torque: 58.8 - 66.7 N·m

    NOTE:
    - Failure to tighten the bolts evenly may cause cracks and distortion of the cylinder head, even leading to engine seizure.
    - Make sure that all the bolts are torqued uniformly to a constant value, also within the specified range.



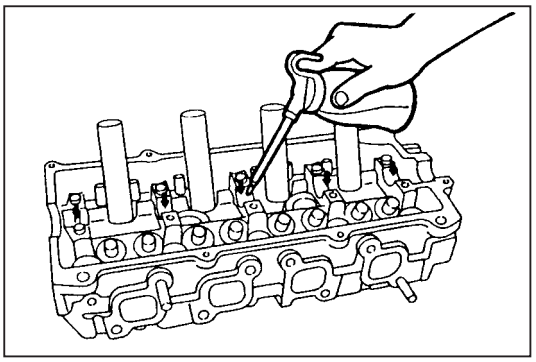
JEM00211-00195

12. Installation of camshaft and rocker shafts
    (1) Wash and dry the holes for the camshaft cap attaching bolts.
    WARNING:
    - Protect your eyes with goggles when using compressed air.



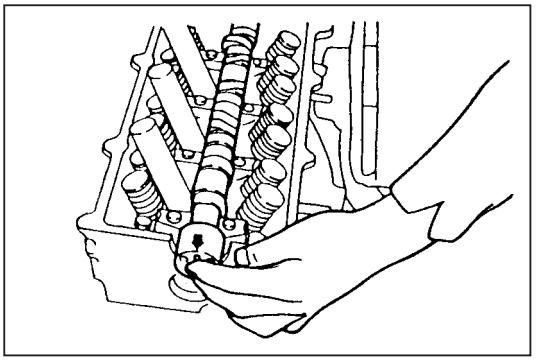
JEM00212-00196

    (2) Liberally apply engine oil to the journal sections and thrust bearing sections.
    NOTE:
    - Be very careful not to allow any oil to flow into the bearing cap attaching holes.



JEM00213-00197

    (3) Assemble the camshaft on the cylinder head in such a way that the locating pin for the camshaft timing belt pulley comes exactly at the top position.



JEM00214-00198

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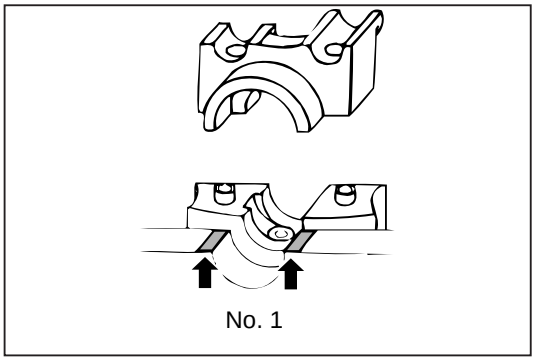
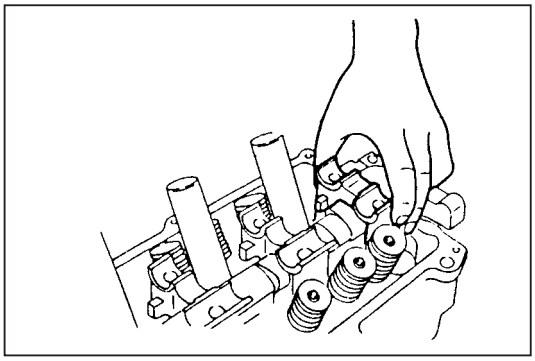
(4) Apply the Three Bond 1104 to the camshaft cap No. 1 attaching section of the cylinder head at those points shown in the right figure.
(5) Apply engine oil to the camshaft journal section.
NOTE:
- Be very careful not to allow any oil to flow into the bearing cap attaching holes.

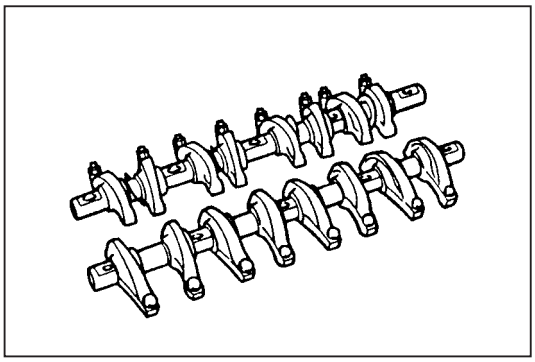


JEM00215-00199

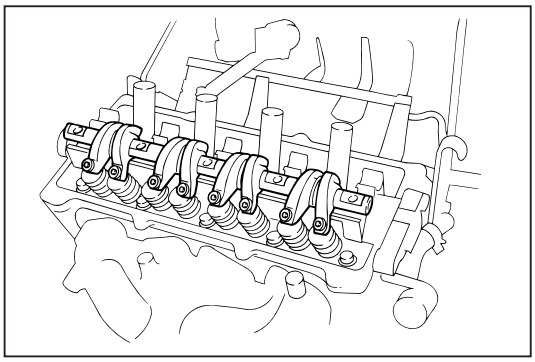
(6) Install the camshaft bearing caps in the sequence of embossed figures on the caps.
NOTE:
- Before the camshaft bearing caps are installed, wipe off any bond oozed from the camshaft cap No. 1.


JEM00216-00200

(7) Assemble the valve rocker arms and wave washers onto the valve rocker shaft, while applying engine oil liberally as shown in the right figure.
NOTE:
- The intake valve rocker shaft can be identified by the recessed sections on it.
- The larger chamber end section of valve rocker shaft faces toward the timing belt side.


JEM00217-00201

(8) Install the valve rocker shaft on the camshaft caps.
NOTE:
- For easier installation, it is advisable to insert the camshaft cap side of rocker arm first.


JEM00218-00202

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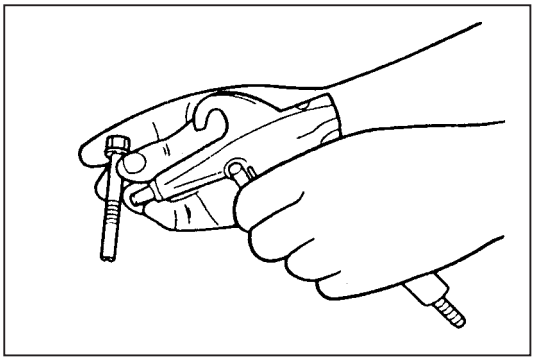
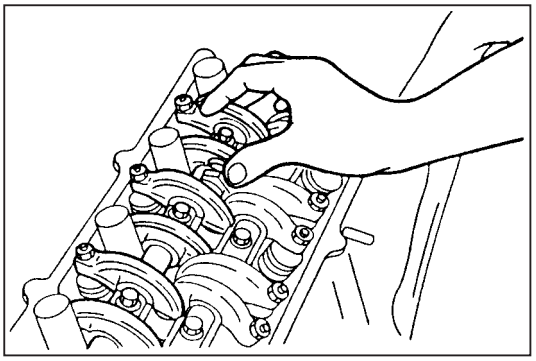
(9) Clean the attaching bolts and dry them with compressed air. Install them to the cylinder head through the rocker shafts and camshaft caps. Tighten the bolts evenly over two or three stages to the specified torque.
Tightening Torque
M10 Bolt: 28.4 - 36.3 N·m/Dry
M8 Bolt: 12.7 - 16.7 N·m/Dry

CAUTION:
- Never exceed the specified tightening torque.
- The bolts and bolt holes should be dry when tightening the bolts.

WARNING:
- Protect your eyes with safety goggles, when using compressed air.

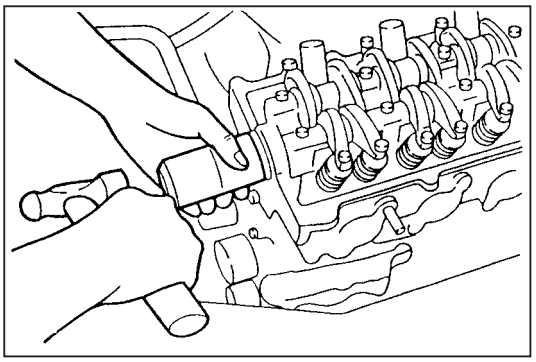

JEM00219-00203

13. Install the spacers into between the intake valve rocker arms on the rocker shaft.


JEM00220-00204

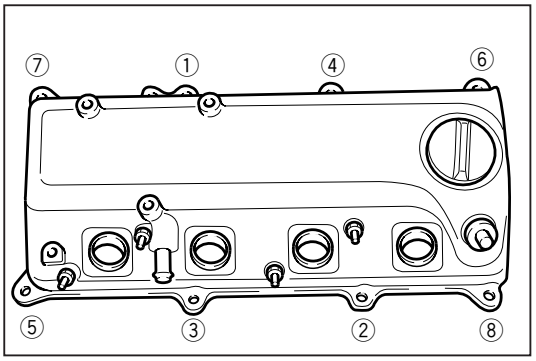
14. Apply engine oil to the lip section of the type T oil seal of the camshaft.
15. Drive the oil seal into position, using the following SST.
SST: 09636-20010-000

CAUTION:
- Be very careful not to tilt the oil seal against the attaching hole of the camshaft oil seal.


JEM00221-00205

16. Installation of the camshaft timing belt pulley.
(Refer to the Timing Belt section of the service manual.)

17. Install the cylinder head cover and tighten the attaching bolts evenly two or three stages, following the sequence shown in the right figure.
Tightening Torque: 2.9 - 4.9 N·m



JEM00222-00206

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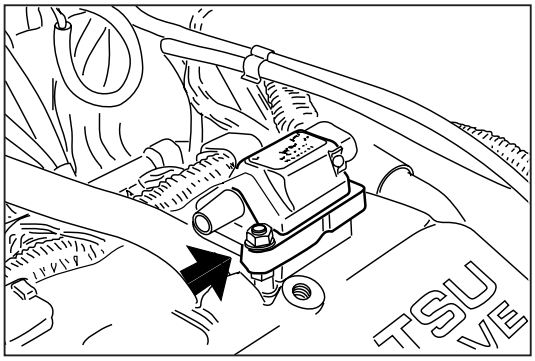
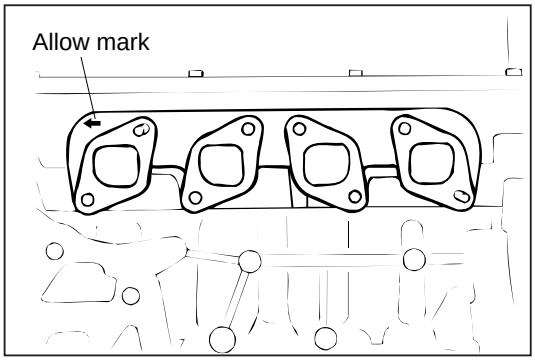
18. Connect the connector to the water temperature sensor.
19. Install the ignition coil to the cylinder head cover and tighten it.
    Tightening Torque: 2.9 - 4.9 N·m

20. Connect the resistive cords between the ignition coil and the spark plug.
    IG coil for No. 2 cylinder – No. 3 cylinder
    IG coil for No. 4 cylinder – No. 1 cylinder



JEM00223-00207

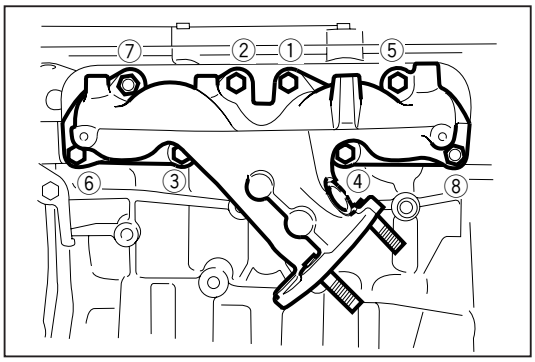
21. Installation of exhaust manifold
    (1) Install the new exhaust manifold gasket in such a way that the arrow mark can be visible and it faces toward the timing belt.



JEM00224-00208

    (2) Install the exhaust manifold to the cylinder head.
    NOTE:
    - Be very careful not to interfere with other parts.

    (3) Install and tighten the attaching bolts and nuts evenly over two to three stages, following the sequence in the right figure.
    Tightening Torque: 29.4 - 44.1 N·m



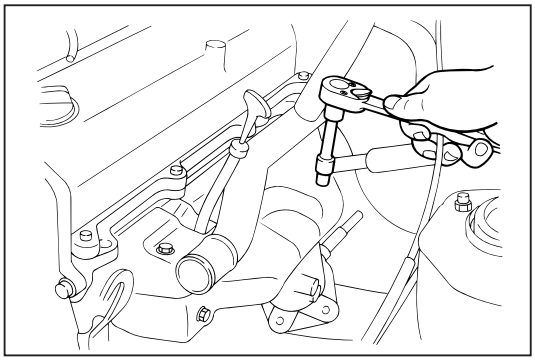
JEM00225-00209

    (4) Install a new O-ring to the oil level gauge guide.
    CAUTION:
    - Do not reuse the O-ring.

    (5) Insert the oil level gauge guide to the cylinder block.
    CAUTION:
    - Be very careful not to damage the O-ring.

JEM00226-00000

    (6) Install the exhaust manifold heat insulator to the exhaust manifold with the attaching bolts and nut.


JEM00227-00210

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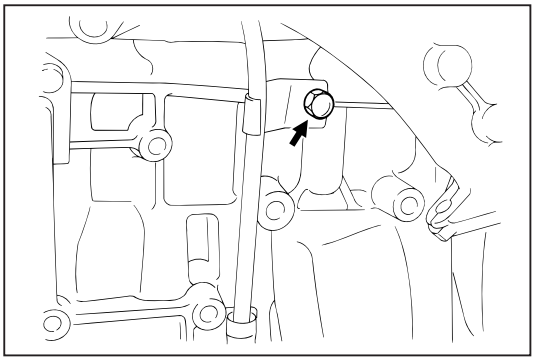
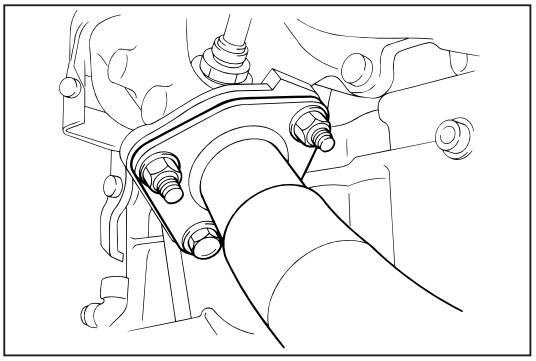
(7) Install and tighten the attaching bolt of the oil level gauge guide.
(8) Insert the oil level gauge to the oil level gauge guide.


JEM00228-00211

(9) Connect the exhaust front pipe to the exhaust manifold with a new gasket interposed.

CAUTION:
- Do not reuse the used gaskets.

(10) Tighten the attaching bolts of the exhaust front pipe to the specified torque.
Tightening Torque: 41.6 - 62.4 N·m

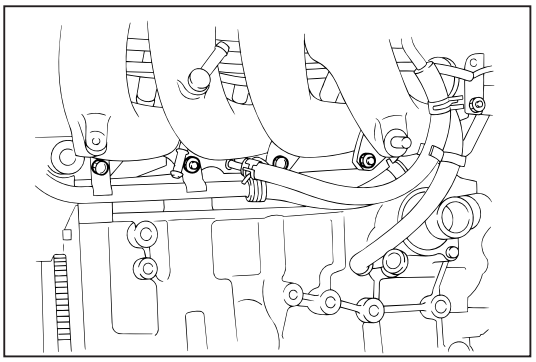

JEM00229-00212

22. Installation of intake manifold
(1) Install a new intake manifold gasket to the cylinder head.
(2) Install the intake manifold to the cylinder head.

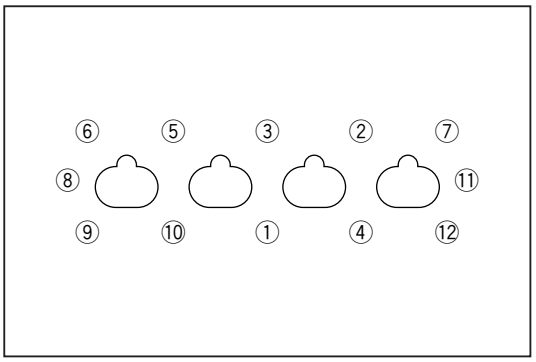
CAUTION:
- Do not interfere with other parts.

(3) Install the attaching bolts and nuts of the intake manifold.

NOTE:
- Be sure to install the following parts interposed with the attaching bolts and nuts of the intake manifold.
  1. By-pass pipe
  2. Oil pressure switch wire clamp
  3. Power steering vane pump bracket.

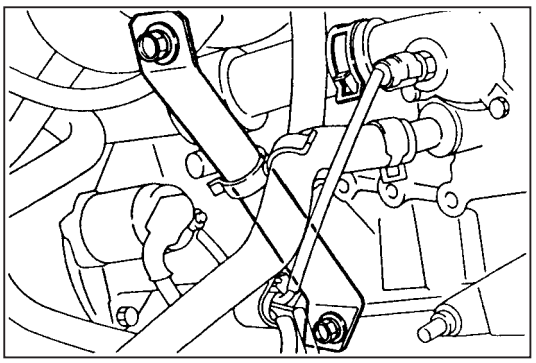

JEM00230-00213

(4) Tighten the intake manifold attaching bolts and nuts evenly to the specified torque over two or three stages in the sequence as indicated in the right figure.
Tightening Torque: 14.7 - 21.6 N·m



JEM00231-00214

(5) Install the intake manifold stays and tighten the attaching bolts.
(6) Install the engine wire ground terminal to the intake manifold.


JEM00232-00215

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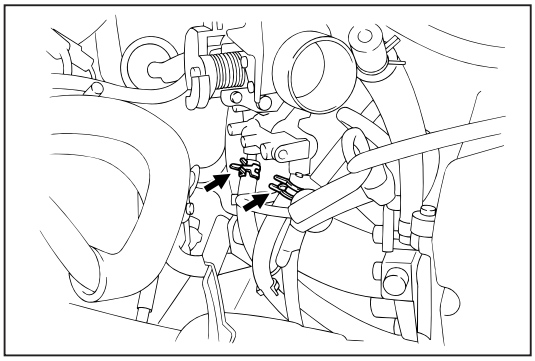
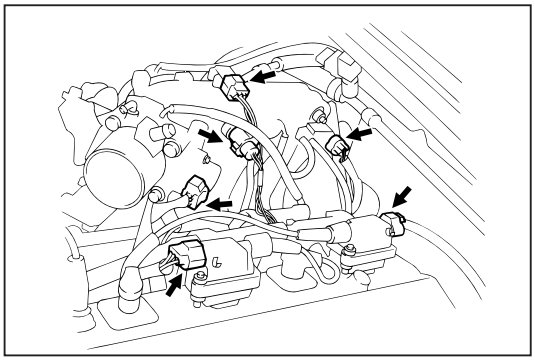
(7) Connect the rubber hoses for brake booster and VSV.
(8) Connect the fuel inlet hose and return hose.
(9) Connect the water hose.



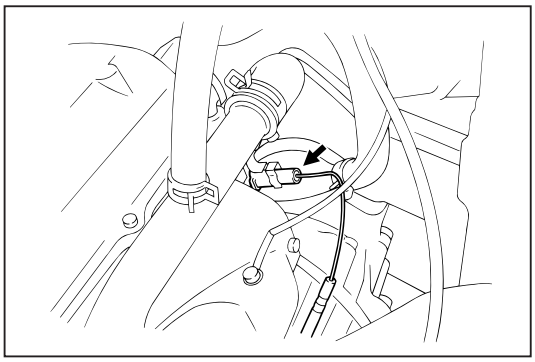
JEM00233-00216

(10) Installation of engine wire
① Connect the connector of the engine wire to the following parts.
a. Ignition coils
b. Injectors
c. Pressure sensor
d. Throttle position sensor
e. Intake air temperature sensor
f. Idle-up VSV
g. Oxygen sensor
h. Cam angle sensor



JEM00234-00217

② Install the harness clamps to each bracket.

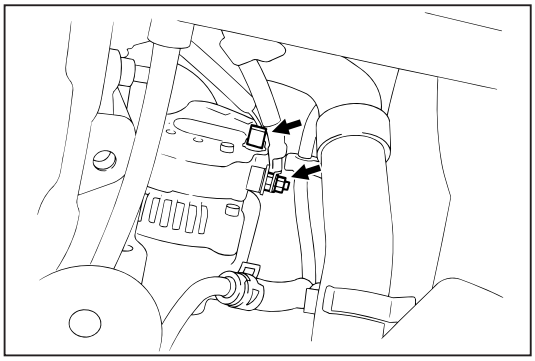


JEM00235-00218

(11) Install the timing belt.
(Refer to installation of timing belt section)

JEM00236-00000

(12) Install the alternator



JEM00237-00219

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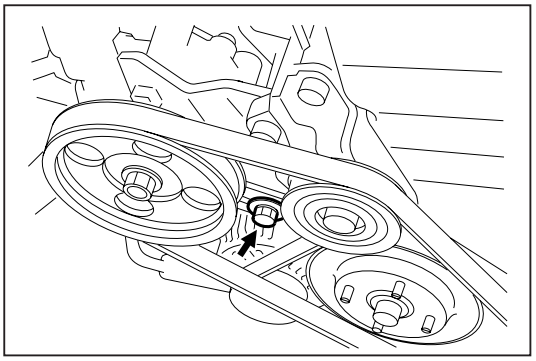
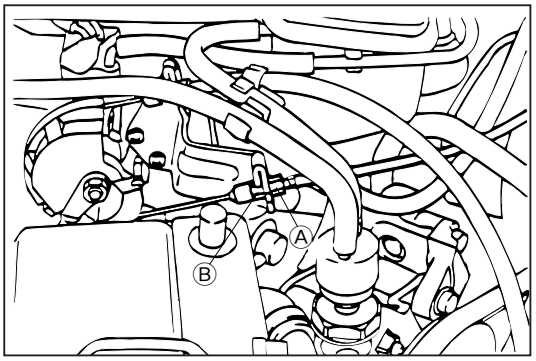
(13) Install the power steering vane pump



JEM00238-00220

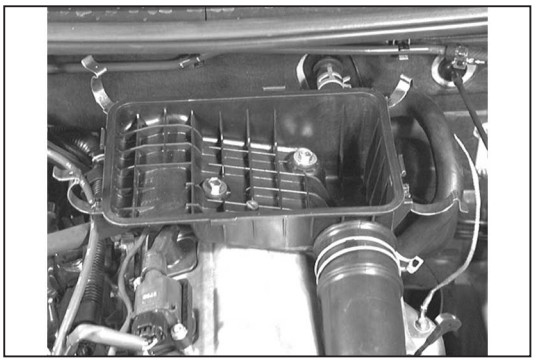
(14) Install the acceleration cable to the throttle body and adjust it.



JEM00239-00221

(15) Installation of air cleaner.

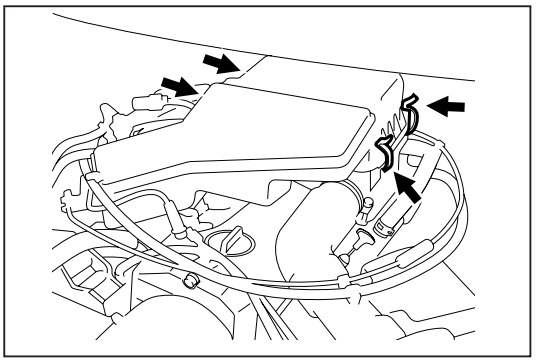
① Install the air cleaner lower case to the engine and tighten the attaching bolts.



JEM00240-00222

② Install the air filter element to the air cleaner lower case.

③ Install the air cleaner upper case with the air duct and fasten the clamp.



JEM00241-00223

④ Tighten the air intake hose attaching bolt.

⑤ Connect the rubber hoses to the air cleaner.

JEM00242-00000

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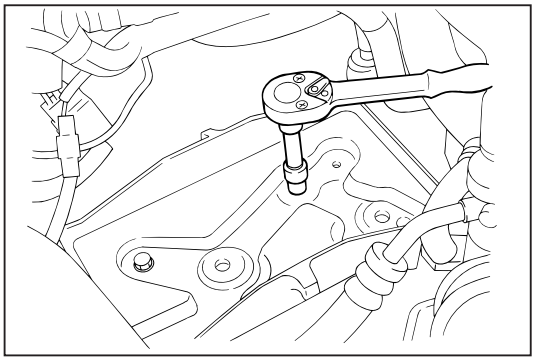
(16) Install the battery carrier and the battery.
(17) Connect the battery cable to each terminals of the battery.



JEM00243-00224

(18) Fill the coolant
(Refer to CO section of this manual)

JEM00244-00000

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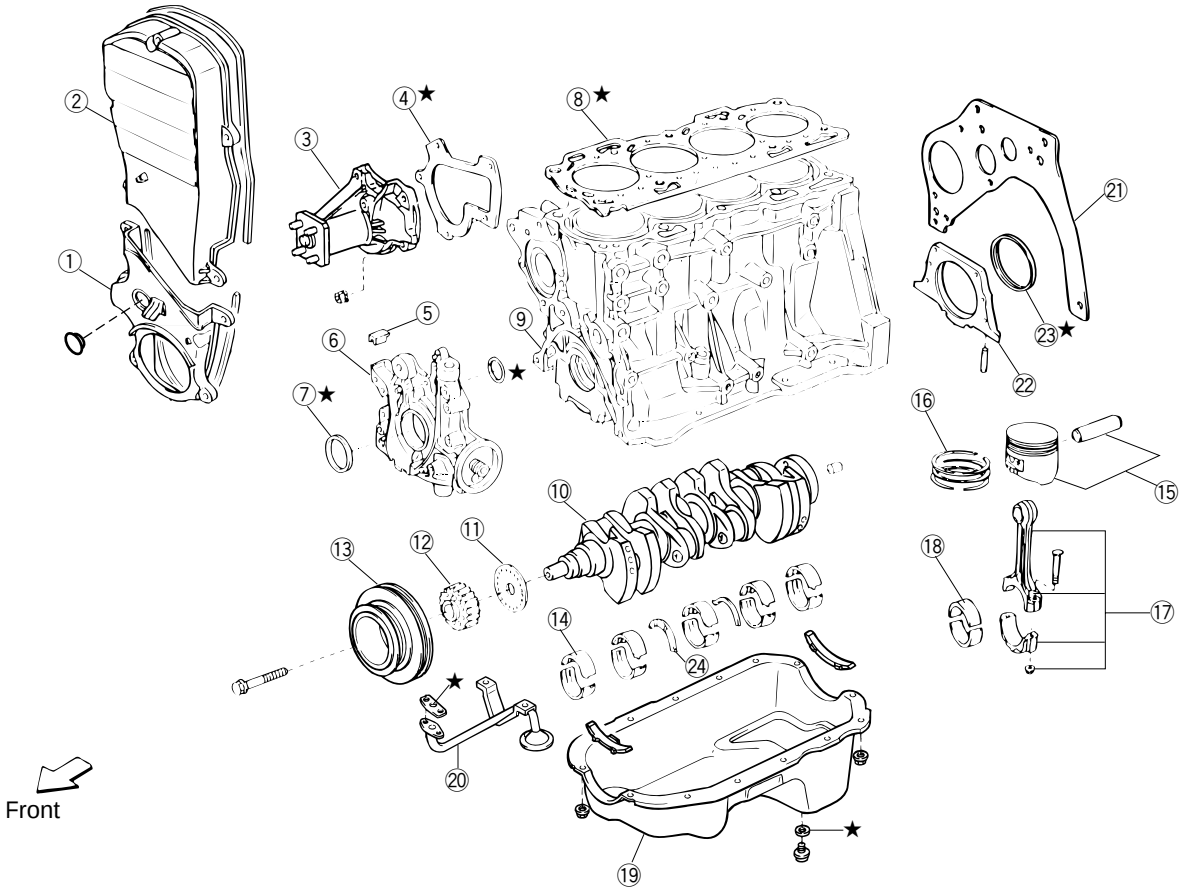
CYLINDER BLOCK

COMPONENTS

★ : Non-reusable parts



① Timing belt cover No. 1
② Timing belt cover No. 2
③ Water pump assembly
④ Water pump gasket
⑤ Dust seal
⑥ Oil pump assembly
⑦ Oil seal
⑧ Cylinder head gasket
⑨ Cylinder block
⑩ Crankshaft
⑪ Crankshaft timing belt pulley flange
⑫ Crankshaft timing belt pulley
⑬ Crankshaft pulley
⑭ Crankshaft bearing
⑮ Piston with pin
⑯ Piston ring
⑰ Connecting rod
⑱ Connecting rod bearing
⑲ Oil pan
⑳ Oil pump strainer
㉑ Rear end plate
㉒ Oil seal retainer
㉓ Oil seal
㉔ Crankshaft thrust bearing

JEM00245-00225

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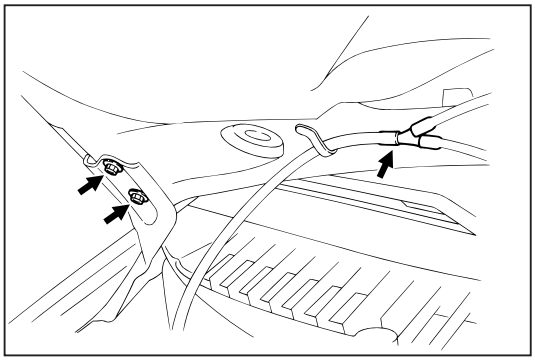
INSTRUCTION PRIOR TO OPERATION

- Install the fender cover to the fenders so that no scratch may be made to the fenders.
- Be sure to read the general information section of the service manual.

JEM00246-00000

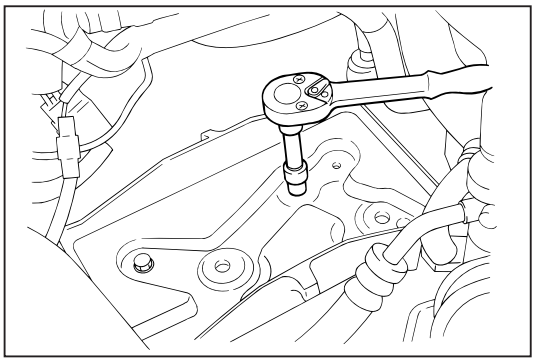
ENGINE REMOVAL

1. Disconnect the battery ground cable from the negative (–) terminal of the battery.
2. Removal of engine hood
   (1) Disconnect the windshield washer hose from the joint section.
   (2) Remove the hose from the clamp of the engine hood.
   (3) Remove the hood, being very careful not to scratch the body and hood.
3. Disconnect the wires of the positive (+) terminal from the battery positive terminal.
4. Drain the coolant.
   (Refer to the CO section of the service manual.)
5. Drain the engine oil.
   (Refer to the MA section of the service manual.)



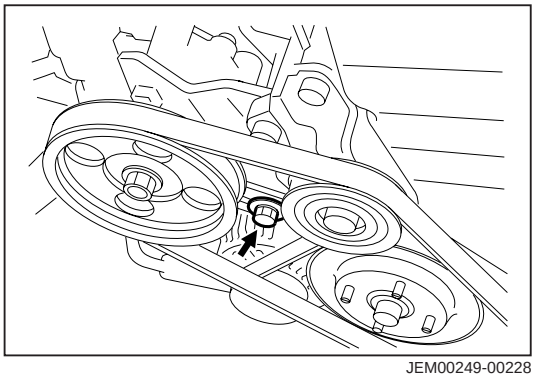
JEM00247-00226

6. Removal of battery
   (1) Remove the battery hold down clamp by removing the two attaching nuts.
   (2) Remove the battery from the battery carrier.
   (3) Remove the wiring harness from the clamp section of the battery carrier.
   (4) Disconnect the engine wire harness clamp from the battery carrier.
   (5) Remove the battery carrier by removing the four attaching bolts.



JEM00248-00227

7. Remove the power steering vane pump from the engine.
   Suspend the removed vane pump at the body side, using an adequate rope.



JEM00249-00228

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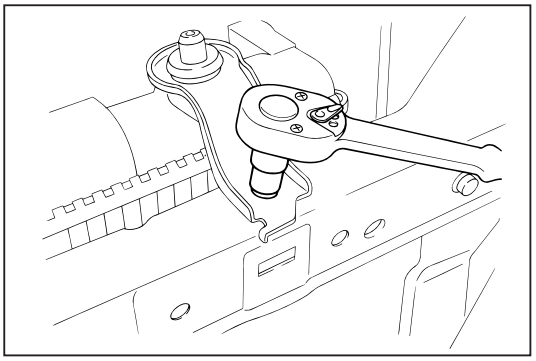
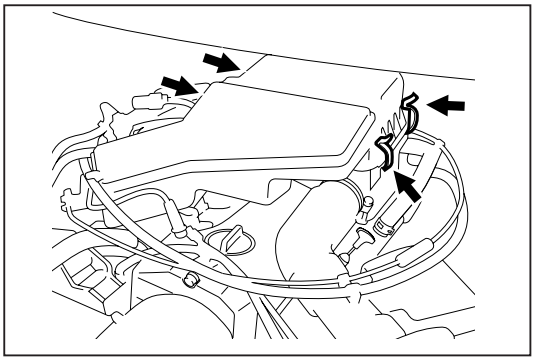
8. Remove the fan and fan shroud.
9. Remove the radiator.



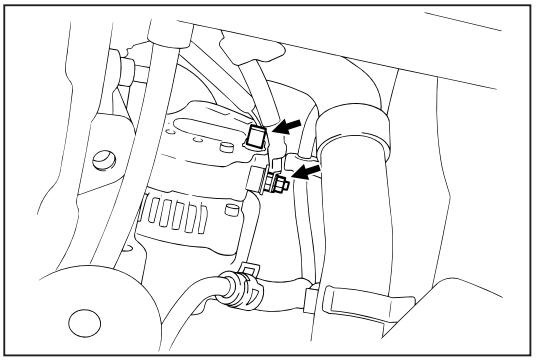
JEM00250-00229

10. Remove the air cleaner.



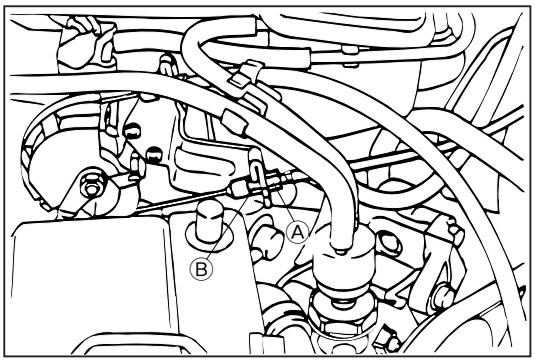
JEM00251-00230

11. Remove the alternator.



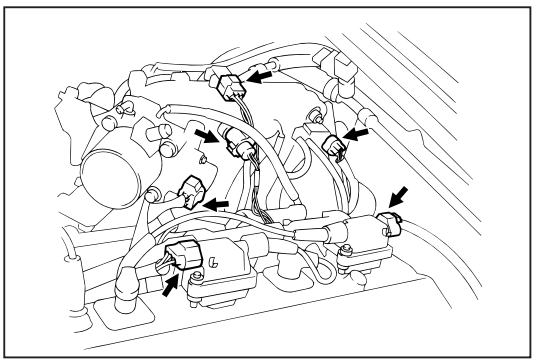
JEM00252-00231

12. Remove the accelerator cable and rubber hoses.



JEM00253-00232

13. Disconnect the following connectors and remove the engine wire
    (1) Ignition coils
    (2) Injectors
    (3) Pressure sensor
    (4) Throttle position sensor
    (5) Intake air temperature sensor
    (6) Idle-up VSV
    (7) Water temperature sensor
    (8) Oxygen sensor
    (9) Cam angle sensor



JEM00254-00233

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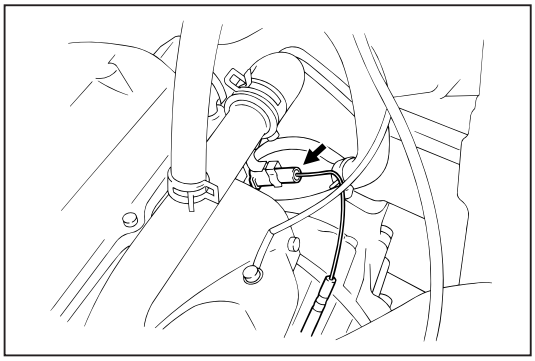
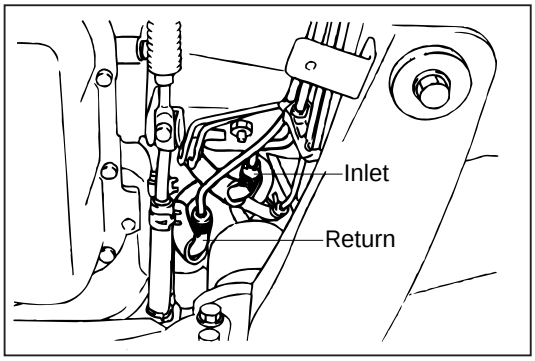


JEM00000-00234

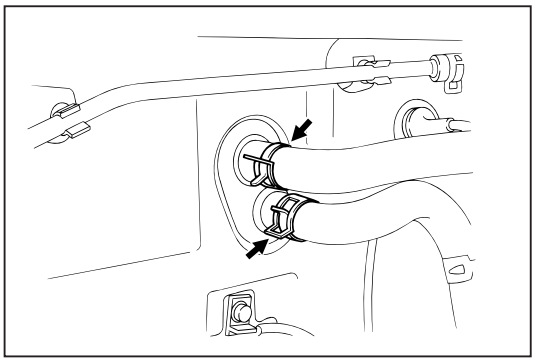
14. Disconnect the fuel inlet hose and return hose.
    CAUTION:
    - The fuel pressure at inside of the fuel line is approximately 284 kPa higher than the atmospheric pressure.
    - Therefore, be sure to gradually pull out the rubber hoses so as to prevent fuel from splashing.



JEM00255-00235

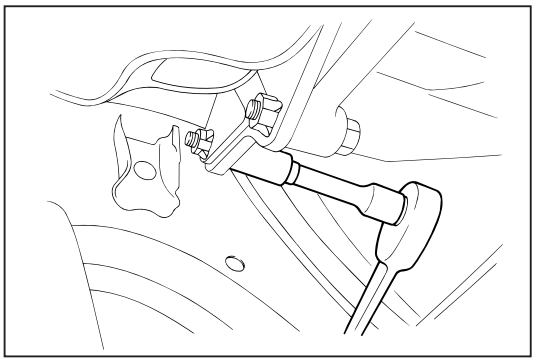
15. Disconnect the heater hoses.
    CAUTION:
    - Be careful not to deform the heater inlet and outlet pipes during disconnection. The heater core and pipe are made copper.

    NOTE:
    - Place a suitable container under the heater hose connecting section, for the coolant may flow out.



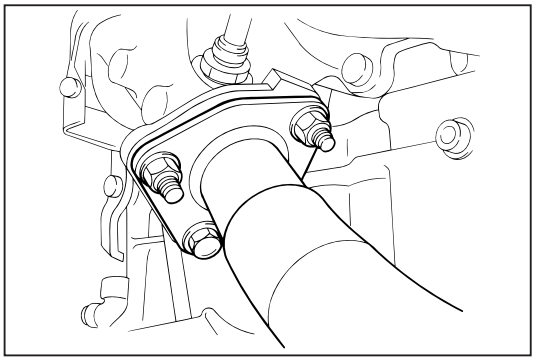
JEM00256-00236

16. Remove the charcoal canister from the engine compartment.
17. Remove the clutch cable with bracket from the transmission.



JEM00257-00237

18. Removal of front exhaust pipe.
    (1) Disconnect the attaching bolt and nuts of the exhaust manifold.
    (2) Disconnect the clamp of the front exhaust pipe.



JEM00258-00238

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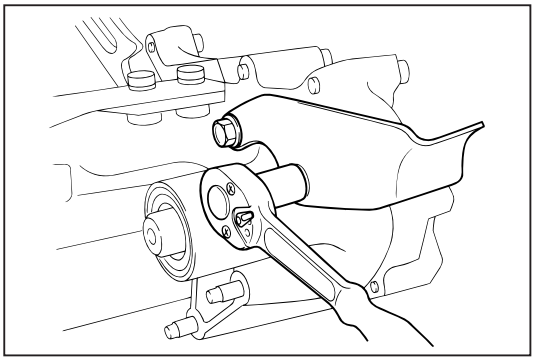
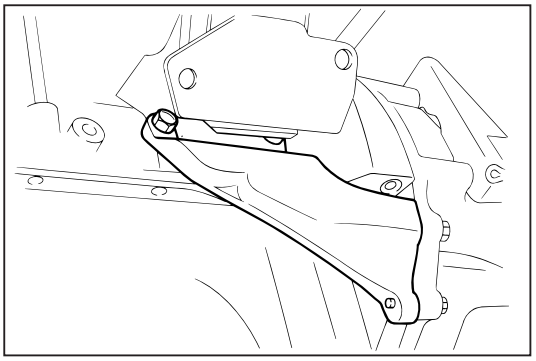
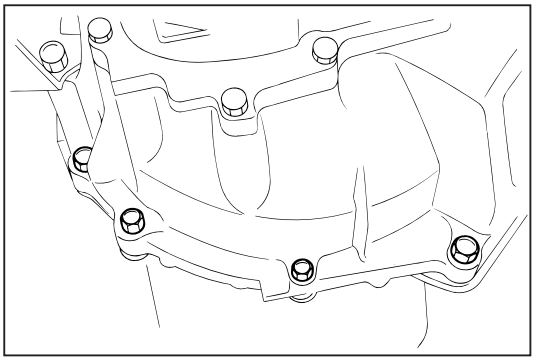
(3) Remove the bracket of the front exhaust pipe clamp from the transmission.
(4) Remove the front exhaust pipe from the engine by disconnecting the attaching nuts of the main muffler.


JEM00259-00239

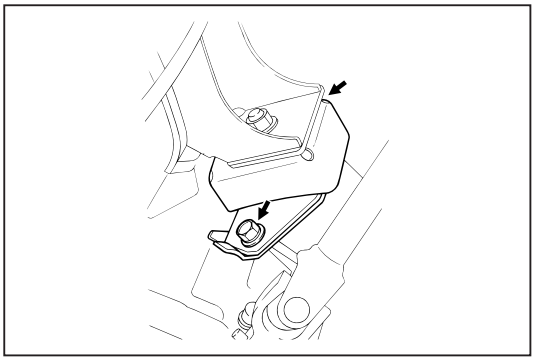
19. Remove the following stiffener from the engine and the transmission.
(1) Engine stiffener RH
(2) Engine stiffener LH
(3) Power train stiffener


JEM00260-00240

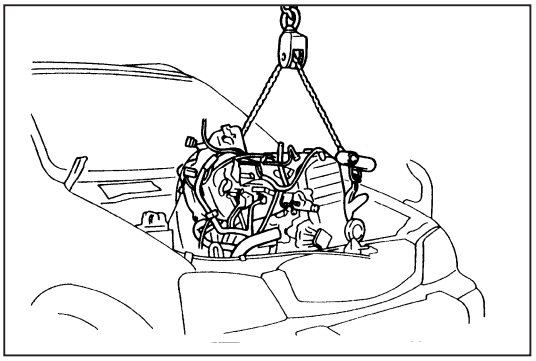
20. Remove the starter from the engine by disconnecting the attaching bolts.
21. Disconnect the attaching bolts of the engine with the transmission.


JEM00261-00241

22. Disconnect the attaching bolts of the engine mounting bracket.


JEM00262-00242

23. Take out the engine from the engine compartment.
CAUTION:
- Be very careful not to allow the engine to hit to the vehicle body and other parts.


JEM00263-00243

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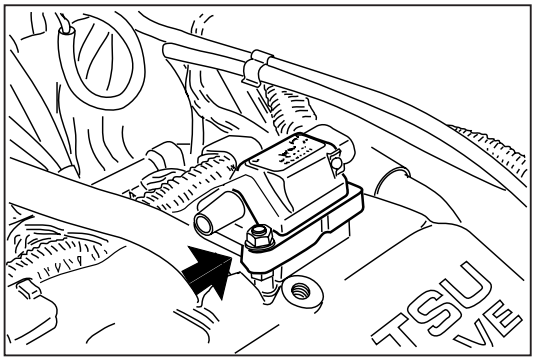
24. Place the engine on the suitable engine stand.

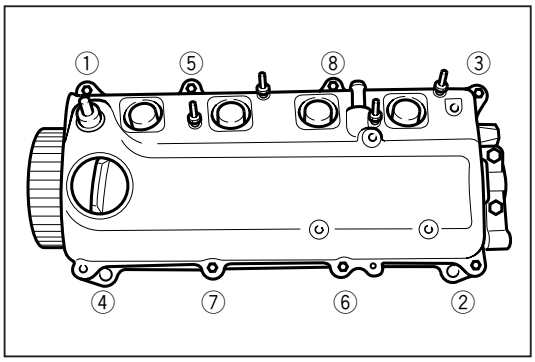
JEM00264-00000

25. Remove the timing belt.
26. Removal of cylinder head cover.
    (1) Remove the ignition coils and resistive cords.



JEM00265-00244

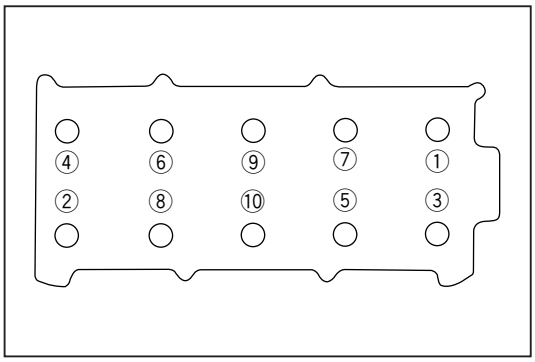
    (2) Remove the cylinder head cover attaching bolts.
    (3) Remove the cylinder head cover.



JEM00266-00245

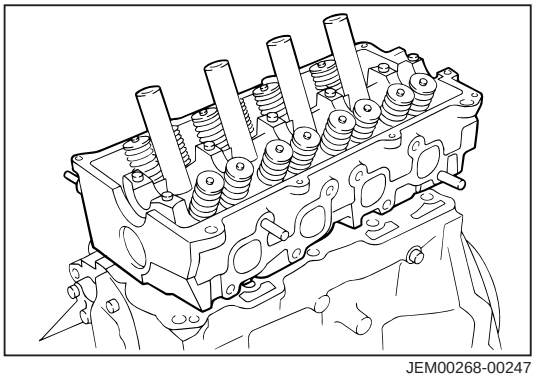
27. Removal of cylinder head.
    (1) Loosen the cylinder head attaching bolts evenly over two or three stages in the sequence indicated in the right figure.

    NOTE:
    - Be certain to loosen the cylinder head bolts evenly. Failure to observe this caution will cause cracks or distortion of the cylinder head, even leading to engine seizure.



JEM00267-00246

    (2) Remove the cylinder head bolts.
    (3) Remove the cylinder head from the cylinder block.



JEM00268-00247

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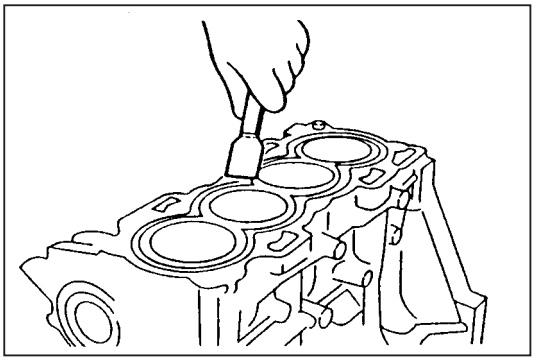
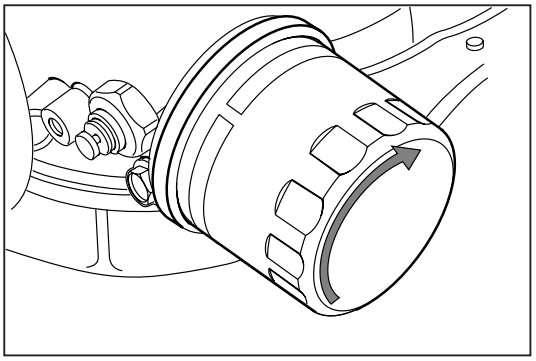
(4) Remove the cylinder head gasket.
(5) Remove any remaining gasket material from the gasket surfaces of the cylinder head and cylinder block, using the gasket scraper.



JEM00269-00248

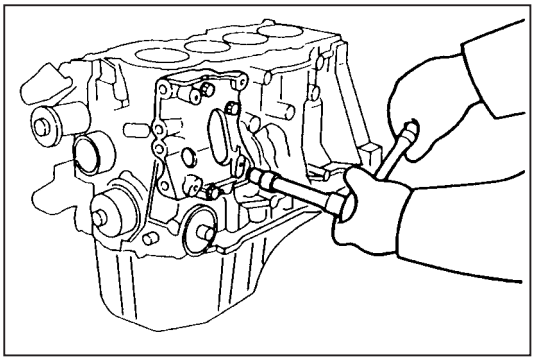
DISASSEMBLY OF CYLINDER BLOCK

1. Remove the oil pressure switch and oil filter.



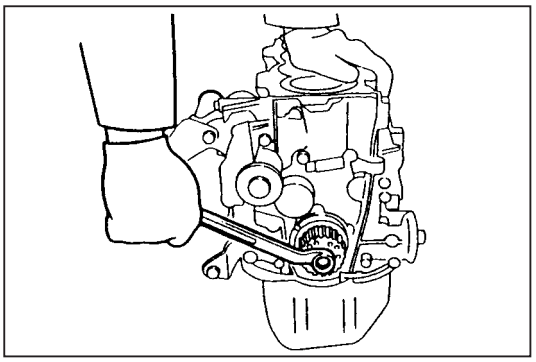
JEM00270-00249

2. Remove the air conditioner compressor bracket.
(Air conditioner equipped vehicle only)



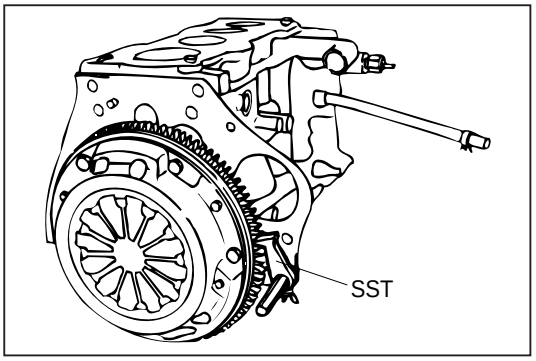
JEM00271-00250

3. Remove the crankshaft timing belt pulley bolt.



JEM00272-00251

NOTE:
- Prevent the ring gear from turning, using the following SST.
SST: 09210-87701-000



JEM00273-00252

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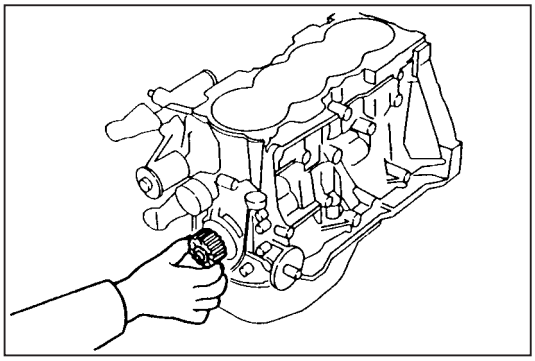
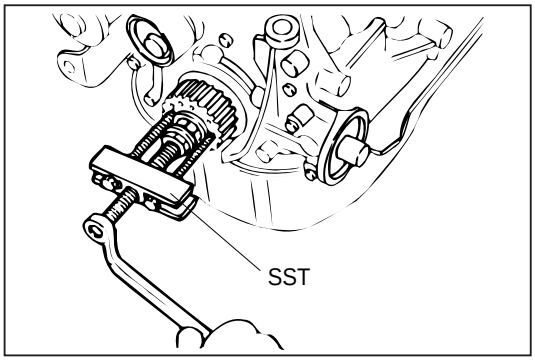
4. Remove the crankshaft timing belt pulley.



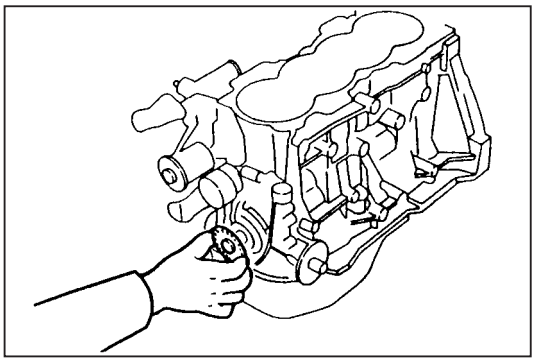
JEM00274-00253

NOTE:
- If the crankshaft timing belt pulley can not be removed by hand, install the following SST with the crankshaft timing belt pulley bolt interposed.
  SST: 09609-20011-000



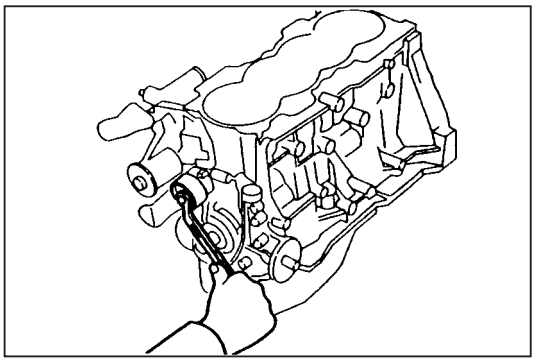
JEM00275-00254

5. Remove the crankshaft timing belt pulley flange.



JEM00276-00255

6. Remove the tensioner and tension spring.



JEM00277-00256

7. Remove the water pump.
8. Remove the water pump gasket.

JEM00278-00000

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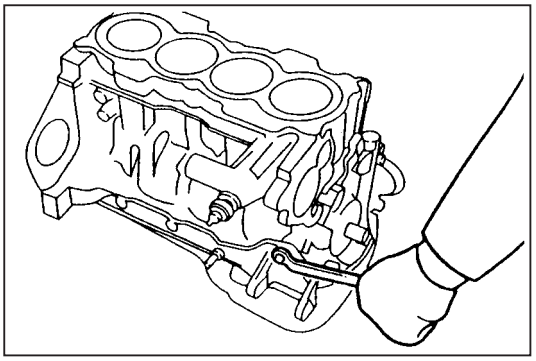
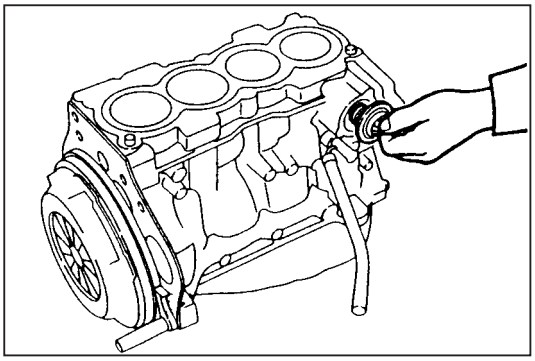
9. Remove the alternator bracket.



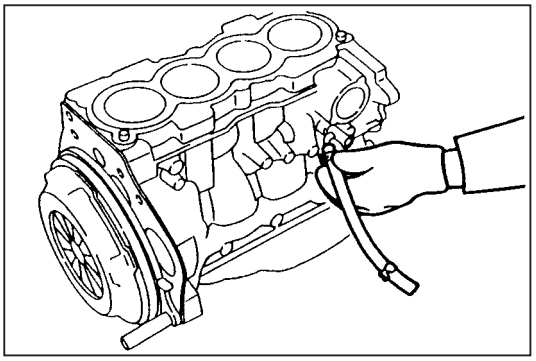
JEM00279-00257

10. Remove the water inlet and thermostat.



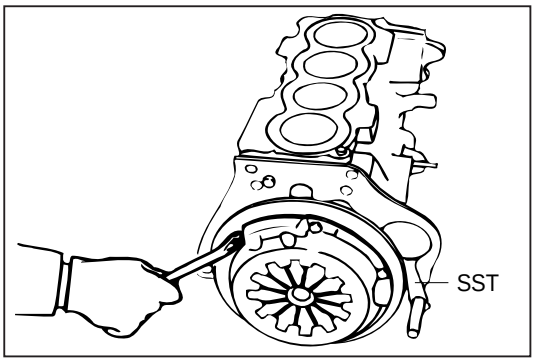
JEM00280-00258

11. Remove the water hose for the throttle body.



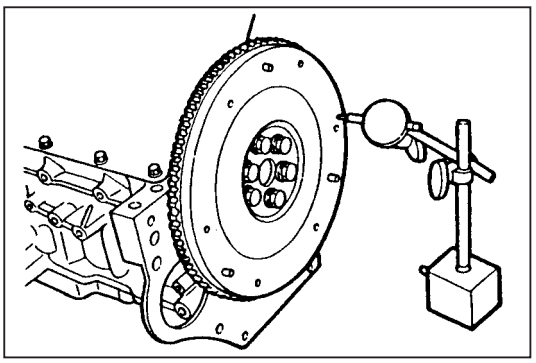
JEM00281-00259

12. Remove the pressure plate and clutch disc. (M/T vehicle only)
NOTE:
- Prevent the pressure plate from turning, using the following SST.
SST: 09210-87701-000



JEM00282-00260

13. Check of flywheel for runout (M/T vehicle only)
NOTE:
- If the runout does not conform to the specification, confirm the tightening torque of the flywheel. Only case where the tightening torque conforms to the specified value, replace the flywheel.



JEM00283-00261

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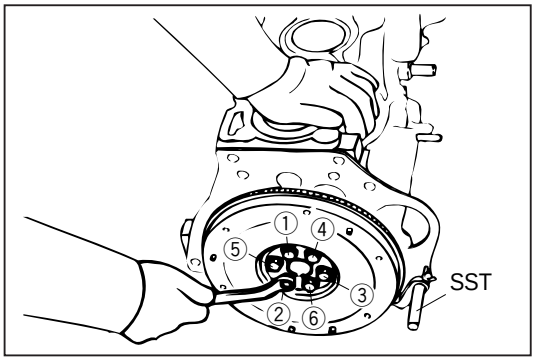
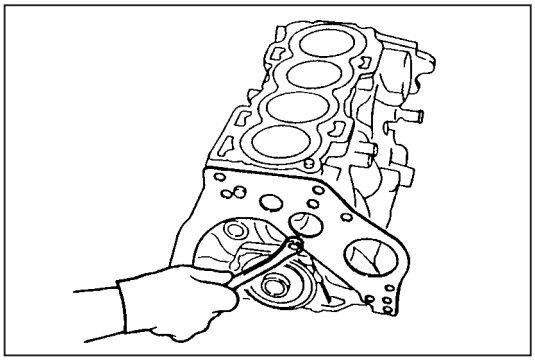
14. Loosen the attaching bolts of the flywheel or drive plate in the sequence as indicated in the right figure. Remove the flywheel or drive plate.
    NOTE:
    - Prevent the flywheel from turning, using the following SST.
      SST: 09210-87701-000



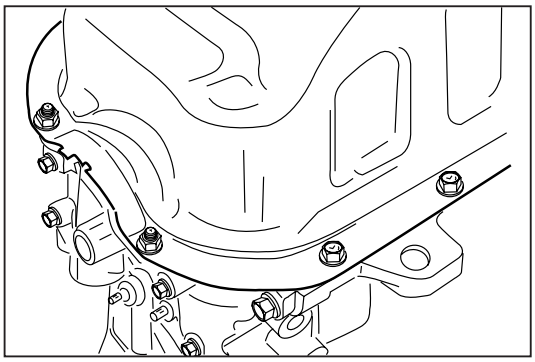
JEM00284-00262

15. Remove the rear end plate.

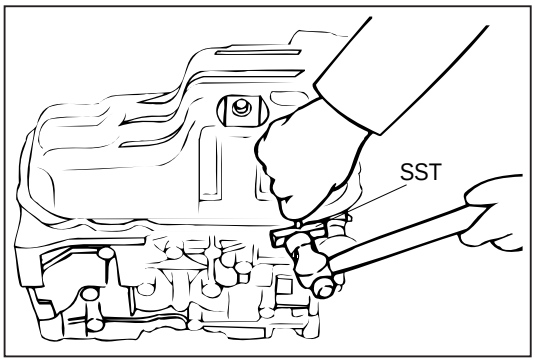

JEM00285-00263

16. Removal of oil pan
    (1) Prepare two suitable wooden blocks. Place the cylinder block on those blocks.
    NOTE:
    - Be very careful not to damage the piston head.

    (2) Loosen the attaching bolts and nuts of the oil pan over two or three stages. Pull out the bolts and nuts.

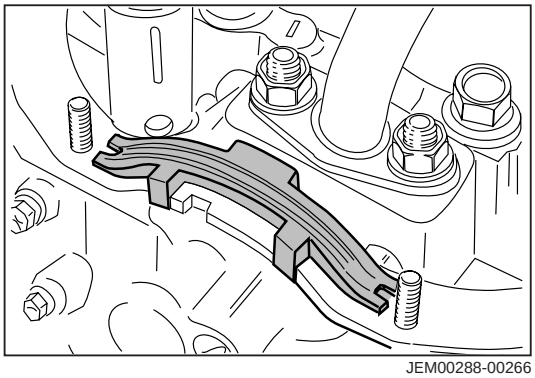

JEM00286-00264

    (3) Separate the oil pan from the cylinder block by driving the following SST into between the cylinder block and the oil pan.
      SST: 09032-00100-000



JEM00287-00265

17. Remove the oil pan gasket.


JEM00288-00266

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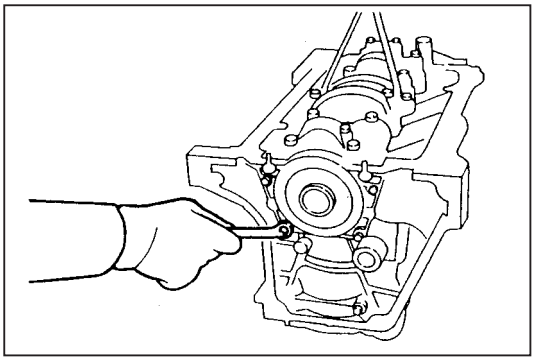
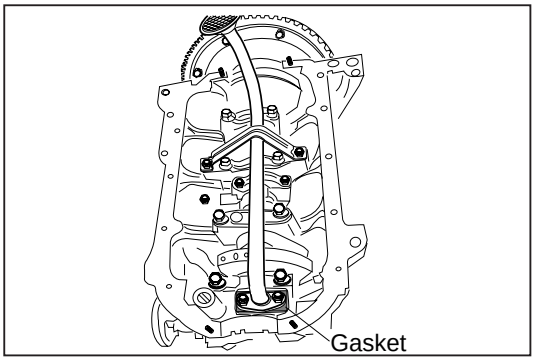
18. Remove the rear oil seal retainer.



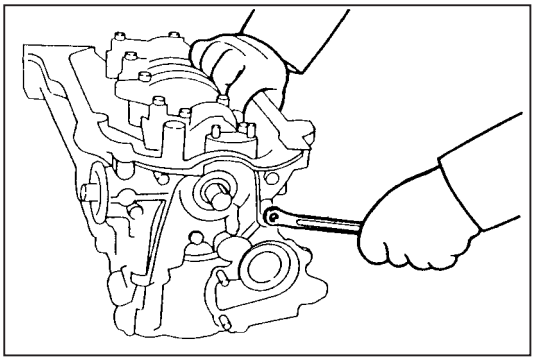
JEM00289-00267

19. Remove the oil strainer.



JEM00290-00268

20. Remove the oil pump.



JEM00291-00269

21. Measurement of connecting rod thrust clearance.
Measure the thrust clearance between the connecting rod and the crankshaft, using a thickness gauge.

    Thrust Clearance

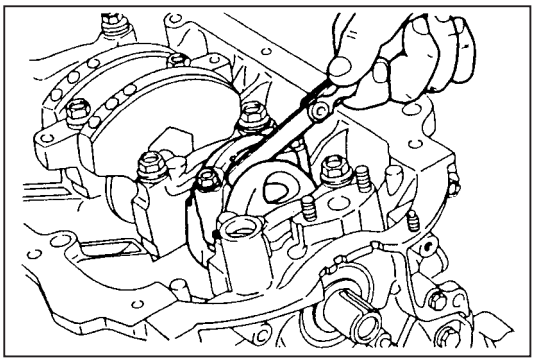
        Standard: 0.15 - 0.4 mm

        Maximum: 0.45 mm

    NOTE:

    - The thrust clearance should be measured while the connecting rod is being pushed against either side of the crankshaft in the axial direction. Measure the thrust clearance at the opposite side.

    If the clearance exceeds the specified value, replace the connecting rod or the crankshaft, or both of them, referring to the width of the big end of the connecting rod in the thrust direction and the side width of the crankpin journal.



JEM00292-00270

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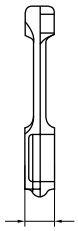
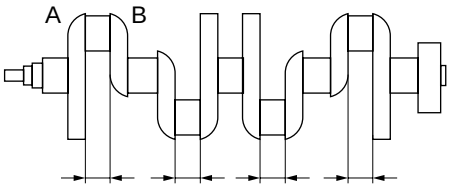
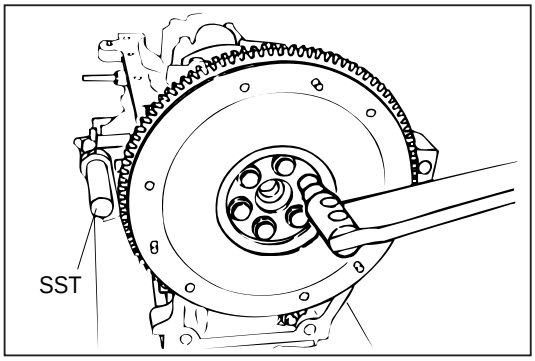
Reference:

Width of big end of connecting rod in thrust direction	Side width of crankpin
21.80 - 21.85 mm	22.0 - 22.2 mm
	Crankshaft HC-EJ engine 

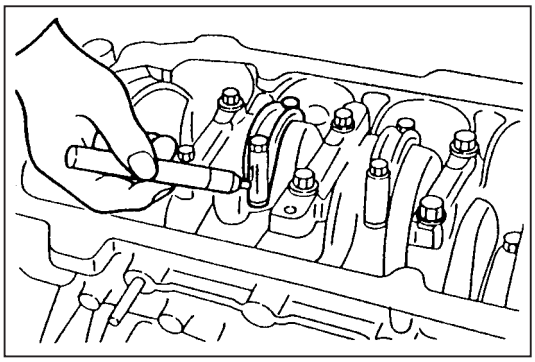
JEM00293-00271

22. Measurement of crankpin journal oil clearance
    (1) Install the flywheel temporarily.



JEM00294-00272

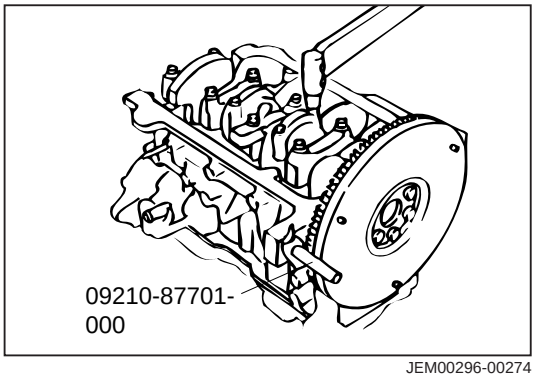
    (2) Wipe off any oil from the side of the mate surface between the connecting rod bearing cap and the connecting rod. Daub a mate mark with an oily paint on the side so that the parts can be assembled correctly in the original combination.
    (Also ensure that the cylinder number may be identified)
    (3) Turn the crankshaft, until the connecting rod bearing cap to be removed comes at the oil pan side.



JEM00295-00273

    (4) Lock the flywheel to prevent the crankshaft from turning, using the following SST.
    SST: 09210-87701-000

    (5) Loosen the connecting rod bearing cap nuts evenly over two or three stages. Then, remove the connecting rod bearing cap nuts.



JEM00296-00274

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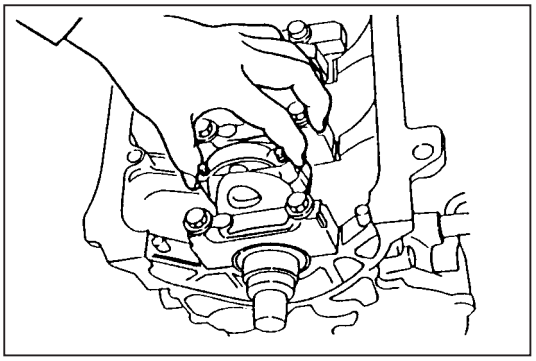
(6) Remove the bearing cap.

NOTE:

- Replace the crankshaft if the crankpin journals exhibit damages, such as seizure.

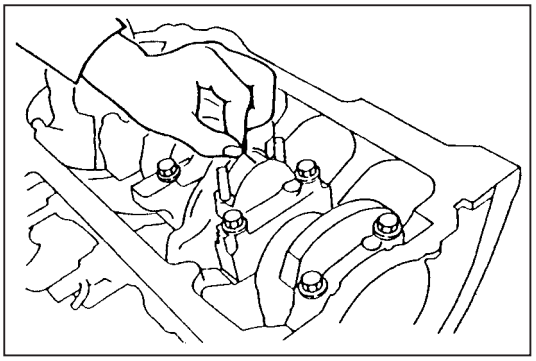


JEM00297-00275

(7) Place a plastigage on the crankpin journal.

NOTE:

- Wipe off any oil from the crankpin journal.

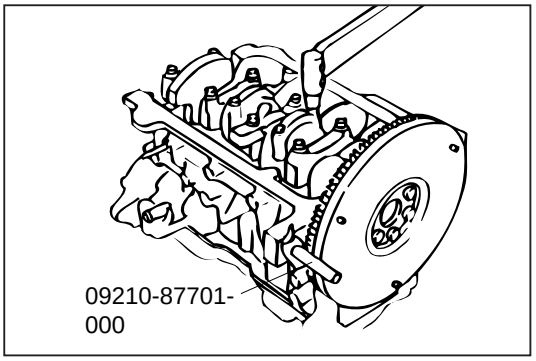


JEM00298-00276

(8) Install the connecting rod cap, making sure that the mate marks are lined up. Tighten the connecting rod bearing cap nuts evenly over two or three stages to the specified torque.
Tightening Torque: 34.3 - 44.1 N·m

NOTE:

- When tightening of the bearing cap nuts, apply engine oil to the bearing cap nuts.
- Prevent the crankshaft from turning, using the SST.
  SST: 09210-87701-000

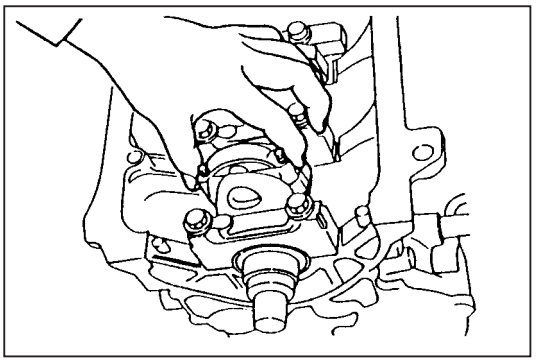


JEM00299-00277

(9) Loosen the connecting rod bearing cap nuts evenly over two or three stages. Then, remove the connecting rod bearing cap.

NOTE:

- Prevent the crankshaft from turning, using the SST.
  SST: 09210-87701-000



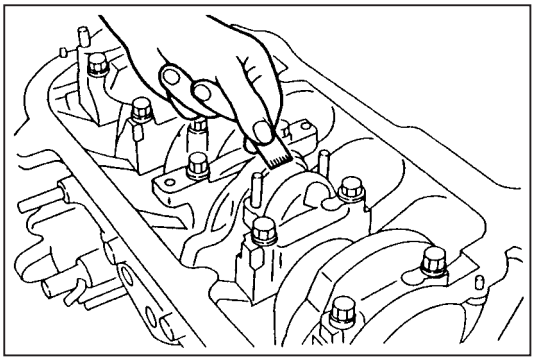
JEM00300-00278

(10) Measure the plastigage width at its widest point.
Oil Clearance: 0.020 - 0.044 mm

If the oil clearance fails to conform to the specified value, measure the crankpin journal diameter and select a suitable connecting rod bearing or replace the crankshaft.

(11) Remove the plastigage from the crankpin journal.

(12) Measure the oil clearances of the remaining crankpin journals.



JEM00301-00279

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23. Selection of connecting rod bearings

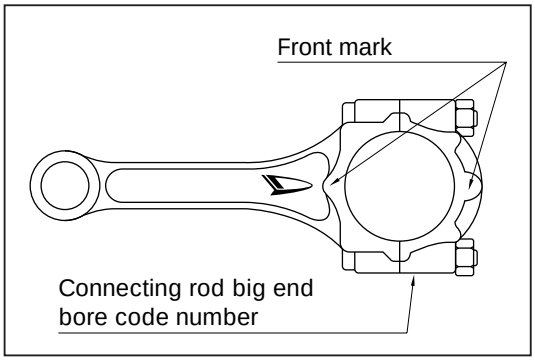
NOTE:

- The replacement of the connecting rod bearings should be performed after all inspections have been finished.

(1) Read the connecting rod big end bore code number.

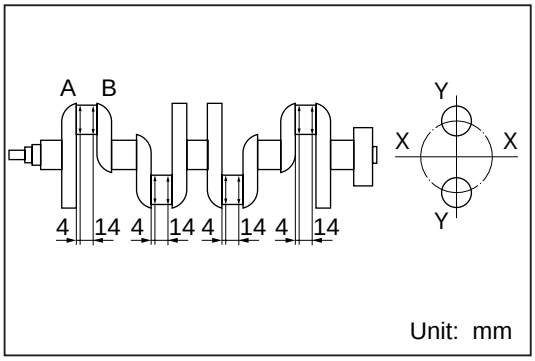
NOTE:

- The connecting rod big end bore code number comes in three kinds of 4, 5 and 6.



JEM00302-00280

(2) Measure the diameter of the crankpin journal.
The measurement should be performed at four points, 90 degrees spaced, for each crankpin journal at the points shown in the right figure. The maximum value is regarded as the crankpin journal diameter.
However, if the variation in the measured diameters exceeds 0.044 mm, replace the crankshaft.



JEM00303-00281

(3) Select the connecting rod bearing or replace the crankshaft, based on the results of (1) and (2).

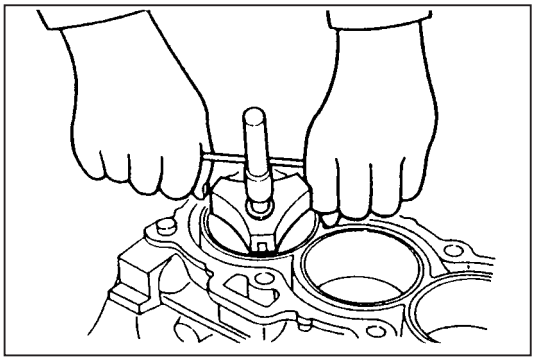
Connecting rod big end bore code number	Crankpin journal diameter	Bearing classification number	Remarks
4	44.993 - 45.000	1	—
	44.985 - 44.992	2	—
	44.976 - 44.984	3	—
	44.975 or less	—	Crankshaft replacement
5	44.993 - 45.000	2	—
	44.985 - 44.992	3	—
	44.976 - 44.984	4	—
	44.975 or less	—	Crankshaft replacement
6	44.993 - 45.000	3	—
	44.985 - 44.992	4	—
	44.976 - 44.984	5	—
	44.975 or less	—	Crankshaft replacement

JEM00304-00000

24. Removal of pistons

(1) Remove all carbon deposits from the piston ring ridges.

(2) Turn the crankshaft, until the connecting rod bearing cap to be removed comes at the oil pan side.



JEM00305-00282

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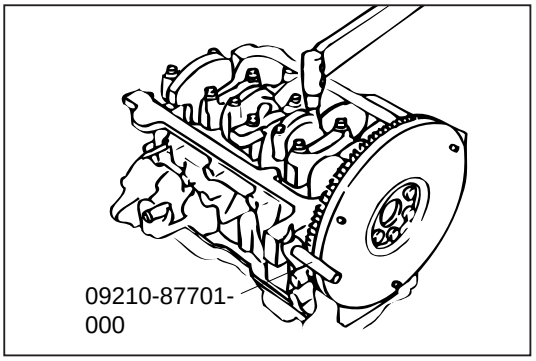
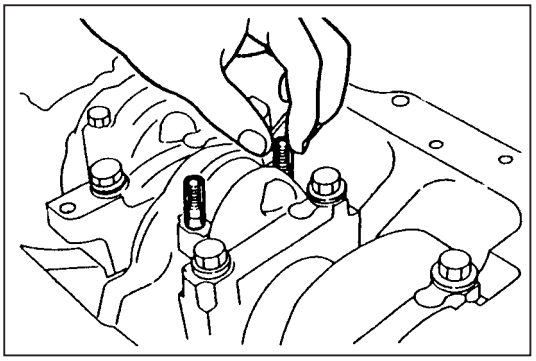
(3) Lock the flywheel to prevent the crankshaft from turning, using the following SST.
SST: 09210-87701-000



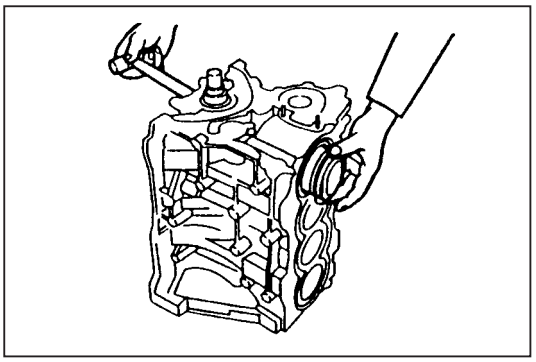
JEM00306-00283

(4) Loosen the connecting rod bearing cap nuts evenly over two or three stages. Then, remove the connecting rod bearing cap nuts.

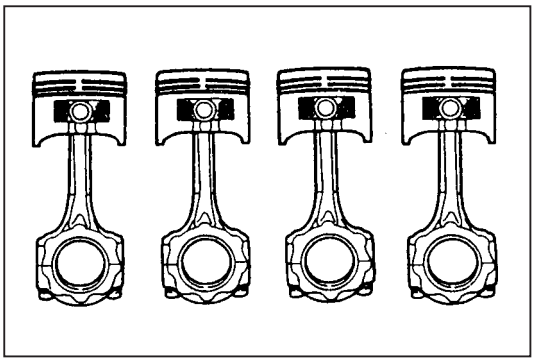
(5) Cover each connecting rod bolt with a short piece of hose to protect the crankpin journal from damage.


JEM00307-00284

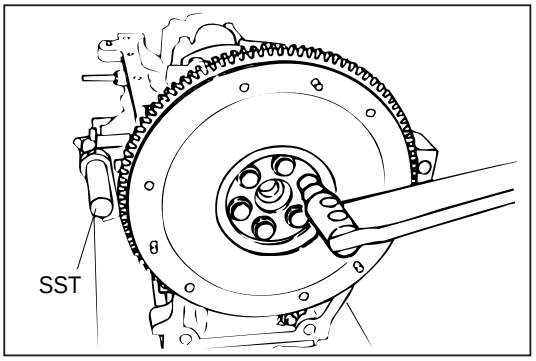
(6) Push out the piston and connecting rod assembly and the upper bearing through the top of the cylinder block.


JEM00308-00285

NOTE:
- Arrange the disassembled pistons and connecting rod in order so that their installation positions may be known readily.
- Care should be exercised so as not to damage the bearings.


JEM00309-00286

25. Remove the flywheel.
NOTE:
- Prevent the ring gear from turning with the SST.
SST: 09210-87701-000



JEM00310-00287

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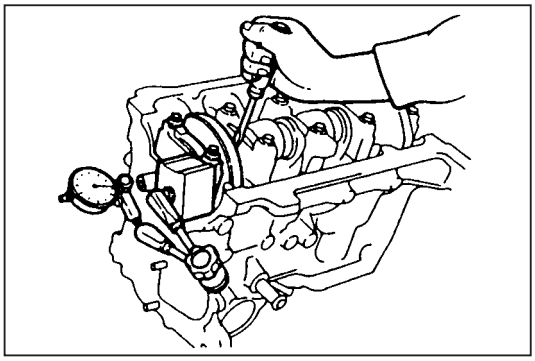
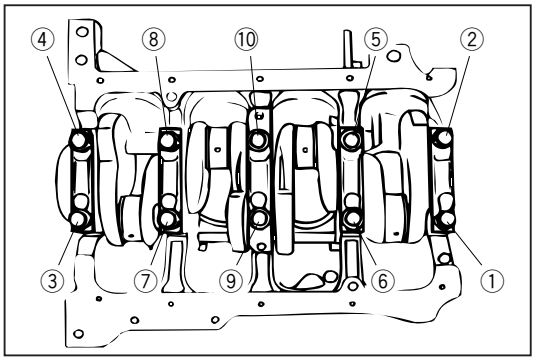
26. Check of crankshaft thrust clearance
NOTE:
- Measure the thrust clearance, using a dial gauge.
  Thrust Clearance
  Specified Value: 0.02 - 0.22 mm
  Allowable Limit: 0.30 mm

If the thrust clearance exceeds the allowable limit, measure the width of the crankshaft thrust bearing contact surface. If the measured value is less than 23.59 mm, replace the thrust washer. If the measured value exceeds 23.59 mm, replace the crankshaft and thrust washer.

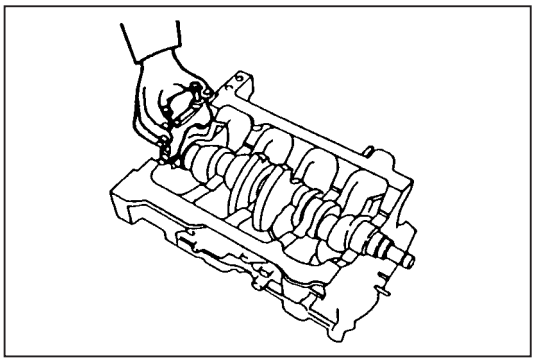

JEM00311-00288

27. Check of crankshaft main journal oil clearance
(1) Gradually loosen the main bearing cap bolts over three stages in the numerical sequence shown in the figure. Remove the bearing cap bolts.

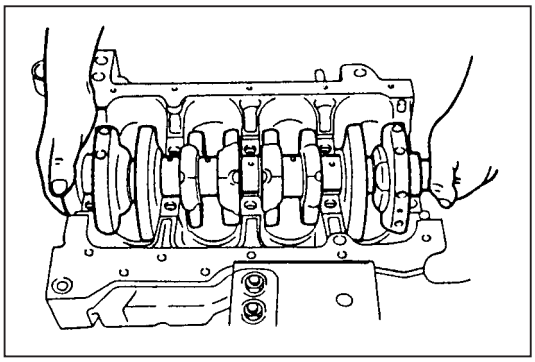


JEM00312-00289

(2) With the main bearing cap bolts inserted into the bolt holes of the main bearing cap, wiggle the bearing cap back and forth. Remove the bearing cap together with the lower bearing.
NOTE:
- Keep the lower bearing fitted to the main bearing cap. Arrange the removed main bearing caps in order.


JEM00313-00290

(3) Lift off the crankshaft.
NOTE:
- Be very careful not to allow the main bearings to be mixed with the bearings of the other cylinders.
- Remove the thrust washer.
- If the main journal or crankshaft bearing exhibit damages, replace the crankshaft or crankshaft bearing as necessary.


JEM00314-00291

(4) Clean the main journals and bearings, using cleaning solvent. Blow them with compressed air.
WARNING:
- Protect your eyes with safety goggles during the cleaning operation.

JEM00315-00000

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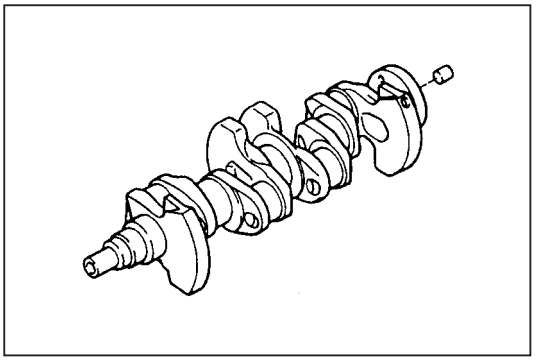
(5) Check the main journals and bearings for pitting or scratches.
If the main journals are damaged, replace the crankshaft.
If the main journal bearings are damaged, replace the main journal bearings.

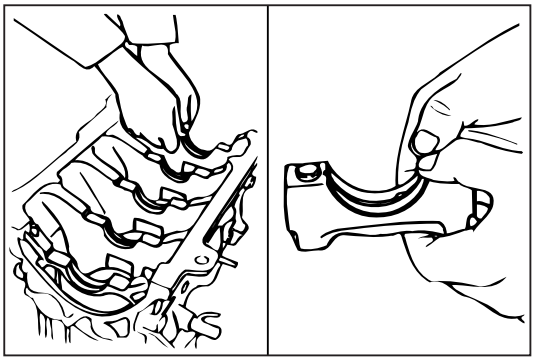


JEM00316-00292

(6) Install the main bearings to the cylinder block and crankshaft main bearing cap.

NOTE:

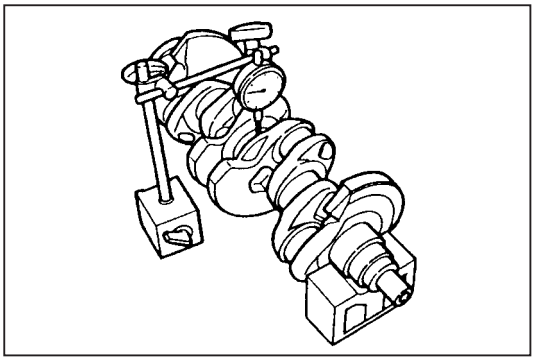
- Do not touch the metal surface of the bearing.



JEM00317-00293

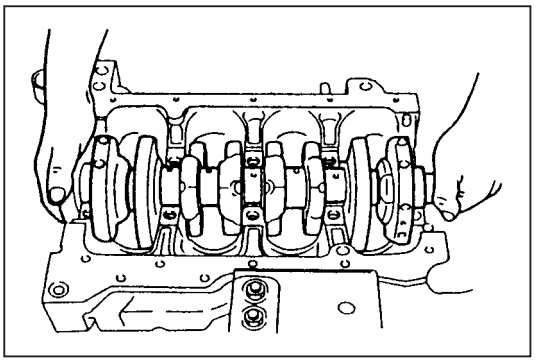
(7) Support the both ends of the crankshaft with a V-block.
Measure the crankshaft runout with a dial gauge.
Allowable Limit of Runout: 0.06 mm

If the runout exceeds the allowable limit, replace the crankshaft.



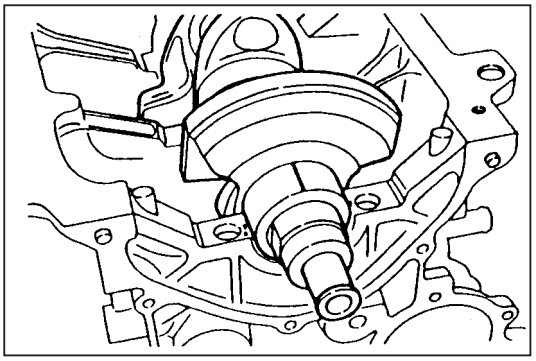
JEM00318-00294

(8) Place the crankshaft in the cylinder block.



JEM00319-00295

(9) Lay a strip of plastigage across each crankshaft main journal.



JEM00320-00296

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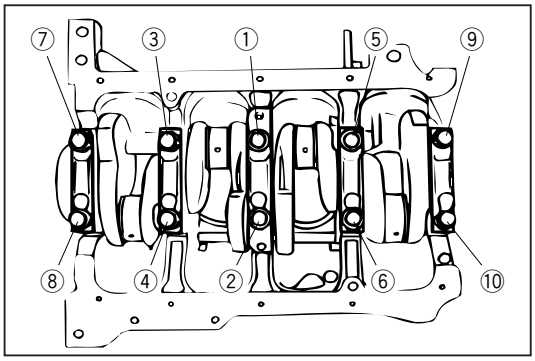
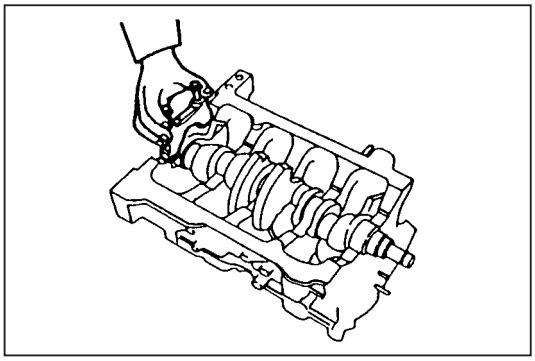
(10) Install the crankshaft bearing caps. Tighten the crankshaft bearing cap bolts evenly in the sequence indicated in the right figure.
Tightening Torque: 44.1 - 53.9 N·m



JEM00321-00297

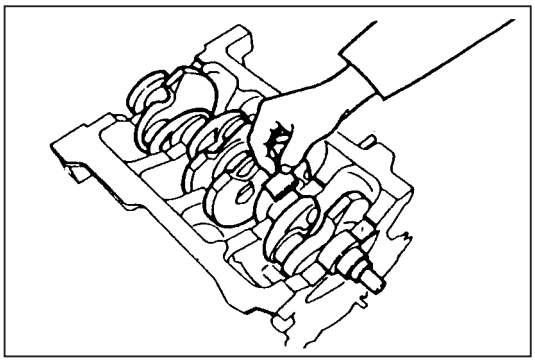
(11) Remove the main bearing caps with the lower bearings fitted on them.


JEM00322-00298

(12) Measure the plastigage width at its widest point.
Oil Clearance: 0.024 - 0.042 mm

If the oil clearance fail to conform to the specified value, measure the crankshaft main journal diameter and select suitable connecting rod bearings or replace the crankshaft.

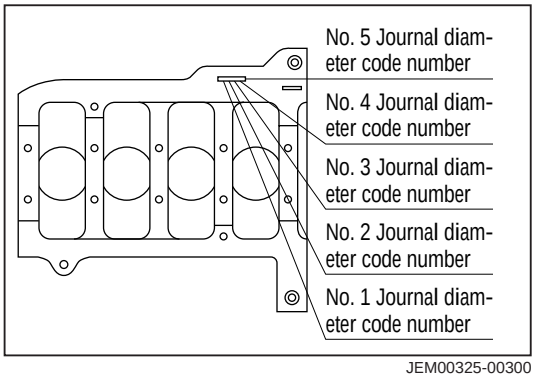
(13) Remove the plastigage from the crankshaft main journals.


JEM00323-00299

28. Selection of crankshaft bearings
NOTE:
- The replacement of the crankshaft bearings should be performed after all inspections have been finished.
- For the selection of the crankshaft bearing as a result of the replacement of the crankshaft, refer to the section under “Replacement of Crankshaft.”

JEM00324-00000

(1) Read the cylinder block main journal diameter code number.
NOTE:
- The main journal diameter code comes in four kinds of 5, 6, 7 and 8.



JEM00325-00300

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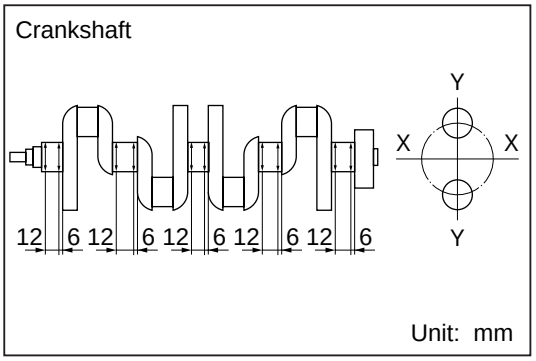
(2) Measure the diameter of the crankshaft main journals.
The measurement should be performed at four points, 90 degrees spaced, for each crankshaft main journal at the points shown in the right figure. The maximum value is regarded as the crankshaft main journal diameter.
However, if the variation in the measured diameters exceeds 0.026 mm, replace the crankshaft.



JEM00326-00301

(3) Select the crankshaft bearings or replace the crankshaft, based on the results of (1) and (2).

Main journal diameter code	Crank main journal diameter mm	Bearing classification number	Remarks
5	49.995 - 50.000	1	—
	49.989 - 49.994	2	—
	49.983 - 49.988	3	—
	49.976 - 49.982	4	—
	49.975 or less	—	Crankshaft replacement
6	49.995 - 50.000	2	—
	49.989 - 49.994	3	—
	49.983 - 49.988	4	—
	49.976 - 49.982	5	—
	49.975 or less	—	Crankshaft replacement
7	49.995 - 50.000	3	—
	49.989 - 49.994	4	—
	49.983 - 49.988	5	—
	49.976 - 49.982	6	—
	49.975 or less	—	Crankshaft replacement
8	49.995 - 50.000	4	—
	49.989 - 49.994	5	—
	49.983 - 49.988	6	—
	49.976 - 49.982	7	—
	49.975 or less	—	Crankshaft replacement

JEM00327-00000

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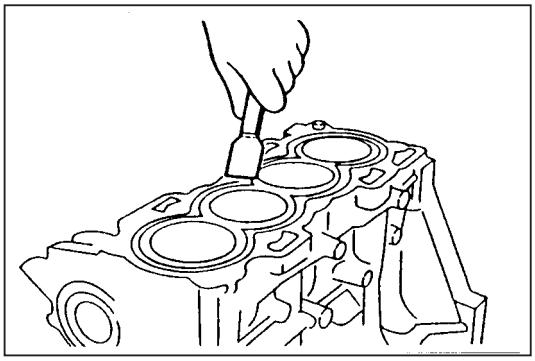
INSPECTION OF EACH PART

INSPECTION OF CYLINDER BLOCK

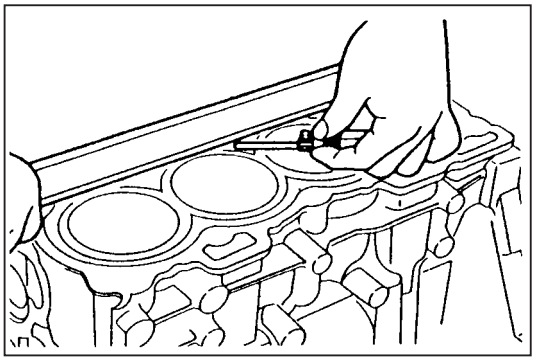
1. Removal of gasket material
   Remove all gasket materials from the cylinder block.
2. Cleaning of cylinder block
   Clean the cylinder block, using a soft brush and cleaning solvent.



JEM00328-00303

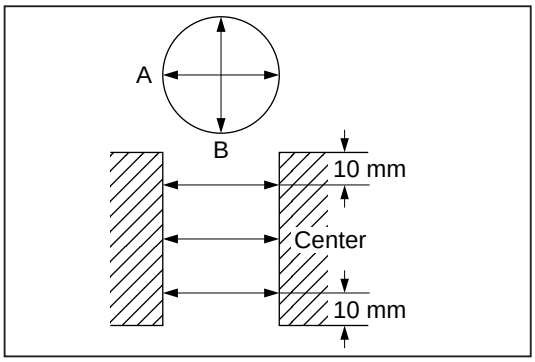
3. Inspection of top surface of cylinder block
   Using a precision straightedge and a thickness gauge, check the surface contacting the cylinder head gasket for warpage.
   Maximum Warpage: 0.10 mm

   If the warpage exceeds the allowable limit, replace the cylinder block.



JEM00329-00304

4. Inspection of cylinder bores
   (1) Measure the bore diameter of each cylinder at the six points shown in the right figure. Ensure that the difference between the maximum and minimum bore diameters of each cylinder is within 0.1 mm.
   If the difference between the maximum and minimum values exceeds 0.1 mm, perform boring and/or honing for the cylinder bore in accordance with the oversized piston.
   The honing angle is 35° ± 5°. The surface coarse degree is 1 - 4Z.

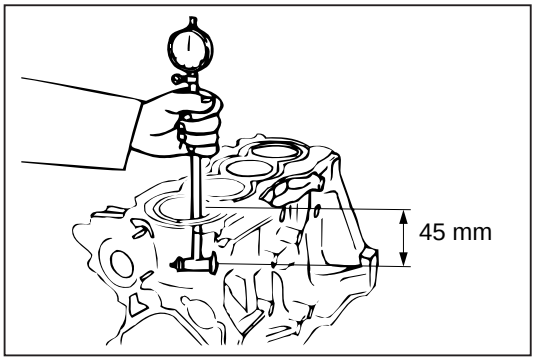


JEM00330-00305

Reference:
The table below shows the cylinder bore diameter when oversized pistons are used.
However, after the diameter of the replacement piston has been measured, perform the finishing in accordance with the piston diameter.

Standard	O/S 0.25
76.000 - 76.030 mm	76.250 - 76.280 mm

(2) Measure the bore diameter of each cylinder at a position shown in the right figure. The measured value is regarded as the cylinder bore diameter.



JEM00331-00306

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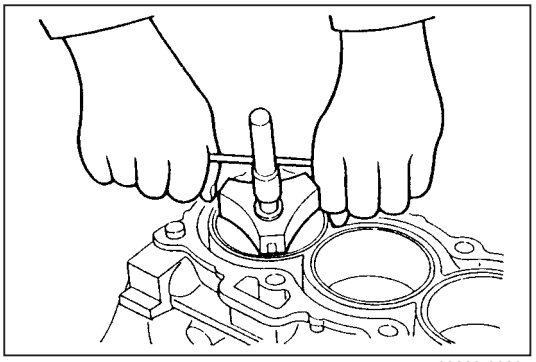
5. Removal of cylinder ridges
   If ridges are formed at the upper parts of the cylinder bores, use a ridge reamer to remove the ridges.



JEM00332-00307

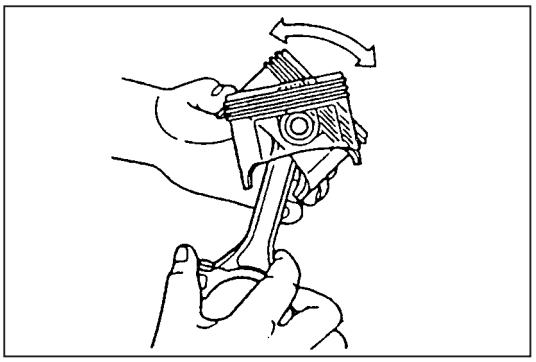
INSPECTION OF PISTONS AND CONNECTING RODS

CAUTION:

- The piston and piston pin are available only as a set so that the oil clearance may become the specified value. Therefore, if you replace a piston or a piston pin, be sure to replace them as a set. Moreover, the piston and piston pin should be handled at all times as a set. Care must be exercised so that the piston or piston pin may be mixed with other ones.

JEM00333-00000

1. Inspection of fit between piston and piston pin
   Try to move the piston back and forth on the piston pin. If any movement is felt replace the piston and piston pin as a set.
   NOTE:
   - When the piston is moved back and forth on the piston pin, you may encounter hard movement. However, if the piston moves smoothly without any binding, this fitting of the piston is normal.



JEM00334-00308

Reference:

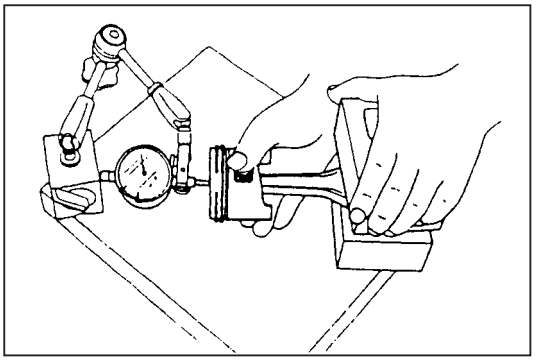
1. The oil clearance between the piston and piston pin is as follows.
   Specified Oil Clearance: 0.005 - 0.011 mm

   NOTE:
   - In the case of a piston and piston pin assembly having this degree of oil clearance, you will hardly feel excessive play when you move the piston by your hands.

JEM00335-00000

2. Measurement of oil clearance
   NOTE:
   - The oil clearance can be measured, following the procedure given below.

   (1) When measuring oil clearance without disassembling:
   Interpose the big end of the connecting rod between V-blocks on a surface plate. Measure the play while moving the piston, as indicated in the right figure.



JEM00336-00309

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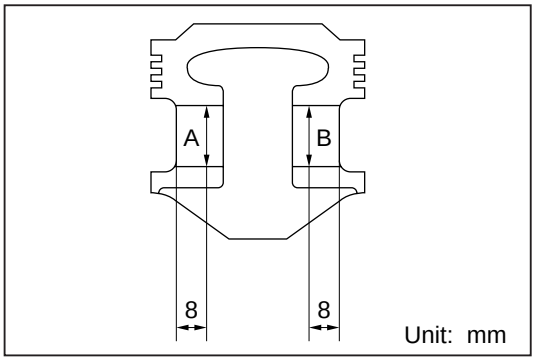
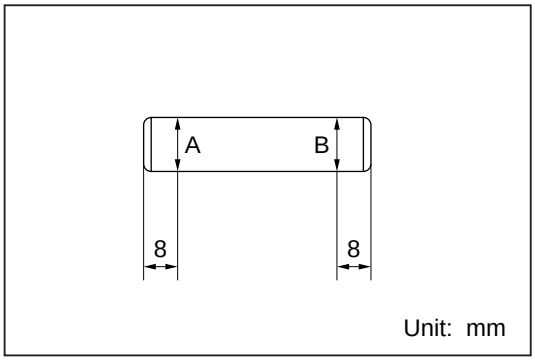
(2) When measuring oil clearance after disassembling:
① Measure the diameter of the whole circumference at the positions A and B indicated in the right figure. The minimum dimension should be the piston pin hole diameter.
Specified Value: 19.002 - 19.005 mm



JEM00337-00310

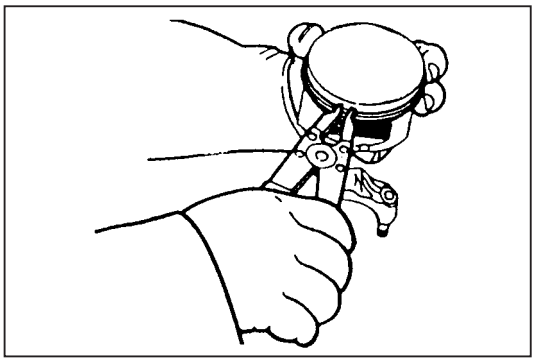
② Measure the diameter of the whole circumference at the positions A and B indicated in the right figure. The maximum dimension should be the piston pin outer diameter.
Specified Value: 18.994 - 18.997 mm



JEM00338-00311

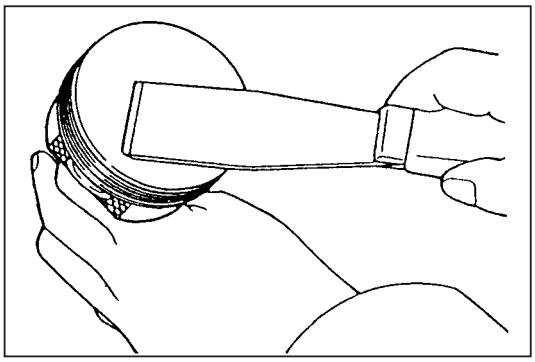
2. Removal of piston rings
NOTE:
- Arrange the removed piston rings in order so that their installation positions may be known readily.
- Do not expand the piston ring unnecessarily beyond the required extent.

(1) Remove the piston rings No. 1 and No. 2, using a piston ring expander.
(2) Remove the oil ring side rails by hand.
(3) Remove the oil ring expander by hand.


JEM00339-00312

INSPECTION OF PISTONS

1. Cleaning of pistons
(1) Remove the carbon deposits from the piston top, using a gasket scraper or the like.
(2) Clean the piston grooves with a broken piston ring or a groove cleaning tool.
NOTE:
- Be very careful not to scratch the piston.


JEM00340-00313

2. Inspection of pistons
Visually inspect the piston for cracks, damage or seizure. Replace the piston, if necessary.

JEM00341-00000

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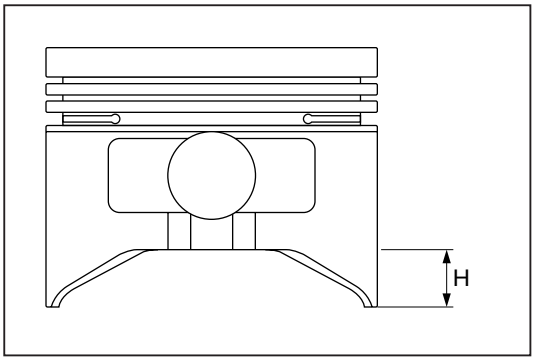
3. Measurement of piston diameter
   (1) Measure the piston outer diameter horizontally at a specified point shown bellow from the lower end of the piston at right angles to the piston pin.
   Specified Measuring Point H: 15 mm



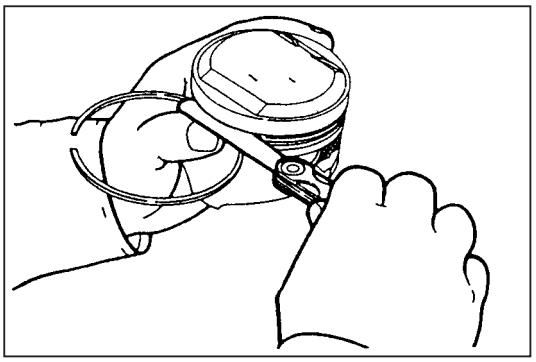
JEM00342-00314

   (2) Calculation of piston-to-cylinder bore clearance
   Subtract the measured piston outer diameter from the measured cylinder bore diameter. Ensure that this piston-to-cylinder bore clearance is less than 0.045 mm.
   Piston-to-Cylinder Bore Clearance
   Specified Value: 0.025 - 0.045 mm
   Allowable Limit: 0.11 mm

   If the piston-to-cylinder bore clearance exceeds the allowable limit, perform boring and honing the cylinder bores so that the cylinder bore diameter may match with the oversized piston.

JEM00343-00000

4. Inspection of piston ring groove side clearance
   Measure the side clearances of the piston rings No. 1 and No. 2 over the entire periphery of each groove, using a thickness gauge.
   The maximum measured value is regarded as the piston ring side clearance.



JEM00344-00315

Piston ring side clearance

	Specified value mm	Allowable limit mm
Compression ring No. 1	0.03 - 0.07	0.12
Compression ring No. 2	0.02 - 0.06	

If the piston side clearance exceeds the allowable limit, measure the piston ring thickness. Referring to the piston ring standard thicknesses given below, replace the piston ring and/or piston so that the piston ring side clearance may become less than the allowable limit.

JEM00345-00000

Piston ring specified thickness

Unit: mm

Compression ring No. 1	1.17 - 1.19
Compression ring No. 2	1.47 - 1.49

NOTE:
- When replacing the piston rings, a set of piston rings for the engine should be replaced.

JEM00346-00000

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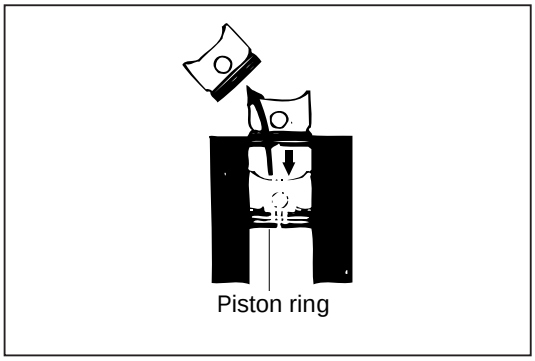
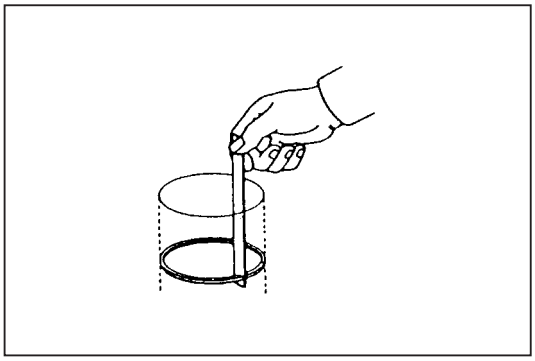
5. Inspection of piston ring end gap
   (1) Apply engine oil to the cylinder walls.
   (2) Insert the piston rings into the cylinder bore.
   (3) Using a piston, push down the piston ring to a point 110 mm from the cylinder block upper surface.



JEM00347-00316

   (4) Measure the piston ring end gap, using a thickness gauge or a feeler gauge.



JEM00348-00317

Piston ring end gap

		Specified value mm	Allowable limit mm
Compression ring No. 1	With “T” mark	0.27 - 0.37	0.7
	With “N” mark	0.27 - 0.40	
Compression ring No. 2		0.4 - 0.55	0.8
Oil ring	Shape of spacer A	0.2 - 0.6	1.0
	Shape of spacer B	0.15 - 0.6	

Oil ring spacer shape

Shape A

Shape B

If the piston ring end gap exceeds the allowable limit, a set of piston rings for that engine should be replaced.

JEM00349-00318

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ASSEMBLY/DISASSEMBLY OF PISTON & CONNECTING ROD

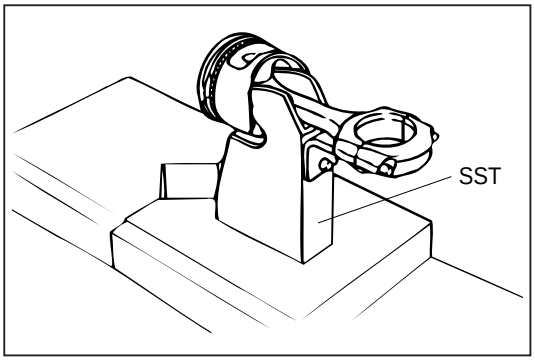
NOTE:

- The piston and piston pin are handled as a set, for their oil clearance is controlled. Therefore, when disassembling the pistons, care must be exercised so that the piston and piston pin may not be mixed with other pistons or piston pins.
- The piston disassembling should be performed only when any malfunction takes place and disassembling is required. Failure to observe this caution may loosen the interference fit between the connecting rod and the piston pin, leading to an engine damage.

1. Disassembly of piston and connecting rod
   Use the following SSTs for the disassembling operation.
   SST: 09221-87704-000
   09221-87705-000

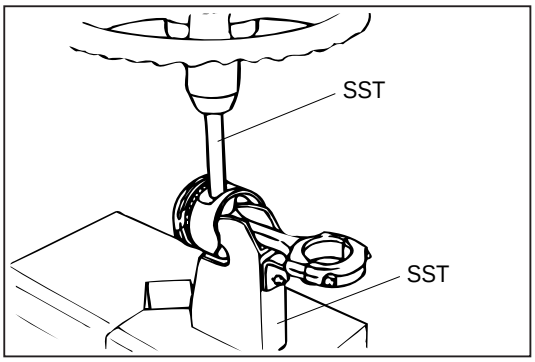
JEM00350-00000

(1) Install the connecting rod in the following SST as shown in the right figure.
SST: 09221-87704-000



JEM00351-00319

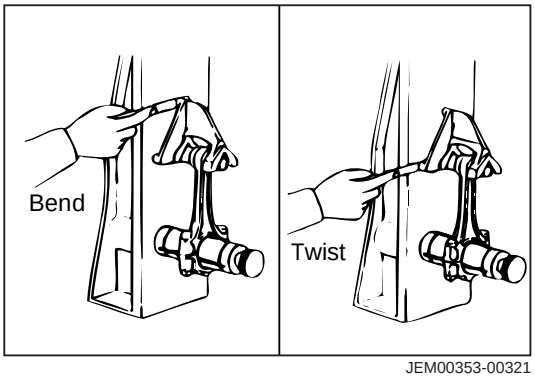
(2) Insert the longer SST into the piston pin hole. Press off the piston, using a hydraulic press.



JEM00352-00320

2. Inspection of connecting rods
   (1) Visually inspect the connecting rods for damage or cracks.
   (2) Check the connecting rod for bend and twist, using a connecting rod aligner.
   Maximum Bend: 0.05 mm
   Maximum Twist: 0.05 mm

   If the bend and/or twist is greater than the maximum limit, replace the connecting rod assembly.



JEM00353-00321

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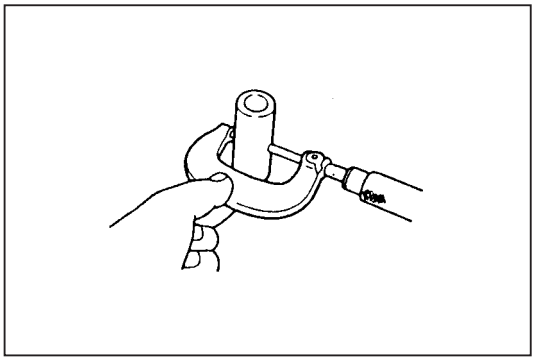
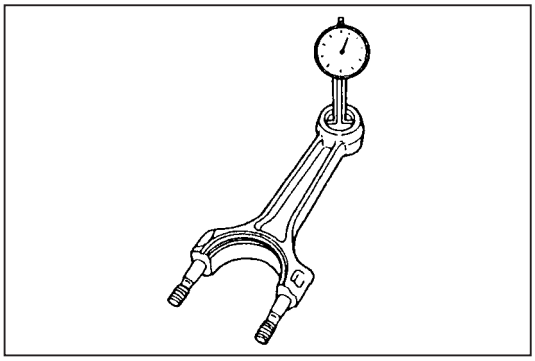
3. Inspection of piston pin-to-connecting rod interference fit
   (1) Measure the outer diameter of the piston pin contacting with the connecting rod, using a micrometer.



JEM00354-00322

   (2) Measure the inner diameter of the connecting rod, using a bore dial gauge.
   (3) Determine the interference fit by subtracting the inner diameter of the connecting rod from the outer diameter of the piston pin.
   Interference Fit: 0.015 - 0.044 mm

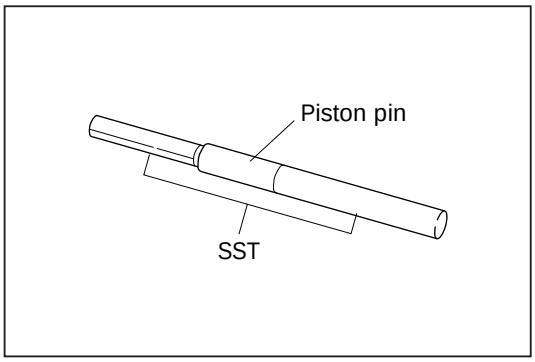
   If the interference fit does not conform to the specification, replace the connecting rod.



JEM00355-00323

4. Assembly of piston and connecting rod
   Use the following SSTs for the assembling operation.
   SST: 09221-87704-000
   09221-87705-000

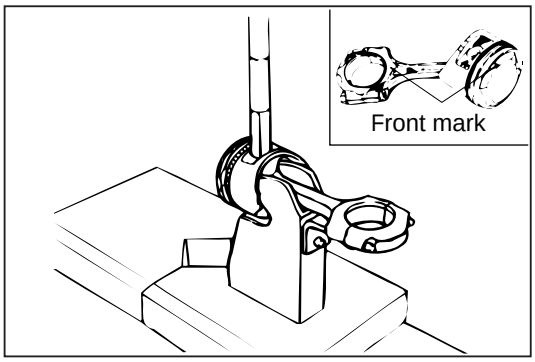
   (1) Install the piston pin to the following SST in a way shown in the right figure.
   SST: 09221-87705-000



JEM00356-00324

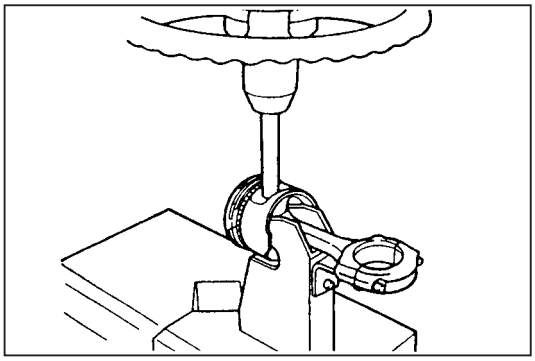
   (2) Install the piston and connecting rod in the SST in a way shown in the right figure. Insert the SST installed with the piston pin into the piston pin hole.
   SST: 09221-87704-000
   09221-87705-000

   NOTE:
   - The piston and connecting rod should be assembled in such a way that the piston front mark and connecting rod front mark come in the same direction.



JEM00357-00325

   (3) Press the piston pin into the piston and connecting rod, using a hydraulic press.



JEM00358-00326

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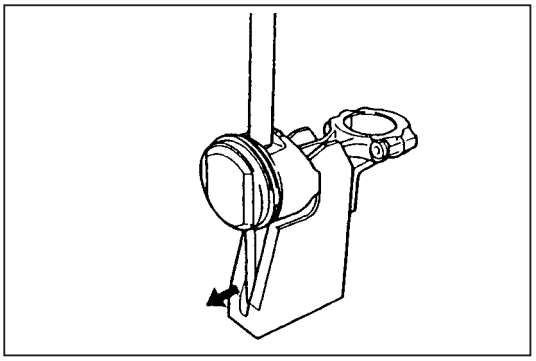
(4) Remove the piston and connecting rod assembly from the SST. Remove the SST from the piston pin.



JEM00359-00327

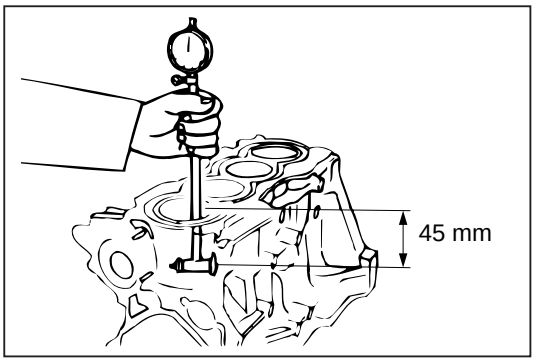
CYLINDER BORING

NOTE:

- When the cylinder is bored, all cylinders should be bored at the same time.
- As for piston rings, use oversized piston rings.

JEM00360-00000

1. Measurement of cylinder bore diameter
   Measure the diameter at a point 45 mm from the cylinder upper surface in the direction shown in the right figure.
   If the measured value exceeds 76.28 mm, replace the cylinder block.



JEM00361-00328

2. Determining cylinder finishing diameter
   (1) Measure the diameter of the oversized piston to be used, using a micrometer.
   NOTE:
   - The measurement should be conducted at the specified skirt section from the piston lower end.
   - Perform the measurement horizontally, not in a tilted state.

JEM00362-00000

   (2) Calculate the finishing dimension, as follows.
   A: Piston diameter
   B: Piston-to-cylinder bore clearance
   0.025 - 0.045 mm
   C: Honing allowance
   0.02 mm
   D: Finishing diameter
   D = A + B – C

JEM00363-00000

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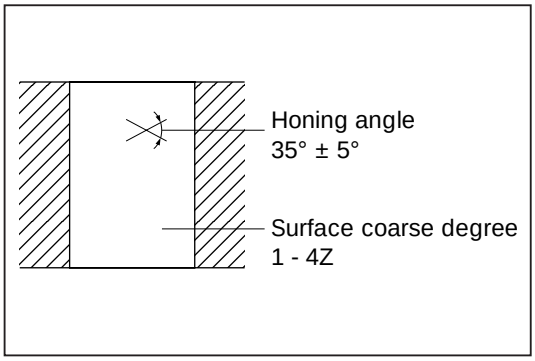
3. Hone the cylinder after the boring.
   (1) Bore the cylinder, leaving a honing allowance of 0.02 mm.
   (2) Hone the cylinder.
   Honing Angle: 35° ± 5°
   Surface Coarse Degree: 1 - 4Z

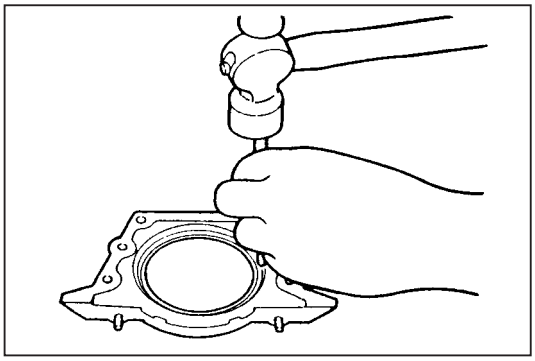


JEM00364-00329

REPLACEMENT OF REAR OIL SEAL

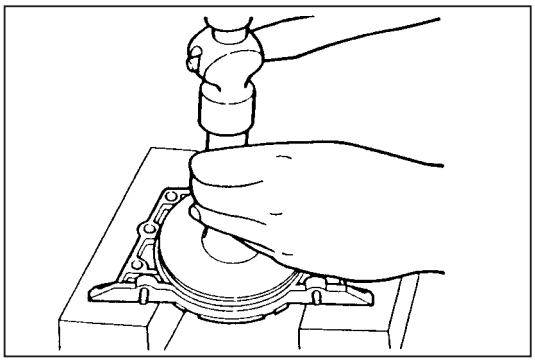
(1) Removal of rear oil seal
Remove the rear oil seal from the rear oil seal retainer, using a pin punch.

NOTE:
- Be very careful not to damage the oil seal retainer.


JEM00365-00330

(2) Installation of rear oil seal
Drive a new rear oil seal into position, using the following SST.
SST: 09223-41020-000

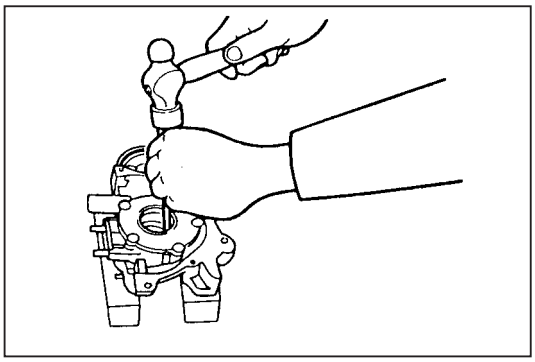
NOTE:
- Care must be exercised to ensure that the oil seal is not driven in a tilted state.


JEM00366-00331

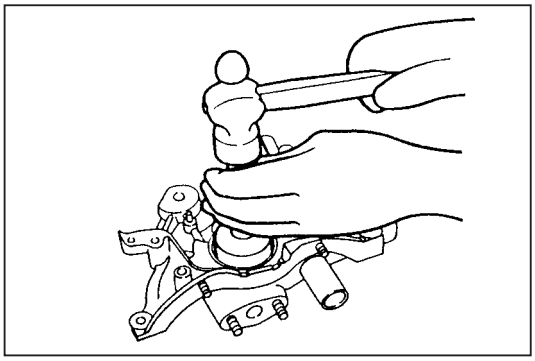
REPLACEMENT OF FRONT OIL SEAL

(1) Removal of front oil seal
Remove the front oil seal from the oil pump, using a pin punch.

NOTE:
- Be very careful not to damage the oil pump during the removal.


JEM00367-00332

(2) Installation of front oil seal
Drive a new front oil seal into position, using the following SST.
SST: 09310-87102-000


JEM00368-00333

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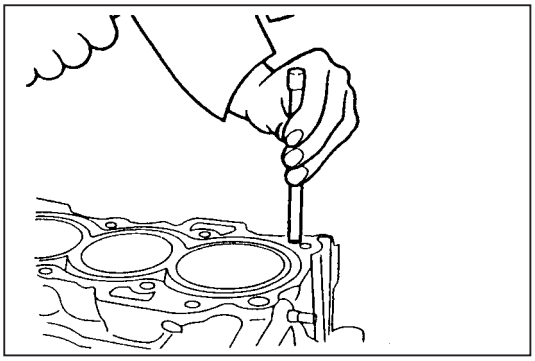
REPLACEMENT OF CYLINDER BLOCK

NOTE:

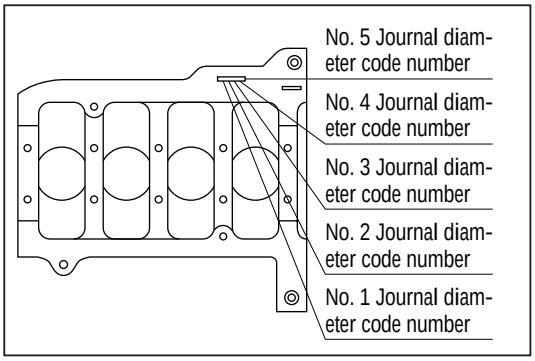
- The cylinder block is furnished along with the pistons as a set. Hence, make sure that each piston is installed in the mated cylinder bore.

1. Wash the cylinder block using cleaning solvent.
2. Drive the oil orifice until it is recessed 3.0 ± 1.0 mm from the cylinder upper surface.
   NOTE:
   - For driving this oil orifice, use an iron rod having an outer diameter of 10 mm.



JEM00369-00334

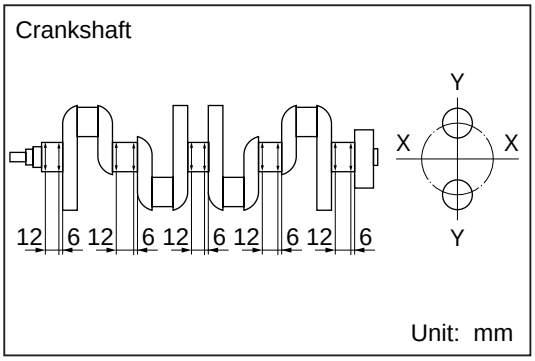
3. Selection of crankshaft bearings
   (1) Read the crankshaft journal diameter code number of the cylinder block.



JEM00370-00335

   (2) Measure the main journal diameter of the crankshaft at those points indicated in the right figure.
   - The measurement should be conducted in four directions for each main journal, 90 degrees spaced, at those points indicated in the right figure.

   (3) Select the crankshaft bearings in accordance with the table next page.



JEM00371-00336

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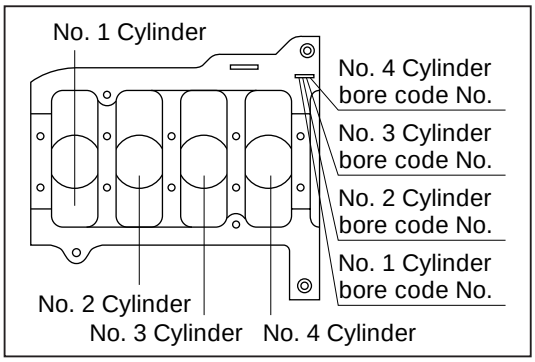
Crankshaft jurnal hole code	Crankshaft journal diameter mm	Crankshaft bearing classification No.	Remarks
5	50.000 - 49.995	1	—
	49.994 - 49.989	2	—
	49.988 - 49.983	3	—
	49.982 - 49.976	4	—
	49.975 or less	—	Crankshaft replacement
6	50.000 - 49.995	2	—
	49.994 - 49.989	3	—
	49.988 - 49.983	4	—
	49.982 - 49.976	5	—
	49.975 or less	—	Crankshaft replacement
7	50.000 - 49.995	3	—
	49.994 - 49.989	4	—
	49.988 - 49.983	5	—
	49.982 - 49.976	6	—
	49.975 or less	—	Crankshaft replacement
8	50.000 - 49.995	4	—
	49.994 - 49.989	5	—
	49.988 - 49.983	6	—
	49.982 - 49.976	7	—
	49.975 or less	—	Crankshaft replacement

JEM00372-00000

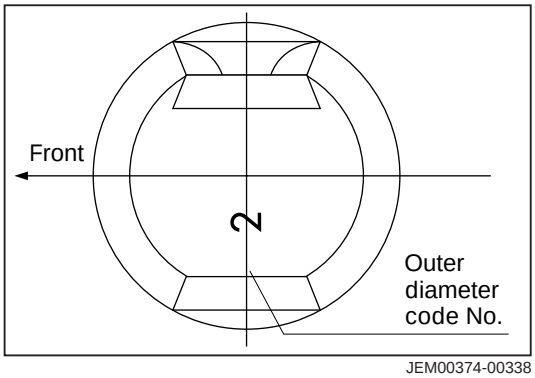
4. Selection of pistons
   (1) Read the cylinder block bore code number.



JEM00373-00337

   (2) Select a piston having the same classification number as the cylinder block bore code number.

NOTE:
- The piston code number is stamped on the top of each piston.



JEM00374-00338

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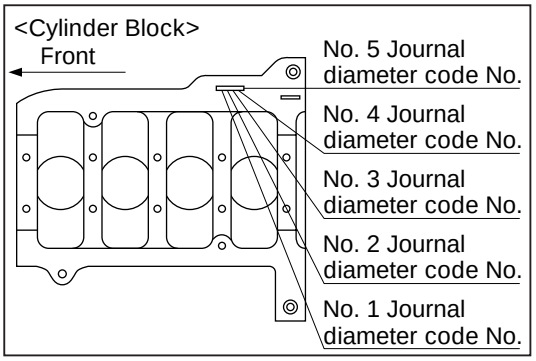
REPLACEMENT OF CRANKSHAFT

(Replacement of the crankshaft only)

1. Wash the crankshaft using cleaning solvent. Dry it with compressed air.
   NOTE:
   - Make sure that the oil gallery exhibits no restriction due to rust-proof oil.
   - As for the crankshaft for automatic transmission, drive the rear end bush into the rear end of the crankshaft with a brass rod so as to prevent damage to the bush.

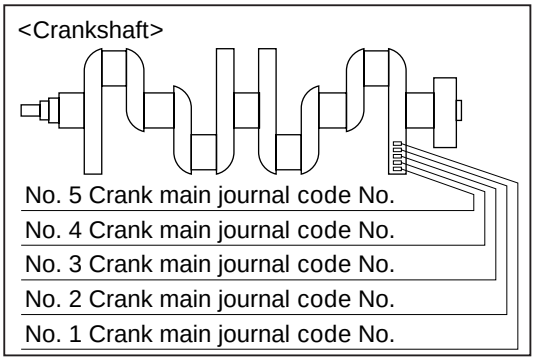
JEM00375-00000

2. Selection of crankshaft bearings
   (1) Read the crankshaft journal diameter code number of the cylinder block.



JEM00376-00339

   (2) Read the crankshaft main journal diameter code number.



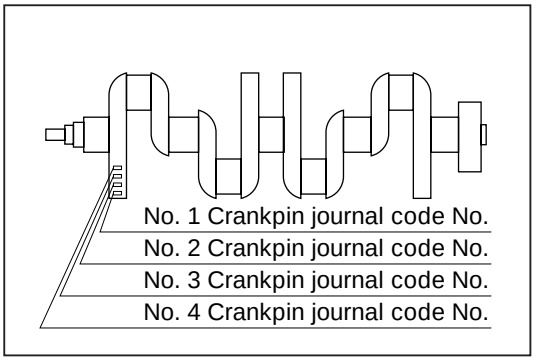
JEM00377-00340

   (3) Establish the crankshaft bearing classification number, using the table below.

Cylinder block \ Crankshaft		Crankshaft journal			
		1	2	3	4
Crankshaft journal diameter code No.	5	4	3	2	1
	6	5	4	3	2
	7	6	5	4	3
	8	7	6	5	4

JEM00378-00000

3. Selection of connecting rod bearings
   (1) Read the crankpin journal diameter code number.



JEM00379-00341

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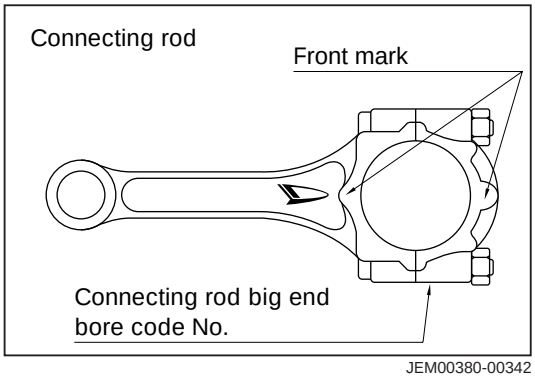
(2) Read the connecting rod big end bore code number.



JEM00380-00342

(3) Establish the classification number of the connecting rod bearing, using the table below.

Connecting rod \ Crankshaft		Crankpin journal diameter code No.		
		1	2	3
Connecting rod big end bore code No.	4	3	2	1
	5	4	3	2
	6	5	4	3

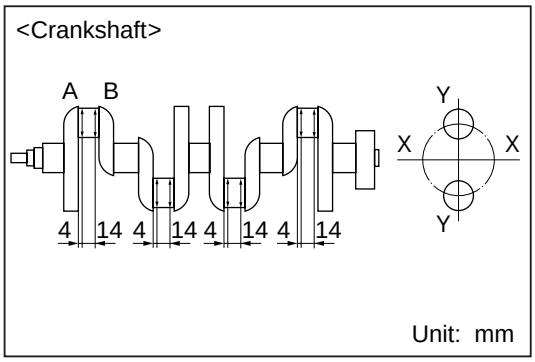
JEM00381-00000

REPLACEMENT OF CONNECTING RODS

1. Wash the connecting rods using cleaning solvent.
   WARNING:
   - Be sure to protect your eyes, wearing goggles.

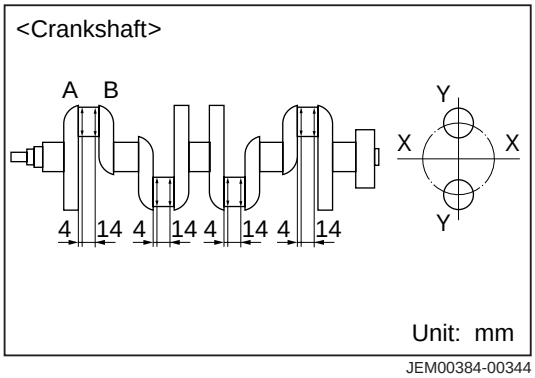
JEM00382-00000

2. Selection of connecting rod bearings
   (1) Read the connecting rod big end bore code number.



JEM00383-00343

   (2) Measure the crankshaft pin diameter of the crankshaft in four directions for each crankshaft pin, 90 degrees spaced, at those points indicated in the right figure.
   NOTE:
   - The greatest value among the measured diameters is regarded as the crankpin journal diameter.
     However, if the difference among the measured values exceeds 0.044 mm, replace the crankshaft.



JEM00384-00344

   (3) Select the connecting rod bearing in accordance with the table posted in next page.

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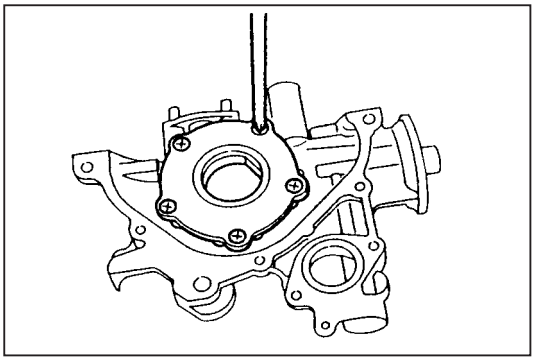
Connecting rod big end bore code No.	Crankpin journal diameter mm	Connecting rod bearing classification No.	Remarks
4	45.000 - 44.993	1	—
	44.992 - 44.985	2	—
	44.984 - 44.976	3	—
	44.975 or less	—	Crankshaft replacement
5	45.000 - 44.993	2	—
	44.992 - 44.985	3	—
	44.984 - 44.976	4	—
	44.975 or less	—	Crankshaft replacement
6	45.000 - 44.993	3	—
	44.992 - 44.985	4	—
	44.984 - 44.976	5	—
	44.975 or less	—	Crankshaft replacement

JEM00385-00000

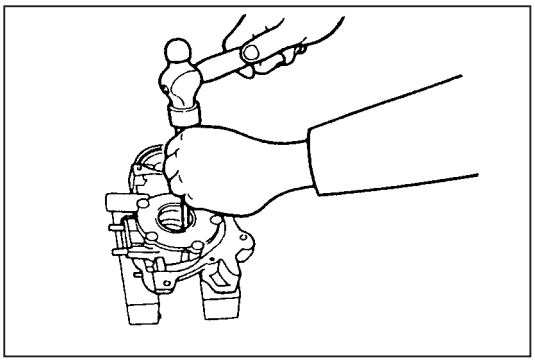
DISASSEMBLY OF OIL PUMP

1. Detach the oil pump cover.



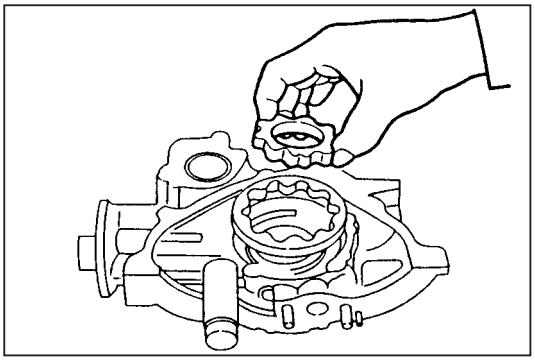
JEM00386-00345

2. Remove the front oil seal.



JEM00387-00346

3. Remove the oil pump rotor set.



JEM00388-00347

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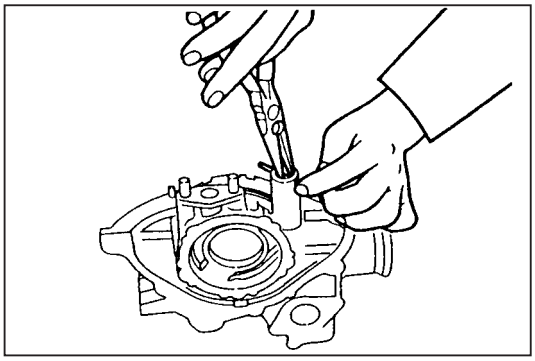
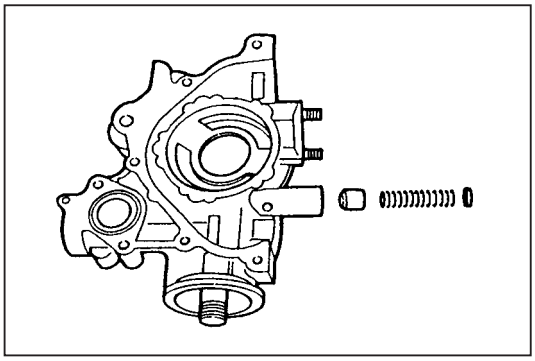
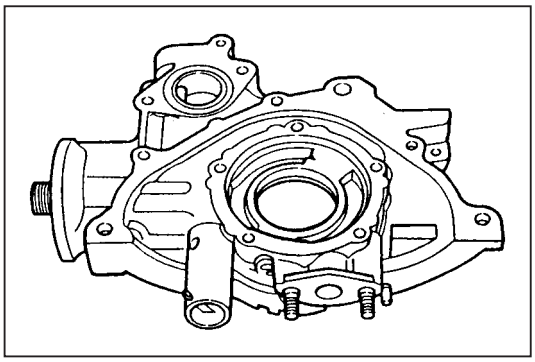
4. Pull out the cotter pin, while pushing the spring retainer with nose pliers or the like.
   NOTE:
   - Put an appropriate cloth, etc. on the retainer spring so that it may not jump out.


JEM00389-00348

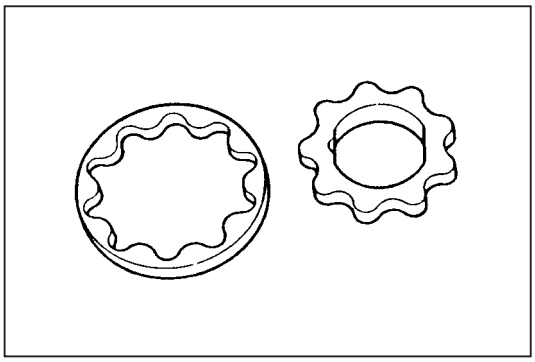
5. Remove the oil pump relief valve spring retainer, compression spring and oil pump relief valve.
   NOTE:
   - Wash the disassembled parts in cleaning solvent.


JEM00390-00349

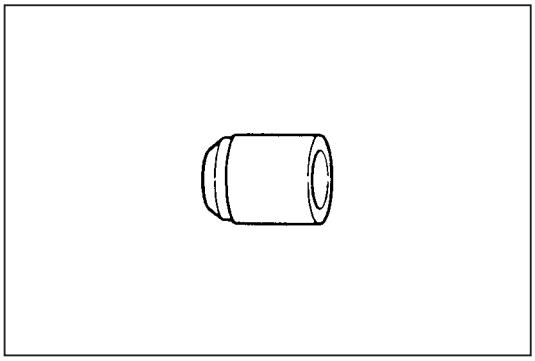
6. Inspection of each part
   (1) Check the pump body for damage.
   Replace the pump body if it exhibits damage.


JEM00391-00350

   (2) Check the rotor set for damage.
   Replace the rotor set if it exhibits damage.


JEM00392-00351

   (3) Check the oil pump relief valve for damage.
   Replace the relief valve if it exhibits damage. Also, check to see if any damage is present at the relief valve installation hole of the oil pump body.


JEM00393-00352

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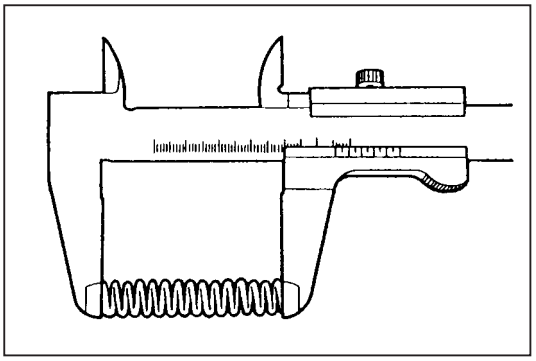
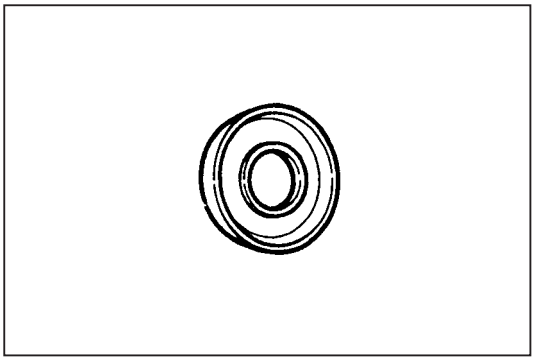
(4) Check the compression spring for damage. Also, measure its free length.
Specified Free Length: 57 mm

Replace the compression spring if it exhibits damage or the free length is less than the specified valve.



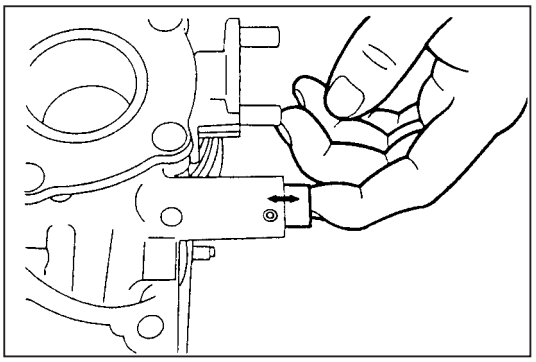
JEM00394-00353

(5) Check the oil pump relief valve spring retainer for damage.
Replace the retainer if it exhibits damage.



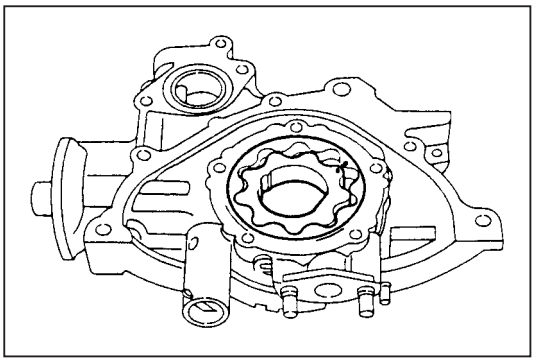
JEM00395-00354

(6) Apply engine oil to the oil pump relief valve. Insert the oil pump relief valve into the oil pump body. Check to see if the valve slides smoothly.
Replace the oil pump body if the valve fails to slide smoothly.



JEM00396-00355

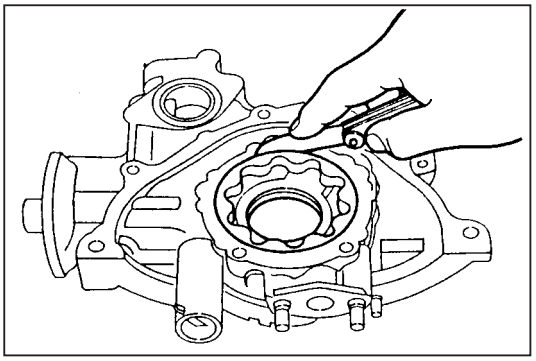
7. Measurement of body clearance, tip clearance and side clearance
(1) Apply a thin film of engine to the rotor mate surface of the oil pump body as well as to the rotor set. Assemble the rotor set in the oil pump body in such a way that the drilled mark may be seen from the outside.



JEM00397-00356

(2) Measure the body clearance between the oil pump body and the outer rotor, using a thickness gauge.
Body Clearance: 0.20 - 0.28 mm

Replace the oil pump if the body clearance exceeds the specified value.



JEM00398-00357

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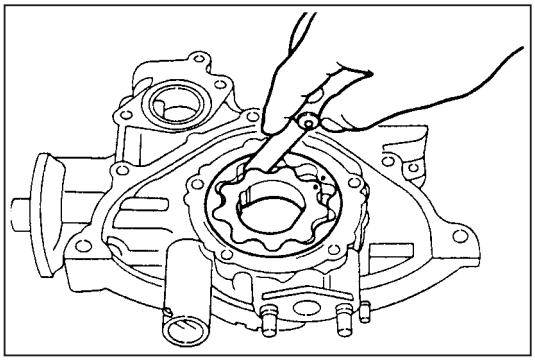
(3) Measure the tip clearance of the rotor set, using a thickness gauge.
Tip Clearance: 0.16 - 0.24 mm

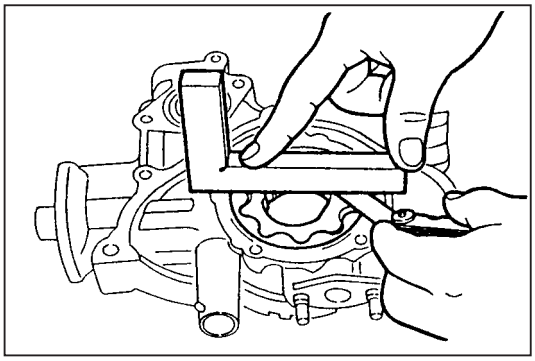
Replace the rotor set if the tip clearance exceeds the specified value.



JEM00399-00358

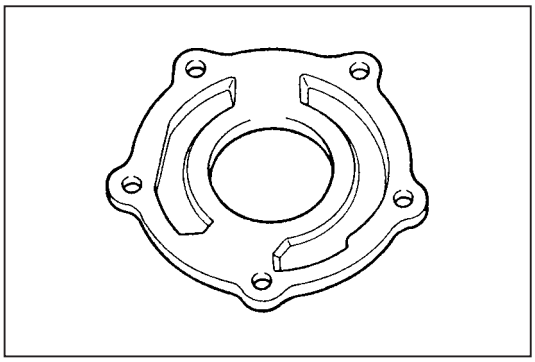
(4) Measure the side clearance between the oil pump body and the rotor set, using and a straightedge and a thickness gauge.
Side Clearance: 0.035 - 0.085 mm

Replace the oil pump if the side clearance exceeds the specified value.



JEM00400-00359

8. Check to see if any wear is present at the rotor set mate surface of the pump cover.
Replace the oil pump cover if it exhibits wear.



JEM00401-00360

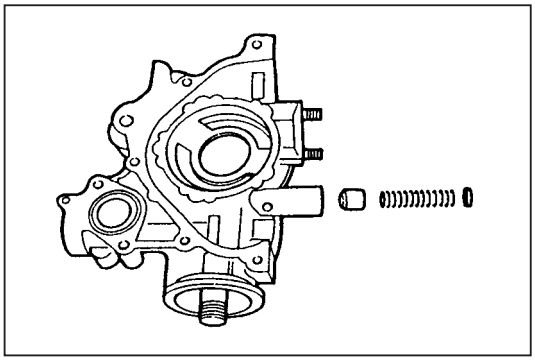
ASSEMBLY OF OIL PUMP

NOTE:
- Wash those parts to be assembled in cleaning solvent. Dry them using compressed air.

WARNING:
- When you use compressed air, be sure to protect your eyes,wearing goggles.

JEM00402-00000

1. Apply engine oil to the relief valve. Then, insert the relief valve into the oil pump body.
2. Insert the compression spring and retainer into the oil pump body.
NOTE:
- Install the retainer in such a direction that its projected side may come at the compression spring side.



JEM00403-00361

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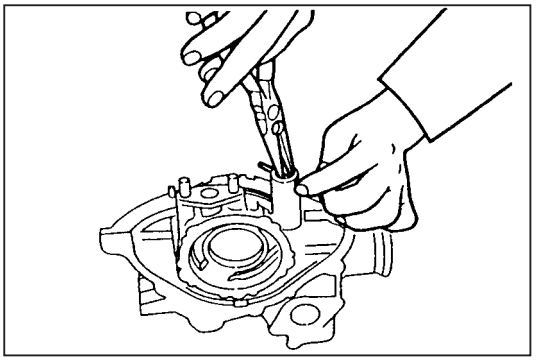
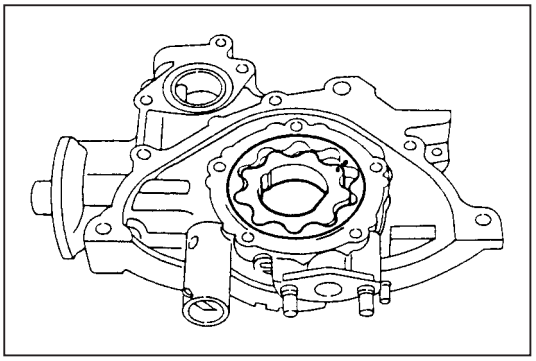
3. Insert a new cotter pin into the retainer while the retainer is being compressed with pliers, etc. Split the end of the cotter pin to form an anchor-like shape.



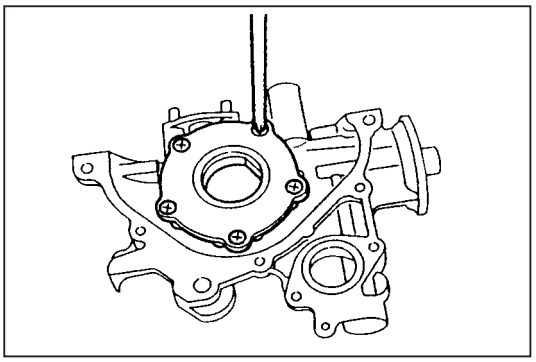
JEM00404-00362

4. Apply engine oil to the rotor set. Assemble the rotor set in the pump body in such a direction that the drilled mark of the rotor may be seen from the outside.



JEM00405-00363

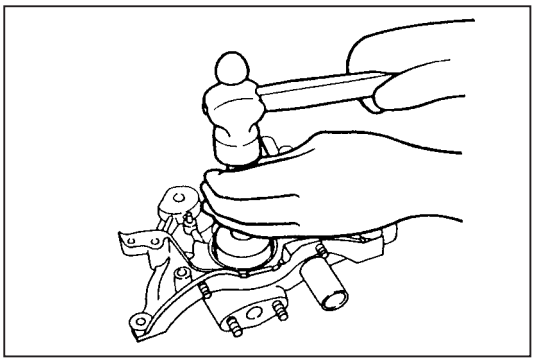
5. Install the oil pump cover. Tighten the cover to the specified torque.
   Tightening Torque: 7.8 - 12.7 N·m



JEM00406-00364

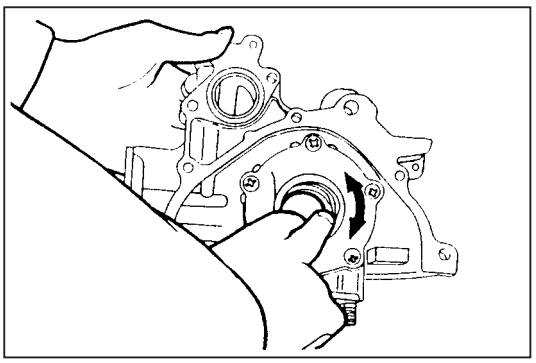
6. Drive a new oil seal into position, using the following SST.
   SST: 09310-87102-000

   NOTE:
   - Be very careful not damage the oil pump during the installation.
   - Make sure that the oil seal is not driven into position in a tilted state.



JEM00407-00365

7. Turn the rotor by hand. Ensure that the rotor turns smoothly.
   If the rotor will not turn smoothly, overhaul the oil pump.
   NOTE:
   - The oil pump performance test procedure is described in the LU section.



JEM00408-00366

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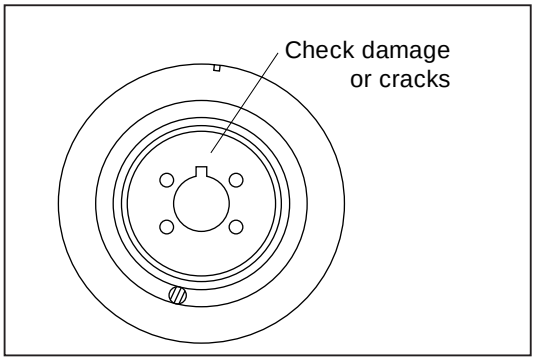
INSPECTION OF CRANKSHAFT PULLEY

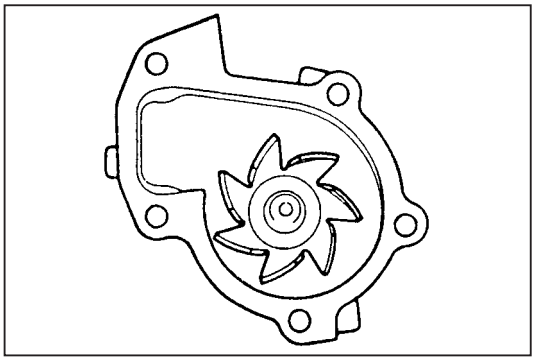
1. Visual inspection of crankshaft pulley
   (1) Check the crankshaft pulley attaching seat for deformation, wear or cracks.
   (2) Check the V-ribbed belt attaching surface for scratches, deformation or wear.
   Replace the crankshaft pulley, as required.



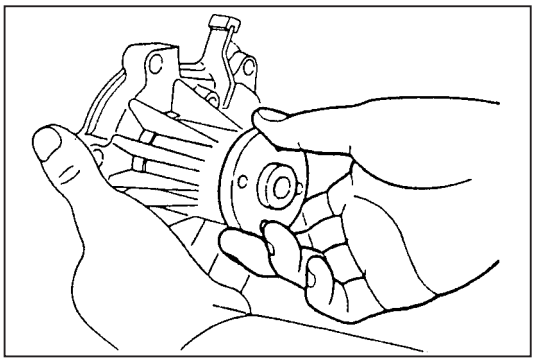
JEM00409-00367

INSPECTION OF WATER PUMP

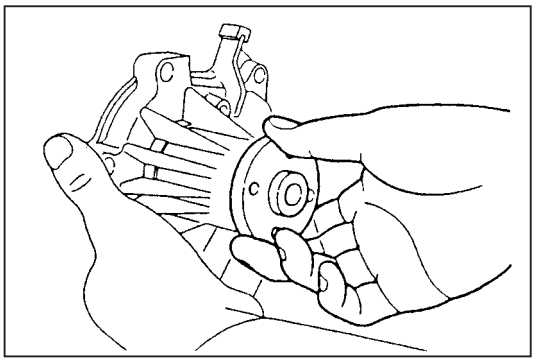
1. Visually inspect the water pump.
   (1) Mechanical seal section for evidence of water leakage
   (2) Rotary fin of water pump for scratches, deformation or cracks
   (3) Water pump attaching surface for scratches
   (4) Water pump pulley attaching seat for scratches or flattened condition
   Replace the water pump, as required.


JEM00410-00368

2. Check the water pump bearing and water pump pulley attaching section for excessive play.
   Replace the water pump, if necessary.

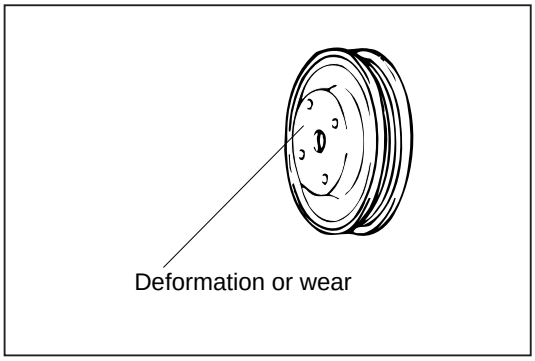

JEM00411-00369

3. Turn the water pump by hand. Ensure that the water pump turns smoothly.
   Replace the water pump, if necessary.


JEM00412-00370

INSPECTION OF WATER PUMP PULLEY

1. Visual inspection of water pump pulley
   (1) Inspect the water pump pulley attaching section for deformation or wear.
   (2) Inspect the V-ribbed belt attaching surface for deformation or wear.
   Replace the water pump pulley, if necessary.



JEM00413-00371

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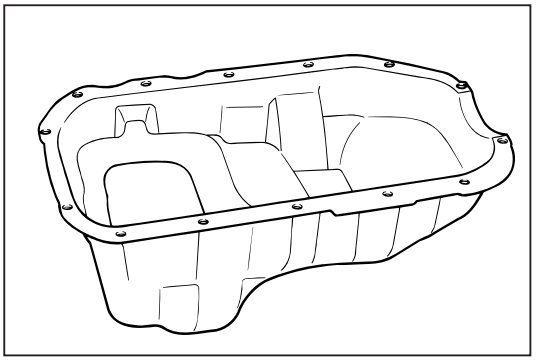
INSPECTION OF OIL PAN

Visually inspect the oil pan for damage or cracks.
Replace the oil pan, as required.



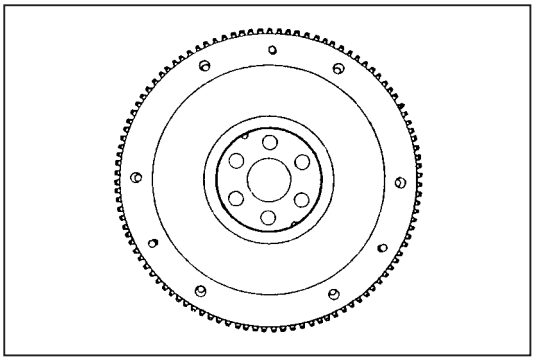
JEM00414-00372

INSPECTION OF FLYWHEEL

Inspect the flywheel for cracks or damage.
Replace the flywheel if it exhibits defects.

INSPECTION AND REPLACEMENT OF RING GEAR

Inspect the ring gear for damage.
Replace the flywheel if it exhibits defects.



JEM00415-00373

CAUTION:

- Never disassemble the flexible type flywheel by removing the flex-plate from the flywheel subassembly.
  If the flywheel has undergone disassembling, it would cause breakage of the flywheel due to unbalanced flywheel mass, while the engine is running.
- Never expose the flexible type flywheel to flame of a burner, etc. If the flywheel is exposed to flame of a burner, for example, at the time of replacement of the ring gear, the quenched state of the flex-plate will be weakened. This may lead to breakage during the engine running.

JEM00416-00000

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ASSEMBLY OF CYLINDER BLOCK

NOTE:

- As for those parts to be reassembled, wash them in cleaning solvent (excluding those parts, such as grease-sealed type bearings, dust seals and electrical parts).
- Then, dry them using compressed air.
- Remove any remaining sealer, etc. from the threaded portions of the switches and sensors.

WARNING:

- Protect your eyes with goggles when using compressed air.

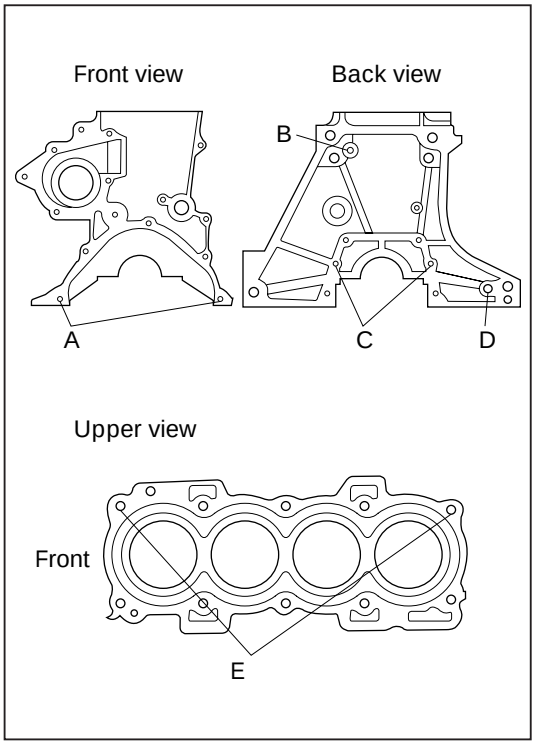
JEM00419-00000

1. Ensure that the straight pins are installed at the positions of the front, rear and upper sides of the cylinder block, as indicated in the right figure. Also, ensure that the protrusion of each straight pin conforms to the specified amount given below.

   Specified Amount of Protrusions

   A: 4 ± 0.5 mm
   B: 8 ± 1.0 mm
   C: 7 ± 1.0 mm
   D: 3 ± 1.0 mm
   E: 6.5 ± 1.0 mm

   If no straight pin is installed or its protrusion fails to conform to the specified value, replace the straight pin with a new one.

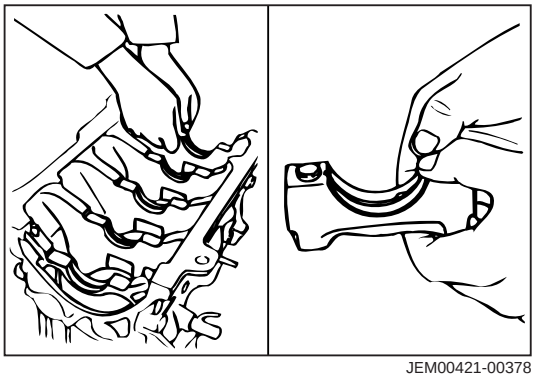


JEM00420-00377

2. Installation of crankshaft
   (1) Install the bearings to the cylinder block and crankshaft bearing caps.

   NOTE:

   - Do not touch with the front and back surfaces of each bearing. Be sure to hold the bearing at its edge surfaces.



JEM00421-00378

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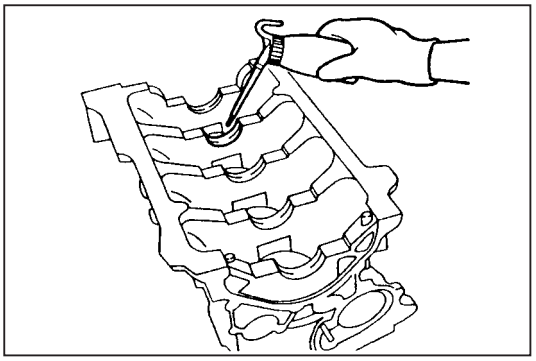
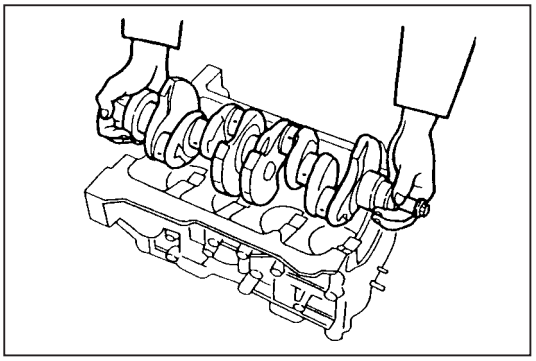
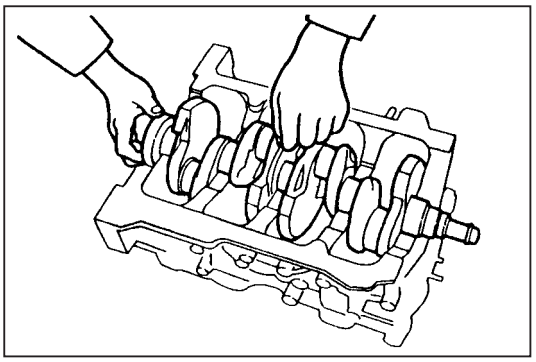
(2) Lubricate the surface of each bearing with engine oil.
NOTE:
- Do not touch with the front and back surfaces of each bearing.
- Never apply engine oil to the crankshaft bearing caps.


JEM00422-00379

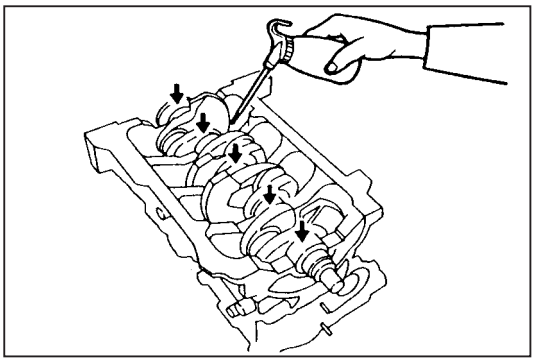
(3) Install the crankshaft in the cylinder block.


JEM00423-00380

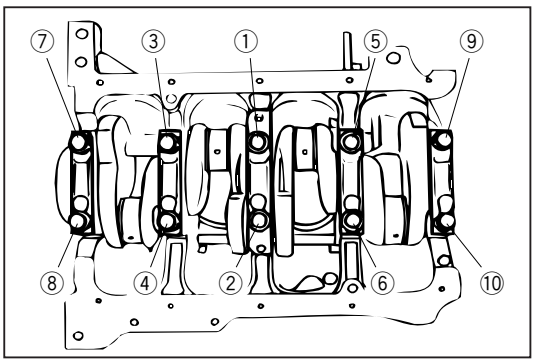
(4) Apply engine oil to the thrust washers. With the side having the oil groove facing toward the crankshaft side, insert each thrust washer between the crankshaft main journal No. 3 and the cylinder block.


JEM00424-00381

(5) Apply engine oil to the crankshaft main journal sections.
NOTE:
- Care must be exercised to ensure that no oil flows into the bearing cap attaching bolt holes.


JEM00425-00382

(6) Install the crankshaft bearing caps with the arrow marks facing toward the oil pump side and also in the numerical sequence.
(7) Thinly apply engine oil to the crankshaft bearing cap bolts. Tighten the bolts to the specified torque over two or three stages in the sequence shown in the right figure.
Tightening Torque: 44.1 - 53.9 N·m



JEM00426-00383

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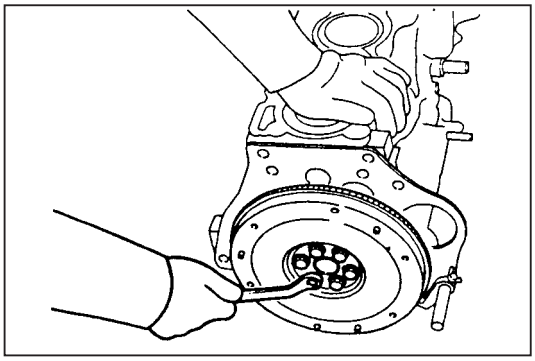
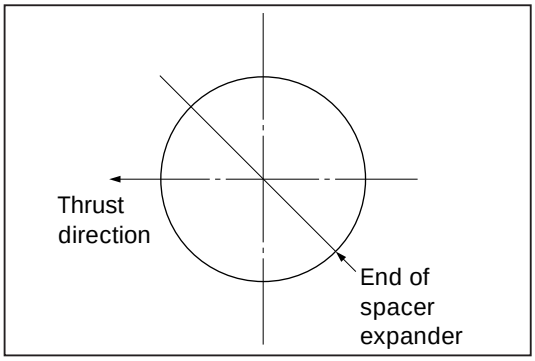
3. Assembly of piston and connecting rod
Install the flywheel on the crankshaft temporarily.
NOTE:
- Care must be exercised to ensure that no oil, etc. gets to the bolts or bolt holes.

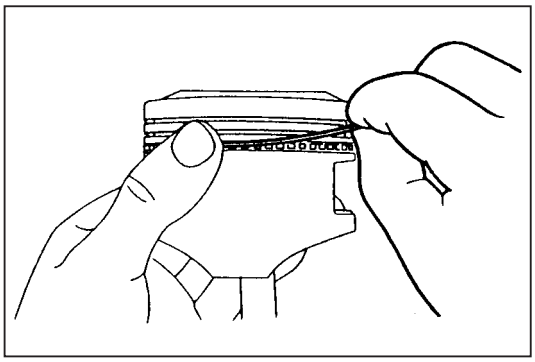

JEM00427-00384

(1) Install the oil ring spacer expander in the oil ring groove. Ensure that the expander end may not line up with the thrust direction nor with the axial direction.
NOTE:
- Do not expand the spacer expander to an extent more than necessary.

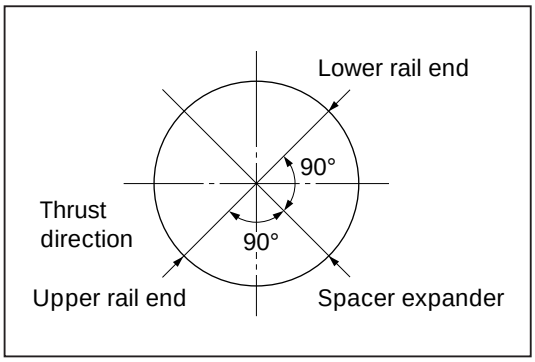


JEM00428-00385

(2) Fit the upper rail into position in such a manner that it is wound up while pushing the edge section of the oil ring spacer expander with your thumb.

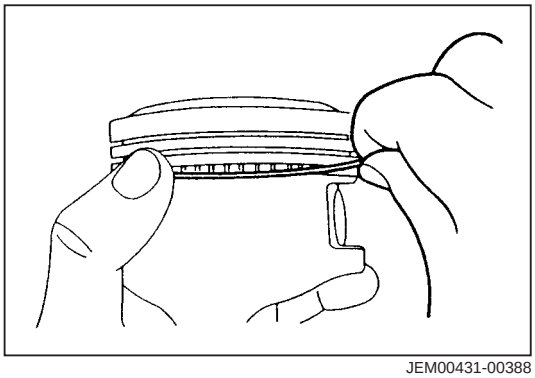

JEM00429-00386

NOTE:
- Ensure that the rail end is deviated 90 degrees to the left from the end of the oil ring spacer expander.
- Do not expand the rail to an extent more than necessary.



JEM00430-00387

(3) Fit the lower rail into position in such a manner that it is wound up.
NOTE:
- Ensure that the rail end is deviated 90 degrees to the right from the end of the oil ring spacer expander.
- Do not expand the rail to an extent more than necessary.
- Make sure that the oil ring can be rotated smoothly.


JEM00431-00388

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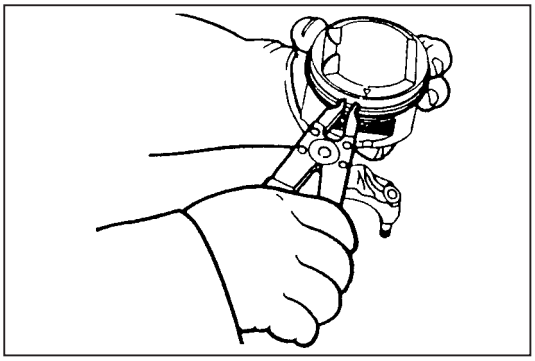
(4) Install the compression ring No. 2 with the stamped mark of T, 2T, N or 2N facing upward, using a piston ring expander.

NOTE:

- Do not expand the piston ring to an extent more than necessary.



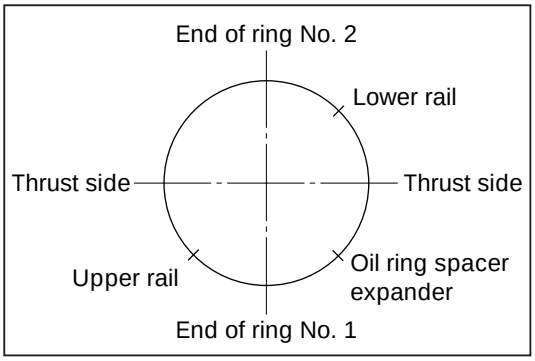
JEM00432-00389

(5) Install the compression ring No. 1 with the stamped mark of T or N facing upward, using a piston ring expander.

(6) Position the piston rings so that each ring end may come at the respective points as indicated in the right figure.

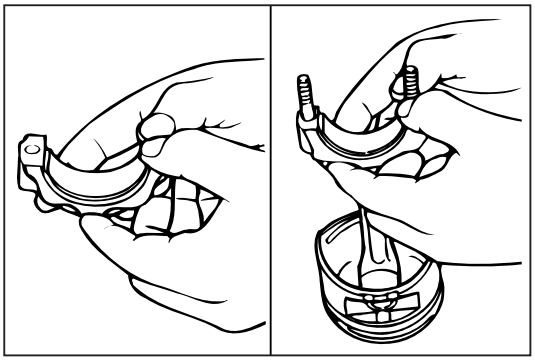
NOTE:

- It is not necessarily required to follow strictly the right figure. However, be sure that the ring end is not lined up with the thrust direction. Also, each ring should be deviated about 120 to 180 degrees from the adjacent ring.



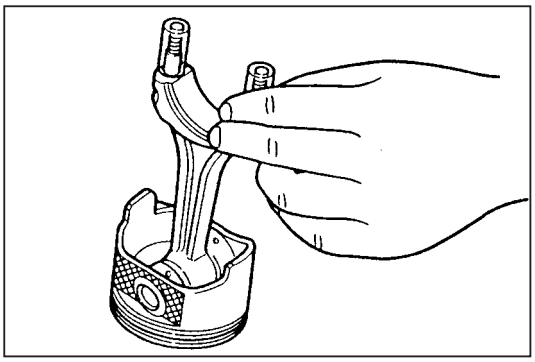
JEM00433-00390

(7) Install the connecting rod bearings on the connecting rod and connecting rod cap, making sure that your fingers will not touch with the front and back surfaces of the bearings.



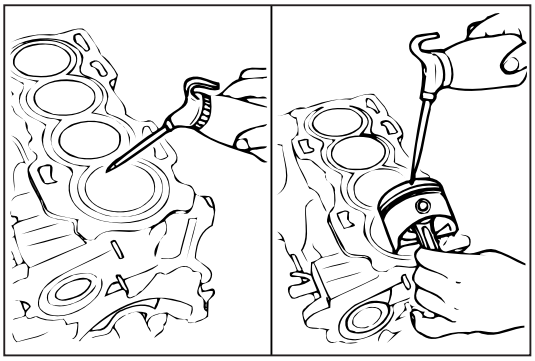
JEM00434-00391

(8) Cut an appropriate vinyl hose to a suitable length. Fit the vinyl hose to each connecting rod bolt sections.



JEM00435-00392

(9) Apply engine oil to the piston rings, piston pins, connecting rod bearings, cylinder walls and crankpin journals.



JEM00436-00393

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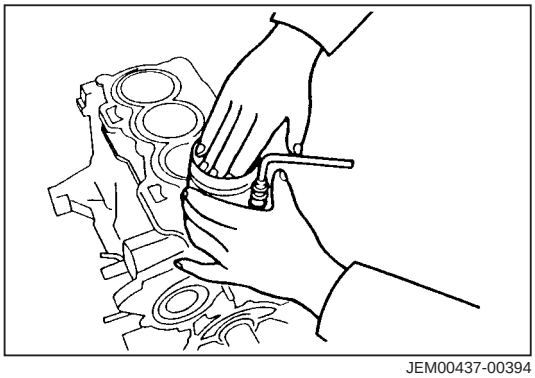
(10) Compress the piston rings by means of the piston ring compressor SST, making sure that the piston ring ends will not move during the installation.
SST: 09217-87001-000


JEM00437-00394

(11) Push the piston by hand into the cylinder bore with the front mark facing toward the oil pump side.

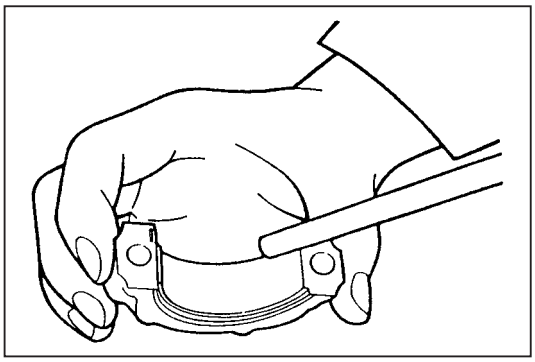
NOTE:
- Be very careful to avoid damaging the connecting rod bearings during the installation.
- Care must be exercised to ensure that the crankpin journal is not scratched by the connecting rod.

(12) Push the piston by hand until the connecting rod reaches the crankpin journal.

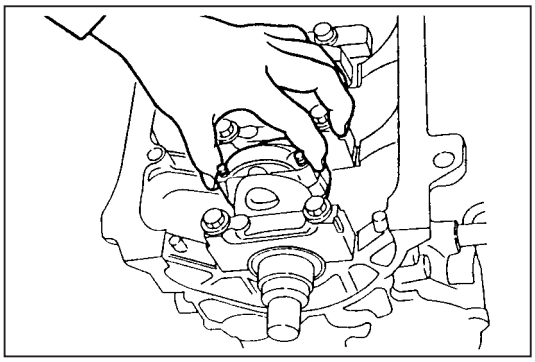
(13) Apply engine oil to the bearing surface of each connecting rod bearing.

NOTE:
- Do not touch with the bearing front surface.

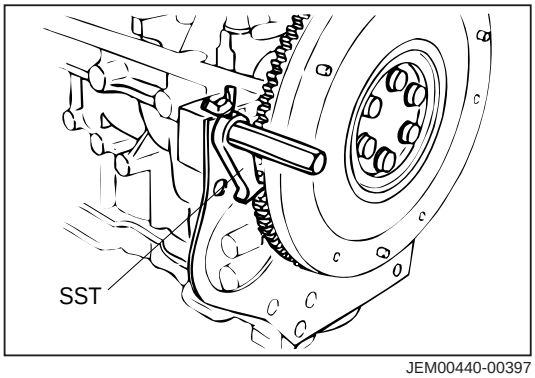
(14) Remove the vinyl hoses which were attached to the connecting rod bolt sections.


JEM00438-00395

(15) Install the connecting rod cap with the front mark facing toward the oil pump side.


JEM00439-00396

(16) Prevent the crankshaft from turning, using the following SST.
SST: 09210-87701-000



JEM00440-00397

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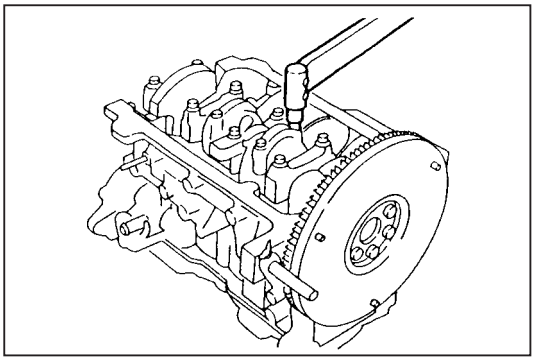
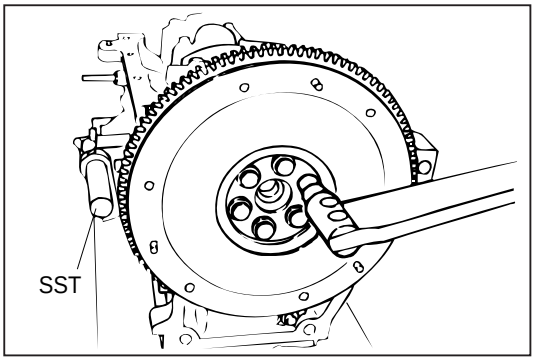
(17) Thinly apply engine oil to the connecting rod cap attaching nuts. Tighten the nuts to the specified torque evenly over two or three stages.
Tightening Torque: 34.3 - 44.1 N·m

(18) Perform the operations described in the steps (1) through (17) for each cylinder.



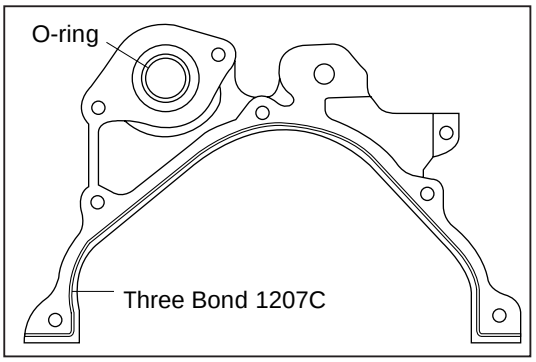
JEM00441-00398

(19) Remove the flywheel.
(20) Remove the following SST.
SST: 09210-87701-000



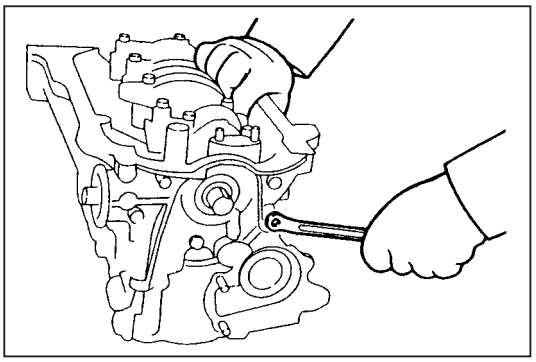
JEM00442-00399

4. Installation of oil pump
(1) Apply the Three Bond 1207C to the oil pump installation surface of the cylinder block, as indicated in the right figure.
(2) Replace the O-ring of the oil pump with a new part.



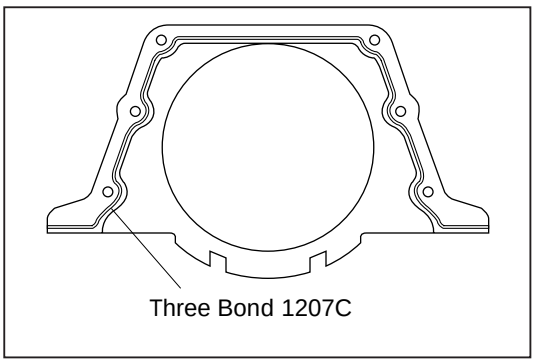
JEM00443-00400

(3) Apply engine oil to the inner surface of the oil seal. Install the oil pump to the cylinder block. Perform tightening to the specified torque.
Tightening Torque: 5.9 - 8.8 N·m



JEM00444-00401

5. Installation of oil seal retainer
(1) Apply the Three Bond 1207C to the oil seal retainer installation surface of the cylinder block, as indicated in the right figure.



JEM00445-00402

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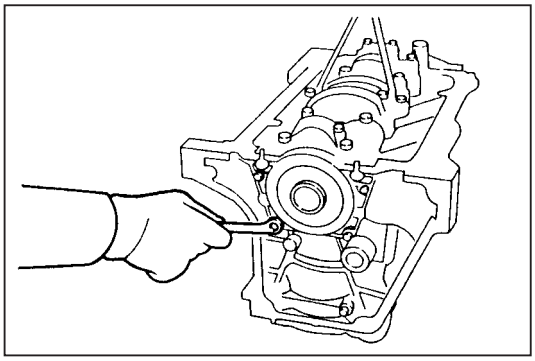
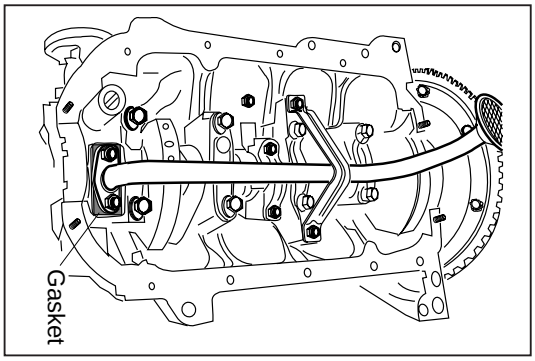
(2) Apply engine oil to the inner surface of the oil seal. Install the oil seal retainer to the cylinder block. Perform tightening to the specified torque.
Tightening Torque: 5.9 - 8.8 N·m (0.6 - 0.9 kgf-m)

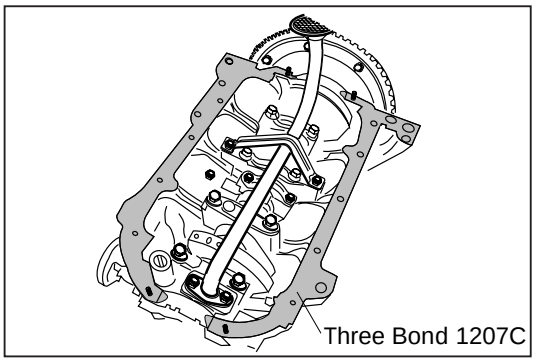

JEM00446-00403

6. Install the oil strainer with a new gasket interposed.



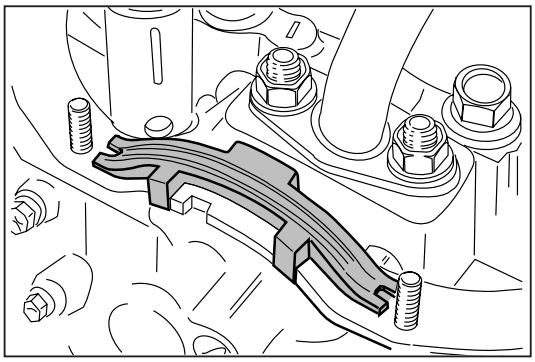
JEM00447-00404

7. Installation of oil pan
(1) Apply the Three Bond 1207C to the oil pan installation surface of the cylinder block, as indicated in the right figure.

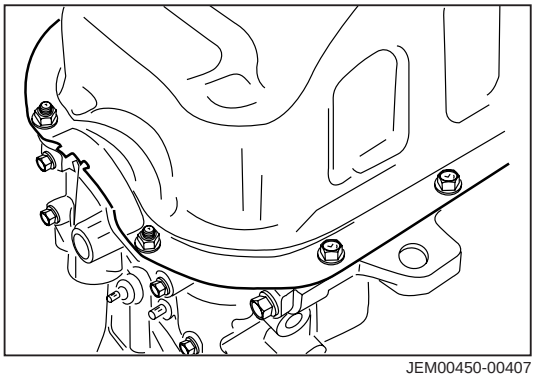


JEM00448-00405

(2) Place the oil pan gaskets.
NOTE:
- Ensure that the end section of the oil pan gasket is overlapped at least 10 mm with the Three Bond 1207C.


JEM00449-00406

(3) Install the oil pan. Tighten the oil pan attaching nuts and bolts to the specified torque over two or three stages.
Tightening Torque: 6.9 - 11.8 N·m


JEM00450-00407

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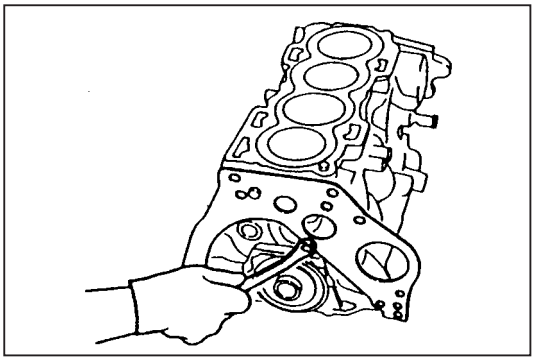
8. Installation of rear end plate
Install the rear end plate to the cylinder block with two attaching bolts.
Tighten the attaching bolts to the specified torque.
Tightening Torque: 14.7 - 21.6 N·m



JEM00451-00408

9. Installation of flywheel
(M/T vehicle only)
(1) Install the flywheel on the crankshaft with the spacer interposed.
(2) Application of flywheel bolt sealing material
① Wash the flywheel bolts. Then, degrease and dry them.

NOTE:
- When degreasing the bolts, remove any oil completely, using a solvent such as a degreasing spraying agent or alcohol.

CAUTION:
- Make sure that no bond nor other foreign matter, such as dust, gets to the bolts.
- Even when new bolts are used, be sure to perform this operation.
- Be sure to interpose the spacer between the crankshaft and the flywheel.

② Check the flywheel bolts for damage. Replace any flywheel bolt which exhibits damage with a new one.

CAUTION:
- Even when a new bolt is used, be sure to perform the operation in the step (1).

③ Clean the flywheel bolt threaded holes at the rear end section of the crankshaft. Degrease and dry them.

CAUTION:
- Make sure that no bond nor other foreign matter, such as dust, gets to the bolt threaded holes.
- As for degreasing, wipe off any oil from the threaded portion with a cloth damped with alcohol.
- Never allow alcohol to get to resin or rubber parts, specifically, the rear oil seal.

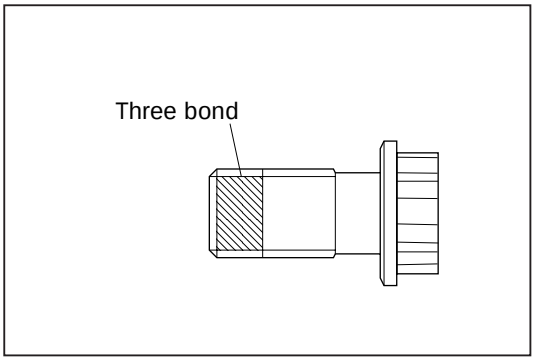
④ Clean the bolt seating surface of the flywheel and degrease it.

NOTE:
- As for degreasing, wipe the bolt seating surface with a cloth damped with alcohol.
- Never allow alcohol to get to resin or rubber parts.

JEM00452-00000

⑤ Apply two to three drops of the Three Bond 1324 to the forward end of the threaded portion of each flywheel bolt.

CAUTION:
- If the Three Bond 1324 is applied excessively beyond the specified amount, the oil will penetrate up to the bolt seating surface. This may cause loosening of the bolts.
- Never use bond sealers other than the designated one.
- Never allow the bond sealer to get to resin or rubber parts.



JEM00453-00409

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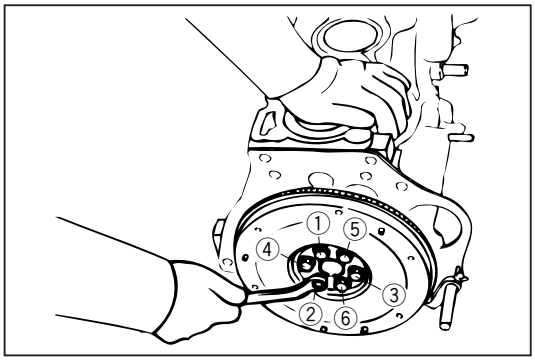
(3) Tighten the flywheel attaching bolts to the specified torque in the sequence indicated in the right figure.
Tightening Torque: 44.1 - 63.7 N·m



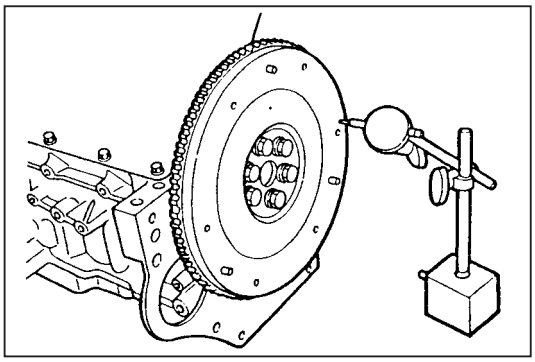
JEM00454-00410

NOTE:
- Prevent the crankshaft from turning at the ring gear section, using the following SST.
  SST: 09210-87701-000

CAUTION:
- When tightening the bolt, make sure that no bond is present on the bolt seating surface.
  If the bond oozes out, perform the operations again, starting the step (2).

(4) Tighten the flywheel attaching bolts to the specified torque in the sequence indicated in the right figure.
Tightening Torque: 78.5 - 98.0 N·m

(5) Measure the flywheel runout, using a dial gauge.
Allowable Runout Limit: 0.1 mm


JEM00455-00411

NOTE:
- Replace the flywheel if its runout exceeds the allowable limit.

10. Installation of drive plate
(A/T vehicle only)
(1) Application of flywheel bolt sealing material
① Wash the flywheel bolts. Then, degrease and dry them.

NOTE:
- When degreasing the bolts, remove any oil completely, using a solvent such as a degreasing spraying agent or alcohol.

CAUTION:
- Make sure that no bond nor other foreign matter, such as dust, gets to the bolts.
- Even when new bolts are used, be sure to perform this operation.

② Check the flywheel bolts for damage. Replace any flywheel bolt which exhibits damage with a new one.

CAUTION:
- Even when a new bolt is used, be sure to perform the operation in the step (1).

③ Clean the flywheel bolt threaded holes at the rear end section of the crankshaft. Degrease and dry them.

CAUTION:
- Make sure that no bond nor other foreign matter, such as dust, gets to the bolt threaded holes.
- As for degreasing, wipe off any oil from the threaded portion with a cloth damped with alcohol.

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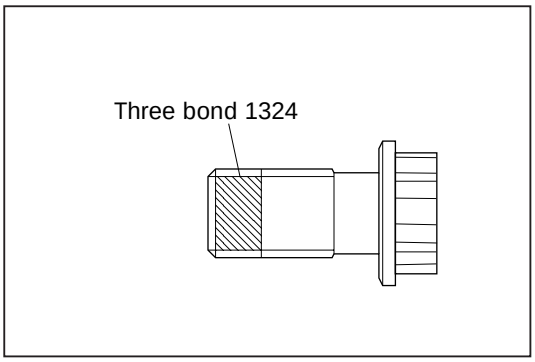
- Never allow alcohol to get to resin or rubber parts, specifically, the rear oil seal.

④ Wash the centering plate. Then, degrease and dry it.

NOTE:
- When degreasing the center plate, remove any oil completely, using a solvent such as a degreasing spraying agent or alcohol.
- Never allow the solvent to get to resin or rubber parts.

JEM00456-00000

⑤ Apply two to three drops of the Three Bond 1324 to the forward end of the threaded portion of each flywheel bolt.



JEM00457-00412

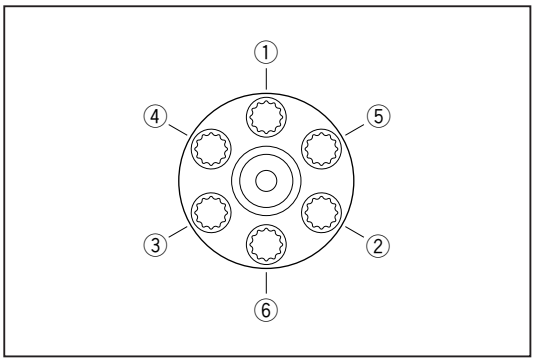
CAUTION:
- If the Three Bond 1324 is applied excessively beyond the specified amount, the oil will penetrate up to the bolt seating surface. This may cause loosening of the bolts.
- Never use bond sealers other than the designated one.
- Never allow the bond sealer to get to resin or rubber parts.

(2) Install the drive plate and centering plate to the crankshaft end. Tighten the attaching bolts temporarily.
Tightening Torque: 44.1 - 63.7 N·m

NOTE:
- Prevent the crankshaft from turning at the ring gear section, using the following SST.
SST: 09210-87701-000

JEM00458-00000

(3) Tighten the drive plate attaching bolts to the specified torque in the sequence indicated in the right figure.
Tightening Torque: 78.5 - 98.0 N·m



JEM00459-00413

NOTE:
- Prevent the crankshaft from turning at the ring gear section, using the following SST.
SST: 09210-87701-000

CAUTION:
- When tightening the bolt, make sure that no bond is present on the bolt seating surface.
If the bond oozes out, perform the operations again, starting the step (1).

11. Assembling of clutch disc and pressure plate
(M/T vehicle only)
(1) Insert the following SST into the crankshaft rear end.
SST: 09301-87703-000

(2) Install the clutch disc.

JEM00460-00000

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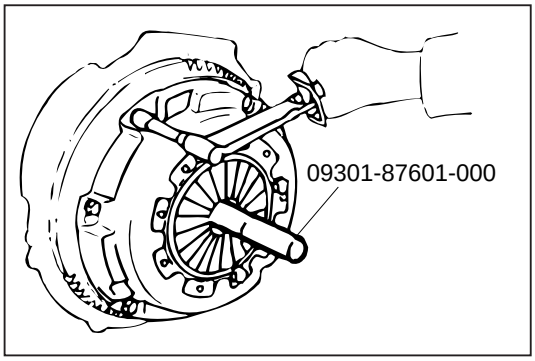
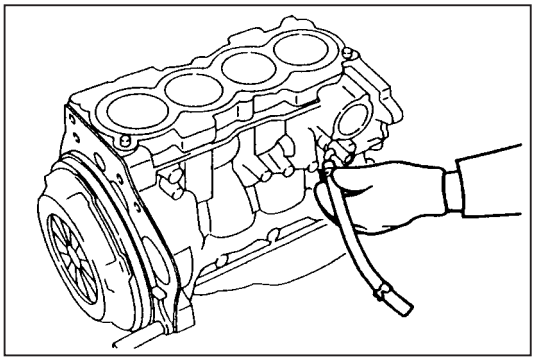
(3) Install the pressure plate, lining up the locating pin of the pressure plate. Tighten the attaching bolts to the specified torque.
Tightening Torque: 14.7 - 21.6 N·m



JEM00461-00414

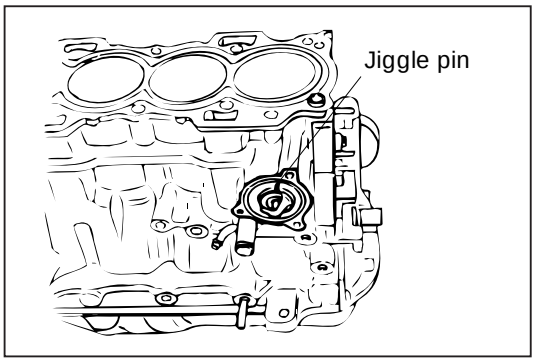
12. Install the water hose for the throttle body use to the cylinder block. Attach the hose bands.


JEM00462-00415

13. Install the thermostat in the cylinder block in such a way that the jiggle pin section may come at the upper side.
CAUTION:
- Make sure to install the jiggle pin of the thermostat in the correct direction. Failure to observe this precaution may cause overheating.

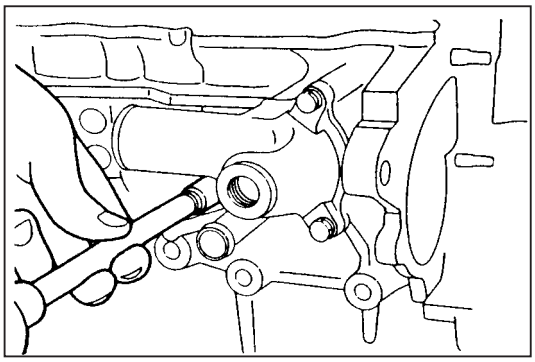
Identification of Thermostat

Destination	Identification color
European Cold spec.	Green
General spec.	Black

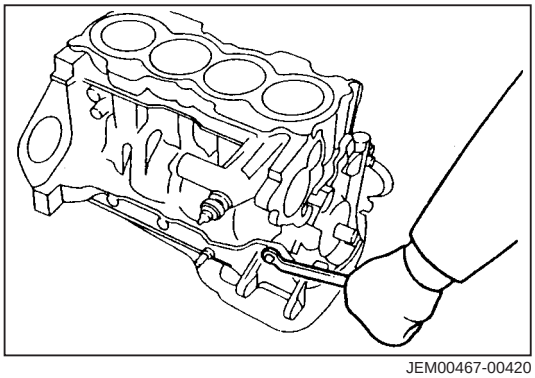


JEM00463-00416

14. Install the water inlet.
Tightening Torque: 5.9 - 8.8 N·m


JEM00464-00417

15. Install the alternator bracket.
Tightening Torque: 34.3 - 49.0 N·m


JEM00467-00420

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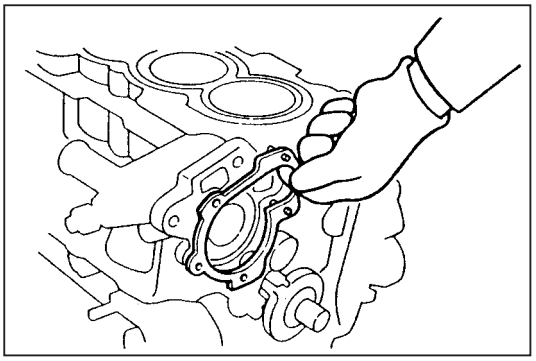
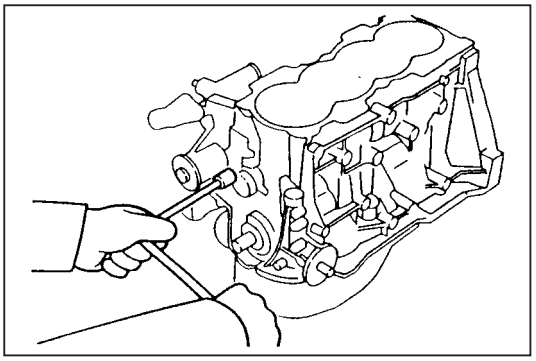
16. Installation of water pump
    (1) Install a new water pump gasket on the cylinder block.



JEM00468-00421

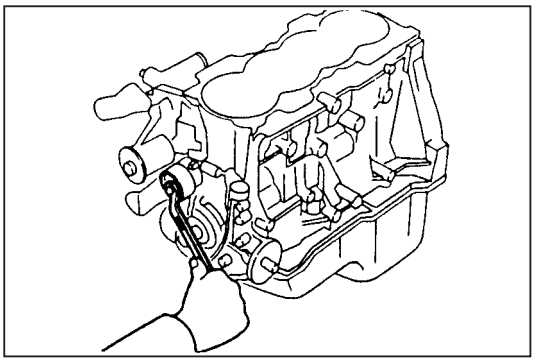
    (2) Install and tighten the water pump to the specified torque.
    Tightening Torque: 14.7 - 21.6 N·m

    NOTE:
    - When the stud bolts have been replaced, apply the Three Bond 1377B to the threaded portion at the cylinder block side.



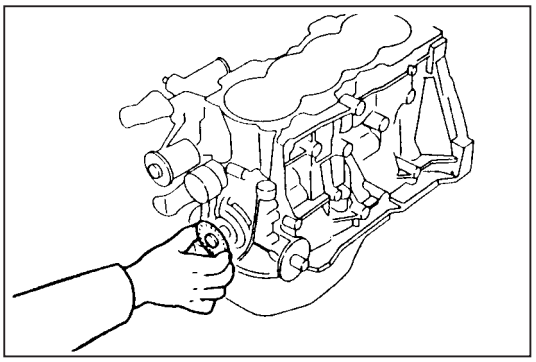
JEM00469-00422

17. Attach the tension spring to the timing belt tensioner. Hang the tension spring hook on the pin. Assemble the timing belt tensioner in place and install the bolt. Push the tensioner to the alternator side as far as it will go. Tighten the tensioner temporarily.



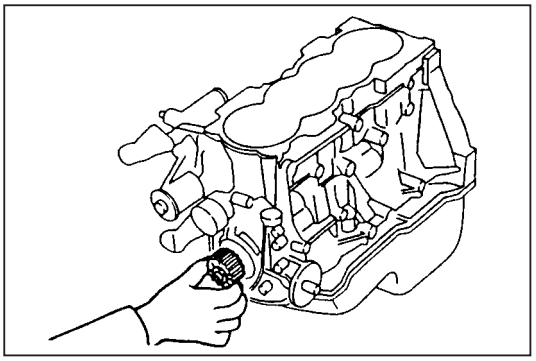
JEM00470-00423

18. Install the crankshaft pulley flange in such a way that its recessed side may come at the cylinder block side.



JEM00471-00424

19. Install the crankshaft timing belt pulley.



JEM00472-00425

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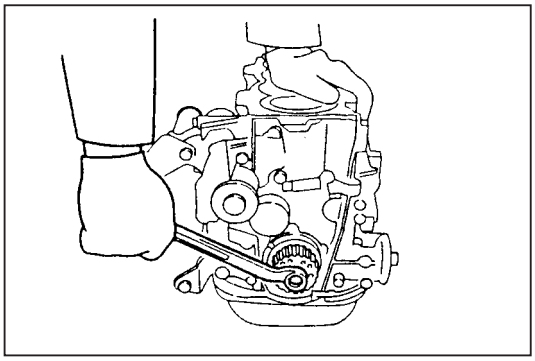
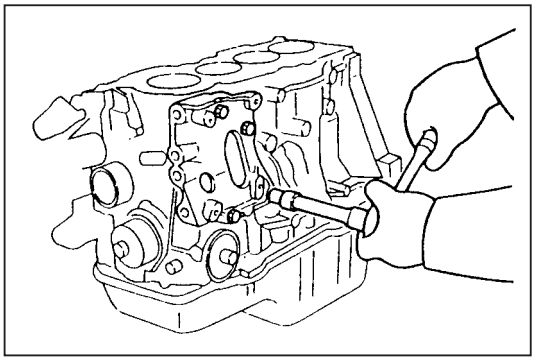
20. Install the crankshaft timing belt pulley attaching bolt. Tighten the bolt to the specified torque.
    Tightening Torque: 88.3 - 98.0 N·m

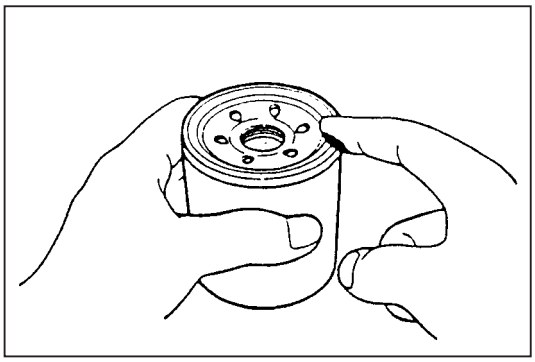
    NOTE:
    - Prevent the crankshaft from turning, using the following SST.
      SST: 09210-87701-000


JEM00473-00426

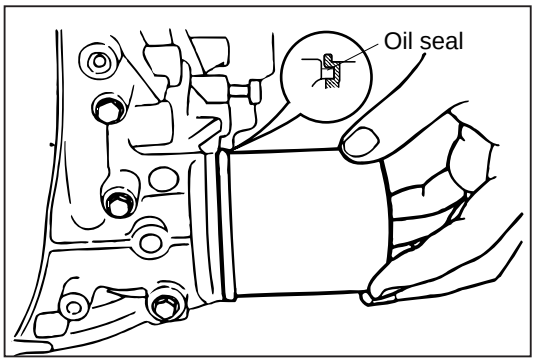
21. Install the air conditioner compressor bracket.
    Tightening Torque: 29.4 - 44.1 N·m


JEM00474-00427

22. Installation of oil filter
    (1) Thinly apply engine oil to the oil seal of the oil filter.

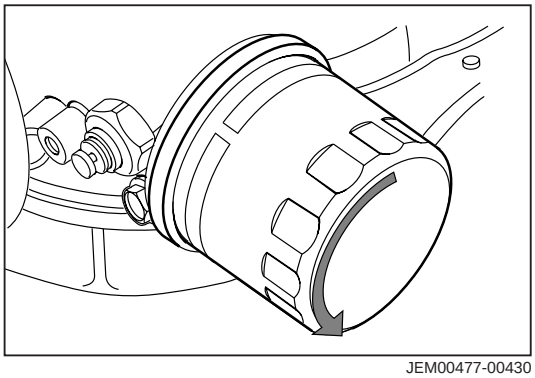

JEM00475-00428

    (2) Screw in the oil filter until the oil seal of the oil filter comes in contact with the oil pump or the contact surface of the oil cooler.



JEM00476-00429

    (3) Then, rotate the oil filter further one complete turn (360 degrees), using the following SST.
    SST: 09228-87201-000


JEM00477-00430

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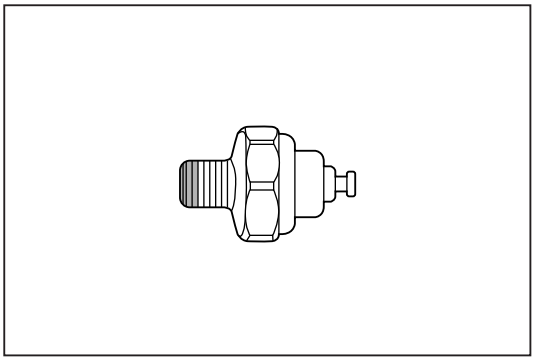
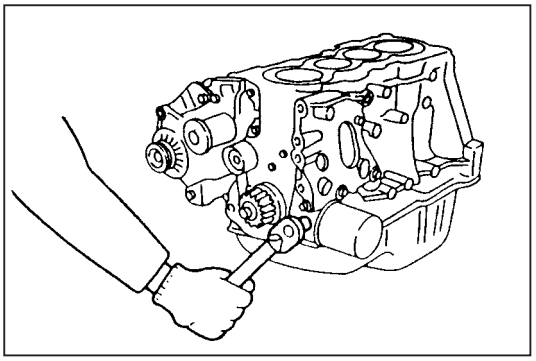
23. Installation of oil pressure switch
    (1) Clean the threaded portion of the oil pressure switch. Wind seal tape around the threaded portion.
    NOTE:
    - The new oil pressure switch is coated with sealer. Hence, when the oil pressure switch is replaced with a new one, first remove the sealer thoroughly. Then wind the seal tape. Also, be sure to clean the threaded holes at the oil pump side.



JEM00478-00431

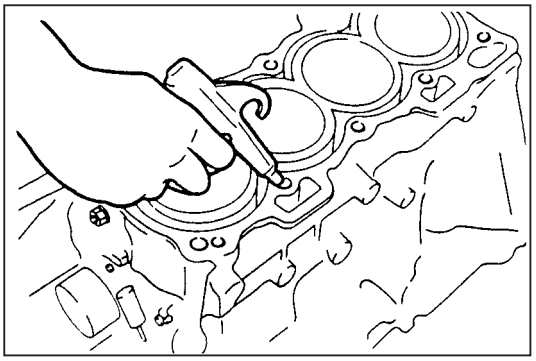
    (2) Tighten the oil pressure switch to the specified torque using a long box wrench having a hexagonal hole.
    Tightening Torque: 11.8 - 19.6 N·m



JEM00479-00432

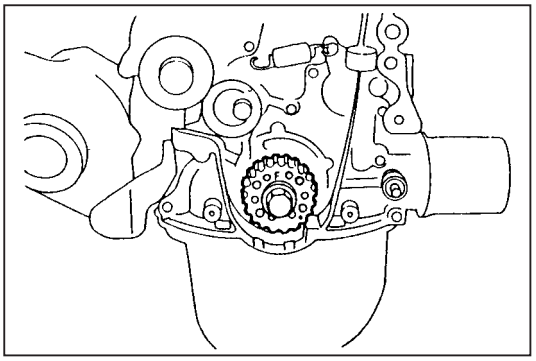
PREPARATION OF ENGINE INSTALLATION

1. Place the cylinder block on a suitable engine stand.
2. Clean and make dry the cylinder head bolt holes.
   WARNING:
   - When you use compressed air, be sure to protect your eyes, wearing goggles.



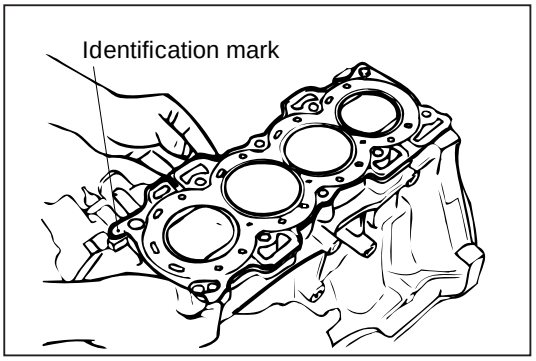
JEM00480-00433

2. Align the drilled mark of the crankshaft timing belt pulley with the indicator of the oil pump.



JEM00481-00434

3. Place the new cylinder head gasket on the cylinder block.



JEM00482-00435

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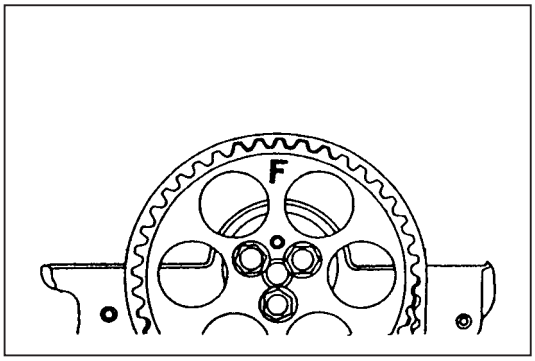
4. Turn the crankshaft, until the “F” mark of the camshaft timing belt pulley comes exactly at the top position.



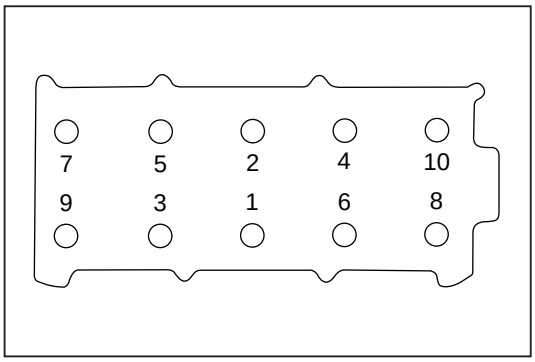
JEM00483-00436

5. Install the cylinder head assembly on the cylinder block.
   CAUTION:
   - Be very careful not to damage the cylinder head gasket and cylinder head gasket attaching surface.
   - Never turn the crankshaft or camshaft independently before installing the timing belt.

JEM00484-00000

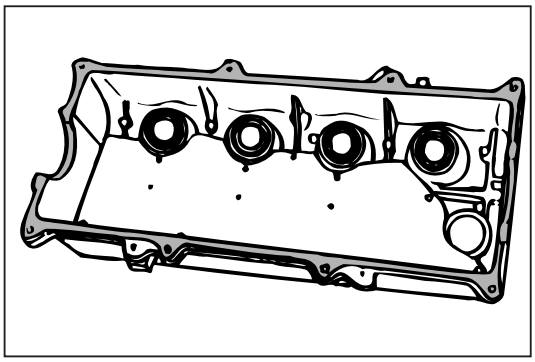
6. Apply engine oil to the threaded portion of the cylinder head bolts.
7. Install the bolts on the cylinder head.
   CAUTION:
   - As for the two bolts at the distributor side, use the bolts whose nominal length is 112 mm, which is shorter than that of others.

8. Tighten the cylinder head bolts evenly over two or three stages to the specified torque, following the sequence shown in the right figure.
   Tightening Torque: 58.8 - 66.7 N·m



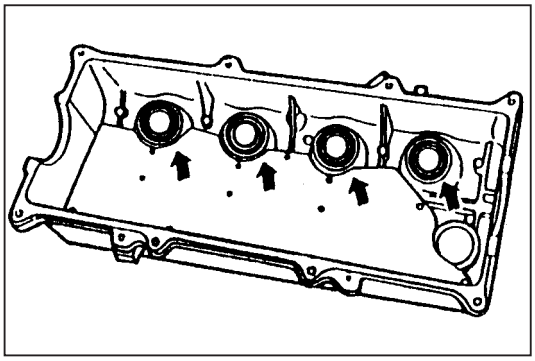
JEM00485-00437

9. Installation of cylinder head cover
   (1) Check the cylinder head cover gasket for damage. Replace the cylinder head gasket if it is damaged.
   (2) Replacement of cylinder head gasket
   (Only case where such replacement is required;)
   ① Remove the cylinder head cover gasket from the cylinder head cover.
   ② Install a new cylinder head cover gasket in such a way that the identification mark comes at the intake manifold side of the cylinder head cover.



JEM00486-00438

   (3) Check the spark plug tube grommet for damage. Replace any grommet which exhibits damage.



JEM00487-00439

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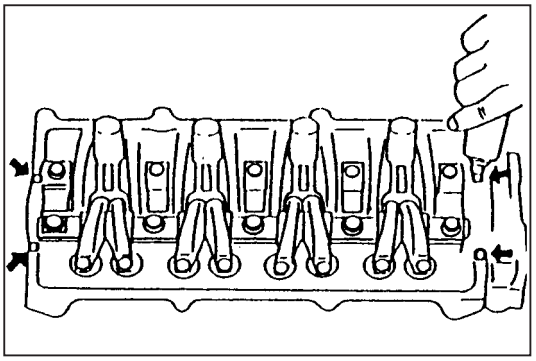
(4) Wipe off any oil from the cylinder head cover gasket attaching surface of the cylinder head.



JEM00488-00440

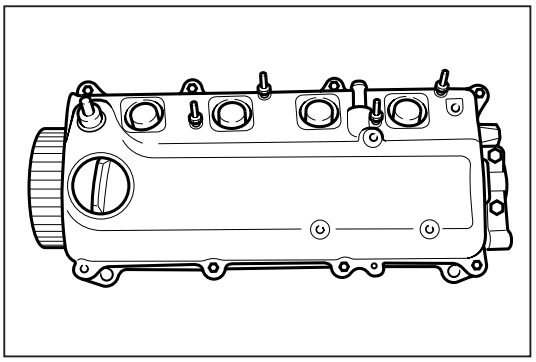
(5) Install the cylinder head cover to the cylinder head.

CAUTION:

- Be very careful not to damage the spark plug tube rubber grommet during installation.

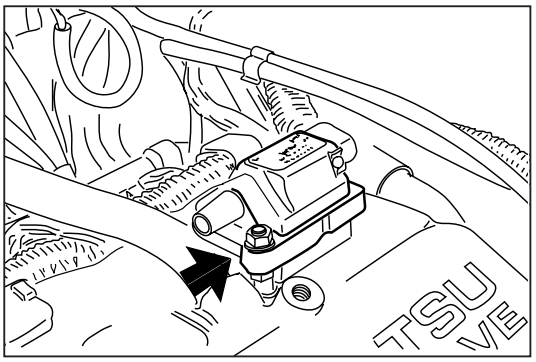
JEM00489-00000

(6) Install the tighten the cylinder head cover attaching bolts to the specified torque, following the sequence in the right figure.
Tightening Torque: 2.9 - 4.9 N·m



JEM00490-00441

(7) Install and tighten the ignition coils to the engine.
(8) Connect the resistive cords.



JEM00491-00442

10. Install the timing belt.
(Refer to the timing belt section)

JEM00492-00000

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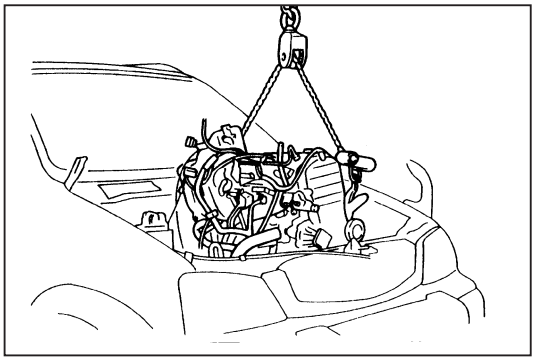
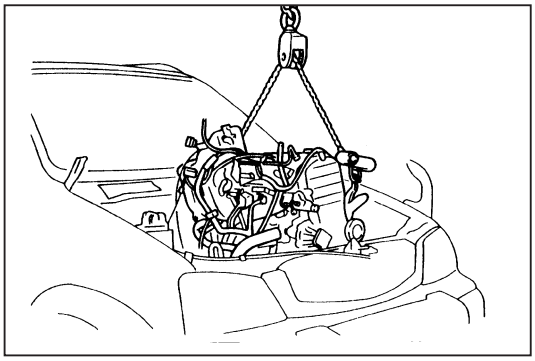
11. Install and tighten the engine mounting bracket with the mounting to the engine.
12. Sling the engine, using a chain block.



JEM00493-00443

INSTALLATION OF ENGINE

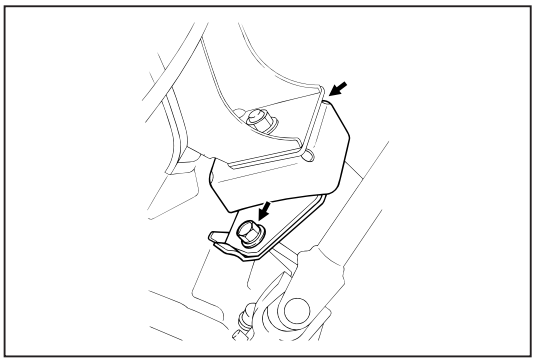
1. Insert the engine to the engine compartment.
2. Joint the engine to the transmission and temporarily install the transmission attaching bolt.



JEM00494-00444

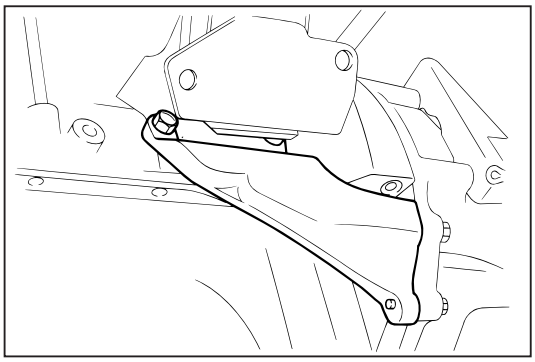
3. Place the engine to the engine mounting section of the engine support number.
4. Install and tighten the engine mounting attaching bolts.
   Tightening Torque: 21.6 - 39.2 N·m

   NOTE:
   - Be very careful not to allow the engine to hit the vehicle body and other parts.



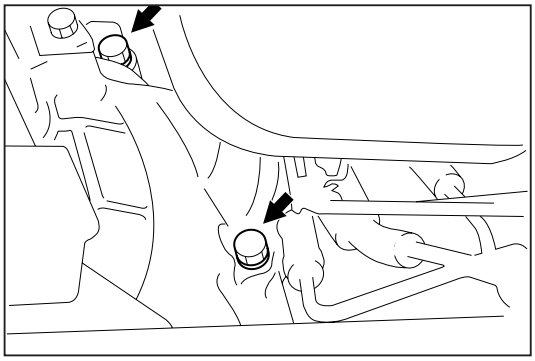
JEM00495-00445

5. Install and tighten the transmission attaching bolts with the power train stiffener bracket.
   Tightening Torque: 49.0 - 68.6 N·m



JEM00496-00446

6. Install the starter motor and starter motor attaching bolts. Tighten the attaching bolts to the specified torque.
   Tightening Torque: 31.2 - 46.8 N·m



JEM00497-00447

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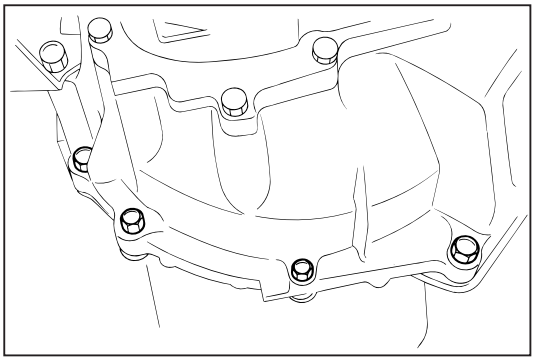
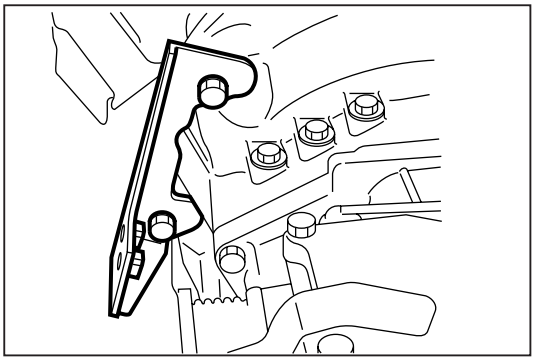
7. Install the clutch housing under cover to the transmission.
   Tighten the attaching bolts to the specified torque.
   Tightening Torque: 49 - 68.6 N·m



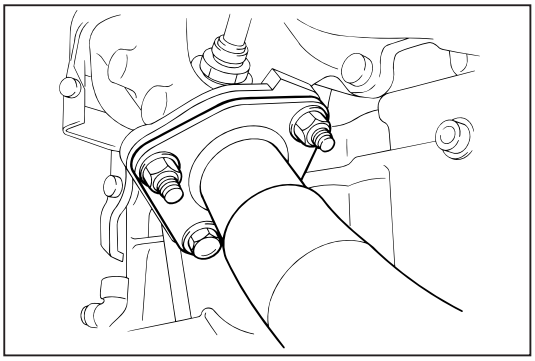
JEM00498-00448

8. Install the engine stiffener to the engine and tighten it to the specified torque.
   Tightening Torque: 29.0 - 44.0 N·m



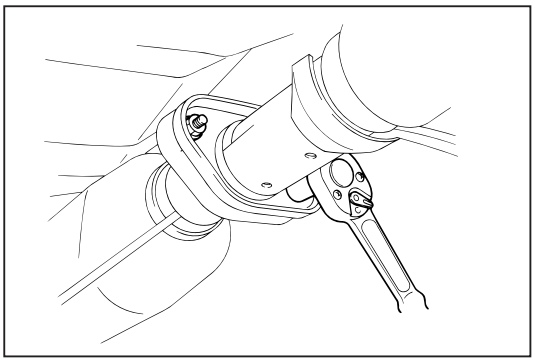
JEM00499-00449

9. Installation of exhaust pipe
   (1) Install the front exhaust pipe to the exhaust manifold with a new gasket interposed.
   NOTE:
   - Do not reuse the used gasket.



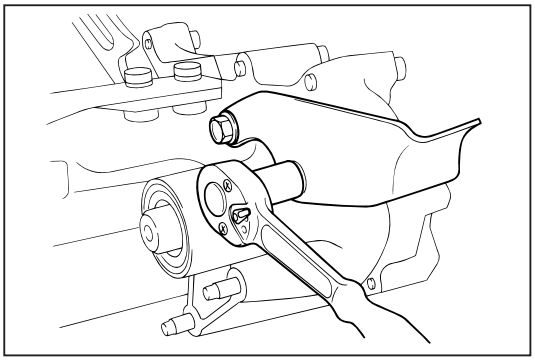
JEM00500-00450

   (2) Temporarily tighten the exhaust pipe attaching nut of the exhaust manifold.
   (3) Connect the front exhaust pipe to the main muffler with a new gasket interposed.
   (4) Tighten the attaching nuts to the specified torque.
   Tightening Torque: 41.6 - 62.4 N·m



JEM00501-00451

   (5) Install the front exhaust pipe clamp bracket to the transmission.
   Tighten the attaching bolts to the specified torque.
   Tightening Torque: 15.2 - 22.8 N·m



JEM00502-00452

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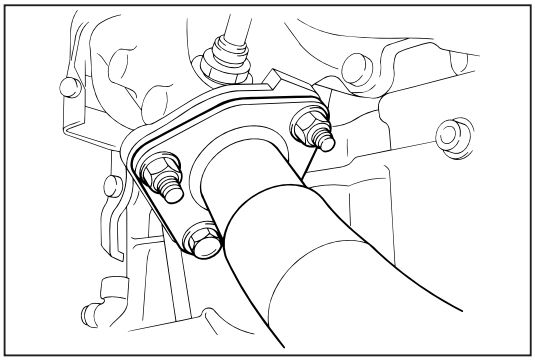
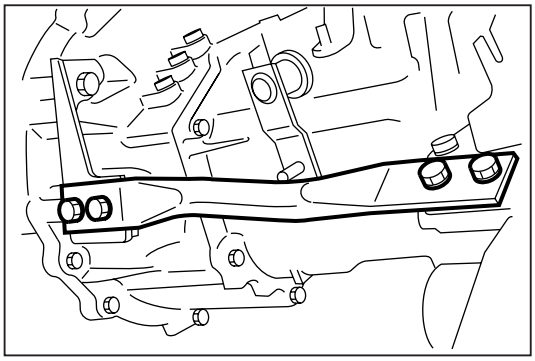
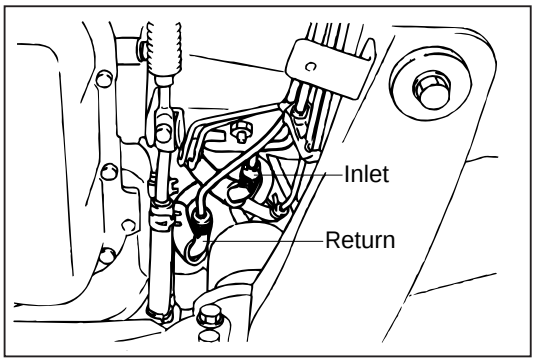
(6) Clamp the front exhaust pipe to the clamp bracket.
(7) Tighten the front exhaust pipe attaching nuts of the exhaust manifold to the specified torque.
Tightening Torque: 15.2 - 22.8 N·m


JEM00503-00453

10. Connect the power train stiffener between the engine .and transfer.
Tighten the stiffener attaching bolts to the specified torque.
Tightening Torque: 29.4 - 44.1 N·m

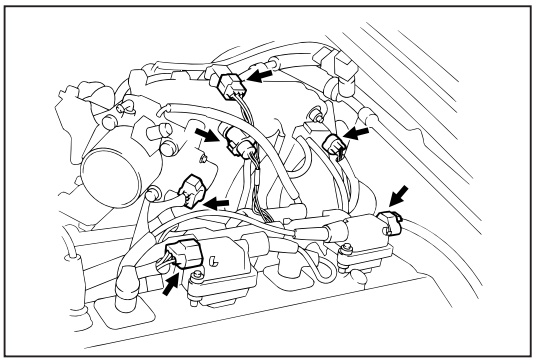

JEM00504-00454

11. Connect the heater hose.
12. Connect the fuel inlet hose and return hose.

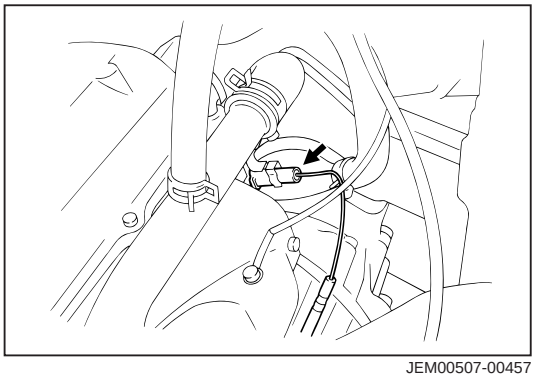


JEM00505-00455

13. Install the engine wire to the engine and connect the following connector.
(1) Ignition coils
(2) Injectors
(3) Pressure sensor
(4) Throttle sensor
(5) Intake air temperature sensor
(6) Idle-up VSV
(7) Water temperature sensor


JEM00506-00456

(8) Oxygen sensor
(9) Cam angle sensor


JEM00507-00457

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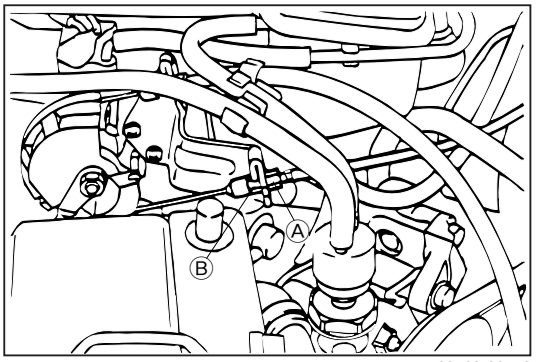
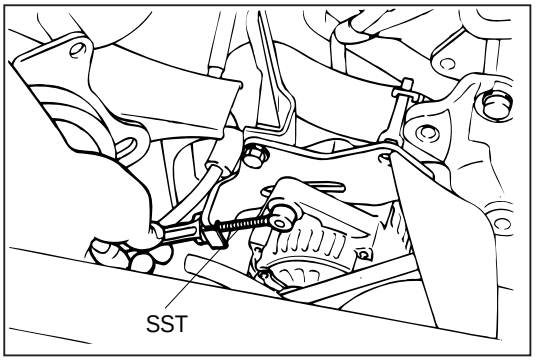
14. Connect the starter wire to the starter motor.
15. Install the accelerator cable to the throttle body and adjust it.
16. Connect the rubber hoses.



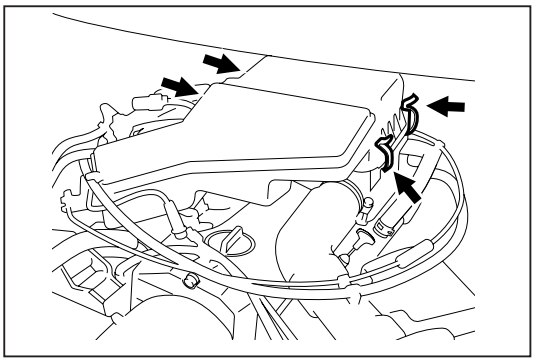
JEM00508-00458

17. Install the alternator to the engine and connect the connectors.

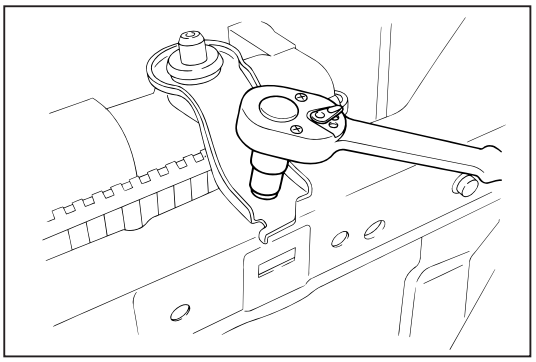


JEM00509-00459

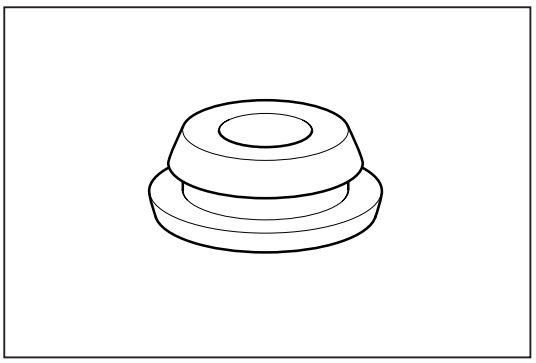
18. Install the air cleaner to the engine.


JEM00510-00460

19. Installation of radiator
    (1) Ensure that the radiator lower grommet exhibits no deformation or damage.
    If any damage is existed, replace the radiator lower grommet with new one.


JEM00511-00461

    (2) Place the radiator into the radiator lower grommet.
    (3) Ensure that the radiator upper grommet for damage.
    Replace the radiator upper grommet with new one, if any damage is present.


JEM00512-00462

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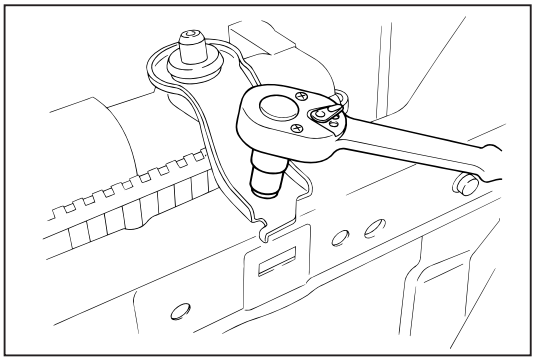
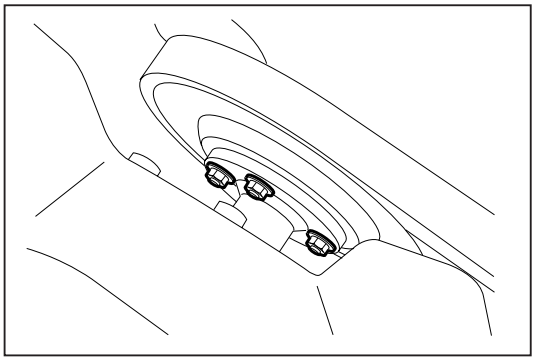
(4) Secure the radiator by installing the radiator brackets with the attaching bolts.
(5) Connect the radiator lower hose and cramp the hose band.



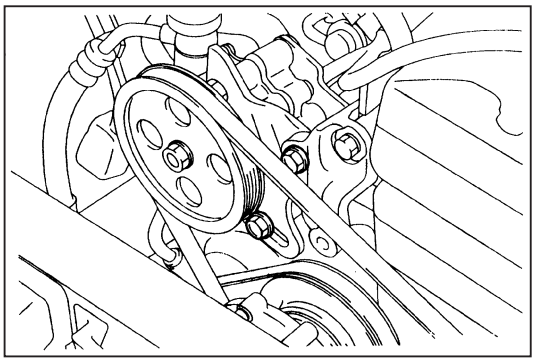
JEM00513-00463

20. Install the cooling fan with the fluid coupling together with the fan shroud.
Tighten the fluid coupling attaching nuts and the fan shroud attaching bolts.
21. Adjust the alternator driver belt tension to the specified value.
(Refer to timing belt section)



JEM00514-00464

22. Install the power steering vane pump drive belt and adjust it's belt tension.
Tightening Torque: 41.7 ± 7.3 N·m

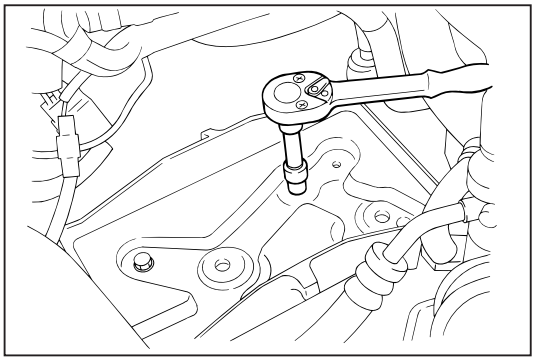


JEM00515-00465

23. Connect the water hoses to the radiator.

JEM00516-00000

24. Installation of battery
(1) Install the battery carrier and tighten it's attaching bolts.
(2) Install the battery to the battery carrier.
(3) Secure the battery by installing the hold down clamp with the attaching nuts.



JEM00517-00466

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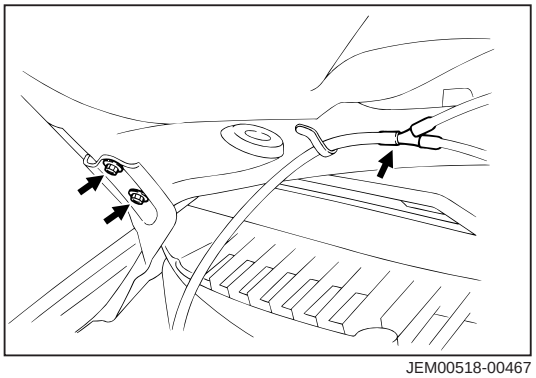
25. Installation of engine hood.
    (1) Install the engine hood, being very careful not to scratch the vehicle body and engine hood.
    (2) Tighten the engine hood attaching bolts and adjust the engine hood dimensions.

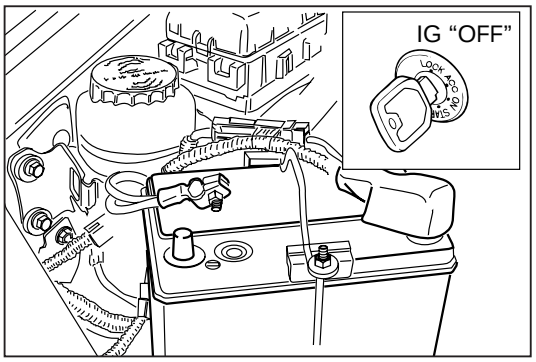


JEM00518-00467

    (3) Connect the windshield washer hose to the joint section.

JEM00519-00000

26. Fill the engine oil.
27. Fill the coolant to the radiator and reserve tank.
28. Connect the positive cable to the positive terminal of the battery.
29. Connect the battery ground cable to the negative terminal of the battery.
30. Perform the engine turn-up.



JEM00520-00468

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ENGINE SPECIFICATION

Item \ Engine type					HC-EJ
Engine proper	Type				Petrol, 4-cycle
	Mounting location				Front
	Cylinder No. and arrangement				4-cylinder-in-line, mounted transversely
	Combustion chamber type				Pent roof type
	Valve mechanism				Belt-driven, SOHC
	Bore × stroke mm				76.0 × 71.4
	Compression ratio				9.5 ± 0.3
	Compression pressure kPa (kgf/cm²-rpm)				1372.9 (14 - 300)
	Maximum output	SAE net kW/rpm	General specifications		61/6100
		European kW/rpm	Australian specifications		↑
		DIN kW/rpm	European specifications		↑
	Maximum torque	SAE net Nm/rpm	General specifications		105/5100
		European Nm/rpm	Australian specifications		↑
		DIN Nm/rpm	European specifications		↑
	Engine dimensions [Length × width × height] mm				630 × 510 × 655
	Number of piston rings		Compression ring		2
			Oil ring		1
	Valve timing		Intake	Open	BTDC 1°
				Close	ABDC 39°
			Exhaust	Open	BBDC 42°
				Close	ATDC 2°
	Valve clearance mm			Intake	[HOT] 0.25
				Exhaust	[HOT] 0.33
	Idling speed rpm			Manual transmission	800 ± 50
				Automatic transmission	850 ± 50
	Blow-by gas recirculating system				Closed type
Lubricating system	Lubricating method				Fully-forced feed method
	Oil pump type				Trochoid type
	Oil filter type				Fully-flow filter type, filter paper type
	Lubrication oil capacity liter		Whole		3.6
			When only oil is changed		3.3
			When oil and oil filter are changed		3.5

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Item \ Engine type			HC-EJ
Cooling system	Cooling method		V-ribed belt driven type
	Radiator type		Corrugation type forced circulation
	Coolant capacity [Including 0.434 liter for reserve tank] liter	Manual transmission	5.4
		Automatic transmission	5.3
	Water pump type		Centrifugal type belt-driven type
	Thermostat type		Wax pellet type bottom-by-pass type
Air cleaner	Type		Filter unwoven fabric type
	Number		1
	Fuel tank	Capacity liter	46
		Location	Underneath rear seat floor
	Fuel pipe material		Rubber and steel tube
	Fuel pump type		Electromotor type
	Fuel filter type		Filter paper type (Voltex type)
	Fuel injection device		Electronic type
	Injector	Type of nozzle retainer	With cushion rubber type
		Nozzle type	Electronic controlled throttle type
		Injection pressure kPa (kgf/cm^2)	284 (2.9)

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Item		Engine type			HC-EJ
Engine electrical system	Ignition system	Voltage V			12 [Negative ground]
		Type			Full transistorized type (ESA) battery ignition type
		Ignition timing			TDC 0° ± 2° with the check connector connected with ground terminal
		Firing order			1-3-4-2
		Spark plug	Manufacturer & Type	DENSO	K20TNR-S, K22TNR-S
				NGK	BKRU6EK, BKRU7EK
			Sparkplug gap mm	DENSO	0.9 - 1.0
				NGK	0.9 - 1.0
			Thread		1.25
	Battery	Type			36B20L
		Capacity AH			28 Ah
	Alternator	Type			Three-phase alternating current commuting type
		Output V-A	MT		12 - 50
			AT		12 - 55
		Regulator type			Contact pointless type (IC regulator type)
	Starter	Type			Magnet engaging type
		Output V-kW			12 - 0.8
	Radio noise suppressing device				Resistive cord

JEM00521-00000

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ENGINE MECHANICALS

Timing belt pulley	Wear limit	Camshaft Crankshaft	119.8 mm 59.3 mm
Timing belt tension spring		Free length Installation load	46.5 mm 29.4 ± 3 N at 50.9 mm (3.0 ± 0.3 kg at 50.9 mm)
Camshaft	Oil clearance (Cylinder head to camshaft) Maximum limit Thrust clearance Maximum limit Fuel pump cam diameter Minimum Fuel pump cam stroke Standard Minimum Valve cam lobe height Intake Exhaust Minimum limit Intake Exhaust Maximum circle run out		0.035 - 0.076 mm 0.17 mm 0.1 - 0.25 mm 0.45 mm 42.65 mm 5.0 mm 4.8 mm 33.434 - 33.634 mm 33.17 - 33.37 mm 33.2 mm 33.0 mm 0.03 mm
Cylinder head	Warpage Valve seat angle Valve contacting angle Valve seat contacting width Maximum valve seat recession (Depth measured from cylinder head gasket attaching surface to uppermost part of a new valve inserted into position)	Cylinder block side Intake manifold side Exhaust manifold side Intake Exhaust Standard Allowance Intake Exhaust	0.10 mm 0.10 mm 0.10 mm 30° - 45° - 70° 20° - 45° - 70° 45° 1.4 mm 1.2 - 1.6 mm 0.5 mm 2.775 mm 6.026 mm
Valves	Valve stem diameter Valve length Valve face angle Valve stock thickness (Minimum) Valve stem oil clearance Intake Exhaust	Intake valve Exhaust valve Intake valve Exhaust valve Intake Exhaust Standard Maximum Standard Maximum	6.560 - 6.580 mm 6.555 - 6.575 mm 112.8 mm 114.5 mm 45.5° 0.8 mm 1.0 mm 0.030 - 0.055 mm 0.080 mm 0.035 - 0.060 mm 0.090 mm

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Valve springs	Free length: Standard Pink marked spring Orange marked spring Minimum Pink marked spring Orange marked spring Installed tension at 38.0 mm Pink marked spring Orange marked spring Maximum out-of squareness	 45.2 ± 0.5 mm About 47.4 mm 43.9 mm 46.1 mm 244.9 N (24.97 kgf) 208.9 N (21.3 kgf) 1.6 mm
Valve rocker arm and valve rocker shaft	Oil clearance Standard Maximum Valve rocker arm bore diameter Valve rocker shaft outer diameter	0.012 - 0.053 mm 0.08 mm 19.500 - 19.521 19.468 - 19.488 mm
Valve rocker arm spacer	Free width	22.00 mm
Exhaust manifold	Warpage	0.1 mm
Intake manifold	Warpage Cylinder head side	0.1 mm
Cylinder block	Maximum cylinder head surface warpage Cylinder bore diameter Standard O/S 0.25 Bore honing angle Coarse degree	0.1 mm 76.000 - 76.030 mm 76.250 - 76.280 mm 35° ± 5° 1 - 4 Z
Piston, piston pin and piston rings	Piston-to-cylinder bore clearance Standard Maximum limit Piston ring groove-to-piston ring side clearance Standard No. 1 Other than below No. 2 Maximum Piston ring thickness Standard No. 1 Other than below No. 2 Piston ring end gap Standard No. 1 With “T” mark With “N” mark No. 2 With “2T” mark With “2N” mark Oil Shape of spacer A Shape of spacer B Maximum No. 1 No. 2 Oil Piston pin-to-connecting rod inference fit Piston-to-piston pin clearance	 0.025 - 0.045 mm 0.11 mm 0.03 - 0.07 mm 0.02 - 0.06 mm 0.12 mm 1.17 - 1.19 mm 1.47 - 1.49 mm 0.27 - 0.37 mm 0.27 - 0.40 mm 0.40 - 0.55 mm 0.40 - 0.55 mm 0.2 - 0.6 mm 0.15 - 0.60 mm 0.7 mm 0.8 mm 1.0 mm 0.015 - 0.044 mm 0.005 - 0.011 mm
Flywheel	Runout Maximum	0.1 mm
Connecting rod	Big end thrust clearance Standard Maximum Maximum bend Maximum twist	0.15 - 0.4 mm 0.45 mm 0.05 mm 0.05 mm
Crankshaft	Crankpin journal oil clearance Main journal oil clearance Crankpin journal diameter Main journal diameter Thrust clearance Standard Maximum limit Runout Maximum	0.020 - 0.044 mm 0.024 - 0.042 mm 44.976 - 45.000 mm 49.976 - 50.000 mm 0.02 - 0.22 mm 0.30 mm 0.06 mm

JEM00522-00000

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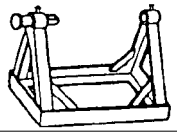
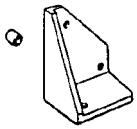
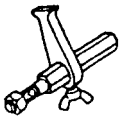
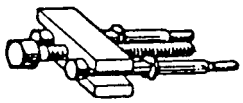
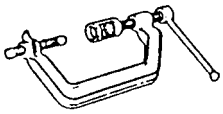
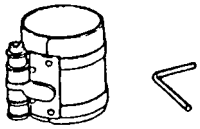
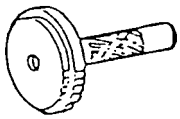
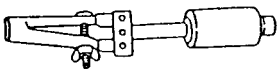
SST (Special Service Tools)

Shape	Part No. and Name	Purpose	Remarks
	09090-04010-000 Engine sling device	Removal and installation of engine	
	09219-87202-000 Engine overhaul stand	Stand for engine overhaul	This stand is to be used in combination with engine overhaul attachment.
	09219-87101-000 Engine overhaul attachment	Attaching engine to overhaul stand	This attachment is to be used in combination with engine overhaul stand.
	09210-87701-000 Flywheel holder	Preventing crankshaft from turning	
	09609-20011-000 Steering wheel puller	Removal of crankshaft timing belt pulley	
	09636-20010-000 Upper ball joint dust cover replacer	Installation of camshaft oil seal	
	09202-87002-000 Valve cotter remover & replacer	Installation and removal of valves	
	09217-87001-000 Piston replacing guide	Guiding piston during insertion	
	09223-41020-000 Crankshaft rear oil seal replacer	Installation of crankshaft rear oil seal	
	09201-87704-000 Valve stem oil seal cover	Removal of valve stem oil seals	
	09310-87102-000 Counter shaft front bearing replacer	Installation of crankshaft front oil seal	
	09221-87704-000 Piston pin remover & replacer body	Removal and installation of piston pins	This remover & replacer body is to be used in combination with piston pin remover & replacer guide
	09221-87705-000 Piston pin remover & replacer guide	Removal and installation of piston pins	This remover & replacer guide is to be used in combination with piston pin remover & replacer body.

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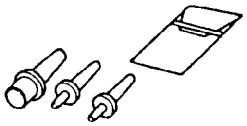
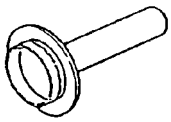
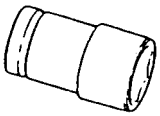
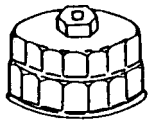
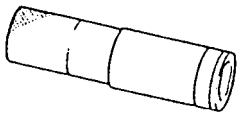
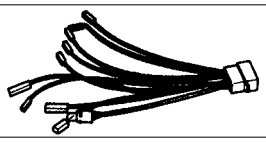
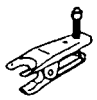
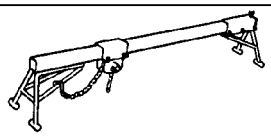
Shape	Part No. and Name	Purpose	Remarks
	09201-87705-000 Valve guide bush remover & replacer	Removal and installation of valve guide bushes	
	09301-87703-000 Clutch guide tool	Assembling clutch	
	09258-00030-000 Plug set	Plugging rubber hoses	
	09648-87201-000 Drive shaft replacer	Disconnecting drive shafts	
	09388-87702-000 Transfer replacer	Press-fitting of rubber grommets	
*1 	09268-87704-000 Oil cooler set bolt box wrench	Removal and installation of oil cooler (only for oil cooler-equipped vehicle)	Only for oil cooler-equipped vehicle
	09032-00100-000 Oil pan seal cutter	Removal of oil pan	
	09228-87201-000 Oil filter wrench	Removal and installation of oil filter	
*2 	09268-87703-000 Plug wrench	Removal and installation of spark plugs	
*3 	09991-87401-000 Wire engine control system inspection	EFI system inspection ABS system inspection Measure engine speed	
*4 	09611-87701-000 Tie rod end puller	Disconnection of tie rod end	

JEM00523-00469

REFERENCE:

	ESB-1 Engine support bridge	Handled by BANZAI Limited	

JEM00524-00470

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TIGHTENING TORQUE

Tightening component		Tightening torque	
		N·m	kgf-m
Cylinder head × Spark plug		14.7 - 21.6	1.5 - 2.2
Cylinder head × Cylinder head cover		2.9 - 4.9	0.3 - 0.5
Cylinder head × Rocker shaft (camshaft cap)	M10	28.4 - 36.3	2.9 - 3.7
	M8	12.7 - 16.7	1.3 - 1.7
Cylinder head × Cylinder block		58.8 - 66.7	6.0 - 6.8
Cylinder head × Exhaust manifold		29.4 - 44.1	3.0 - 4.5
Cylinder head × Intake manifold		14.7 - 21.6	1.5 - 2.2
Cylinder head × Water outlet		14.7 - 21.6	1.5 - 2.2
Cylinder block × Water inlet		5.9 - 8.8	0.6 - 0.9
Cylinder block × Crankshaft main bearing cap		44.1 - 53.9	4.5 - 5.5
Cylinder block × Oil pump		5.9 - 8.8	0.6 - 0.9
Cylinder block × Rear oil seal retainer		5.9 - 8.8	0.6 - 0.9
Cylinder block × Water pump		14.7 - 21.6	1.5 - 2.2
Cylinder block × Transmission		49.0 - 68.6	5.0 - 7.0
Cylinder block × Alternator bracket		34.3 - 49.0	3.5 - 5.0
Cylinder block × Rear end plate		9.8 - 14.7	1.0 - 1.5
Crankshaft × Flywheel		78.5 - 98.0	8.0 - 10.0
Crankshaft × Drive plate		78.5 - 98.0	8.0 - 10.0
Crankshaft × Crankshaft timing belt pulley		88.3 - 98.0	9.0 - 10.0
Camshaft × Camshaft timing belt pulley		14.7 - 21.6	1.5 - 2.2
Connecting rod × Connecting rod cap		34.3 - 44.1	3.5 - 4.5
Intake manifold × Gas filter		11.8 - 19.6	1.2 - 2.0
Intake manifold × Union bolt for brake booster		11.8 - 19.6	1.2 - 2.0
Intake manifold × Plug screw		11.8 - 19.6	1.2 - 2.0
Intake manifold × Delivery pipe		14.7 - 21.6	1.5 - 2.2
Intake manifold × Rear stiffener		49.0 - 68.6	5.0 - 7.0
Exhaust manifold × Front exhaust pipe		41.6 - 62.4	4.2 - 6.4
Engine mounting stiffener RH × Transmission (MT)		29.4 - 44.1	3.0 - 4.5
Engine mounting stiffener LH × Transmission		29.4 - 44.1	3.0 - 4.5

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Tightening component		Tightening torque	
		N·m	kgf-m
Oil pump × Oil pressure switch		11.8 - 19.6	1.2 - 2.0
Oil pump body × Oil pump cover		7.8 - 12.7	0.8 - 1.3
Oil pan		6.9 - 11.8	0.7 - 1.2
Water inlet × Thermo control switch		24.5 - 34.3	2.5 - 3.5
Pressure plate		14.7 - 21.6	1.5 - 2.2
Lower member subassembly		48.1 - 89.2	4.9 - 9.1
Drive plate × Torque converter		22.6 - 32.4	2.3 - 3.3
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J100

EC

EMISSION CONTROL SYSTEMS

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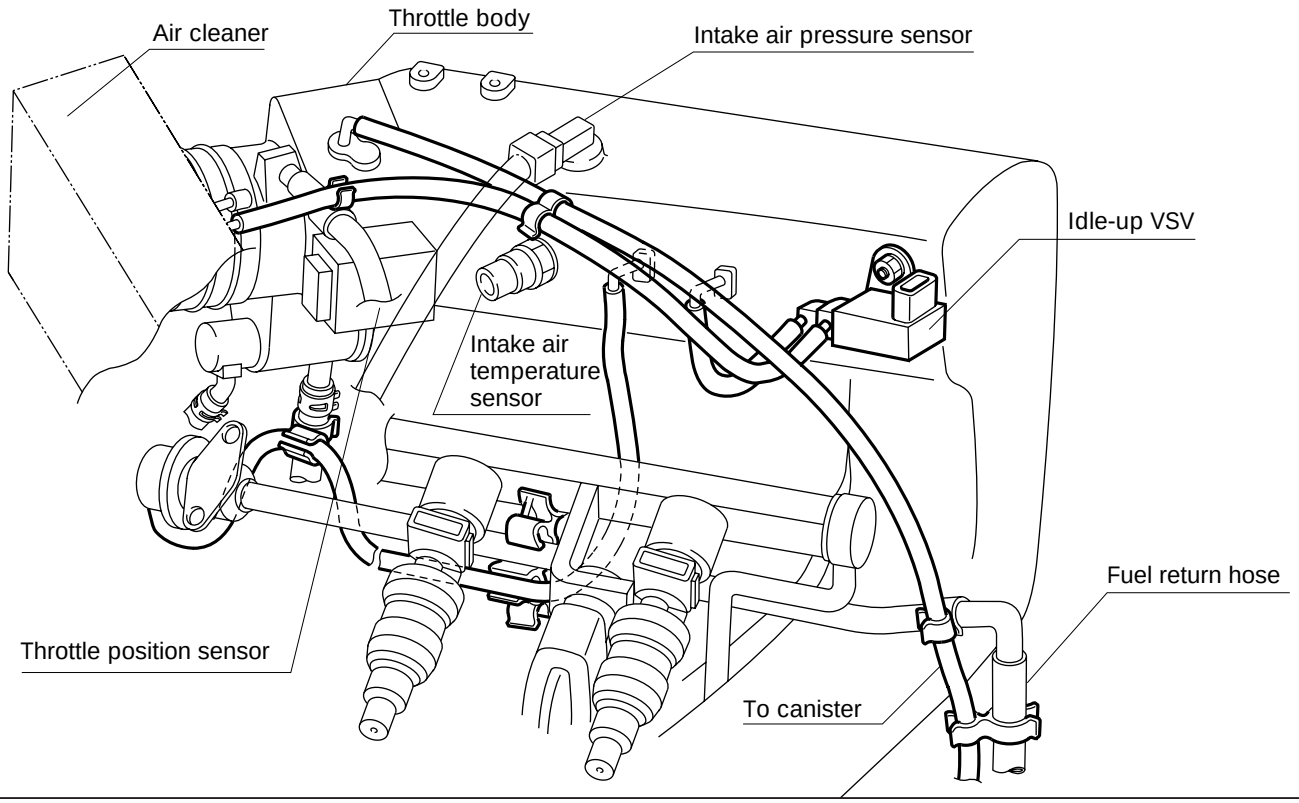
COMPONENT LAYOUT

[Manual transmission Vehicle]



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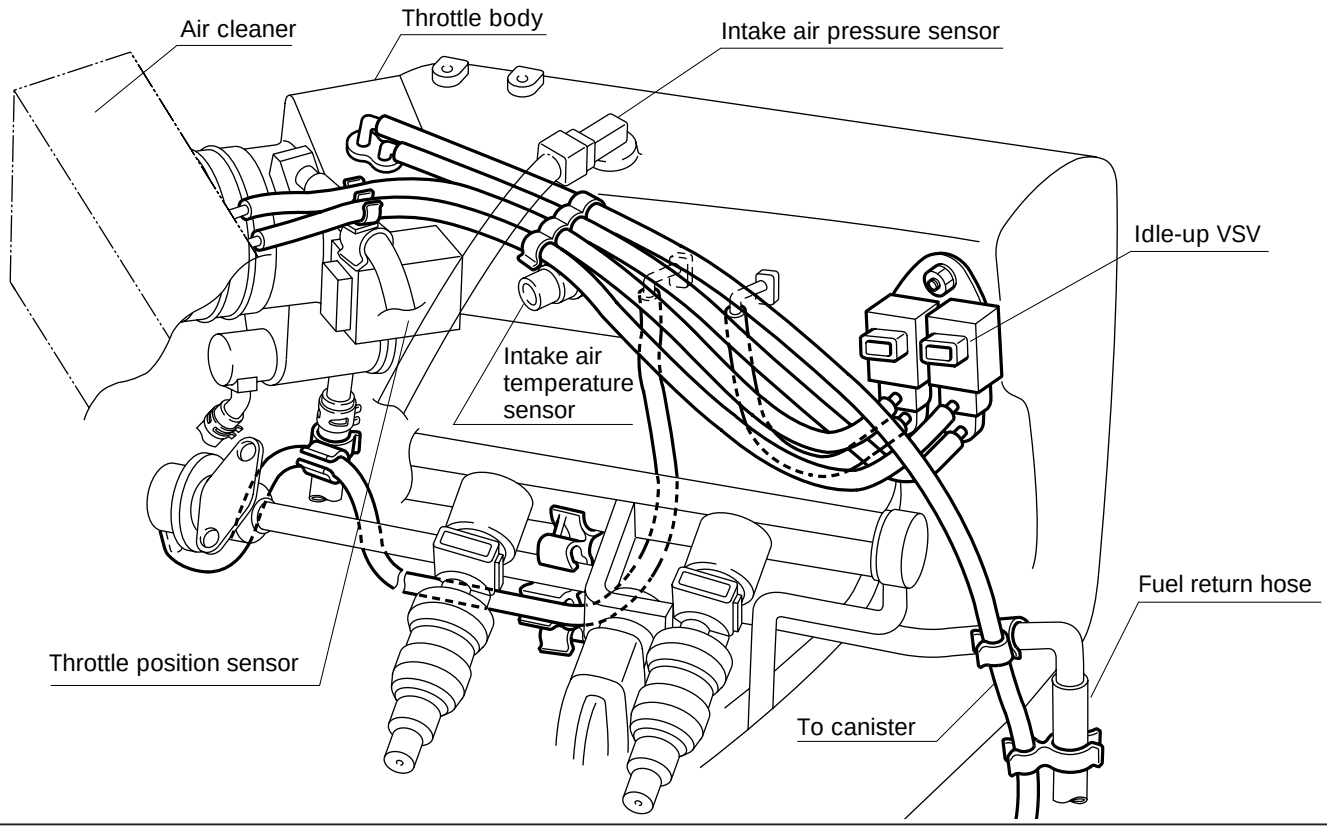
[Automatic transmission Vehicle]



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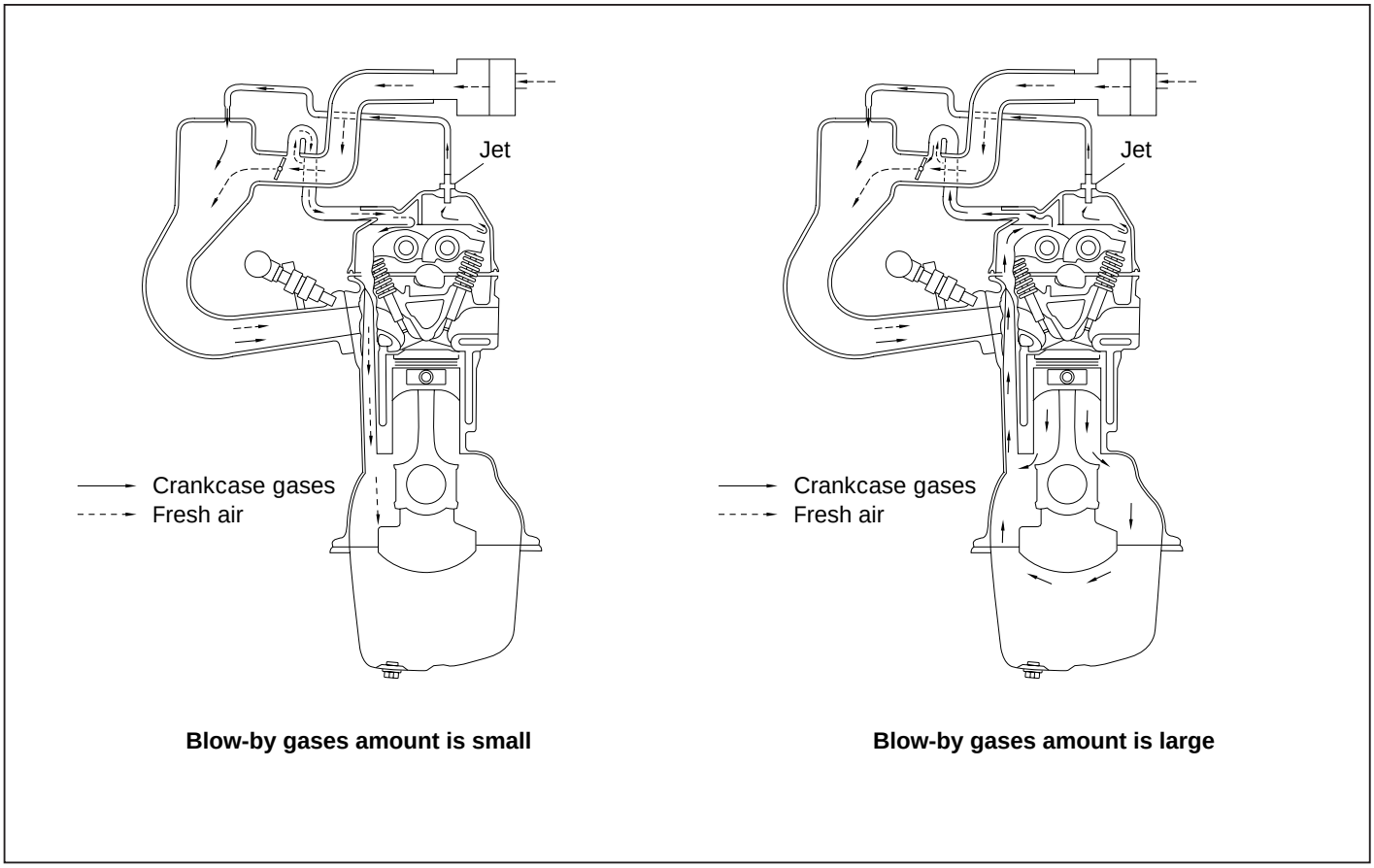
POSITIVE CRANKCASE VENTILATION SYSTEM

The engine equipped with a sealed type blow-by gas recirculating system in order to prevent blow-by gases generated inside the crankcase from being released into atmosphere.
When the no blow-by gases is generated in the cylinder, air in the cylinder head cover are ventilated by the fresh air introduced from up stream of the throttle valve to down stream of the throttle valve through inside of the cylinder head cover.
At this time, the flow rate of air is regulated by a jet provided at the cylinder head cover, thus stabilizing the engine idle speed, if engine at the idling.
When the generating amount of the blow-by gases is small, the blow-by gases generated inside the crankcase flow into the cylinder head cover side through the gas path of the cylinder block, oil in the blow-by gases is separated by oil separator provided at the cylinder head cover.
Then, the blow-by gases in the cylinder head cover introducing to the cylinders through down stream of the throttle body to be burnt there again in the cylinders.
At this time, the air flow rate of the blow-by gases is regulated by a jet provided at the cylinder head cover, thus stabilizing the engine idle speed, if engine at the idling.
When the large amount of the blow-by gases are generated, the blow-by gases are flow into the cylinders both through the upstream path and downstream path of the throttle valve.



Blow-by gases amount is small

Blow-by gases amount is large

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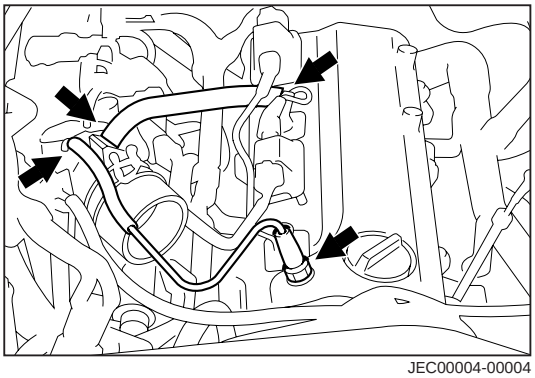
INSPECTION OF PCV HOSE & CONNECTION


JEC00004-00004

Visual inspection of hoses and connections

Check the hoses and connections for cracks, leakage or damage.

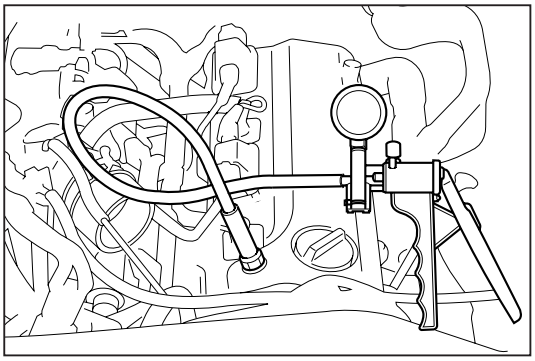
If any parts exhibit fault, replace or repair them, as required.

Inspection of blow-by gas recirculation device

1. Disconnect the blow-by gas hose from the throttle body side.
2. Ensure that a heavy resistance exists when you blow your breath from the disconnected hose end.
   If no resistance is felt, replace the cylinder head cover.
   NOTE:
   - Slight air continuity normally exists.

JEC00005-00000

3. Connect a MityVac to the disconnected hose.
4. Ensure that air continuity exists without resistance when air is sucked in the MityVac.
   If no air continuity exists, replace the cylinder head cover.
5. Disconnect the MityVac from the disconnected hose.
6. Connect the blow-by hose to the throttle body.


JEC00006-00005

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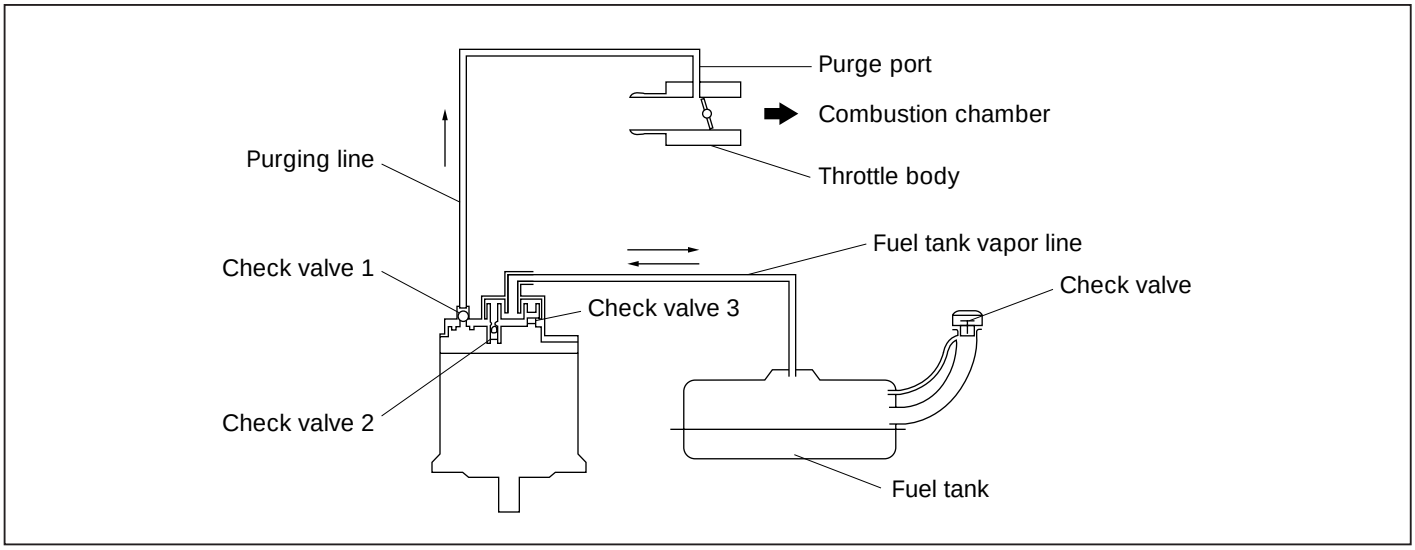
FUEL EVAPORATIVE EMISSION CONTROL SYSTEM

The fuel evaporative emission control system employs a charcoal canister type. The charcoal canister type leads the fuel vapor into the charcoal canister which uses activated carbon to absorb HC emission. The absorbed HC emission is drawn into the throttle body to be burnt together with mixture in the combustion chamber.



JEC00007-00006

Pressure condition in tank	Engine condition	Canister check valve			Check valve in safety filler cap	Fuel Evaporative emission (HC)
		1	2	3		
High pressure in tank	Engine is running at idle condition	Closed	Open	Closed	Closed	HC emission is absorbed by the charcoal canister.
	Vehicle is running	Open	Open	Closed	Closed	HC emission is sucked into the engine through the charcoal canister.
Low vacuum pressure in tank	Engine is running at idle condition	Closed	Closed	Open	Closed	HC emission absorbed by the charcoal canister is returned to the tank.
High vacuum pressure in tank	Engine is running at idle condition	Closed	Closed	Open	Open	If the vacuum pressure rises, even after the check valve of charcoal canister has opened, the safety valve in the fuel filler cap will open to prevent damage to fuel tank

JEC00008-00000

Inspection of fuel vapor lines, fuel tank & filler cap

1. Visual inspection of fuel vapor lines and connections for loose connections, kinks or damage
   If any damage is present, repair or replace the parts, as required.
2. Visual inspection of fuel tank
   Check the fuel tank for deformation, cracks or fuel leakage.
   If any damage is present, repair or replace the part, as required.
   Replace the fuel tank cap, if any deformation is caused by the negative pressure in the fuel tank.

JEC00009-00000

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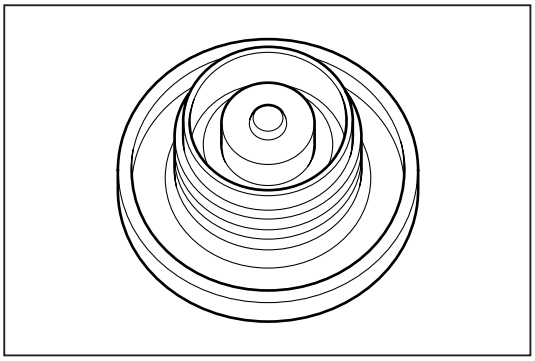
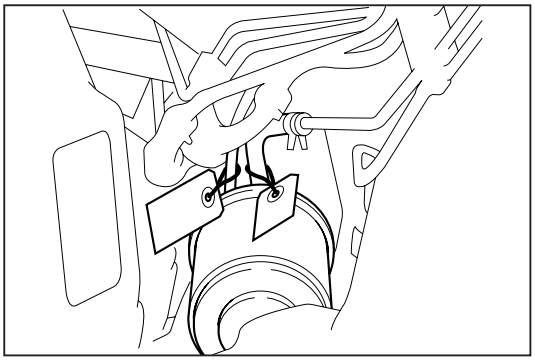
3. Inspection of the fuel filler cap
   Check the fuel filler cap and gasket for damage or deformation.
   Also check the air continuity with some resistance is existing on the fuel filler cap.
   Replace the cap, if necessary.
   NOTE:
   - If fuel tank deformed by negative pressure, be sure to replace the fuel filler cap with new one after replacing the fuel tank.

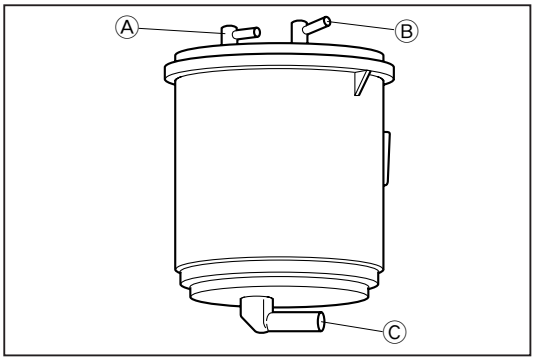

JEC00010-00007

4. Inspection of the charcoal canister
   (1) Detach the hose band from charcoal canister.
   (2) Disconnect the rubber hoses from charcoal canister.
   NOTE:
   - Prior to disconnection of the rubber hose, put a tag on each of the rubber hoses so that they may be reconnected correctly to the original position.


JEC00011-00008

   (3) Remove the charcoal canister from vehicle by pull up the charcoal canister case.

   (4) Visually inspect the charcoal canister case for cracks or damage.
   If any damage is found, replace the charcoal canister with new one.
   (5) Check of charcoal canister for air leakage Ensure that no air leakage is present when applying compressed air of 29.4 kPa (0.3 kgf-cm^2) into the fuel tank side pipe Ⓑ with carburetor side Ⓐ and atmosphere side Ⓒ pipes plugged.
   If air leakage is present, replace the charcoal canister with new one.
   (6) Ensure that the no air continuity is exist when blowing your breath into purge side Ⓐ pipe of the charcoal canister.
   If air continuity is exist, replace the charcoal canister with new one.
   (7) Check of charcoal canister for restriction.
   ① Ensure that the air continuity is existing to the atmosphere side Ⓒ pipe, when blow your breath into the fuel tank side pipe Ⓑ while the purge side Ⓐ pipe is plugged.
   If no air continuity is exist, replace the charcoal canister with new one.
   ② Ensure that the air continuity is existing when applying a negative pressure to the purge side pipe Ⓐ by the Mity Vac.
   If no air continuity is exist, replace the charcoal canister with new one.



JEC00012-00009

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(8) Cleaning of charcoal canister Clean the charcoal canister by blowing compressed air of 294.2 kPa (3.0 kg/cm^2) into the fuel tank side pipe Ⓑ while holding the purge side of canister pipes Ⓐ closed.

NOTE:

- Do not attempt to wash the charcoal canister.
- No activated carbon should come out during the test. If activated carbon comes out replace the charcoal canister.

(9) Install the charcoal canister to vehicle.

(10) Reconnect the rubber hoses and attach the new hose band.

JEC00013-00000

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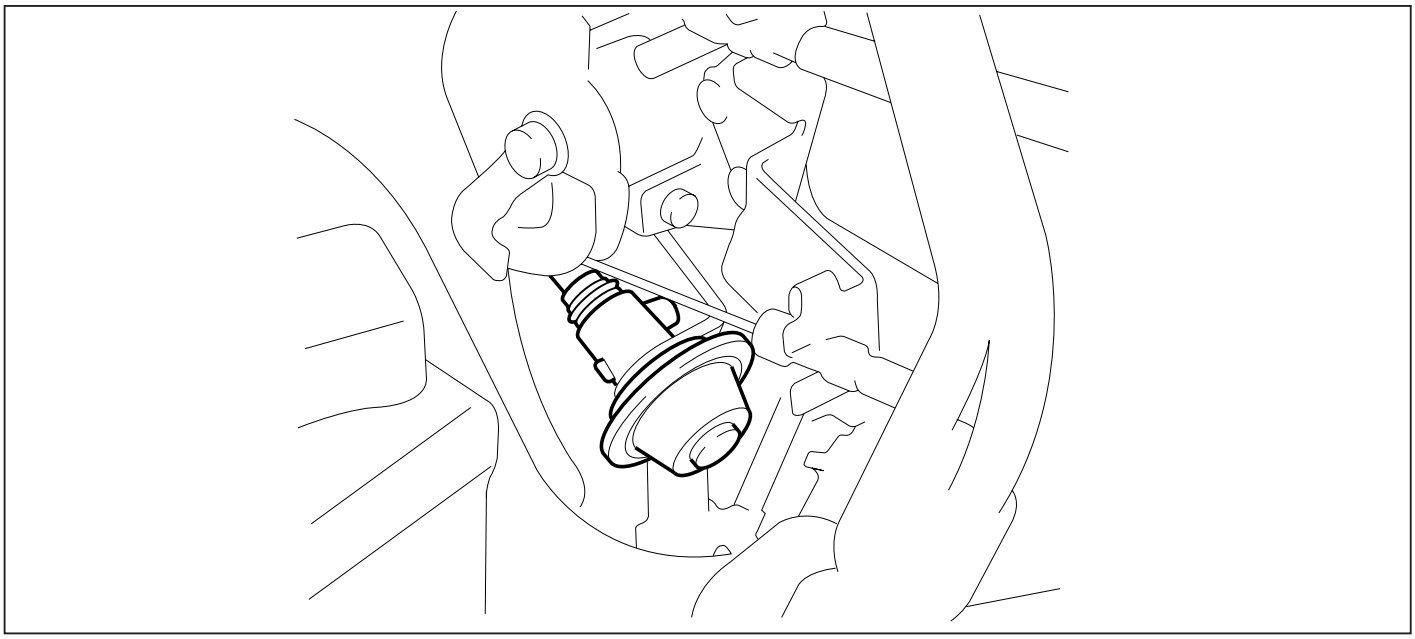
DASHPOT (DP) SYSTEM (only for automatic transmission models)

This system prevents the throttle valve from suddenly closing, thus reducing the CO and HC emissions.



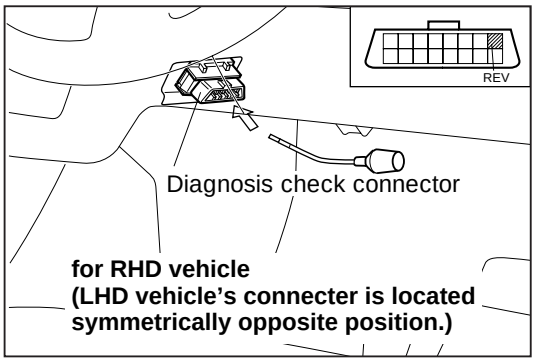
JEC00014-00010

Conditions	Throttle valve	Dashpot
Idling	Idle speed position	Pushed in by return force of throttle lever.
Normal driving	Opened position	Pushed out by the diaphragm spring.
Deceleration	Slightly opens and then slowly closes to the idle position	Pushed in by return force of the throttle lever.

JEC00015-00000

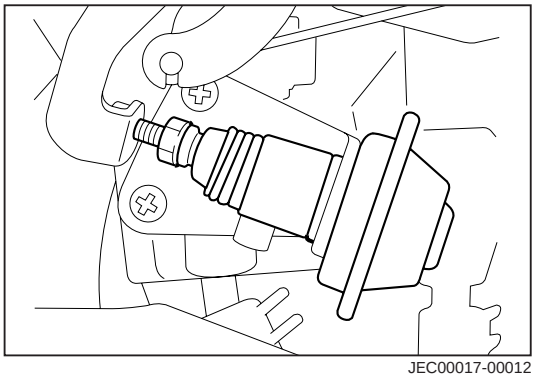
Inspection and adjustment of dashpot (DP) system

1. Connection of tachometer
   Connect the tachometer to the engine (REV terminal, vehicle side of connector), by connecting the following SST between them.
   SST: 09991-87402-000



JEC00016-00011

2. Start and warm-up the engine.
3. Ensure that the adjusting screw of the dashpot is not contact with dashpot shaft when the engine revolution speed at 3500 rpm.
   If adjusting screw of the dashpot is contact with the dashpot shaft, adjust the adjusting bolt height.



JEC00017-00012

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4. Slowly release the throttle lever.
5. Ensure that the engine revolution within the specified range.

   Specified Engine Revolution

   AT: 2400 ± 100 rpm

   If not adjust the engine revolution speed by adjusting screw and repeat the step (3) to (5) again.

JEC00018-00000

6. On condition that engine revolution speed is 3500 rpm, release the throttle lever quickly.
   Make sure that the engine revolution speed changes from 3500 rpm to idle speed within 0.5 - 5.0 seconds after dashpot works.
7. Stop the engine.
8. Remove the tachometer.
9. Remove the SST from the REV terminal, vehicle side of connector.

JEC00019-00000

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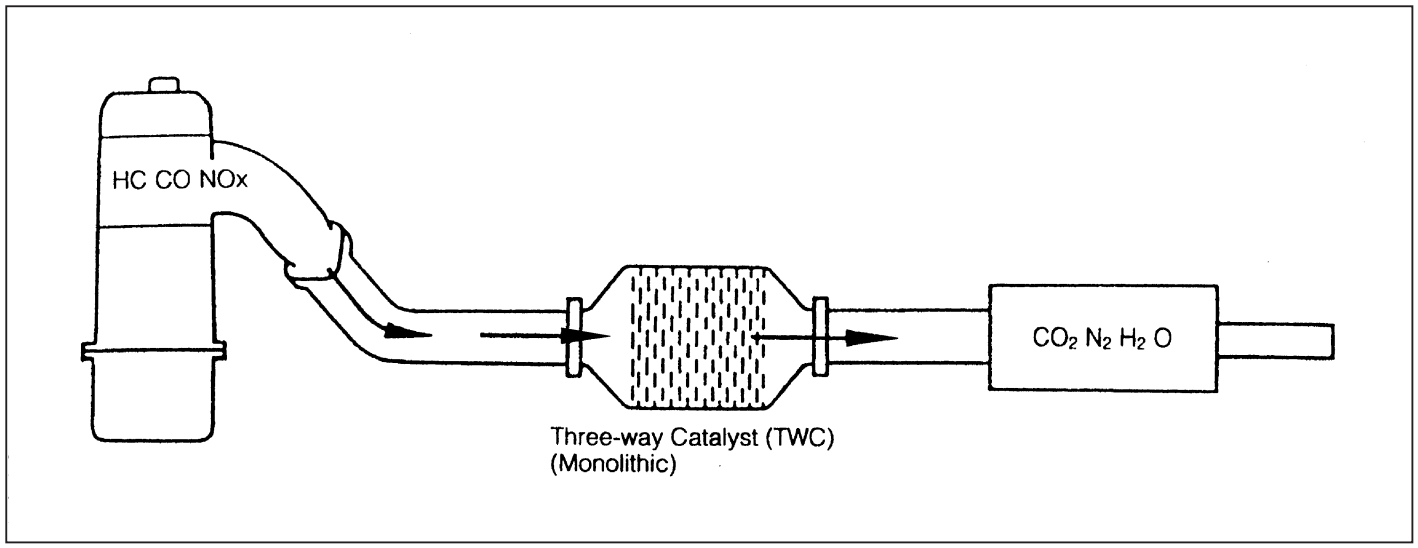
THREE-WAY CATALYST (TWC) SYSTEM

In this three-way catalyst, the oxidation of carbon monoxide (CO) and the reduction of nitrogen oxides (NOx) contained in exhaust gas can take place simultaneously. Thus, the three-way catalyst purifies the exhaust gas by converting its harmful component gas into harmless carbon dioxide (CO_2), water vapor (H_2O) and nitrogen (N_2).



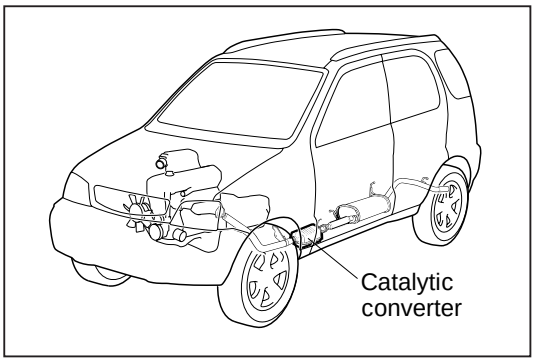
JEC00020-00013

Exhausta gas component	TWC	Exhaust gas
HC, CO and NOx	Oxidation and reducation	CO_2 H_2O and N_2

JEC00021-00000

INSPECTION OF EXHAUST PIPE ASSEMBLY

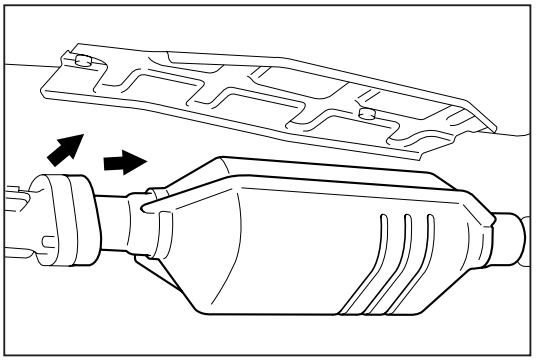
1. Check the connections for looseness or damage.
2. Check the clamps for weakness, bend or damage.



JEC00022-00014

INSPECTION OF HEAT INSULATOR

1. Check heat insulator for damage.
2. Check for adequate clearance between the three-way catalyst and heat insulator.



JEC00023-00015

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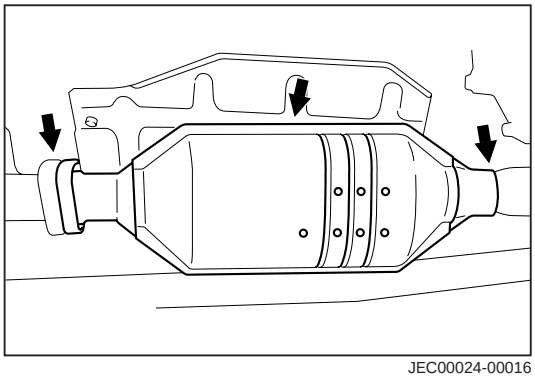
THREE-WAY CATALYST

INSPECTION

1. Check the connection for looseness or damage.
2. Check the three-way catalyst for dents or damage.



JEC00024-00016

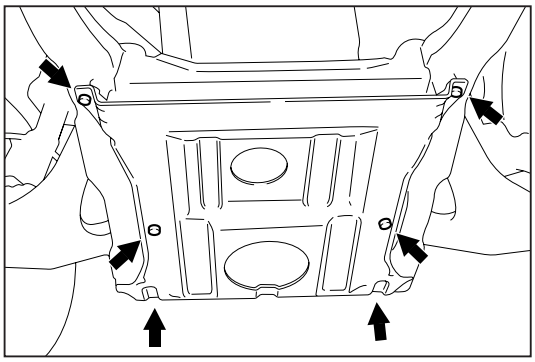
REMOVAL

WARNING:
- Do not perform any operation while the exhaust pipe is still hot.

1. Jack up the vehicle and support it with safety stands.

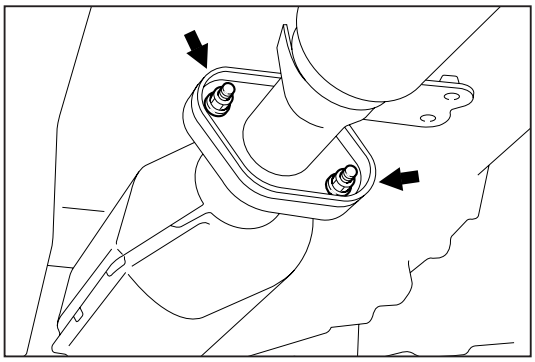
JEC00025-00000

2. Remove the engine undercover, by removing the six attaching bolts.



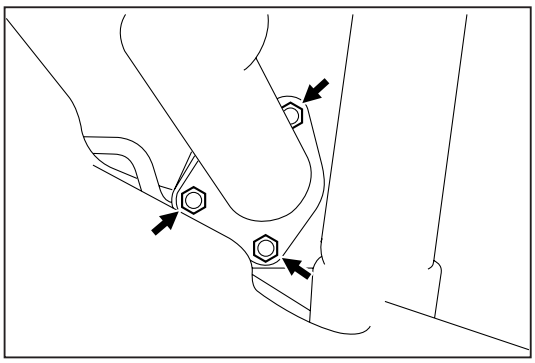
JEC00026-00017

3. Separate the tail pipe assembly from the front exhaust pipe assembly by removing the two bolts and nuts.



JEC00027-00018

4. Separate the front exhaust pipe assembly from the exhaust manifold by removing the three bolts and nuts.
   NOTE:
   - When replace the catalytic converter, replace it as the front exhaust pipe assembly.



JEC00028-00019

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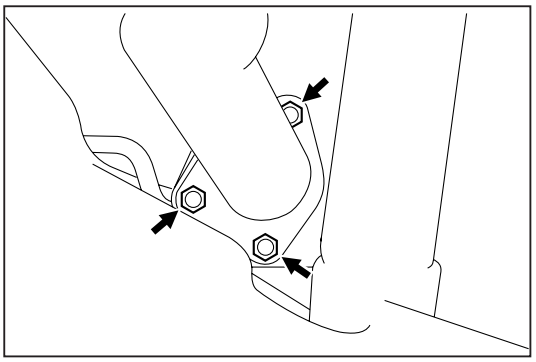
INSTALLATION

1. Install a new gasket to the front exhaust pipe and tail pipe.

JEC00029-00000

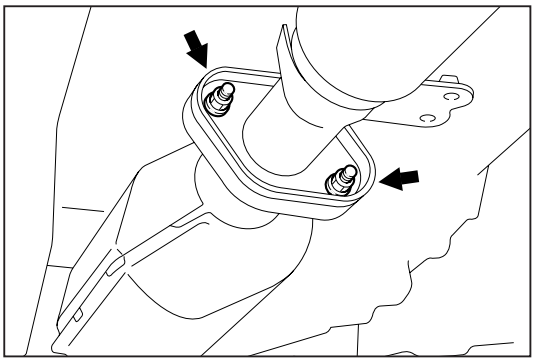
2. Install the front exhaust pipe assembly to the exhaust manifold.
   Tightening Torque: 36.3 - 51.0 N·m (3.7 - 5.2 kgf-m)

   NOTE:
   - Mark sure that the front mark is located at front side.



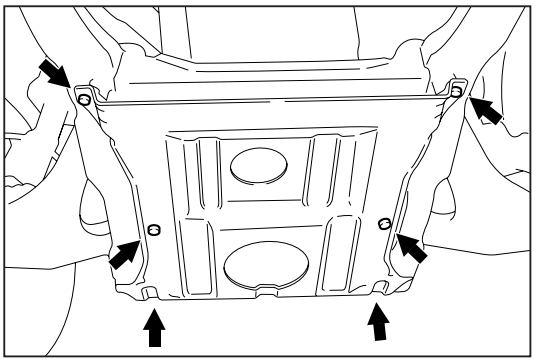
JEC00030-00021

3. Tighten the attaching bolts and nuts for the three-way catalyst at the tail pipe side.
   Tightening Torque: 36.3 - 51.0 N·m (3.7 - 5.2 kgf-m)



JEC00031-00022

4. Install the engine undercover, by attaching the six bolts.



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SST (Special Service Tools)

Shape	Part No. and name	Purpose
	09991-87402-000 Tacho pulse pick-up wire	Connecting engine tachometer
	09258-00030-000 Plug set	Plugging rubber hoses.

JEC00033-00024

TIGHTENING TORQUE

Tightening component	Tightening Torque		
	N·m	kgf-m	Remark
Cylinder head × Exhaust manifold	29.4 - 44.1	3.0 - 4.5	Dry
Exhaust manifold × Exhaust pipe	34.3 - 49.0	3.5 - 5.0	Dry
Exhaust manifold clamp	29.4 - 44.1	3.0 - 4.5	Dry
Exhaust pipe front × Exhaust pipe rear	36.3 - 51.0	3.7 - 5.2	Dry
Exhaust pipe support	9.8 - 15.7	1.0 - 1.6	Dry

JEC00034-00000

SERVICE SPECIFICATIONS

Ignition timing		B.T.D.C. 0 ± 2°/800 ± 50 rpm (M/T) B.T.D.C. 0 ± 2°/850 ± 50 rpm (A/T)
Idle speed		
Transmission type	M/T	A/T
Idle speed	800 ± 50 rpm	850 ± 50 rpm
Throttle positioner touch revolution		2400 ± 100 rpm (A/T)
Throttle positioner operating time		0.5 - 5.0 seconds (A/T)
Compression pressure at 300 rpm	Standard Minimum Difference between cylinders	1373 kPa (14.0 kgf/cm^2) 1030 kPa (10.5 kgf/cm^2) 147 kPa (1.5 kgf/cm^2)

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EF

EFI SYSTEM

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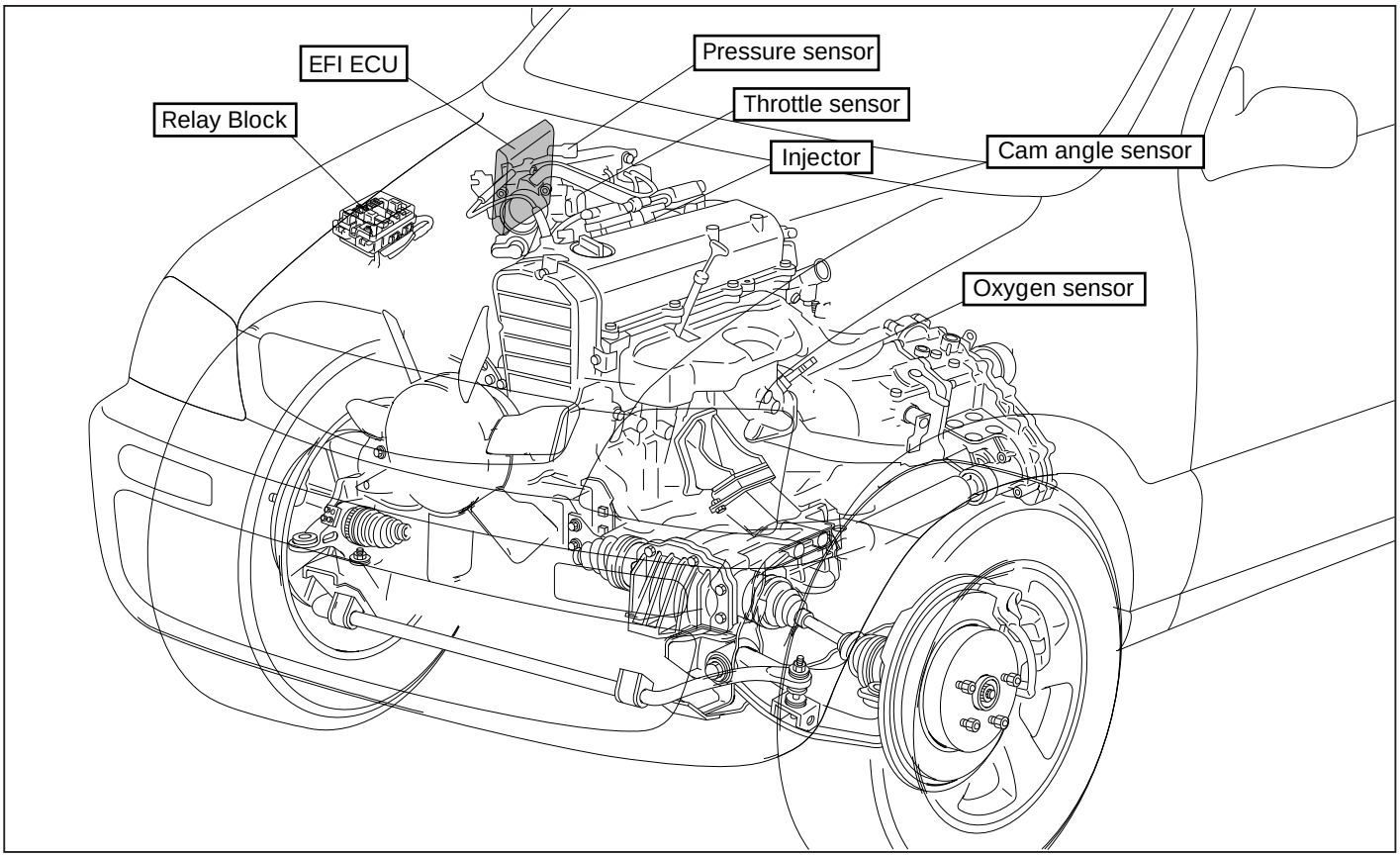
SYSTEM DESCRIPTION

LOCATION OF ELECTRONIC CONTROL PARTS



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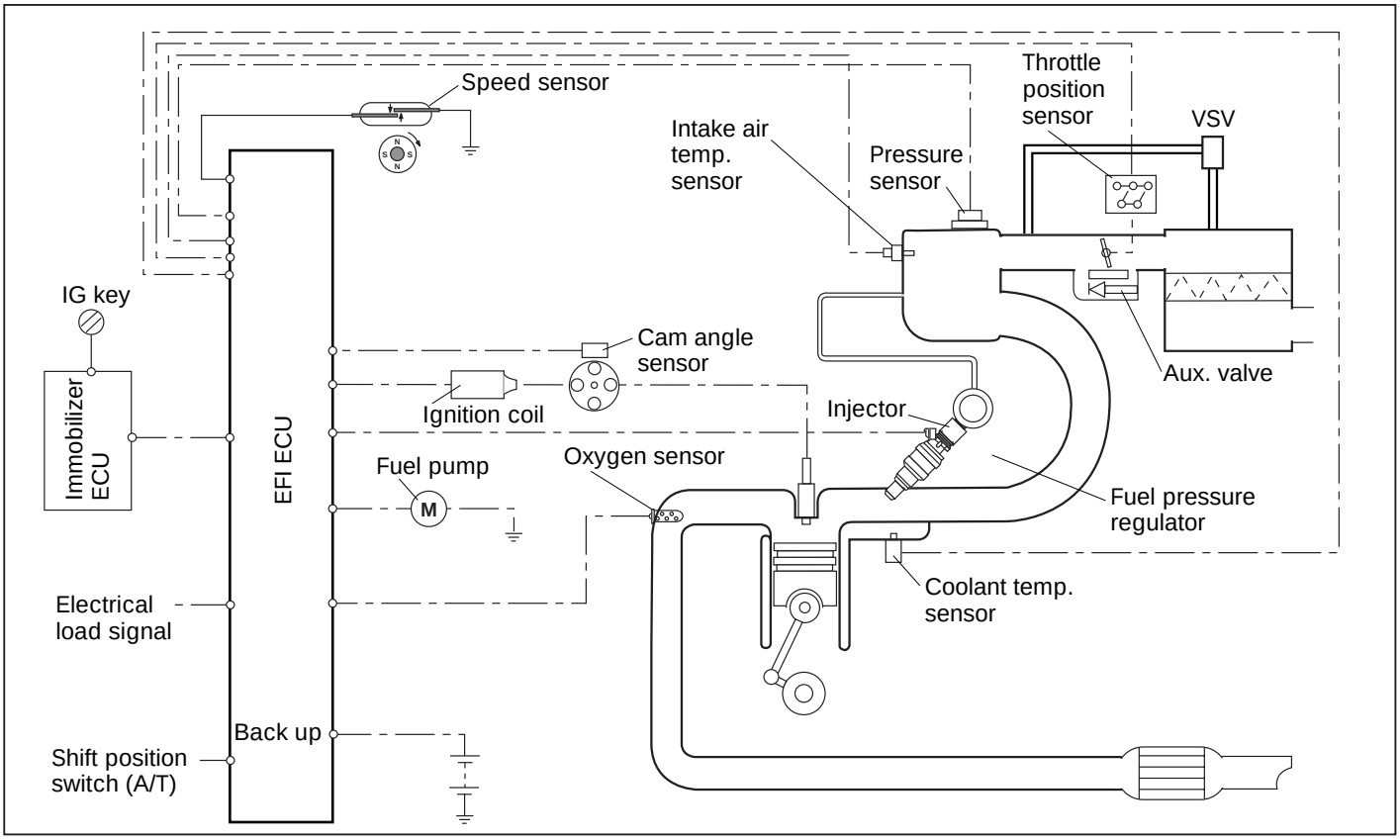
SYSTEMATIC DIAGRAM



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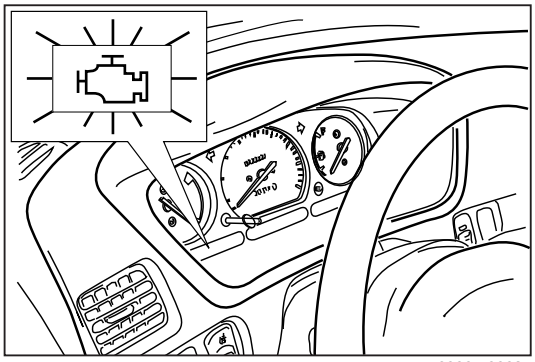
DIAGNOSIS SYSTEM

DESCRIPTION

A self-diagnosis system is built in the ECU. If any abnormality should occur in the signal systems of various sensors, the self-diagnosis system memorizes the malfunction code number in the ECU. In respect to important abnormalities, the check engine lamp at the instrument panel goes on, thus warning the driver of the abnormality.
When the abnormality is cleared, the check engine lamp goes out.
When the Test terminal of the diagnosis connector is connected with the earth terminal, the malfunction code number that has been memorized in the ECU will be indicated in a form of blinking of the check engine lamp in the instrument panel.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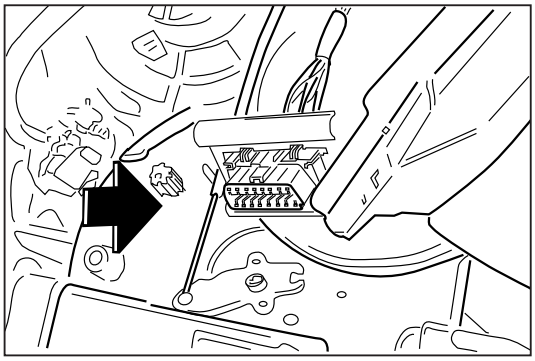
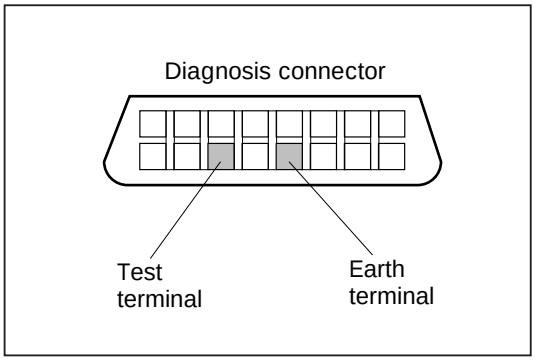

JEF00005-00032

CHECK ENGINE LAMP

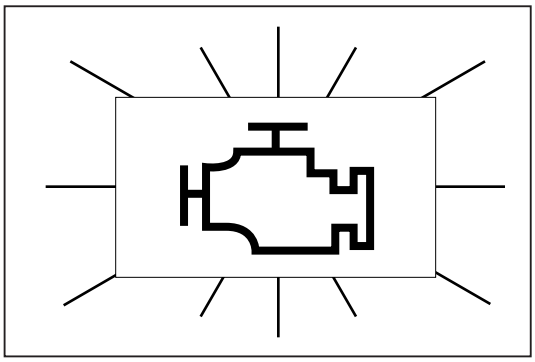
1. When the ignition switch is turned on, the check engine lamp goes on.
   (The engine is under a stopped state.)
2. When the engine starts, the check engine lamp goes off.
   If the check engine lamp remains illuminated, it indicates that the diagnosis system has detected system malfunction.



JEF00006-00033

READING OUT OF DIAGNOSIS CODE

1. Initial conditions
   (1) Battery voltage of 11 volts or more
   (2) Throttle valve fully closed
   (3) All accessory switches turned OFF
2. Reading out of diagnosis code
   (1) Connect the terminal between the test terminal and the earth terminal with a jump wire as indicated in the illustration.
   (2) Turn the ignition switch to the “ON” position. At this time, be careful not to start the engine.
   (3) Read out the diagnosis code by observing the flashing number of the check engine lamp.


JEF00007-00034

NOTE:
- When system malfunction was detected, go to page EF–18, “TROUBLE SHOOTING ACCORDING TO DIAGNOSIS SYSTEM”.
- If the check engine lamp fails to blink, it is likely that the ECU is malfunctioning. Hence, proceed to the inspection of the diagnosis system circuit.

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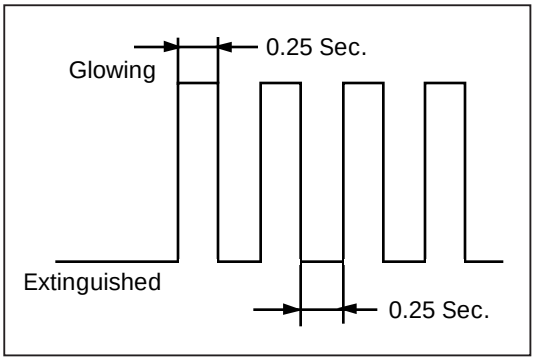
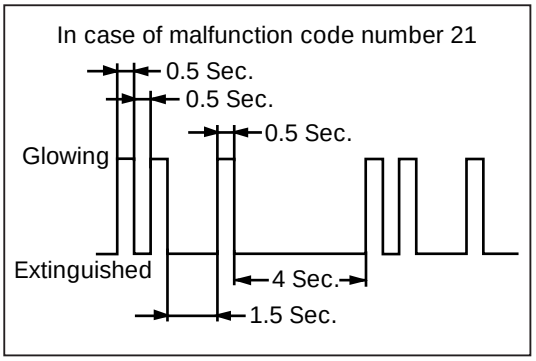
EXPLANATION OF DIAGNOSIS CODES

1. Indication of normal code
   The engine check lamp glows for 0.25 second, 0.25 second after the ignition switch has been turned ON. After a lapse of 0.25 second, the check engine lamp again glows for 0.25 second.
   Then, this pattern will be repeated.



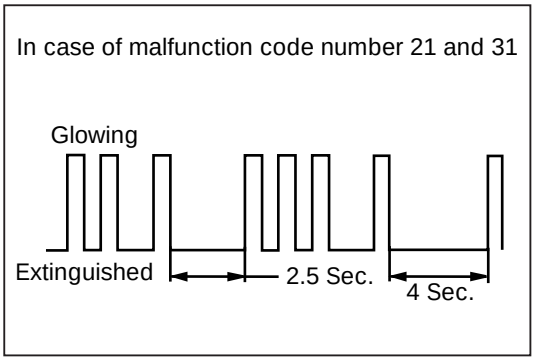
JEF00008-00036

2. Indication of malfunction code
   (1) When a single malfunction code is indicated:
   The diagnosis code is composed of two digits. These two numbers are indicated by blinking of the check engine lamp. Four seconds after the ignition switch has been turned ON, the check lamp indicates first the number of the tens digit of the diagnosis code by glowing the same times as the number. The lamp glows for 0.5 second each time and then it is extinguished for 0.5 second. After a pause of 1.5 seconds, the check lamp indicates the number of the units digit of the diagnosis code by glowing the same times as the number. The lamp glows for 0.5 second each time and then it is extinguished for 0.5 second. Then, this pattern will be repeated after a pause of 4 seconds.



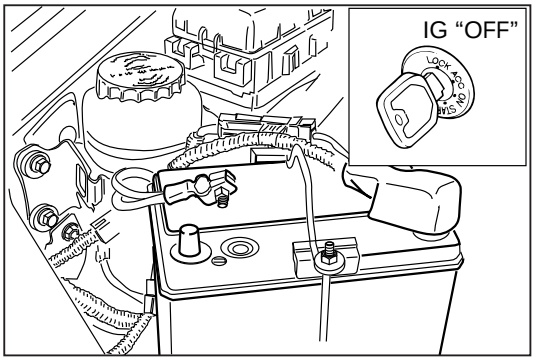
JEF00009-00037

   (2) When plural malfunction codes are indicated:
   In cases where plural malfunction codes have been detected, the two-digit diagnosis codes are indicated in the sequence of the code number, starting from a smaller number. Each diagnosis code is indicated in the above described pattern. A pause of 2.5 seconds occurs between the outputs of respective diagnosis codes, thus separating one from another. After all of the plural diagnosis codes that have been detected are indicated, the check engine lamp is extinguished for four seconds. Then, the detected plural diagnosis codes will be indicated again.



JEF00010-00038

3. Canceling of diagnosis code
   To erase the diagnosis codes memorized in the ECU after malfunctions have been repaired, disconnect the battery ground cable from the negative (–) terminal of the battery for at least 10 seconds with the ignition switch turned OFF. [When ambient temperature is about 20°C.]
   NOTE:
   - After the diagnosis codes have been read, remove the SST at the diagnosis connector.



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SUMMARY OF TROUBLE SHOOTINGS

NOTE:

- Prior to the troubleshooting according to malfunction phenomena, conduct the basic inspections so as to narrow down the possible causes for malfunctions. For instance, if the spark inspection of the basic inspection proves to be normal, it can be assumed that the ignition system is functioning normally. Moreover, the information obtained during diagnosis through questions can help further narrow down the possible causes.

Possible malfunctioning parts \ Malfunction phenomena		Poor starting				Unstable idling					Engine stalling			Poor running			
		No initial combustion takes place.	Although initial combustion takes place, combustion is not complete.	Hard starting (during cold period)	Hard starting (during hot period)	Fast idle is not effective.	Idle revolution speed is too low.	Idle revolution speed is too high.	Unstable idling	Hunting during idling	Engine stalls at time when vehicle moves off.	Engine stalls when accelerator pedal is released.	Engine stalls during idling.	Hesitation during acceleration period	Hunting during running	Lack of output	Knocking
Control system	Pressure sensor		●	●	●				●	●	●	●	●	●	●	●	●
	Water temperature sensor		●	●	●	●		●	●		●		●	●		●	
	Intake air temperature sensor		●	●	●									●		●	●
	Throttle position sensor										●		●	●	●	●	●
	Air conditioner switch						●	●		●							
	Oxygen sensor								●			●	●				
	Neutral start switch						●										
	Cam angle sensor	●											●	●	●		
Fuel system	Fuel pump system	●	●						●				●	●	●	●	
	Pressure regulator	●	●	●	●	●			●				●	●	●	●	
	Fuel filter	●	●	●	●								●	●	●	●	
	Injector	●	●	●	●	●			●				●	●	●	●	
Ignition system	IG coil	●											●		●		
	Spark plug	●	●	●	●				●				●	●		●	
	Resistive cord	●	●	●	●		●		●				●	●		●	
	Ignition timing		●	●			●				●					●	●
Air intake system	Idle-up VSV						●	●	●	●	●	●					
	Throttle valve			●		●	●	●	●	●						●	
	Throttle body								●	●						●	
	Hose, etc., disconnected		●	●	●				●	●			●	●			
Power supply system	ECU power supply circuit	●															
	IG switch	●															
	Fuel pump relay	●															
	Main relay	●															

JEF00012-00101

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CAUTION FOR IMMOBILIZER-EQUIPPED VEHICLE

1. The immobilizer system is formed by communication between the Immobilizer ECU and the EFI ECU by means of the rolling code. The rolling code will be automatically retained both in the immobilizer ECU and in the EFI ECU when the engine is started once with the key of the immobilizer system. The engine will not start if the rolling code in the immobilizer ECU and EFI ECU are not identical. Therefore, the engine will not start when using the EFI ECU which was mounted before on another vehicle with the immobilizer system without resetting the rolling code.

JEF00013-00102

2. Even when the EFI ECU has been replaced according to the check results of the trouble shooting and the relevant malfunction has been remedied, be sure to reinstall the old EFI ECU so as to confirm that the malfunction was obviously caused by the faulty EFI ECU.
   NOTE:
   - Be sure to reset the rolling code in the EFI ECU and Immobilizer ECU using a diagnosis tester (DS-21). Furthermore, registration of the ignition key should be performed when installing the EFI ECU which was mounted on the vehicle equipped with the immobilizer system to another vehicles.
   - Refer to the BE section of the service manual.

JEF00014-00103

3. However, the engine can start when using the EFI ECU which was mounted on a vehicle without the immobilizer system. However, after completion of the test where this EFI ECU was used for the vehicle with the immobilizer system, if this EFI ECU is returned to the original vehicle, the engine of the original vehicle will not start any more.

JEF00015-00104

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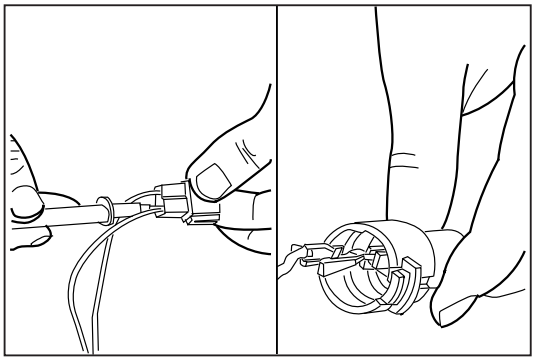
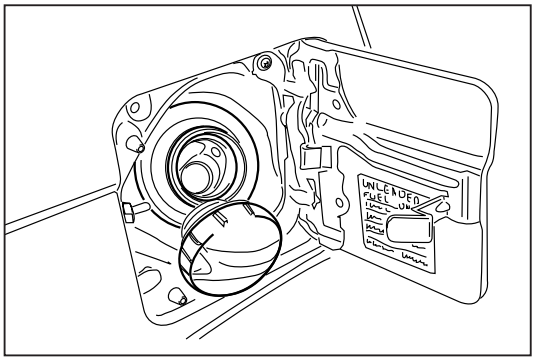
PRECAUTIONS

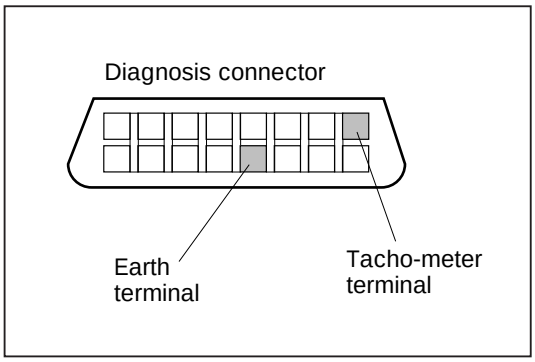
1. When resistance or voltage measurement is conducted at the connector section, insert a measuring probe from the back of the connector, being very careful not to damage the harness to terminal connections.
   In the case of water-proof type connectors, a measurement is conducted at the connector section, while the measuring probe is in contact with the terminal at the connection side of the connector. Be very careful not to apply any excessive force to the terminal at the connector side.
   As an alternative method, insert a male or femele terminal into the connector terminal or connect an adequate attachment.


JEF00016-00201

2. The fuel line at the high-pressure side is pressurized to a fuel pressure of about 284 kPa. Therefore, a large amount of gasoline flows out when parts of the fuel line are disconnected. Hence, take the following countermeasures.
   WARNING
   - Release the inner pressure of the fuel tank by removing the fuel filler cap in advance.

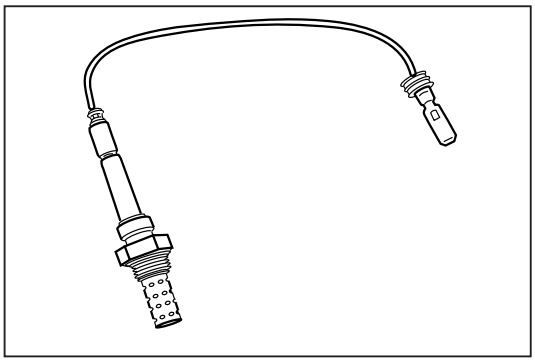

JEF00017-00202

3. Tachometer connection
   Connect a tachometer probe to the measuring terminal of the diagnosis connecter.
   CAUTION:
   - This does not apply if your tachometer is a pick-up type.
   - Never allow the tachometer probe to touch the ground, for it could result in damage to the igniter and/or ignition coil.
   - Some kinds of tachometers may not be suited for the ignition system of the vehicle. Therefore, ensure that your tachometer is compatible with the ignition system of the vehicle.

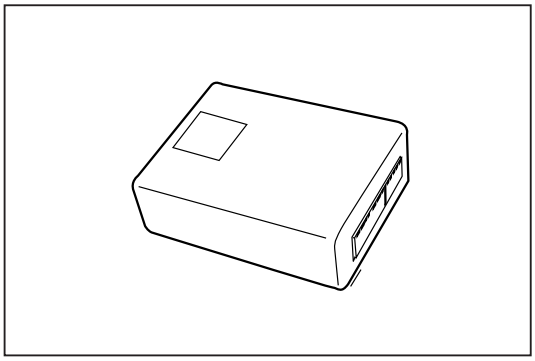


JEF00018-00203

4. Precautions during oxygen sensor handling
   (1) Do not drop the oxygen sensor or hit it to other objects.
   (2) Do not immerse the sensor in water or do not cool it by water.
5. Do not open the cover of the ECU proper.
   (Failure to observe this caution could cause ECU malfunction.)


JEF00019-00204

6. Before disconnecting or reconnecting the connector of the ECU proper of the EFI system, be sure to turn off the ignition switch and all accessory switches. Also, disconnect the battery ground cable from the battery negative terminal.
   Failure to observe this caution could cause ECU malfunction.
7. Never apply strong impacts to the EFI parts. Pay utmost attention during the installation/removal.
   Especially, special caution must be exercised as to the handling of the ECU.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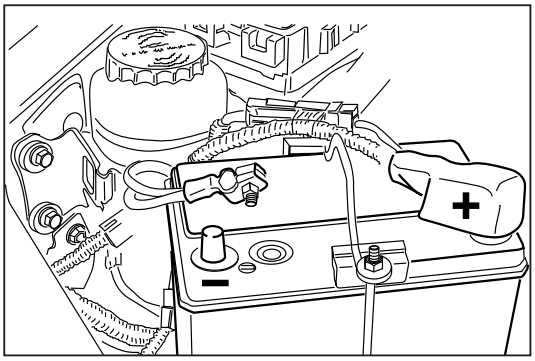
8. When installing the battery, care must be exercised not to mistake the battery polarity.
   CAUTION:
   - A battery of 12 volts for automotive use must be used.

9. When the voltage or resistance of the ECU is measured during the check, never touch terminals other than the specified terminals. Failure to observe this caution could cause ECU malfunction.



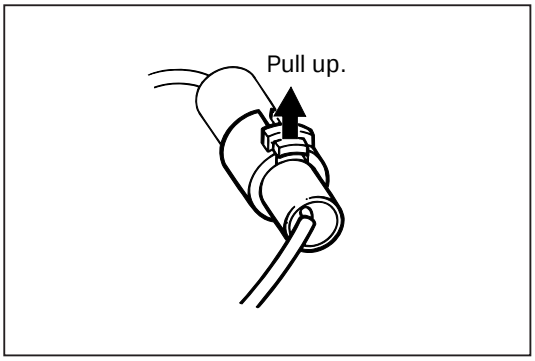
JEF00021-00207

10. When the system is checked on a rainy day, be very careful not to allow water to get to connectors and/or terminals. Also, when the engine compartment is washed, prevent water from splashing the EFI-related parts and connectors.
11. Every EFI part should be replaced as an assembly.

JEF00022-00208

12. When disconnecting or reconnecting the connector, care must be exercised as to the following points.
    (1) Carefully observe the shape of the lock prior to the disconnection/connection.
    (2) Release the lock. Then, disconnect the connector.
    NOTE:
    - When disconnecting the connector, be sure to hold the connector holder, not to pull the wire.

    (3) Insert the connector, until the lock is engaged completely.
    (4) Be sure to keep the number of disconnection/reconnection of the connector at a minimum level.



JEF00023-00209

13. When the vehicle is equipped with wireless installations (HAM, CB, etc.)
    The ECU has been so designed that it is resistant to external influence.
    However, if a vehicle is equipped with a CB wireless installation and so forth (even if its output is only 10 W), it may affect the ECU adversely. Therefore, observe the following precautions.

    (1) Install an antenna at a place as far away as possible from the ECU.
    The ECU is installed under the instrument panel.
    Therefore, the antenna should be installed at the rear of the vehicle.
    (2) The antenna cord should be kept at least 20 cm away from the engine wire. Never wind the antenna cord together with the engine wire with tapes.
    (3) Adjust the antenna output correctly.
    (4) Never install a wireless installation with a high output on the vehicle.

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JEF00025-00212

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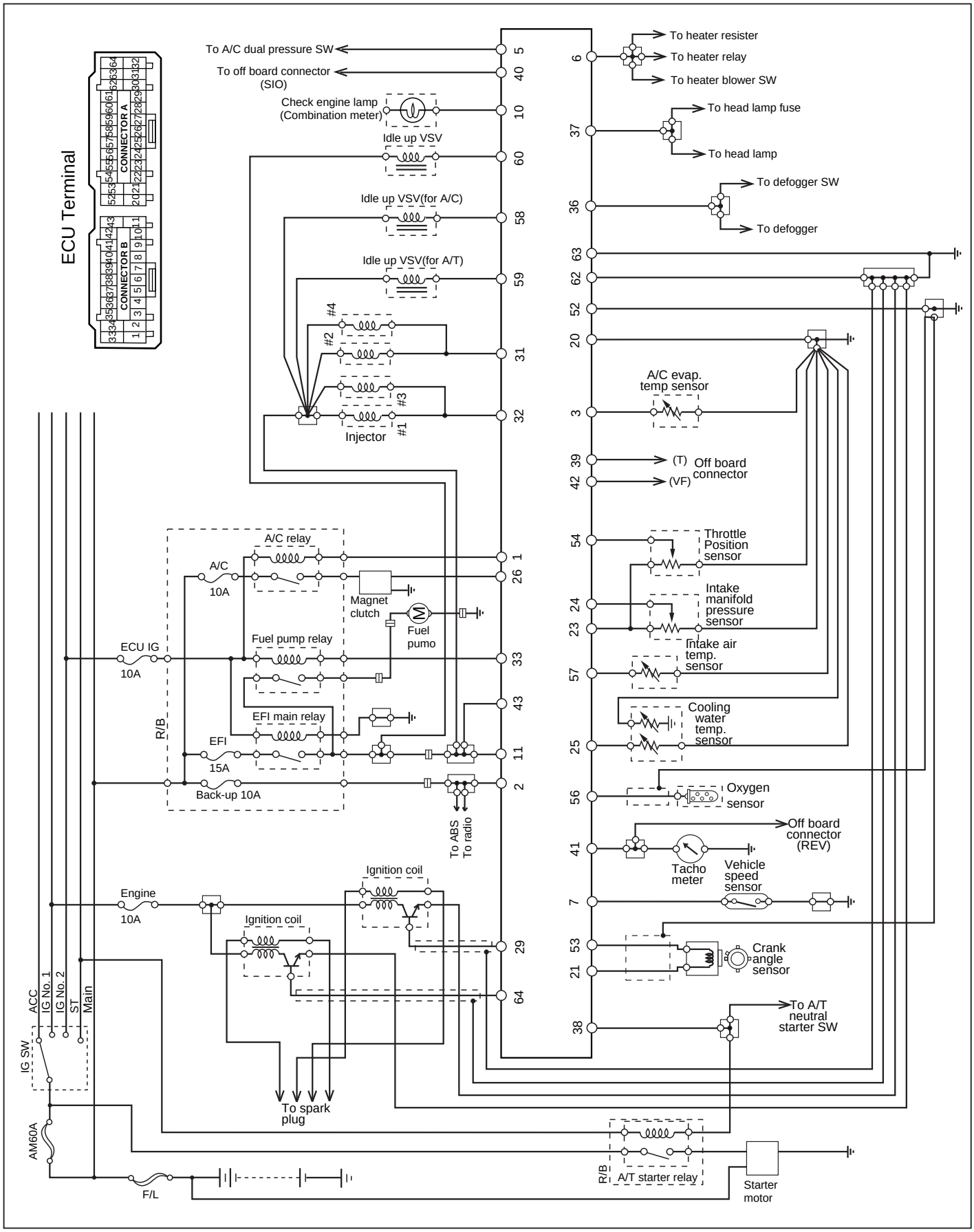
BASIC INSPECTION

WIRING DIAGRAM OF EFI SYSTEM



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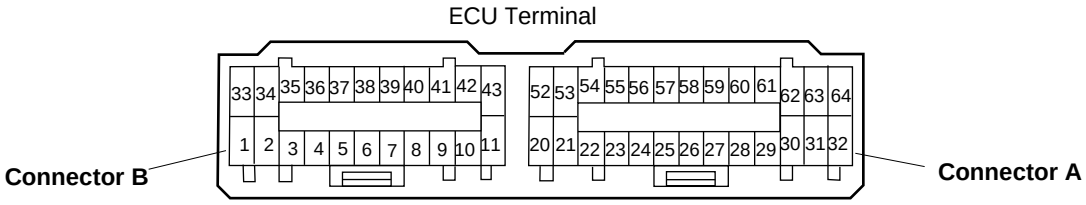
ARRANGEMENT OF EFI ECU TERMINAL



CONNECTOR A

No.		Contents of connection	No.		Contents of connection
20	E1	Sensor system ground	52	E2	Sensor ground
21	N+	Cam angle sensor (+)	53	N–	Cam angle sensor
22	—	Throttle position sensor (Idle)	54	PSW	Throttle position sensor
23	VC	Pressure sensor power supply	55	—	
24	PIM	Pressure sensor signal	56	Ox	Oxygen sensor
25	THW	Coolant temperature sensor	57	THA	Intake air temperature sensor
26	KNK	A/C lock sensor	58	VSV3	Idle up VSV (for A/C)
27	—		59	VSV2	Idle up VSV (for A/T)
28	ALT	Alternator cut	60	VSV1	Idle up VSV (for electrical load)
29	IG2	Ignition signal (#2,#3 cylinder)	61	—	
30	—		62	E01	Power supply system ground
31	#20	Injector (#2, #4 cylinder)	63	E02	Ignition system ground
32	#10	Injector (#1, #3 cylinder)	64	IG1	Ignition signal (#1, #4 cylinder)

CONNECTOR B

No.		Contents of connection	No.		Contents of connection
1	MGC	A/C Magnet clutch	33	FC2	Fuel pump relay (Without IMB.)
2	BAT	Battery (Back-up power supply)	34	FC1	Fuel pump relay (With IMB.)
3	ACEV	A/C Evaporator temp, sensor	35	—	
4	—		36	DEF	Defogger switch
5	ACSW	A/C Switch	37	H/L	Headlamp switch
6	BLW	Heater blower	38	A/T	Neutral start switch
7	SPD	Vehicle speed sensor	39	T	Test terminal
8	—		40	SIO	Diagnosis tester
9	—		41	REV	Engine speed signal
10	W	Check engine lamp	42	VF	VF monitor terminal
11	+B1	Power supply	43	+B2	Power supply

JEF00027-00302

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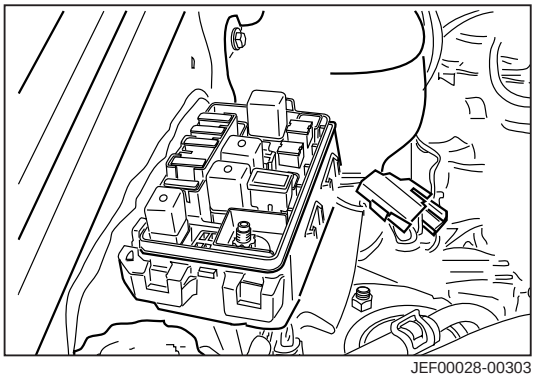
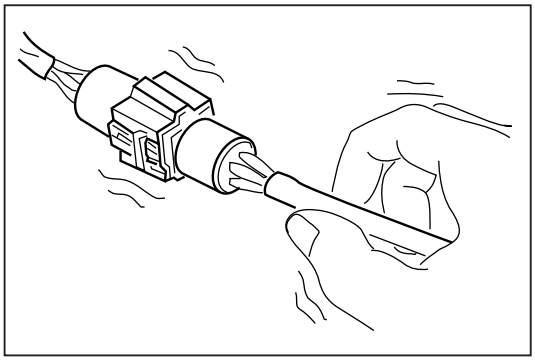
Trouble shooting hints

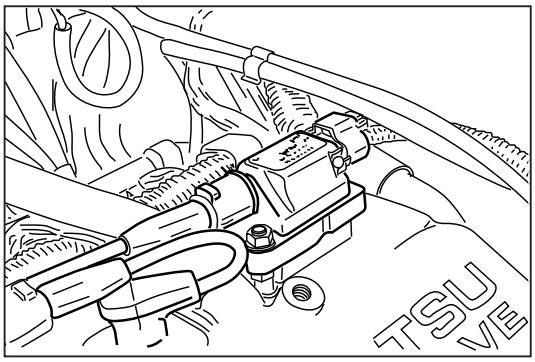
1. In most cases, engine troubles are attributable to systems other than the EFI system.
   (1) Battery voltage, fuse blown or fusible link blown
   (2) Body earth
   (3) Fuel leakage, fuel filter clogged or fuel pump malfunctioning
   (4) Spark plugs faulty, spark plug wires faulty, distributor faulty, igniter faulty, or ignition timing adjusted improperly
   (5) Admission of air


JEF00028-00303

2. Most of troubles related to the EFI system are merely caused by poor wire connections.
   Ensure that connectors are connected securely.
   Check connectors, being careful as to the following points.
   (1) Visually inspect that terminals are not bent.
   (2) Ensure that connectors are securely connected and locked.
   (3) Check to see if the malfunction phenomenon takes place when applying light vibration to the connector or the wire connected to the connector.


JEF00029-00305

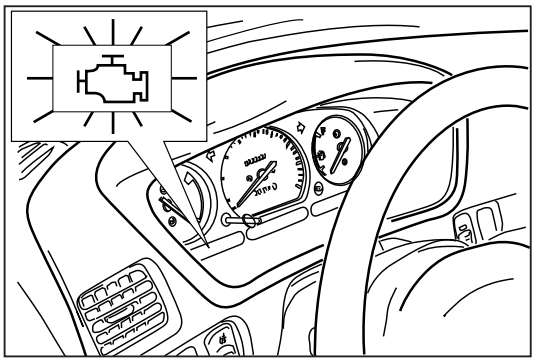
3. If engine misfire takes place, the following measures should be taken.
   (1) Ensure that the battery terminals and so forth are connected properly.
   (2) Handle the spark plug wires carefully.
   (3) After completion of repairs, ensure that the ignition coil terminals and other ignition system wire are reconnected securely.



JEF00030-00306

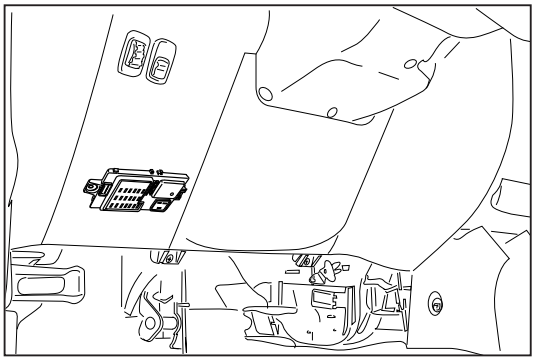
Check to see if diagnosis detects malfunction code.

1. Check of diagnosis code
   When the engine starts, the check engine lamp in the combination meter remains illuminated. It indicates that the diagnosis has detected system malfunctions.
2. Read out the diagnosis code.
   NOTE:
   - See page EF–4.
   - When system malfunction has been detected, proceed to page EF–18, “TROUBLE SHOOTING ACCORDING TO DIAGNOSIS SYSTEM”.


JEF00031-00309

Check of power supply circuit

1. Check the fuses and fusible link.
   If the fuses are blown out, be sure to perform the trouble shooting.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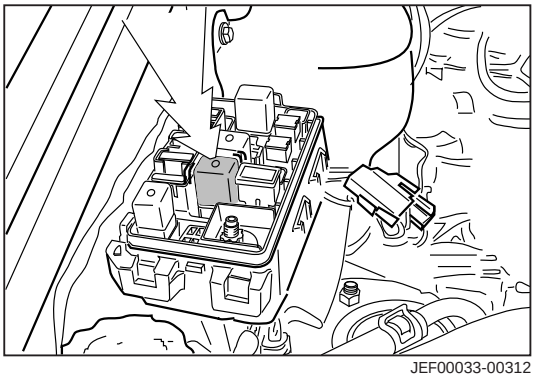
2. Check the EFI main relay.
   (a) Turn the ignition switch to the “ON” position. Check to see if the relay emits an operating sound.



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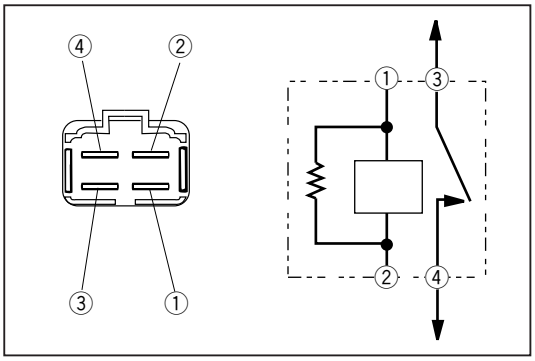
   (b) Remove the EFI main relay from the relay box.
   Check that there is continuity between the terminals 1 and 2.
   Specified Resistance: 40 - 100 Ω

   (c) Check that there is continuity between the terminals 3 and 4 when a voltage of 12 V is applied to across the terminals 1 and 2.

   NOTE:
   - Even when the trouble has not been solved by repairing the relay, check the wire harness.



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3. Check the fuel pump relay.
   (a) When the ignition switch is set to the “ON” position, check to see if the relay emits an operating sound.
   (b) Remove the fuel pump relay from the relay box.
   Check that there is continuity between the terminals 1 and 2.
   Specified Resistance: 40 - 100 Ω

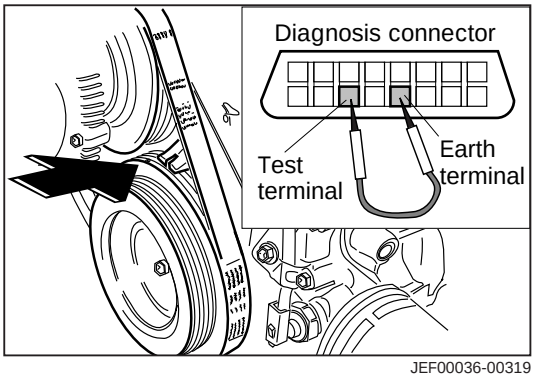
   (c) Check that there is continuity between the terminals 3 and 4 when a voltage of 12 V is applied to across the terminals 1 and 2.

JEF00035-00314

Check of ignition system

1. Connect a timing light to the ignition wire of the No. 1 cylinder.
2. Check to see if the ignition timing mark on the crankshaft pully is aligned with the indicator.
   Specified Value: 0 ± 2° BTDC/ at Idle

   NOTE:
   - Remove the air cleaner case.
   - Connect the test terminal and the earth terminal with a jump wire at the diagnosis connector.



JEF00036-00319

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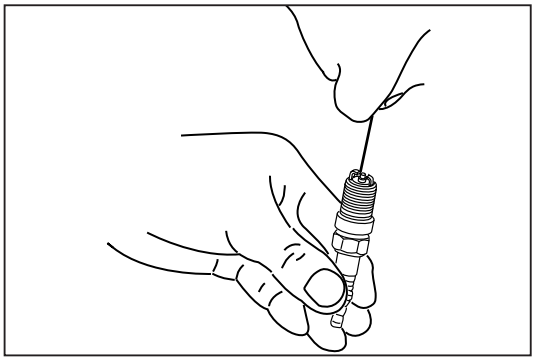
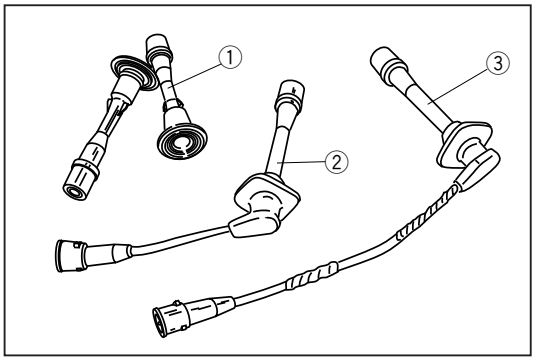
3. Remove the spark plug(s).
4. Visually inspect the spark plug for electrode wear, thread or insulator damage.
5. Measure the electrode gap, using a plug gap gauge.
   Specified Value: 0.9 - 1.0 mm (NGK, DENSO)

   NOTE:
   - If the gap will not conform to the specification, replace the plug.


JEF00037-00320

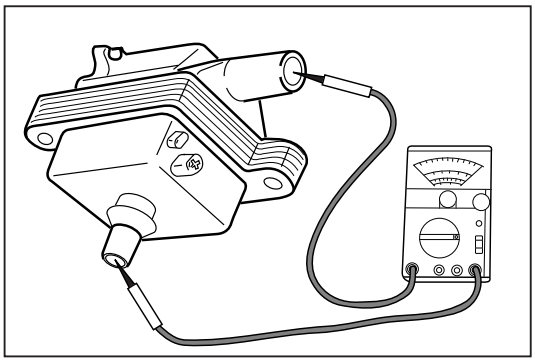
6. Check if the resistance of the the spark plug distance piece and the ignition wire is within the specification.
   Spark Plug Distance Piece 1: 0.3 Ω or less
   Ignition Wire 2: 3.8 kΩ
   Ignition Wire 3: 5.6 kΩ

   NOTE:
   - Remove the ignition coils from the cylinder head cover. Then, remove the wire and distance piece.



JEF00038-00321

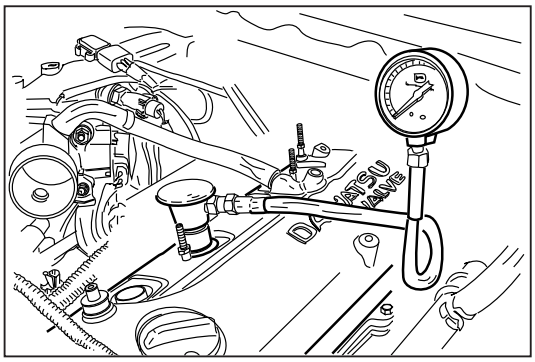
7. Check if the ignition coil resistance is within the specification.
   Secondary Coil: 13.6 - 2.0 kΩ


JEF00039-00322

Check of compression pressure

1. Temporarily remove the main relay and fuel pump relay.
2. Insert a compression gauge into the spark plug hole.
3. Depress the accelerator pedal fully.
4. While cranking the engine, measure the compression pressure.
   Minimum Value: 1030 kPa at 300 rpm

   NOTE:
   - Always use a fully charged battery so that at least a revolution speed of 300 rpm is attained.


JEF00040-00323

Check of fuel system

1. Using a sound scope, check to see if each injector emits an operating sound when the engine is being started or cranked.
   NOTE:
   - If a sound scope is not available, apply a screwdriver or the like to the injector. So you can feel an operating vibration.
   - If the injector emits no operating sound, check the wiring or connectors. Then, perform the following procedure.

JEF00041-00331

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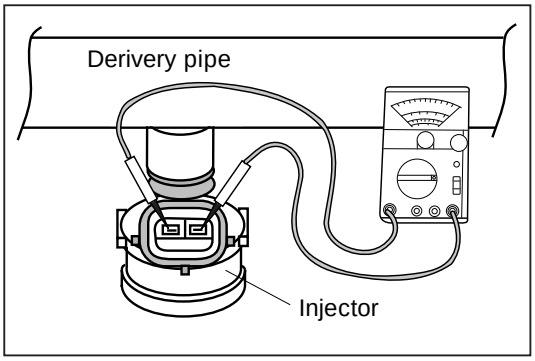
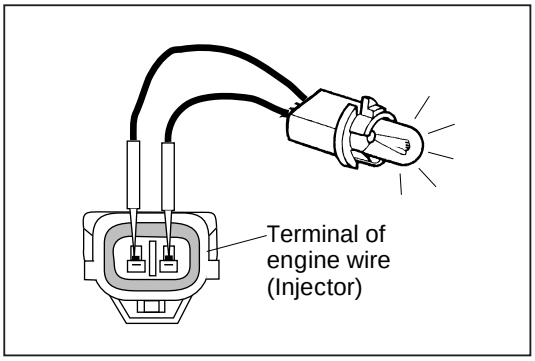
2. Disconnect the injector connector of the engine wire.
3. Measure the resistance between the terminals of each injector.
   Specified Resistance: 11 - 17 Ω (at 20°C)

   NOTE:
   - If the resistance is not within the specification, replace the injector.
   - If the resistance will conform to the specification, perform the following procedure.



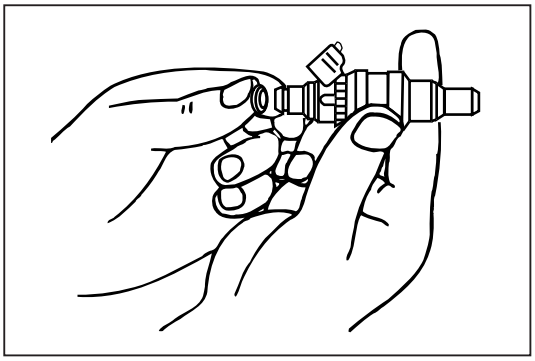
JEF00042-00332

4. Using a test lamp (12 V 6 W), check to see if the lamp will be illuminated as shown in the illustration when the engine is being started or cranked.
   If not, check the wiring harness and ECU output.

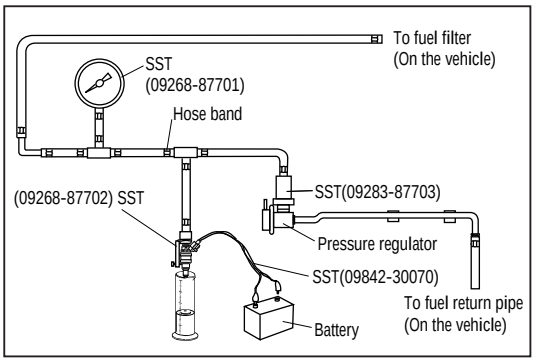


JEF00043-00333

5. Remove the fuel delivery pipe.
   Remove the injectors.
6. Remove the injector grommet and O-ring.
   NOTE:
   - Check to see if the injector grommet exhibits damage.

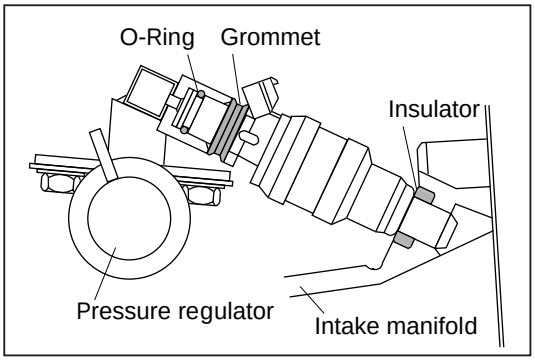

JEF00044-00334

7. Using the following SSTs, connect the injector, as indicated in the figure. Insert the injector into the measuring cylinder.
   SST:
   (1) 09268-87701-000
   (2) 09268-87702-000
   (3) 09842-30070-000



JEF00045-00335

   NOTE:
   - Install a new grommet to the injector.
   - Install a new O-ring to the O-ring seal section.
   - Attach the hose bands to the rubber hose connections.



JEF00046-00336

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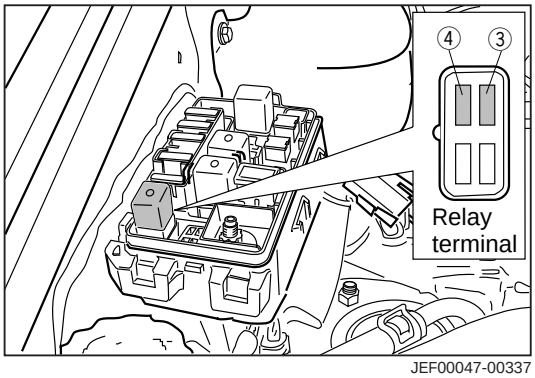
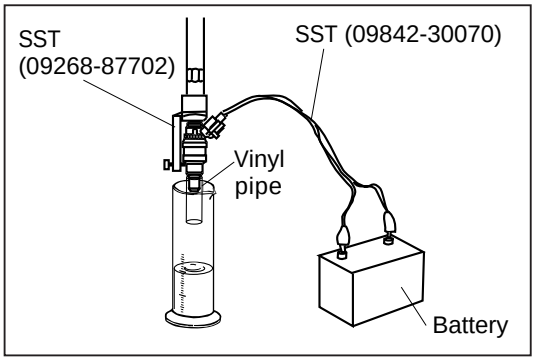
8. Remove the fuel pump relay. Then, connect the terminal with a jump wire as shown in the illustration.
9. Turn the ignition switch to the “ON” position.



JEF00047-00337

10. Connect the SST wire to the battery terminal for 15 seconds.
11. Measure the amount of fuel collected in the measuring cylinder.
    Specified Amount of Fuel: Approx. 42 - 48 ml
    Variation Between Injectors: 5 ml or less



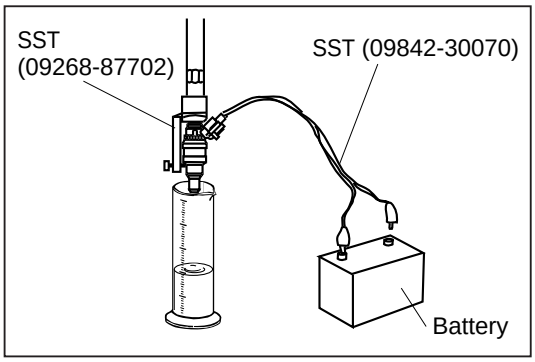
JEF00048-00338

NOTE:
- Attach a suitable vinyl hose to the tip-end of the injector so as to prevent fuel from splashing.
- Conduct the measurement two or three times for each injector.
- Before the injector is pulled out, make certain to turn off the ignition switch.
- When removing the injector, use a suitable cloth or the like so as to prevent fuel from splashing.
- Prior to the test, perform air bleeding for the fuel hose.

JEF00049-00338

12. Ensure that no fuel is leaking from the injector nozzle when the SST wire is removed from the battery terminal.
    Specification: Less than one drop of fuel per minute

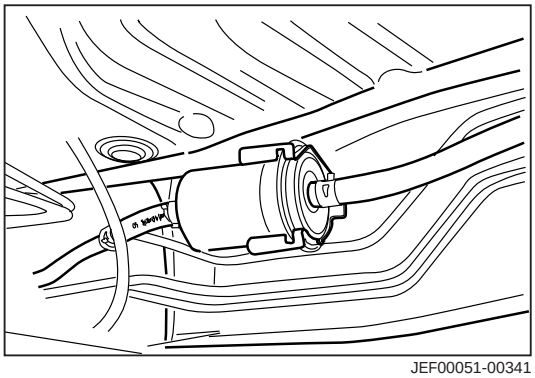
NOTE:
- If the leakage exceeds the specification, replace the injector.



JEF00050-00339

13. Turn off the ignition switch.

14. Loosen the hose band at the fuel filter.
15. Connect a suitable fuel hose (about 2 meter long) to the fuel filter.
16. Insert one end of the fuel hose in a measuring cylinder.
    CAUTION:
    - The fuel pressure of the fuel line is approximately 284 kPa. Hence, be sure to gradually remove the pipe so as to prevent fuel from splashing.
    - Since the fuel will flow out, be certain to place a suitable container or cloth under the fuel filter so that no fuel may get to the resin or rubber parts of the vehicle.


JEF00051-00341

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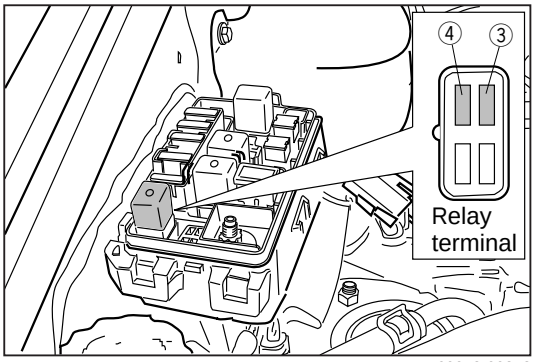
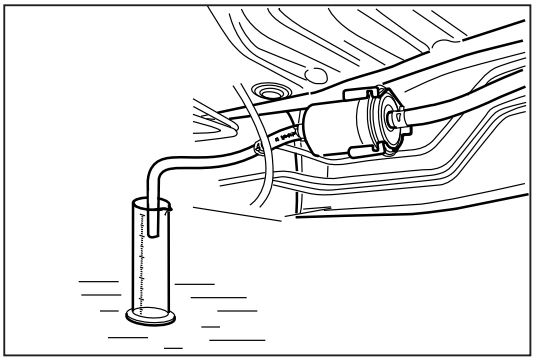
17. Remove the fuel pump relay. Then, connect the terminal with a jump wire as indicated in the illustration.
18. Turn the ignition switch to the “ON” position for 10 seconds. Then, turn off the ignition switch.



JEF00052-00342

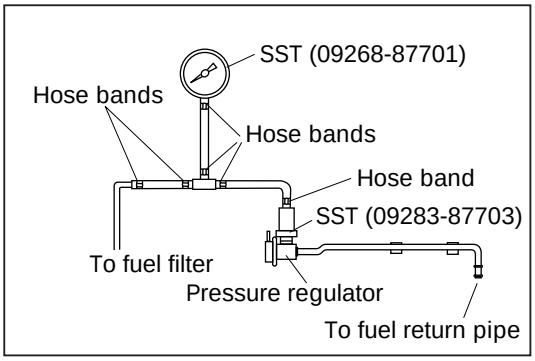
19. Measure the amount of fuel collected in the measuring cylinder.
    Specified Amount of Fuel: 230 ml or more

    NOTE:
    - Check to see if the fuel lines and filter exhibit leakage, deformation or choking.



JEF00053-00343

20. Remove the fuel pressure regulator from the fuel delivery pipe. Then, install a fuel pressure gauge between the pressure regulator and the fuel pipe from the fuel filter as shown in the illustration.
    SST: 09268-87701-000
    09283-87703-000



JEF00054-00344

21. Turn the ignition switch to the “ON” position.
22. Check to see if the fuel pressure conforms to the specified pressure.
    Specified Value: 284 ± 5 kPa

    NOTE:
    - If the fuel pressure is less than the specification, check the fuel pump and fuel pressure regulator.

JEF00055-00345

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23. Check the idle revolution speed.
    (1) Connect a tachometer to the terminal of the diagnosis connector.
    (2) Check to see if the fast idle revolution speed is within the reference value.
        Reference Value: Around 1400 rpm/25°C

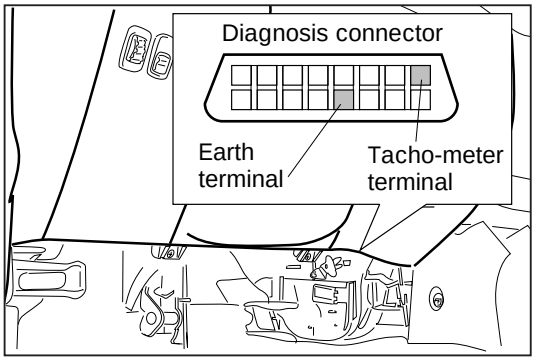
NOTE:
- The fast idle revolution speed can not be adjusted to the specification. If the revolution speed will not conform to the reference value, perform the inspection of the auxiliary air system, following the procedure given below.

    (3) Remove the air cleaner case from the throttle body.
    (4) Start the engine. Check that there is air continuity at the auxiliary air port under the following conditions.
        ① Apply your finger to the auxiliary air valve port. Ensure that the engine speed drops.
        ② When the cooling water temperature is above 70°C, apply your finger to the auxiliary air port. Ensure that the engine speed does not change.

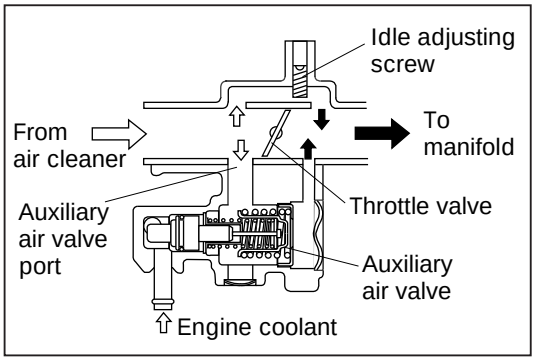
NOTE:
- If the auxiliary air system exhibits malfunction, replace the throttle body.

    (5) Check to see if the idle revolution speed conforms to the specification when the engine water temperature is higher than 80°C.
        Specified Value
        M/T Vehicle: 800 ± 50 rpm
        A/T Vehicle: 850 ± 50 rpm

NOTE:
- If the revolution speed will not conform to the specification, check the EFI ECU unit. See page EF–41.



JEF00056-00346



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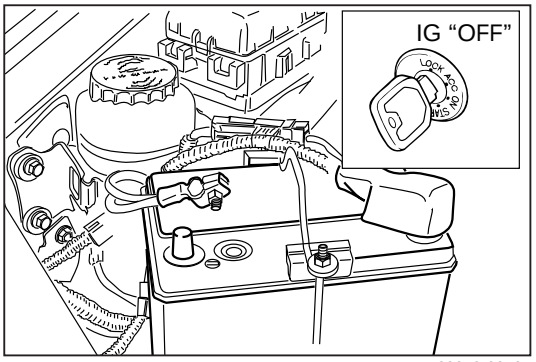
TROUBLE SHOOTING ACCORDING TO DIAGNOSIS CODE

PREPARATION OF TROUBLE SHOOTING WITH SST

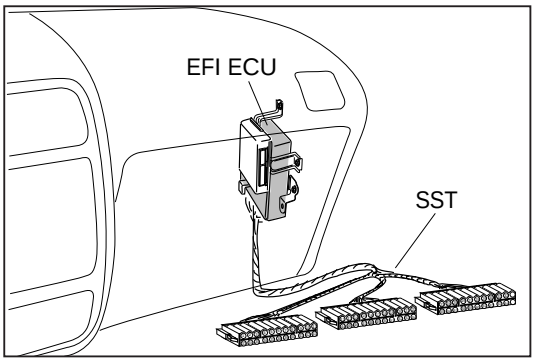
The EFI unit can be checked by measuring the resistance or voltage at the SST terminals.

1. Disconnect the battery ground cable from the negative (–) terminal of the battery.
   CAUTION:
   - Be sure to memorize the malfunction code before disconnecting the battery cable. Otherwise the maifunction code(s) will be erased by disconnecting the battery code.



JEF00059-00401

2. Disconnect the wire harness connectors from the EFI ECU connectors at the cowl side of the passenger seat.
3. Connect the following SST between the wire harness connectors and the EFI ECU connectors.
   SST: 09842-87706-000



JEF00060-00402

4. Reconnect the battery ground cable to the negative (–) terminal of the battery.
   CAUTION:
   - When disconnecting or reconnecting the EFI ECU connectors, be sure to disconnect the battery ground cable from the negative (–) terminal of the battery with the ignition switch and all accessory switches in the off state.
   - When installing a new battery, care must be exercised not to mistake the battery polarity. Failure to observe this caution could cause ECU malfunction.
   - Before using the SST, be sure to check to see if short or open wire exists between the terminals of the SST.

JEF00061-00403

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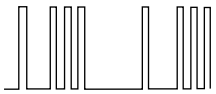
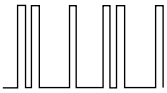
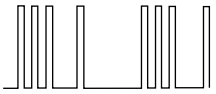
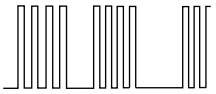
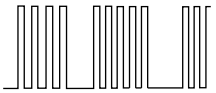
DIAGNOSIS CODE TABLE

When the diagnosis system detects malfunctions, the check engine lamp will go on even if the diagnosis connector test terminal is not connected to the earth terminal.

Code No.	Number of flashing	Diagnosis item	Diagnosis contents	Trouble area	See page
13		Engine revolution signal	• When the engine revolution signal is not inputted while the starter switch is on.	1. Cam angle sensor & circuit	EF–202
21		Oxygen sensor signal	• When the input signal from the oxygen sensor shows too lean air-to-fuel ratio under certain conditions:	1. Oxygen sensor circuit 2. Oxygen sensor	EF–22
31		Pressure sensor signal	• When the input signal from the pressure sensor becomes more than 4.9 V or less than 0.7 V.	1. Pressure sensor circuit 2. Pressure sensor	EF–257
42		Cooling water temperature signal	• When the engine cooling water temperature sensor circuit becomes open or shorted.	1. Water temp. sensor circuit 2. Water temperature sensor	EF–27
43		Intake air temp. signal	• When the intake air temperature sensor circuit becomes open or shorted.	1. Air temperature sensor circuit 2. Air temperature sensor	EF–29
44		A/C evapo. temperature sensor	• When the A/C evaporator temperature sensor circuit exhibits open or short.	1. A/C evaporator temperature sensor circuit 2. A/C evaporator temperature sensor	EF–31
45		A/C compressor	• When the A/C switch is turned on, the rotation signal from the A/C compressor becomes too low because of slipping of the magnet clutch or overload.	1. A/C magnet clutch 2. A/C lock sensor circuit	EF–33
51		Switch signal	• When the A/C switch is turned on, the idle switch is turned off with the test terminal of the diagnosis connector shorted. However no memorizing will take place.	1. A/C switch circuit 2. A/C switch 3. Idle switch circuit 4. Throttle position sensor	EF–35
52		Vehicle speed sensor signal	• When the vehicle speed sensor signal circuit exhibits open wire or or short circuit.	1. Vehicle speed sensor circuit 2. Vehicle speed sensor	EF–37
81		Immobilizer signal	• When the rolling codes can not be exchanged between the EFI ECU and the immobilizer ECU or the rolling codes are not matched.	1. Wire harness between the Immobilizer ECU and EFI ECU 2. Immobilizer ECU 3. EFI ECU	EF–39
83		Immobilizer signal	• When the rolling codes can not be exchanged in the EFI ECU.	1. EFI ECU	EF–39

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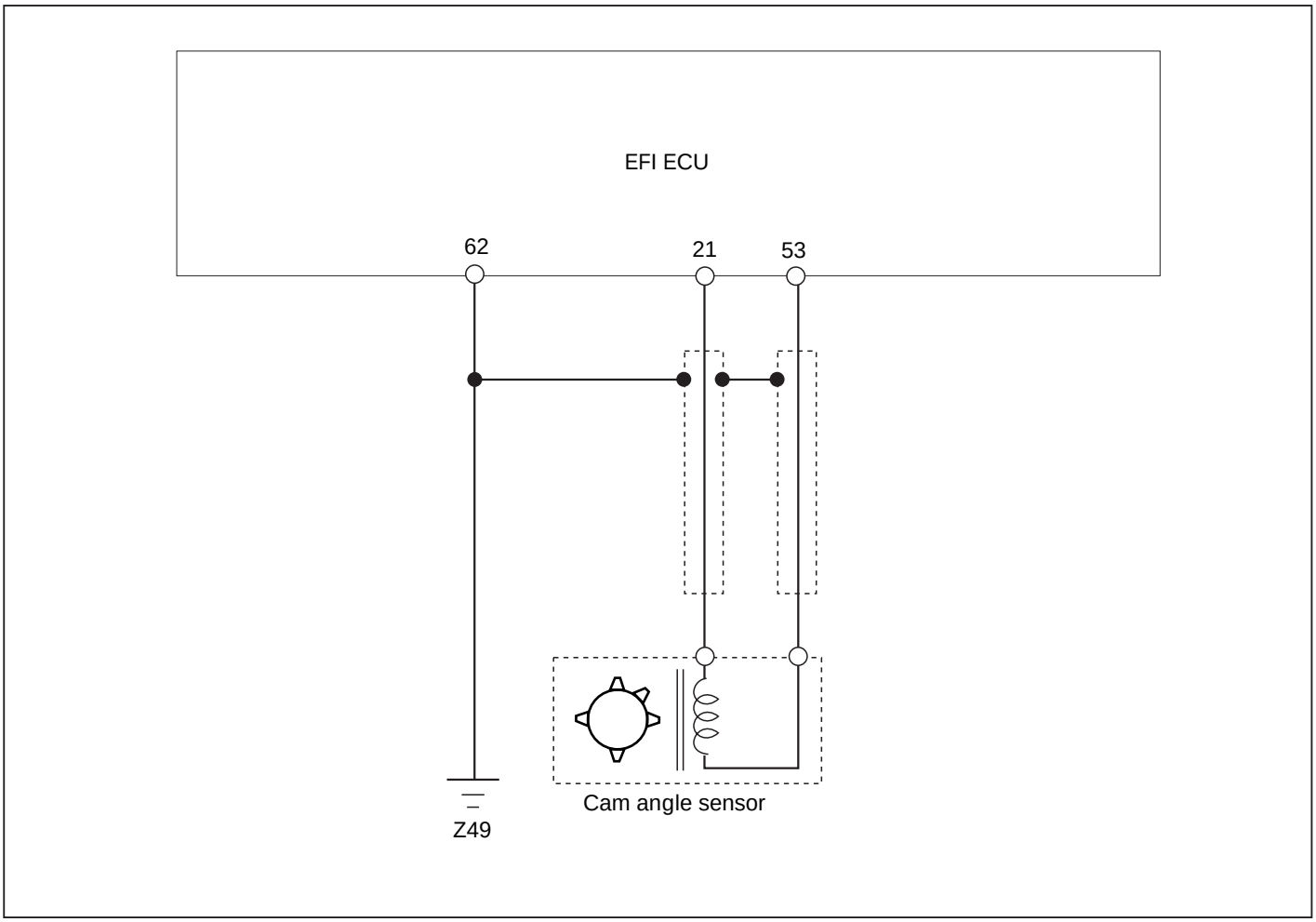
DIAGNOSIS CODE NO. 13
CAM ANGLE SENSOR & CIRCUIT



JEF00063-00501

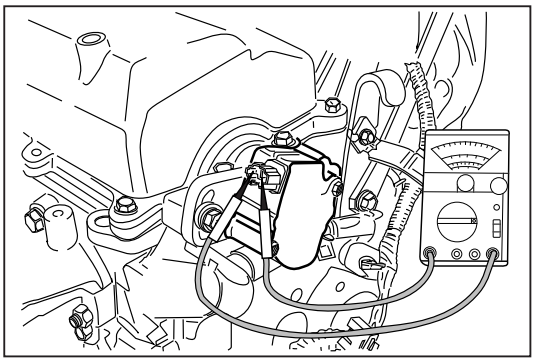
When no cam angle sensor signal is inputted within 2 seconds while the engine is being cranked by the starter motor.

1. Check of cam angle sensor
   (1) Disconnect the connector of the cam angle sensor.
   (2) Check that there is the specified resistance between the respective terminals of the cam angle sensor.
   Specified Value: 205 - 255 Ω

   NOTE:
   - If the resistance will not conform to the specification, replace the signal generator. Refer to the IG section.

   (3) Temporarily remove the EFI main relay at the relay box.
   (4) Check that there is a voltage between the terminals of the cam angle sensor when the engine is being cranked.
   Specified Value: About AC 150 mV/300 R.P.M.

   NOTE:
   - The generating voltage should be measured, using the AC range of a volt meter.
   - If the measured value does not conform to the specification, adjust the gap. See the IG section.



JEF00064-00502

JEF00065-00503

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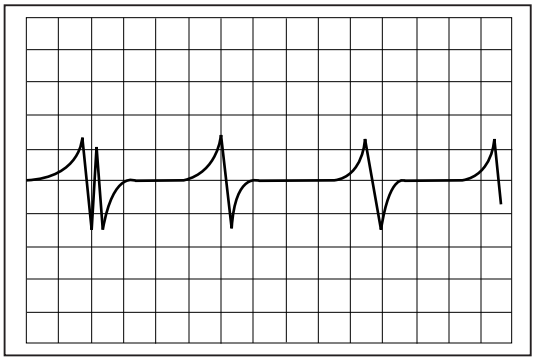
REFERENCE

(1) Prepare an oscilloscope.
(2) Connect a probe to the respective terminals.
(3) Check to see if a signal shown in the graph appears at the terminals when the engine is being cranked.

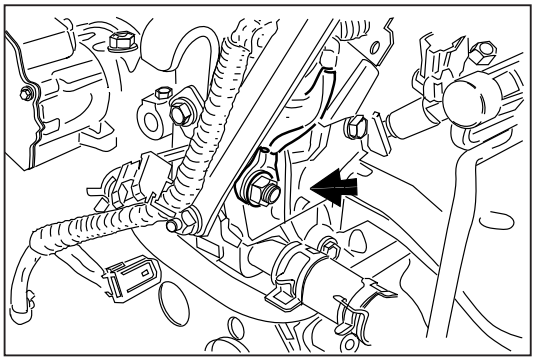
NOTE:

- If not, check the air gap of the signal generator. Refer to the IG section of the service manual.



JEF00066-00504

3. Check the wire harness and ground earth.
   (1) Check to see if the earth bolt exhibits looseness or corrosion.

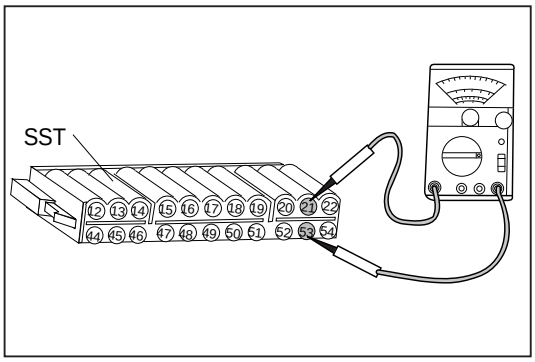


JEF00067-00506

   (2) Connect the connector of the cam angle sensor and the wire harness connector.
   (3) Connect the SST.

NOTE:

- Refer to page EF–18, “Preparation of trouble shooting with SST”.
- At this time, disengage the connector between the SST and the EFI ECU.



JEF00068-00507

   (4) Measure the resistance between the SST terminals 21 and 53.
   Specified Value: 205 - 255 Ω

NOTE:

- If the trouble has not been solved by repairing the wire harness or parts, then, proceed to page EF–41, Replacement of ECU.

JEF00069-00508

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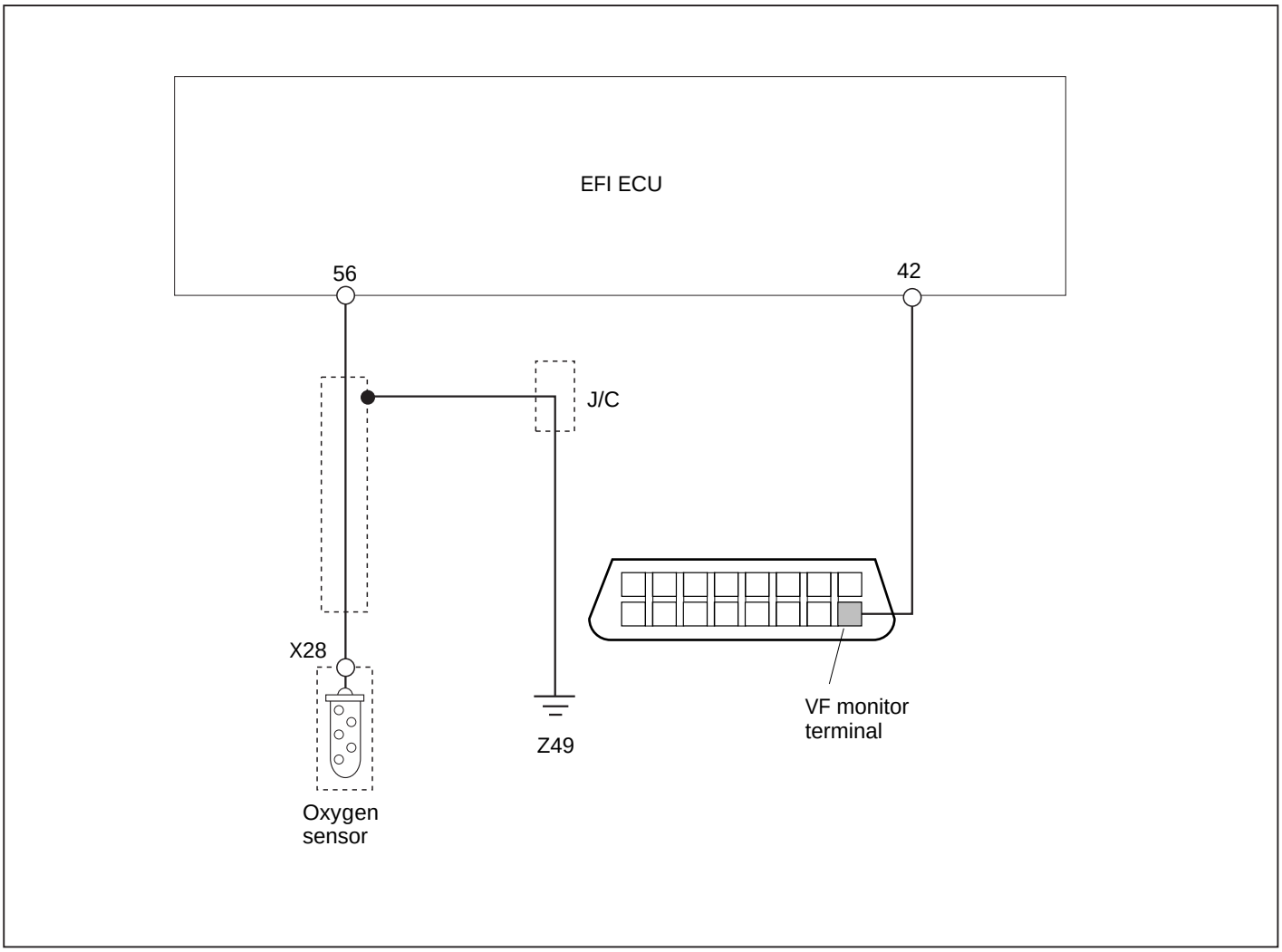
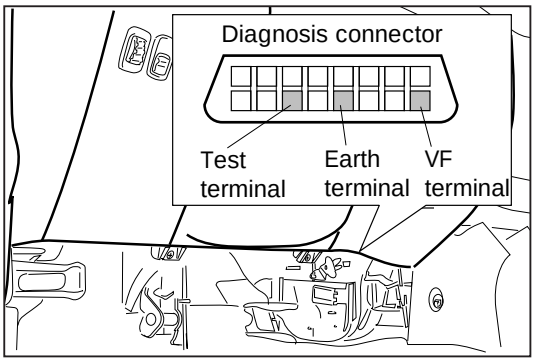
DIAGNOSIS CODE NO. 21
OXYGEN SENSOR & CIRCUIT



JEF00070-00511

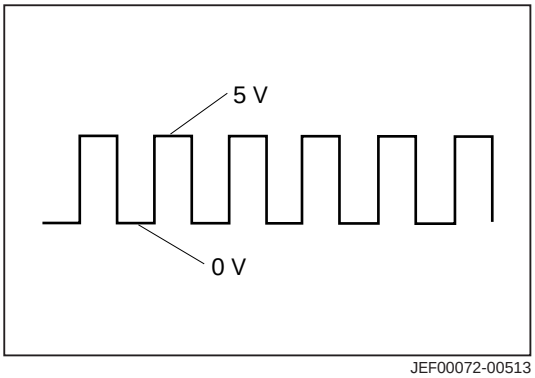
The ECU detects malfunction when the input signal from the oxygen sensor shows too lean air-to-fuel mixture continuously for 2 seconds or more when the engine revolution speed is 1500 rpm or more and the engine is in a hot condition.

1. Inspection of oxygen sensor circuit
   (1) Warm up the engine completely.
   (2) Connect the test terminal and the earth terminal with a jump wire at the diagnosis connector.
   (3) Measure the voltage between the VF terminal and the earth terminal as indicated in the illustration.
   Specified Voltage: 0 - 5 V



JEF00071-00512

   (4) While keeping the engine revolution speed at 3000 rpm for about 2 minutes, count how many times the pointer of the voltmeter swings within 10 seconds.
   8 Times or more: Normal
   0 - 7 Times: Proceed to the following steps.



JEF00072-00513

NOTE:
- The throttle valve must be opened.

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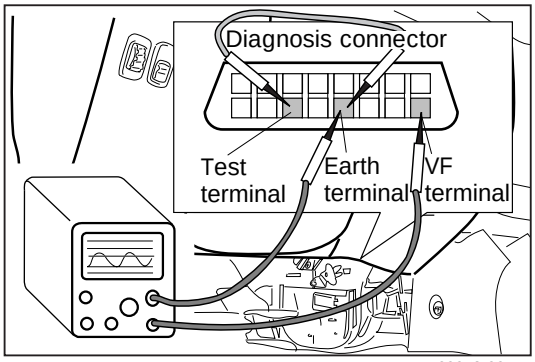
REFERENCE

(1) Prepare an oscilloscope.
(2) Connect a jump wire to the test terminal and the earth terminal.
(3) Connect a probe to the VF terminal and the earth terminal.
(4) Check to see if a signal shown in the graph appears at the terminals while the engine is rotating at 3000 rpm.



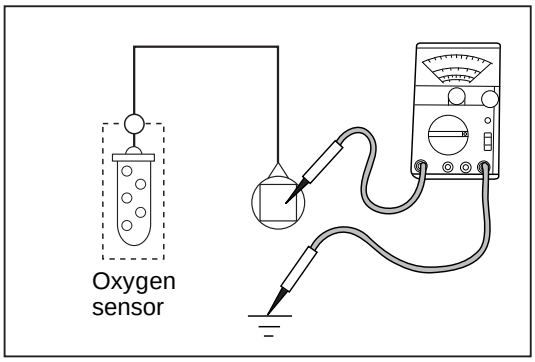
JEF00073-00514

NOTE:
- There are cases where the measurement can not be conducted with a tester having a low reaction speed. Therefore, use a tester having a high reaction speed or oscilloscope.
- If no voltage appears, check the oxygen sensor unit.

JEF00074-00515

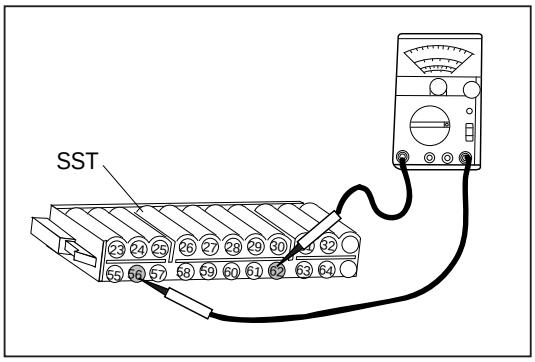
2. Check of oxygen sensor
(1) Warm up the engine completely.
(2) Disconnect the connector of the oxygen sensor.
(3) Connect a voltmeter to the connector terminal of the oxygen sensor.
(4) Hold the engine revolution speed for 2 minutes at about 3000 rpm. At this time, ensure that the reading of the voltmeter registers 0.45 V or more.

NOTE:
- When the oxygen sensor connector has been disconnected, an air-to-fuel mixture ratio of the engine will become rich. The oxygen sensor therefore generates an electromotive force of about 0.45 volts or more.
- Replace the oxygen sensor with a new part, if the reading will not register 0.45 V or more.
- If the reading conforms to the specification, proceed to the following procedure.



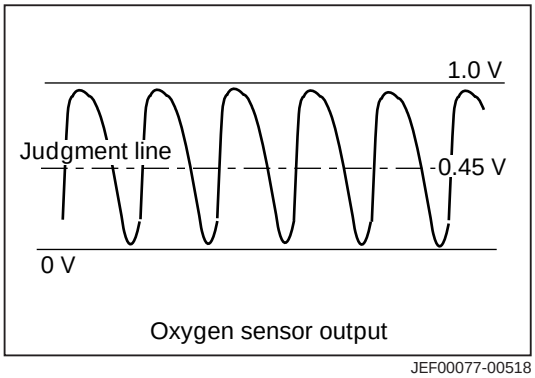
JEF00075-00516

3. Check of wire harness
(1) Connect the SST between the ECU connectors and the wire harness connectors. (See page EF–18.)
(2) Ensure that the voltage between the SST terminals 56 and 62 is the specified value while keeping the engine revolution speed at 3000 rpm.
Specified Voltage: 0.2 - 1.0 V



JEF00076-00517

NOTE:
- At this stage, remove the jump wire from the test terminal and the earth terminal of the diagnosis connector.



JEF00077-00518

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(3) Perform the procedure given in the table, according to the measurement results.

Measured voltage	Remedy
0 V	1) Check the oxygen sensor circuit for open wire or short circuit.
The measured voltage varies mainly within a range under 0.45 V.	Remedy causes for too-lean fuel mixture. • Pressure sensor • Pressure regulator • Fuel line • Fuel filter • Fuel pump • Injector
The measured voltage varies within a range of 0 - 1.0 V, centering around 0.45 V. However, the reaction speed the is low. (The pointer of the voltmeter swings less than 8 times within 10 seconds.)	Check the ECU. (Go to page EF–41, REPLACEMENT OF ECU.)
The measured voltage varies mainly within a range above 0.45 V.	Remedy causes for too-rich fuel mixture. • Pressure sensor • Fuel line • Pressure regulator • Injector
1.0 V	Remedy causes for too-rich fuel mixture. • Pressure sensor • Fuel line • Pressure regulator • Injector
More than 1.0 V	Check the oxygen sensor circuit for short circuit with other positive line. Repair or replace the wiring harness.

JEF00078-00519

NOTE:

- If the trouble has not been solved by repairing the wire harness or parts, then, proceed to page EF–41, Replacement of ECU.

JEF00079-00520

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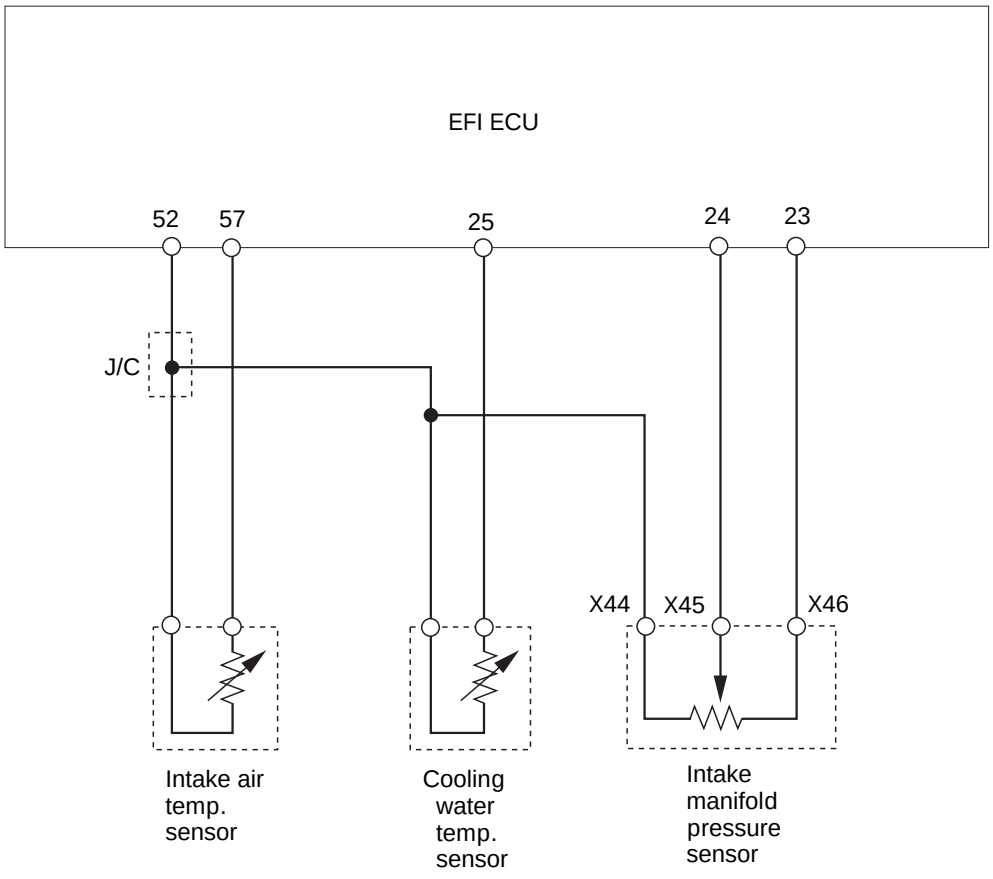
DIAGNOSIS CODE NO. 31
PRESSURE SENSOR & CIRCUIT



JEF00080-00521

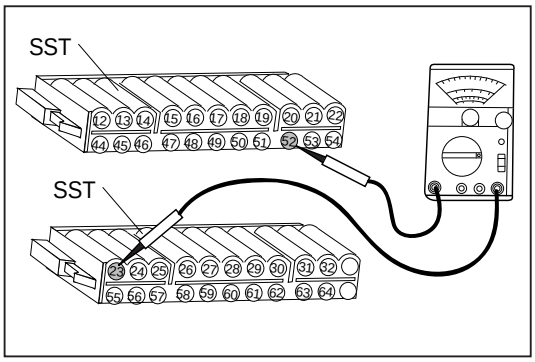
When the pressure sensor becomes open or shorted:

1. Check the pressure sensor.
   (1) Connect the SST between the ECU connectors and the wire harness connectors.
   (2) Ensure that the voltage between the SST terminals 23 and 52 is within the specified value when the ignition switch is turned to the ON position.
   Specified Value: 4.5 - 5.5 V

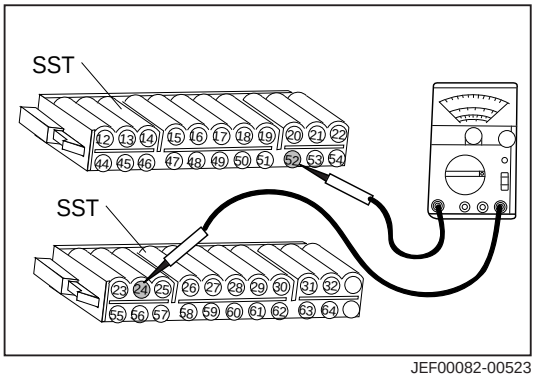
   NOTE:
   - If no voltage appears, check the ECU power supply circuit, ECU ground circuit and the wire harness.

   (3) Ensure that the voltage between the SST terminals 24 and 52 is within the following specified voltage when the ignition switch is turned to the ON position.

Altitude (From sea level) m	Atmospheric pressure kPa (mmHg)	Voltage
0	101.3 (760)	3.30 - 4.0 V
500	95.5 (716)	3.10 - 3.8 V
1000	89.9 (674)	2.95 - 3.65 V



JEF00081-00522



JEF00082-00523

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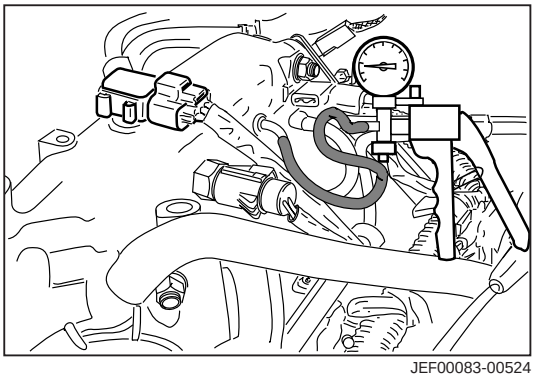
(4) Temporarily connect a vacuum gauge (The MityVac may be used) to the negative pressure port of the VSV so that the inner pressure of the intake manifold may be measured. Next, start the engine and keep it idling. At this time, ensure that the gauge reading and the voltage across the SST terminals 24 and 52 satisfy the following formula given below.

$V = 0.004 \times P_1 + 0.6$

Where:

V = P sensor output during idling (V)

P_1 = Intake manifold negative pressure during idling (–mmHg)



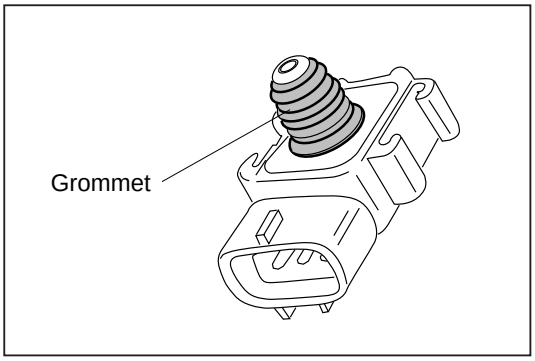
JEF00083-00524

CAUTION:

- Once the pressure sensor is removed from the intake manifold, even for the purpose of inspection, never re-use the pressure sensor. This is because the grommet of the sensor will be damaged by the removal.

NOTE:

- If the measured voltage fails to drop by the specified value, replace the pressure sensor.
- If the measured voltage does not conform to the specifications, check the wire harness.
- If the trouble has not been solved by repairing of the wire harness or parts, proceed to page EF–41, Replacement of ECU.



JEF00084-00525

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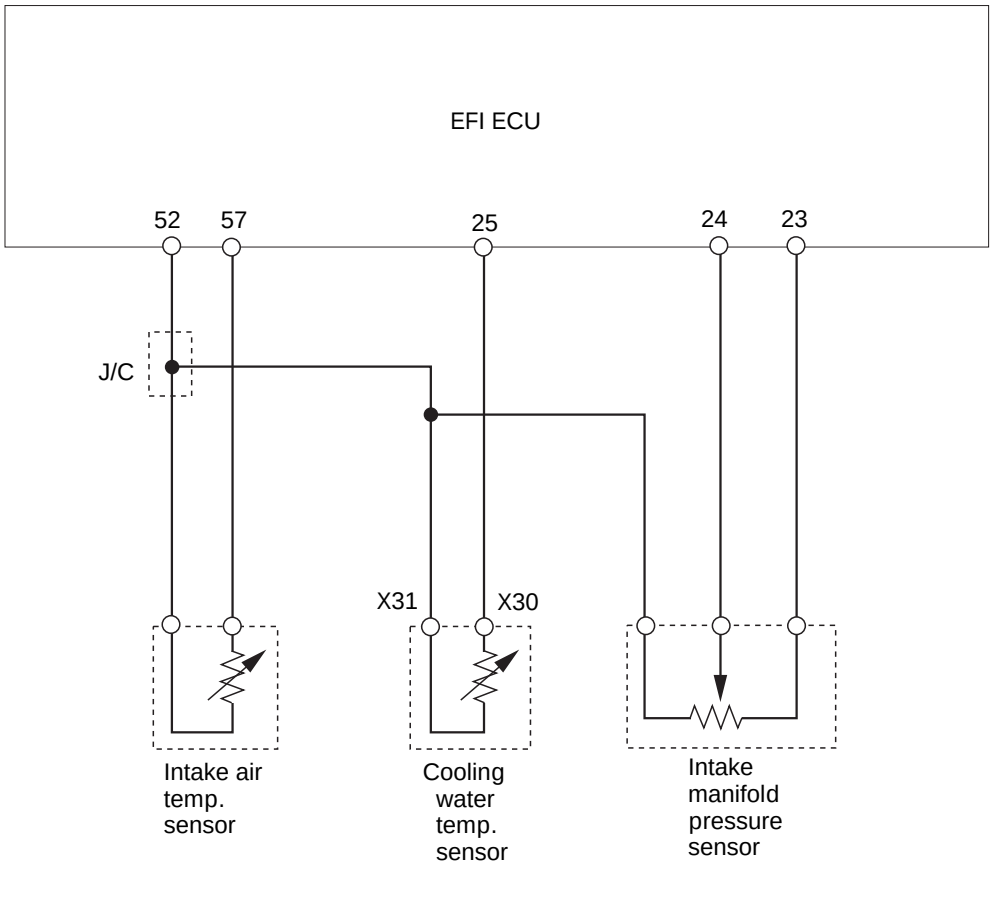
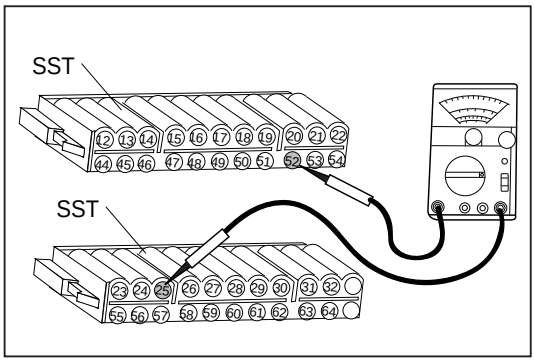
DIAGNOSIS CODE NO. 42
WATER TEMPERATURE SENSOR & CIRCUIT



JEF00085-00531

When the pressure sensor becomes open or shorted:

1. Check to see if the connector is connected properly.
2. Check of wire harness
   (1) Connect the SST between the ECU connectors and the wire harness connectors.
   (2) Ensure that the voltage between the SST terminals 25 and 52 is within the specified value when the ignition switch is turned to the ON position.



JEF00086-00532

NOTE:
- If the measured voltage does not conform to the specifications, check the wire harness.

Measuring points Temperature ϒC	Voltage
20	2.450 ± 0.15
80 - 90	0.318 ± 0.01

JEF00087-00533

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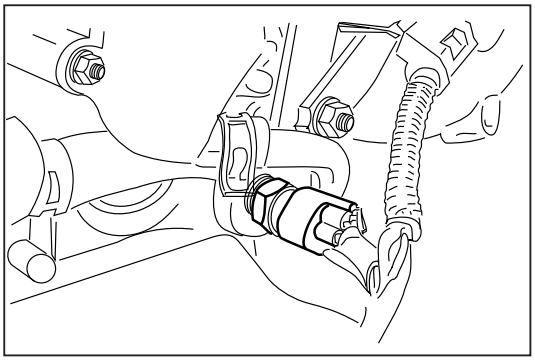
3. Check the water temperature sensor unit.
   (1) Turn off the ignition switch.
   (2) Disconnect the connector of the water temperature sensor.
   (3) Drain the engine cooling water.
   (4) Remove the water temperature sensor unit.

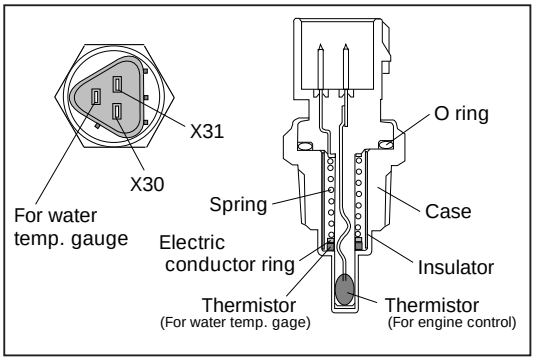
   NOTE:
   - Be certain to perform the replacement and repairs of the sensor only after the intake manifold has been removed from the cylinder head.

   (5) Check that the resistance between the terminals X30 and X31 of the water temperature sensor is within the specified value in the table. See page EF–27.

   NOTE:
   - If the trouble has not been solved by repairing the wire harness or parts, proceed to page EF–41, Replacement of ECU.



JEF00088-00534



JEF00089-00535

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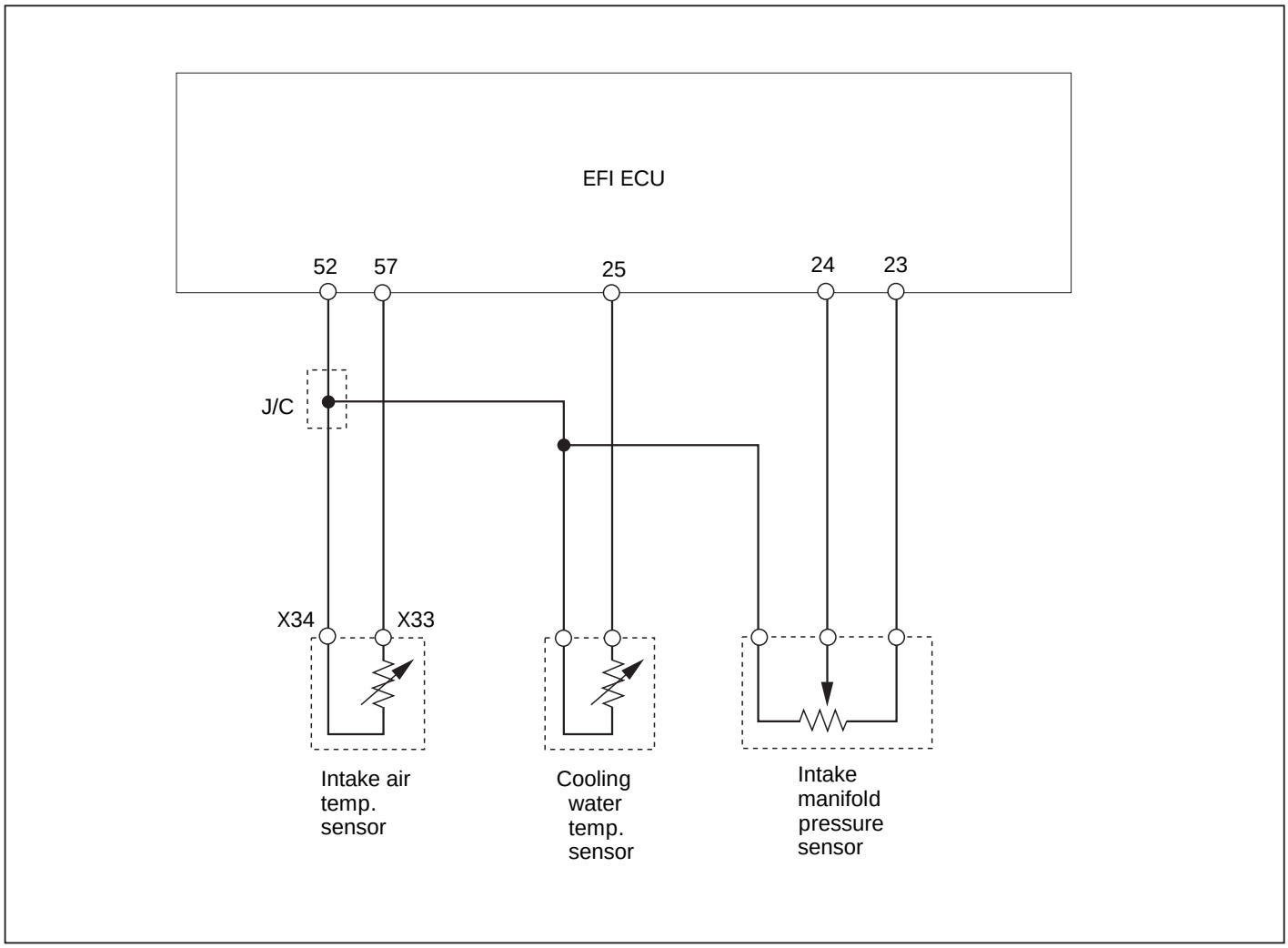
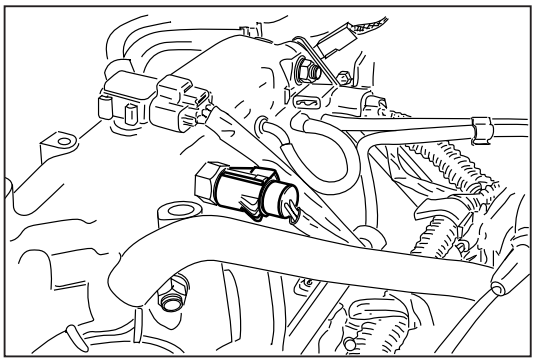
DIAGNOSIS CODE NO. 43
INTAKE AIR TEMPERATURE SENSOR & CIRCUIT



JEF00090-00541

When the pressure sensor becomes open or shorted:

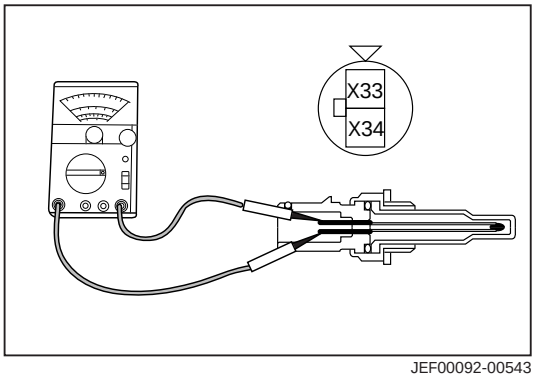
1. Check to see if the wire harness connectors are connected properly.
2. Disconnect the connector of the intake air temperature sensor.
   NOTE:
   - Before the wire harness connector is disconnected, be sure to turn off the ignition switch.



JEF00091-00542

3. Check that the resistance between the terminals X33 and X34 of the intake air temperature sensor is within the specified value.

Temperature ϒC	Resistance kΩ
40	1.140 ± 0.3
20	2.450 ± 0.5
0	5.880 ± 1.5



JEF00092-00543

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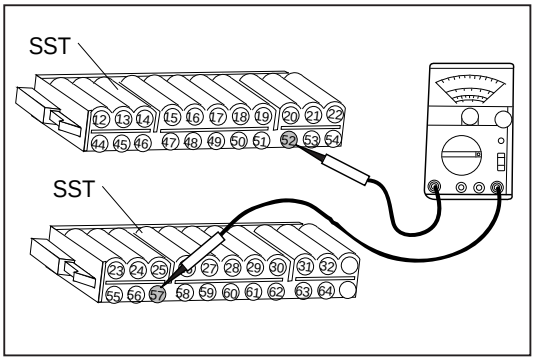
4. Check of wire harness
   (1) Connect the SST between the ECU connectors and the wire harness connectors.
   (2) Check that the voltage between the SST terminals 52 and 57 is within the specified value when the ignition switch is turned to the ON position.
   Reference: 20°C 1.8 - 2.9 V



JEF00093-00544

NOTE:
- If the measured voltage does not conform to the specifications, check the wire harness.
- If the diagnosis code No. 43 is flashing, most likely it denotes that open wire occurs intermittently or the shielding is poor.
- If the trouble has not been solved by repairing the wire harness or parts, then, proceed to page EF–41, Replacemeny of ECU.

JEF00094-00545

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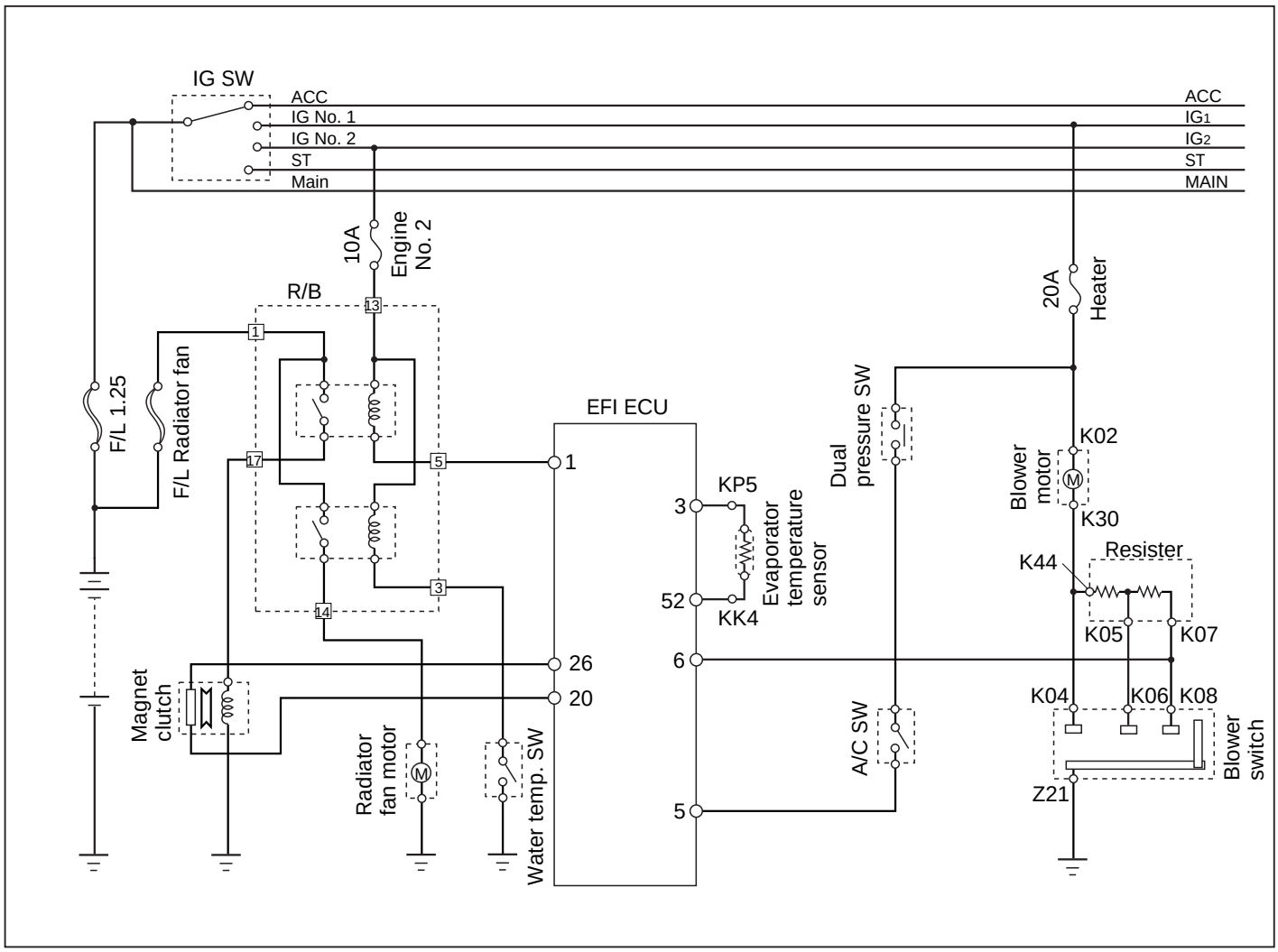
DIAGNOSIS CODE NO. 44

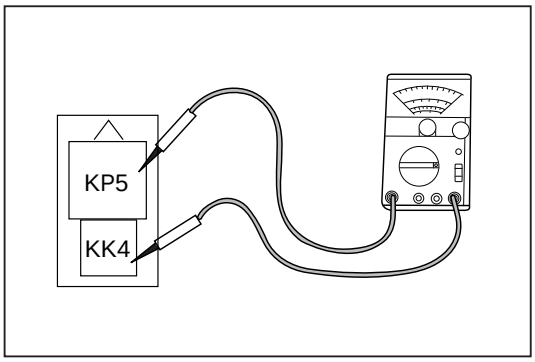
AIR CONDITIONER EVAPORATOR TEMPERATURE SENSOR & CIRCUIT



JEF00095-00551

When the air conditioner evaporator temperature sensor and circuit becomes open or shorted:

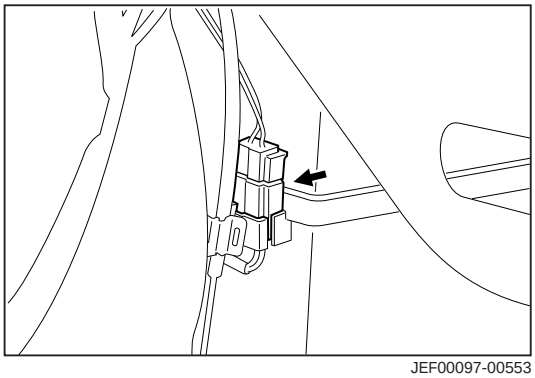
1. Check to see if the wire harness connectors are connected properly.
2. Disconnect the connector of the evaporator temperature sensor.
   NOTE:
   - Before the wire harness connector is disconnected, be sure to turn off the ignition switch.



JEF00096-00552

3. Check the resistance between the terminals.

Temperature ϒC	Resistance kΩ
25	1.500 ± 0.15
15	2.340 ± 0.23
0	4.850 ± 0.24



JEF00097-00553

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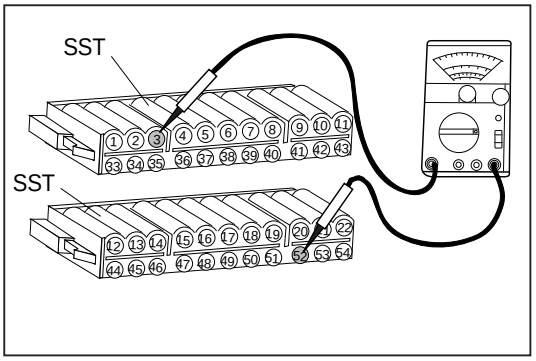
4. Check of wire harness
   (1) Connect the SST between the ECU connectors and the wire harness connectors.
   (2) Check that the voltage between the SST terminals 3 and 52 is within the specified value when the ignition switch is turned to the ON position.
   Reference: 20°C 1.8 - 2.9 V



JEF00098-00554

NOTE:
- If the measured voltage does not conform to the specification, check the wire harness.
- If the trouble has not been solved by repairing the wire harness or parts, then, proceed to page EF–41, Replacement of ECU.

JEF00099-00555

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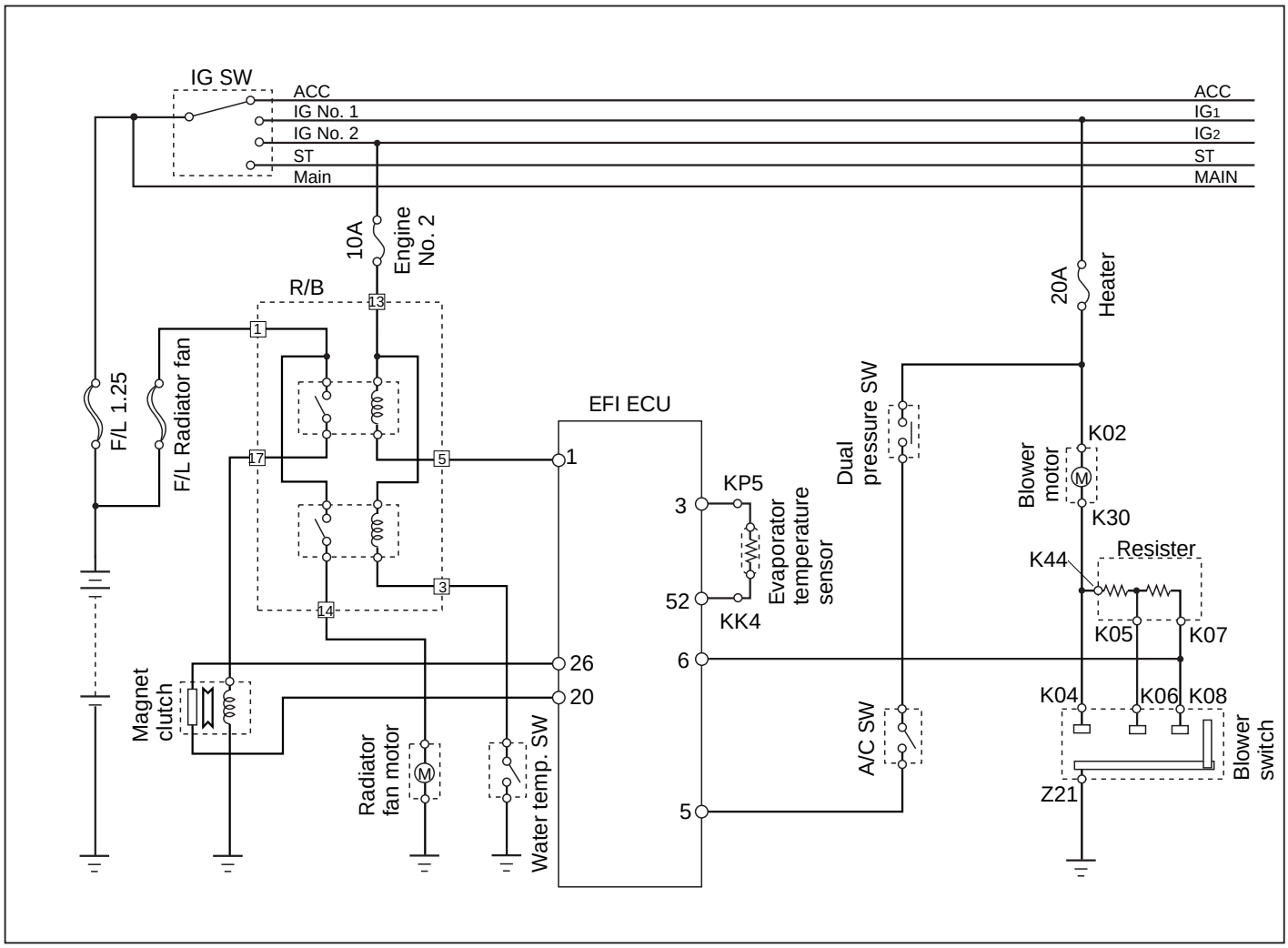
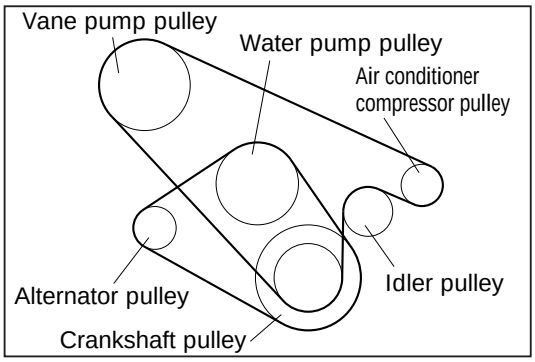
DIAGNOSIS CODE NO. 45
AIR CONDITIONER LOCK SENSOR & CIRCUIT



JEF00100-00556

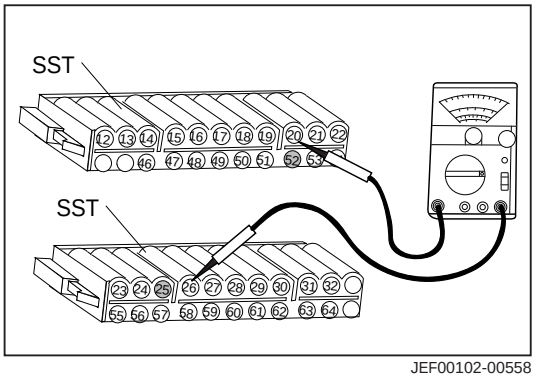
When the ECU detects malfunction of the A/C lock sensor circuit.

1. Check the drive belt tension of the A/C compresser. Check the A/C compresser for sticking before checking the A/C lock sensor circuit.
2. Check the connection of the A/C lock sensor connector.
   NOTE:
   - This code will not be memorized.
   - The diagnosis code will be indicated only when the test terminal is connected with the ground terminal.



JEF00101-00557

3. Check the A/C lock sensor and circuit.
   (1) Connect the SST between the ECU and the cowl wire.
   (2) Check the output voltage across the SST terminals 26 and 20 when the A/C compresser is operating.
   Specified Value: 0.1 - 3 V (Pulse signal)



JEF00102-00558

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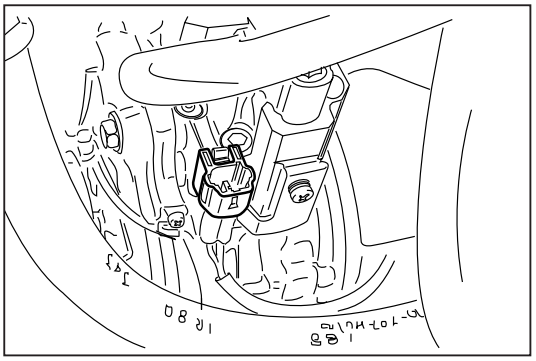
4. Check of wire harness
   (1) If the measured voltage is o volt, check the wiring between the ECU and the A/C lock sensor connector for open wire or short circuit.
   (2) Check the A/C lock sensor by measuring the output voltage at the sensor connector.



JEF00103-00559

NOTE:
- If the trouble has not been solved by repairing the wire harness or parts, then, proceed to page EF–41, Replacement of ECU.

JEF00104-00560

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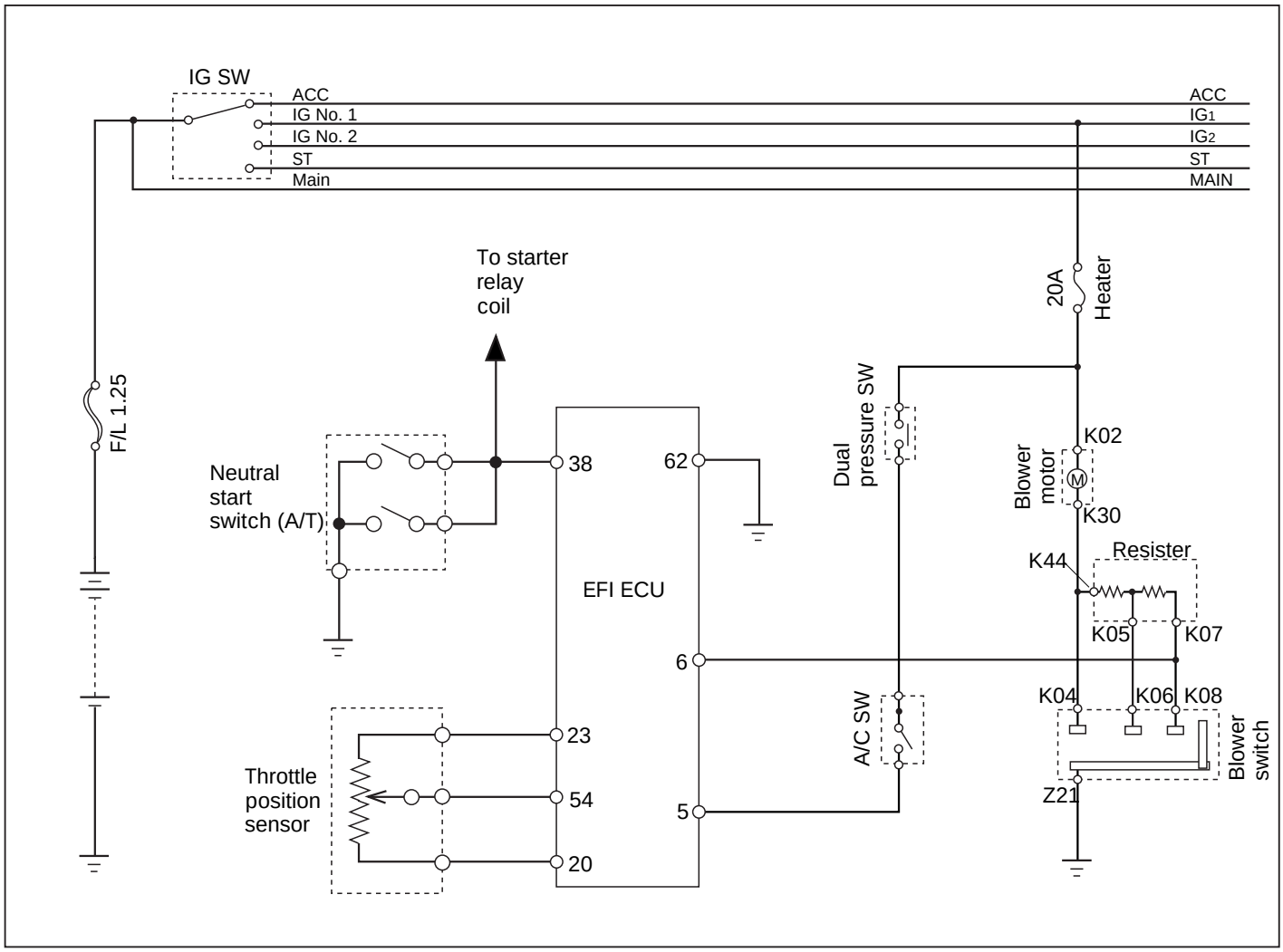
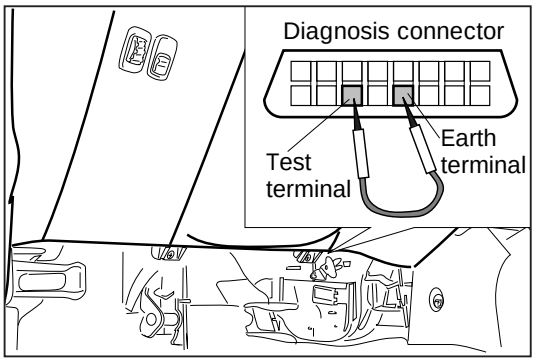
DIAGNOSIS CODE NO. 51
SWITCHING SIGNAL CIRCUIT



JEF00105-00561

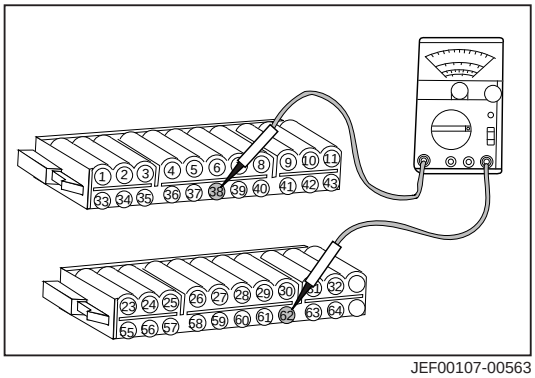
When the ECU detects malfunction of the switching circuit.

1. Check that the following wire harness connector or switching circuits are connected properly.
   (1) Throttle position sensor circuit
   (2) A/C switch circuit
   (3) Neutral start switch circuit of the A/T.
   NOTE:
   - This code will not be memorized.
   - The diagnosis code will be indicated only when the test terminal is connected with the earth terminal as shown in the illustration.



JEF00106-00562

2. Check of wire harness and switches
   (1) Connect the SST between the ECU connectors and the wire harness connectors.
   (2) Check that there is continuity between the SST terminals 62 and 38 when the A/T shift lever is shifted to the P or N position.



JEF00107-00563

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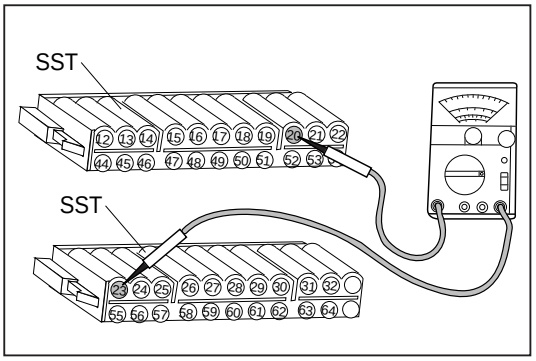
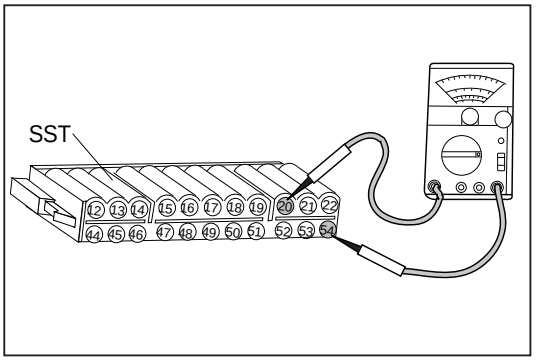
(3) Check the voltage between the SST terminals 20 and 23 when the throttle valve is opened and the ignition switch is turned on.
Specified Value: 4.5 - 5.5 V



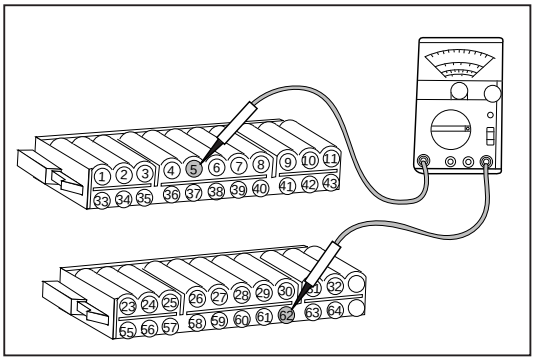
JEF00108-00564

(4) Check the voltage between the SST terminals 20 and 54 when the throttle valve is fully closed and the ignition switch is turned on.
Specified Value: 0.4 - 0.8 V

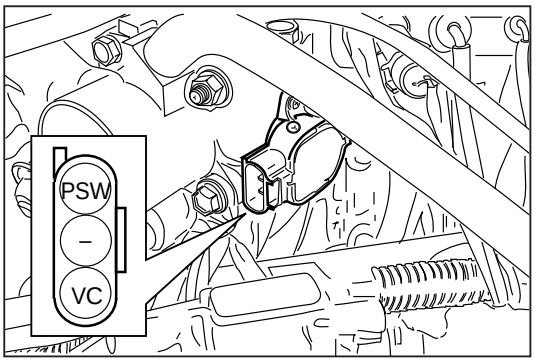


JEF00109-00565

(5) Check the voltage between the SST terminals 5 and 62 when the A/C switch is turned on.
Specified Value: Battery voltage


JEF00110-00566

(6) Turn off the ignition switch. Then, disconnect the connector of the throttle position sensor.
(7) Check the resistance between the terminals PSW and VC of the throttle position sensor.
Specified Value: 2.5 - 6.0 kΩ



JEF00111-00567

NOTE:
- If the trouble has not been solved by repairing the wire harness or parts, then, proceed to page EF–41, Replacement of ECU.

JEF00112-00568

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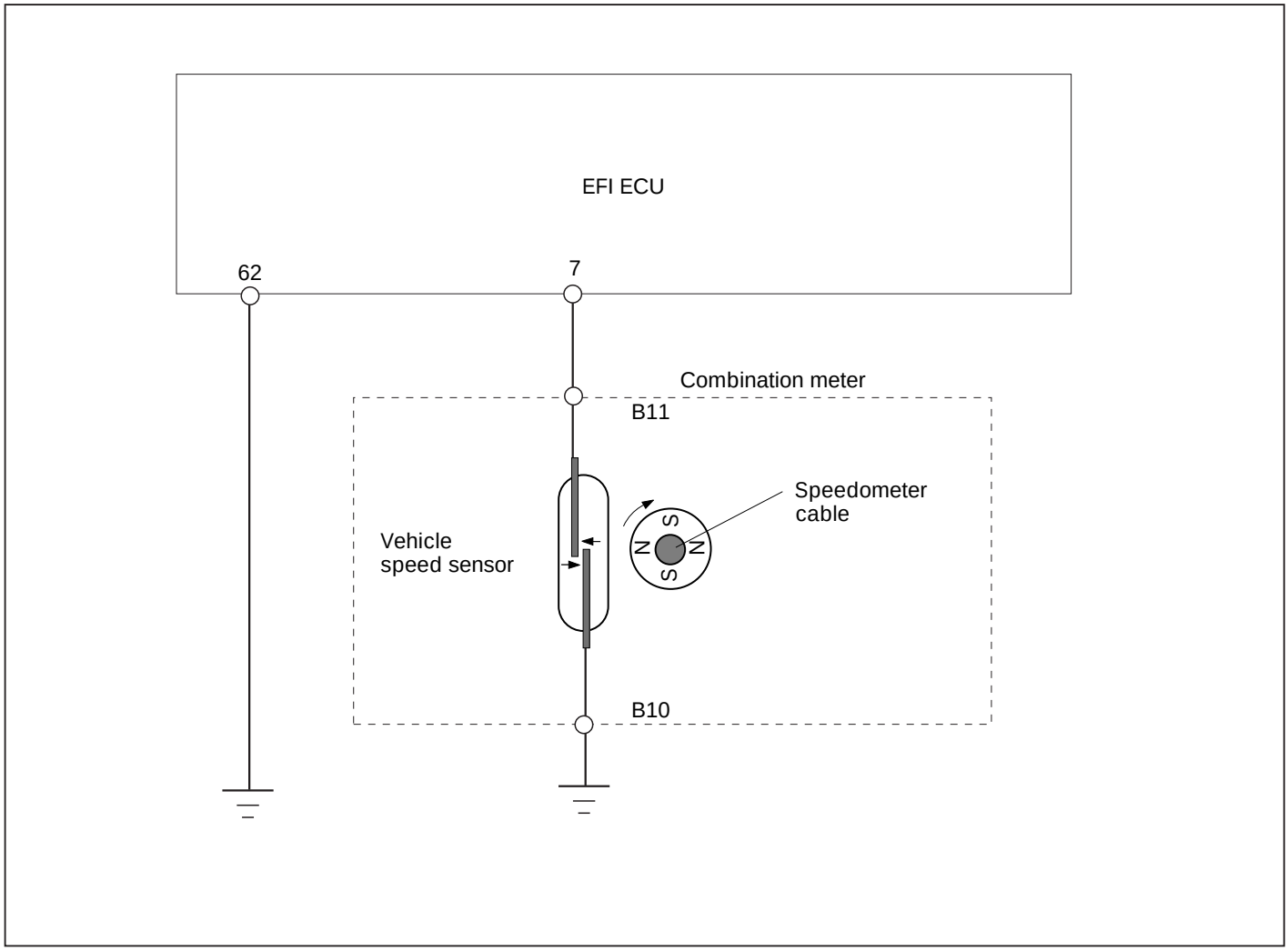
DIAGNOSIS CODE NO. 52
VEHICLE SPEED SENSOR & CIRCUIT



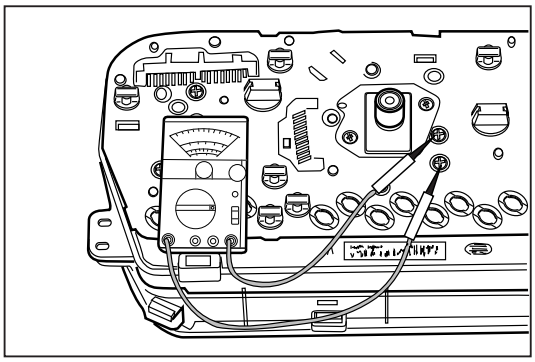
JEF00113-00571

When the pressure sensor becomes open or shorted:

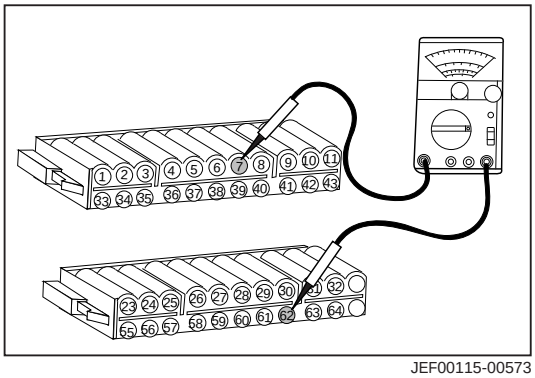
1. Check of the reed switch
   (1) Remove the combination meter.
   (2) Ensure that continuity occurs four times at the terminals B10 and B11 of the combination meter while the speedometer drive shaft completes a turn.

   NOTE:
   - The sensor has been so constructed that its rotary shaped-magnet rotates at the same revolution speed as the speedometer cable turns ON/OFF reed switch, thereby making it possible to input the vehicle speed to the computer. Four pulses are generated as the speedometer cable completes its one turn.

2. Check of wire harness
   (1) Connect the SST between the ECU connectors and the wire harness connectors.
   (2) Check that the voltage between the SST terminals 7 and 62 is within the following specified value when the vehicle moves and the ignition switch is turned to the ON position.
   Specified Value: 0 - 5 V for pulse signal



JEF00114-00572



JEF00115-00573

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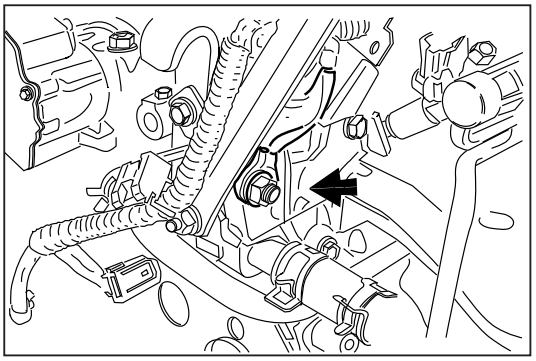
NOTE:

- If the measured voltage is 0 volt, check that the wire harness or connector is shorted.
- If the measured voltage is still 5 volts, check that the wire harness or connector exhibits open wire.
- If the diagnosis code No. 43 is flashing, most likely it denotes that open wire occurs intermittently or the shielding is poor.
- Check to see if the earth bolt exhibits looseness or corrosion.
- If the trouble has not been solved by repairing the wire harness or parts, then, proceed to page EF–41, Replacement of ECU.



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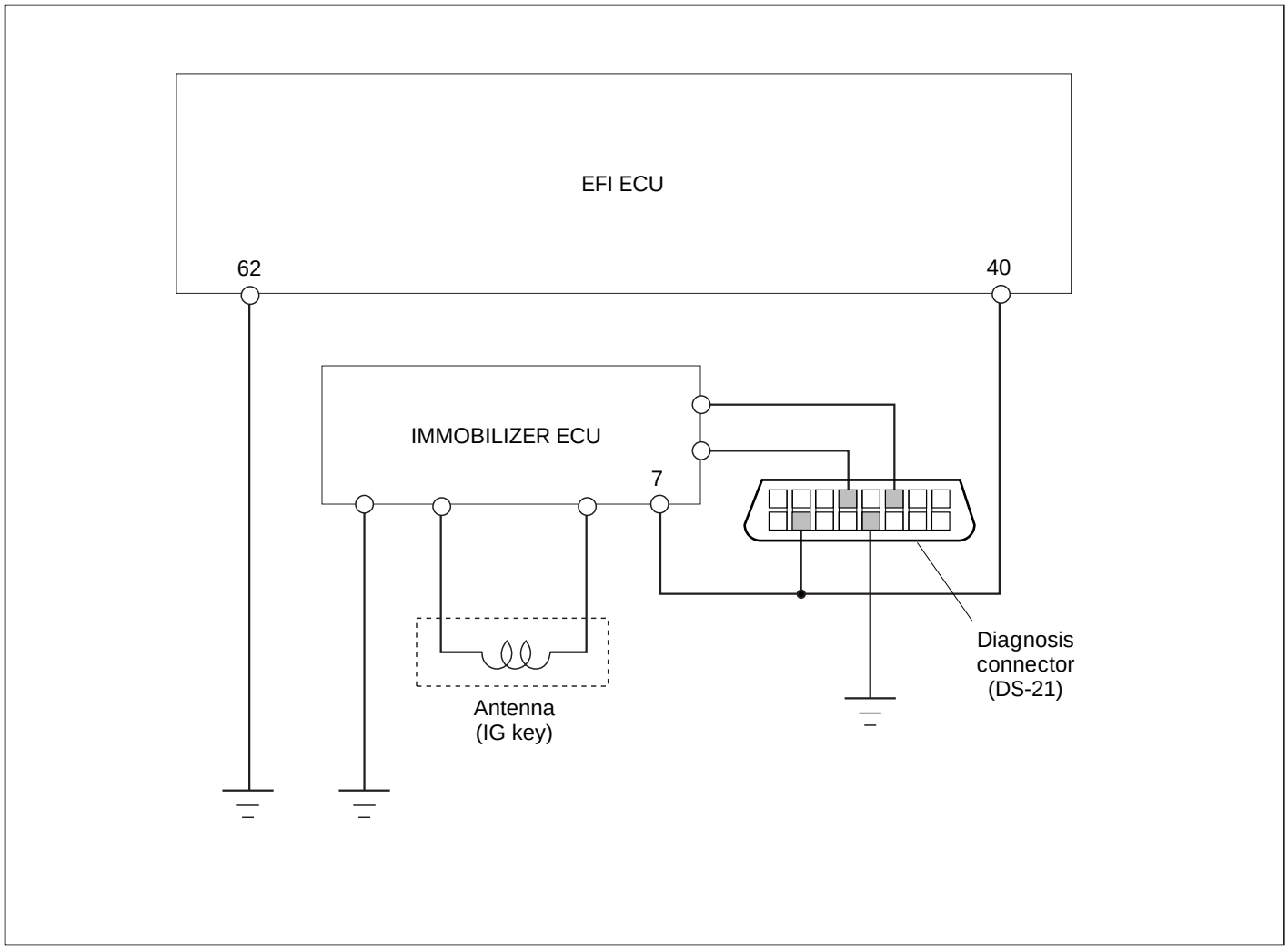
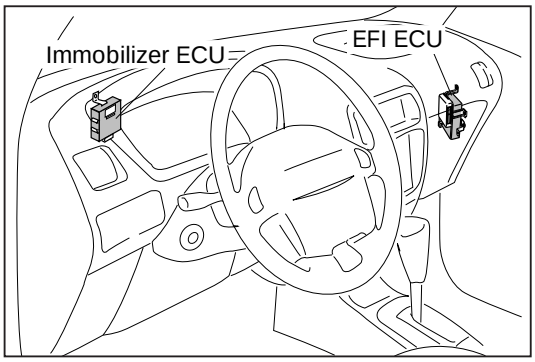
DIAGNOSIS CODE NO. 81
IMMOBILIZER SIGNAL CIRCUIT



JEF00117-00581

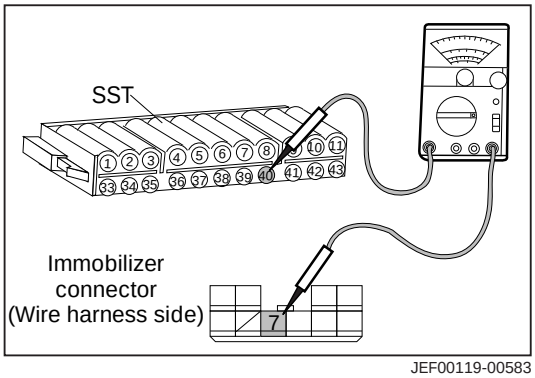
When the rolling codes cannot be exchanged between the engine EFI ECU and the immobilizer ECU or the rolling codes are not matched.

1. Check of wire harness
   (1) Connect the SST between the ECU connectors and the wire harness connectors.
   (2) Remove the screws of the glove compartment sub-assembly.
   (3) Disconnect the connector of the Immobilizer ECU.



JEF00118-00582

   (4) Check that continuity exists between the terminal 7 (Cowl wire side terminal of the Immobilizer ECU) and terminal 40 (SST terminal).
   If not, check the wire harness.



JEF00119-00583

   NOTE:
   - If the diagnosis code No. 43 is flashing, most likely it denotes that open wire occurs intermittently or the shielding is poor.
   - If the trouble has not been solved by repairing the wire harness or connectors, then, proceed to the following steps.

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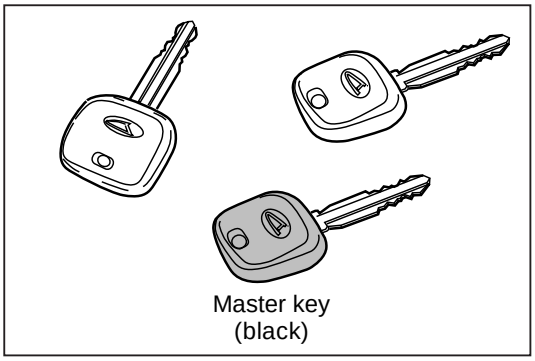
2. Check the Immobilizer system.
   NOTE:
   - In cases where the ECU is replaced with a new EFI ECU, be sure to use the master key to start the engine for the first time. The engine will not start with a key other than the master key. In cases where the ECU is replaced with an EFI ECU other than a new one, the engine will not start even if the master key is used. For details, refer to the immobilizer manual.
   - When the diagnosis code No. 81 occurs because of reasons other than abnormality of the wire harness, most likely the immobilizer ECU is malfunctioning.
     Refer to the immobilizer manual.


Master key
(black)

JEF00120-00585

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REPLACEMENT OF ECU

INSPECTION

NOTE:

- Even when the replacement of the ECU is required in previous checks, make sure that the ECU malfunction has not been caused by factors other than the ECU by carrying out the following checks. Then, proceed to replace the ECU.
- The measurement of voltage should be conducted while all of the connectors are connected.

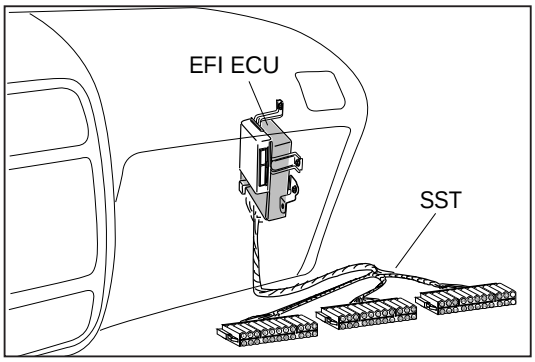
JEF00121-00701

CAUTION:

- In cases where the ECU is replaced with a new EFI ECU, be sure to use the master key and connect the test terminal with the earth terminal to start the engine for the first time. The engine will not start with a key other than the master key.
- In cases where the ECU is replaced with an EFI ECU other than a new one, the engine will not start even if the master key is used.
  For details, refer to the immobilizer manual.

JEF00122-00702

1. Install the SST.
   See page EF–18, “Preparation of trouble shooting with SST”.
2. Measurement of voltage or resistance
   (1) Measure the voltage or resistance between respective terminals.
   (2) Check to see if the measured voltage or resistance conforms to the specifications in accordance with the following “CHARACTERISTICS OF ECU OUTPUT” table.



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CHARACTERISTICS OF ECU OUTPUT (1)

Followings are standard voltage or resistance at ECU.

Item	Terminal	Condition	Standard voltage or resistance	Remedies
Power supply	2 – 62	All times	Battery voltage	Check back-up fuse in the relay box.
	11 – 62 43 – 62	Ignition switch is turned on.	Battery voltage	Check main relay in the relay box.
Earth group	20 52 62 63	All times	1 Ω or less	Check ground earth of wiring harness.
Pressure sensor	23 – 52	Ignition switch is turned on.	4.5 - 5.5 V	Check ECU power supply.
	24 – 52	Ignition switch is turned on. Atmospheric pressure is 101 kPa.	3.3 - 4.0 V	Check pressure sensor.
Water temp. sensor	25 – 52	Ignition switch is turned on. After engine has warmed up fully. (Cooling water temperature is 80 - 90℃.)	0.4 - 0.65 V	Check cooling water temperature sensor.
Intake air temp. sensor	57 – 52	Ignition switch is turned on. Air temperature sensor inside the surge tank is 20 (68).	1.8 - 2.9 V	Check air temp. sensor.
Oxygen sensor	56 – 62	Engine is rotating at about 3000 r.p.m., after engine has warmed up fully.	Voltage varies within 0.2 - 1.0 V	Check oxygen sensor.
Cam angle sensor	21 – 53	While the engine is being cranked by the starter motor.	0.1 - 0.3 V (AC range)	Check crank angle sensor.
Throttle position sensor	23 – 20	Ignition switch is turned on.	4.5 - 5.5 V	Check throttle position sensor.
	54 – 20	Ignition switch is turned on. Throttle valve is fully closed.	1.0 V or less	
		Ignition switch is turned on. Throttle valve is fully opened.	3.5 - 4.1 V	
Vehicle speed sensor	7 – 62	Ignition switch is turned on. When vehicle is moved. (Measured voltage changes 4 times for movement of 1.6 m)	Change in voltage between 0.1 V and approx. 5 V	Check speed sensor.
Ignition coil drive	63 – 29 63 – 64	Ignition switch is turned on.	3 V or less	Check ignition coil.
Injector drive	31 – 62 32 – 62	Ignition switch is turned on.	Approx. battery voltage	Check injector(s).
Fuel pump drive	33 – 62 or 34 – 62	Ignition switch is turned on.	Approx. battery voltage	Check fuel pump relay. The terminal 34 is for immobilizer system.
VF monitor	42 – 62	Engine is rotating at about 3000 r.p.m. after engine has warmed up fully.	1.8 - 3.2 V	Check oxygen sensor.
Alternator	28 – 62	Engine is running.	Approx. battery voltage	Check alternator.

JEF00124-00704

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CHARACTERISTICS ECU OUTPUT (2)

Followings are standard voltage or resistance at ECU.

Item	Terminal	Condition	Standard voltage or resistance	Remedies
Electrical load	37 – 62	Headlamp switch is turned on.	Approx. battery voltage	Check headlamp fuse or switch.
	36 – 62	Ignition switch is turned on and defogger switch is turned on.	Approx. battery voltage	Check defogger fuse or switch.
	6 – 62	Ignition switch is turned on and heater blower switch is turned on.	0.1 V or less	Check heater blower switch.
		Heater blower switch is turned off.	Approx. battery voltage	Check gauge fuse or heater blower relay.
Tachometer signal	41 – 62	Ignition switch is turned on.	0.1 V or less	Check tachometer.
		Engine is rotating at idling speed.	Approx. 6 V (AC range)	Replace ECU.
Automatic transmission signal	38 – 62	When A/T shift lever is in P or N range.	1 Ω or less	Check wire harness.
Air conditioner signal	5 – 62	When ignition SW is turned on and A/C switch is turned on.	Approx. battery voltage	Check wire harness.
	1 – 62	Engine is running at idling speed and A/C SW is turned on.	3.0 V or less	Check wire harness.
	26 – 62	Engine is running at idling speed and A/C switch is turned on.	0.1 V - 0.4 V (AC range)	Check wire harness.
	3 – 62	Ignition SW is turned ON.	0.15 - 4.8 V	Check wire harness.
Idle-up VSV control	60 – 62	Engine is running at idling speed and headlamp switch, defogger switch or heater switch is turned on.	0.5 V or less	Check wire harness.
	59 – 62	Engine is running at idling speed and headlamp switch, defogger switch or heater switch is turned on.	0.5 V or less	Check wire harness.
	58 – 62	Engine is running at idling speed and A/C switch is turned on.	0.5 V or less	Check wire harness.
Test terminal	39 – 62	Ignition switch is turned on.	4.5 - 5.5 V	Check ECU.
Check engine lamp	10 – 62	Ignition switch is turned on.	Approx. battery voltage	Check wire harness.

JEF00125-00705

After completion of inspection

(1) Disconnect the ground cable terminal from the negative (–) terminal of the battery.
(2) Remove the SST by disconnecting its connectors from the ECU and engine wire connectors.
(3) Connect the wire harness connectors to the ECU.
(4) Reconnect the ground cable terminal to the negative (–) terminal of the battery.

JEF00126-00706

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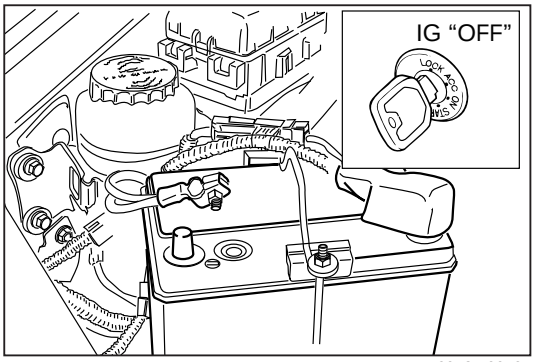
ECU REPLACEMENT

1. Disconnect the ground cable terminal from the negative (–) terminal of the battery.
2. Remove the glove compartment subassembly.



JEF00127-00707

3. Disconnect the wire harness connector from the ECU.
4. Remove the ECU by removing the attaching bolts and nuts.
5. Install a new ECU.
   CAUTION:
   - Never touch the bracket screws mounted on the ECU proper. This tampering will cause an ECU malfunction.
6. Connect the wire harness connector to the ECU.
7. Install the glove compartment subassembly.
8. Connect the ground cable terminal to the negative (–) terminal of the battery.

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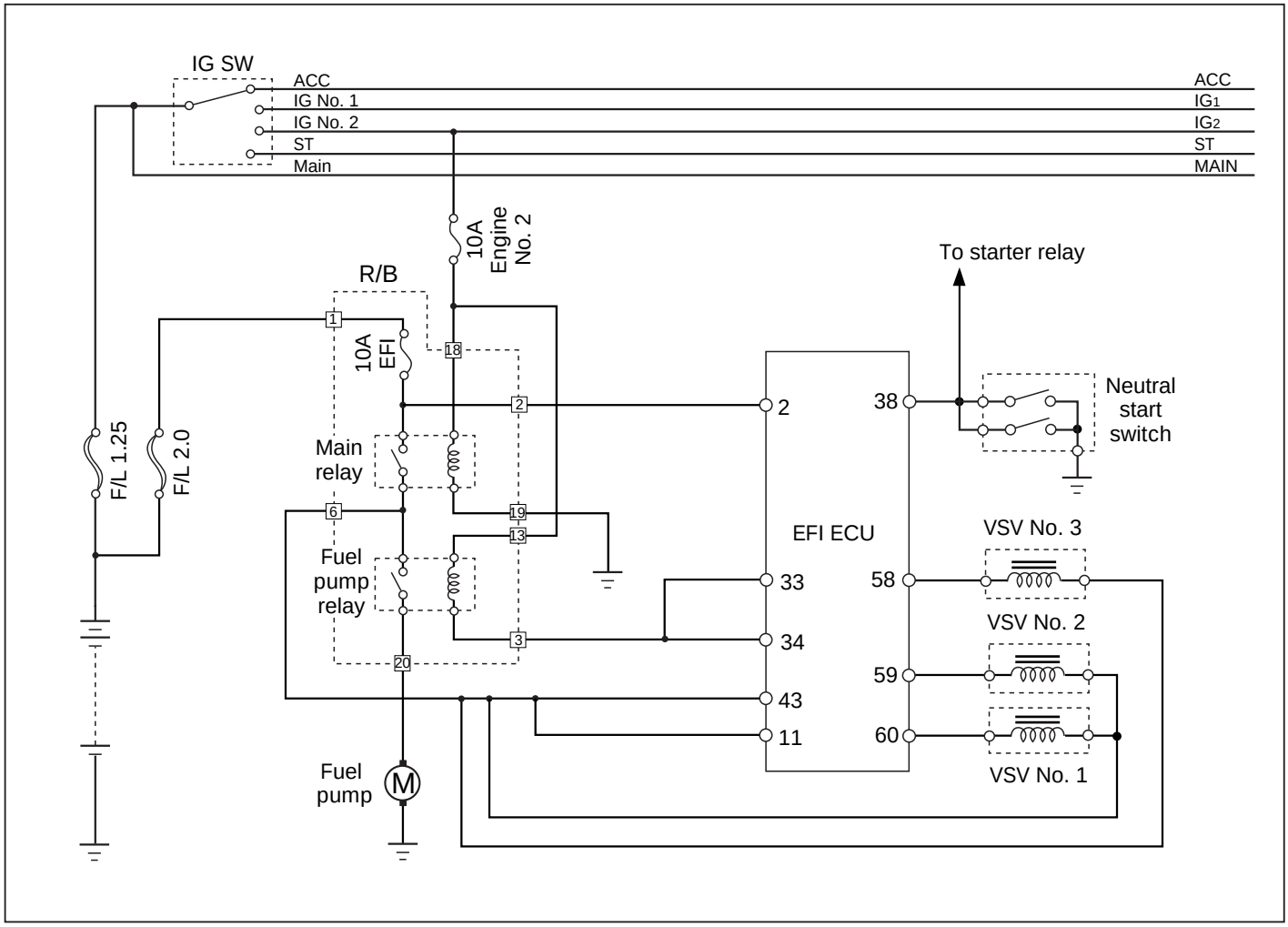
INSPECTION OF IDLE-UP CONTROL SYSTEM

WIRING DIAGRAM



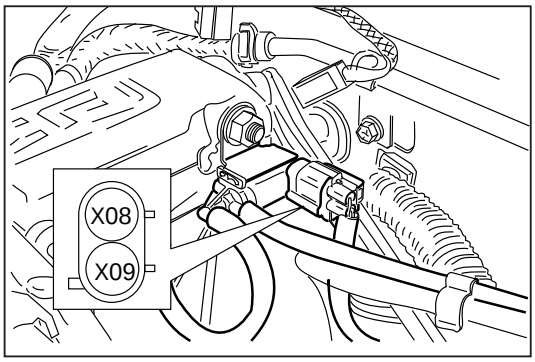
JEF00129-00901

UNIT INSPECTION

1. Remove the air cleaner case subassembly and its relevant parts.
2. Disconnect the connector of the idle-up VSV.
3. Measure the resistance between the respective terminals of the VSV.
4. Ensure that the specified resistance exists between the terminals described below.
   Specified Value: 32 ± 5 Ω

   NOTE:
   - If the resistance will not conform to the specified value, replace the idle-up VSV.

5. Apply a negative pressure of 13.3 kPa (100 mmHg) to the VSV, using a MityVac or a vacuum pump.
6. Check to see if the negative pressure applied in the step 5 becomes zero when the battery voltage is applied to the terminals of the VSV.
   NOTE:
   - If not, replace the idle-up VSV.



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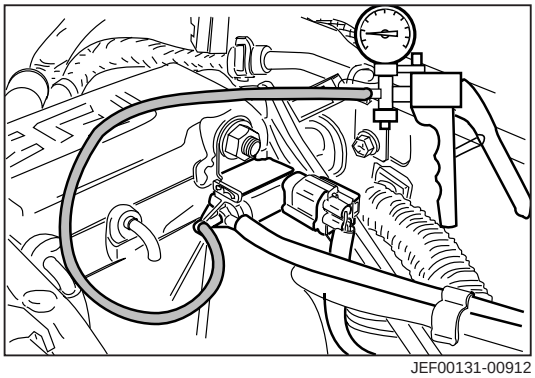

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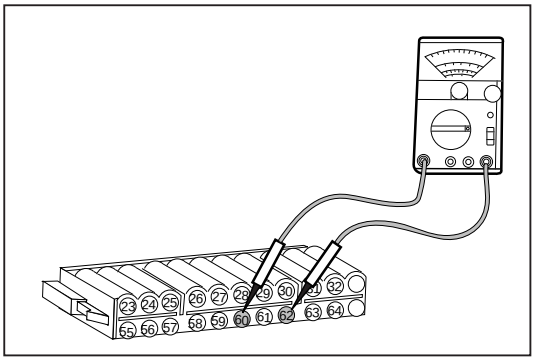
SYSTEM INSPECTION

VSV No. 1

1. Connect the SST between the EFI ECU connector and the wire harness connectors. See page EF–18.
2. With the engine running, measure the voltage between the terminals 60 and 62 of the SST.

	Condition	Specified value
1	Until engine is warmed up fully after engine starting from engine cold state.	0.5 V or less
2	Defogger switch is turned on.	
3	Heater blower switch is turned on.	
4	Headlamp switch is turned on.	

NOTE:
- The measurement should not be performed when plural conditions of those discribed above one met concurrently.
- If the check results will not conform to the requirements given in the table, check and repair those related systems.



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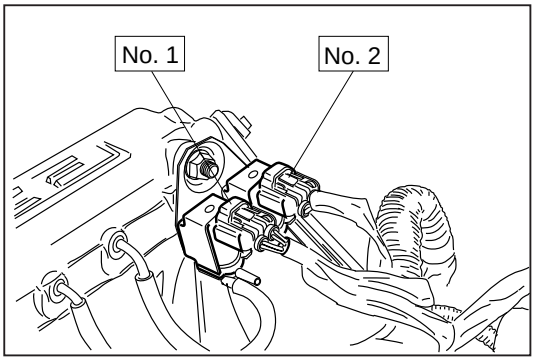


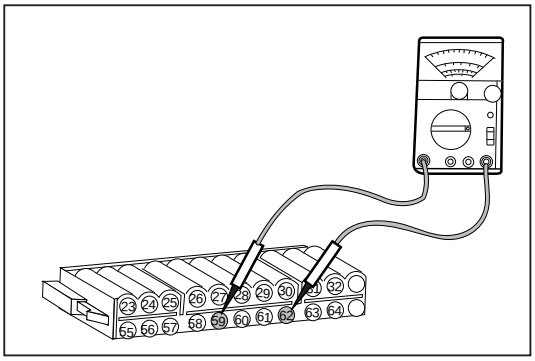
JEF00133-00942

VSV No. 2

1. Connect the SST between the EFI ECU connector and the wire harness connectors. See page EF–18.
2. With the engine running, measure the voltage between the terminals 59 and 62 of the SST.

	Condition	Specified value
1	Until engine is warmed up fully after engine starting from engine cold state.	0.5 V or less
2	The shift lever has been moved from D, 2, L or R to P or N.	
3	Defogger switch, heater blower switch and headlamp switch have been turned on.	

NOTE:
- This VSV is equipped on A/T vehicles only.
- If the check results will not conform to the requirements given in the table, check and repair those related systems.



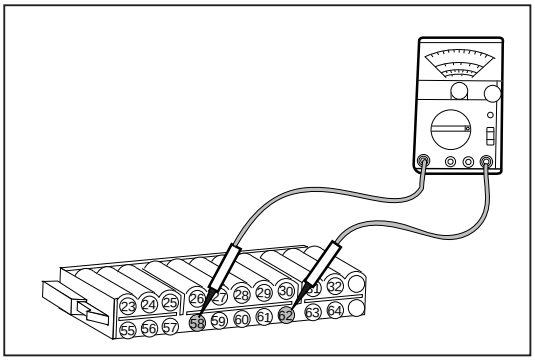
JEF00134-00943

JEF00135-00944

VSV No. 3

1. Connect the SST between the EFI ECU connector and the wire harness connectors. See page EF–18.
2. With the engine running and air conditioner switch turned on, measure the voltage between the terminals 58 and 62 of the SST.
   Specified Value: 0.5 V or less

NOTE:
- This VSV is used for the air conditioner system.
- If the check results will not conform to the requirements given in the table, check and repair those related systems.



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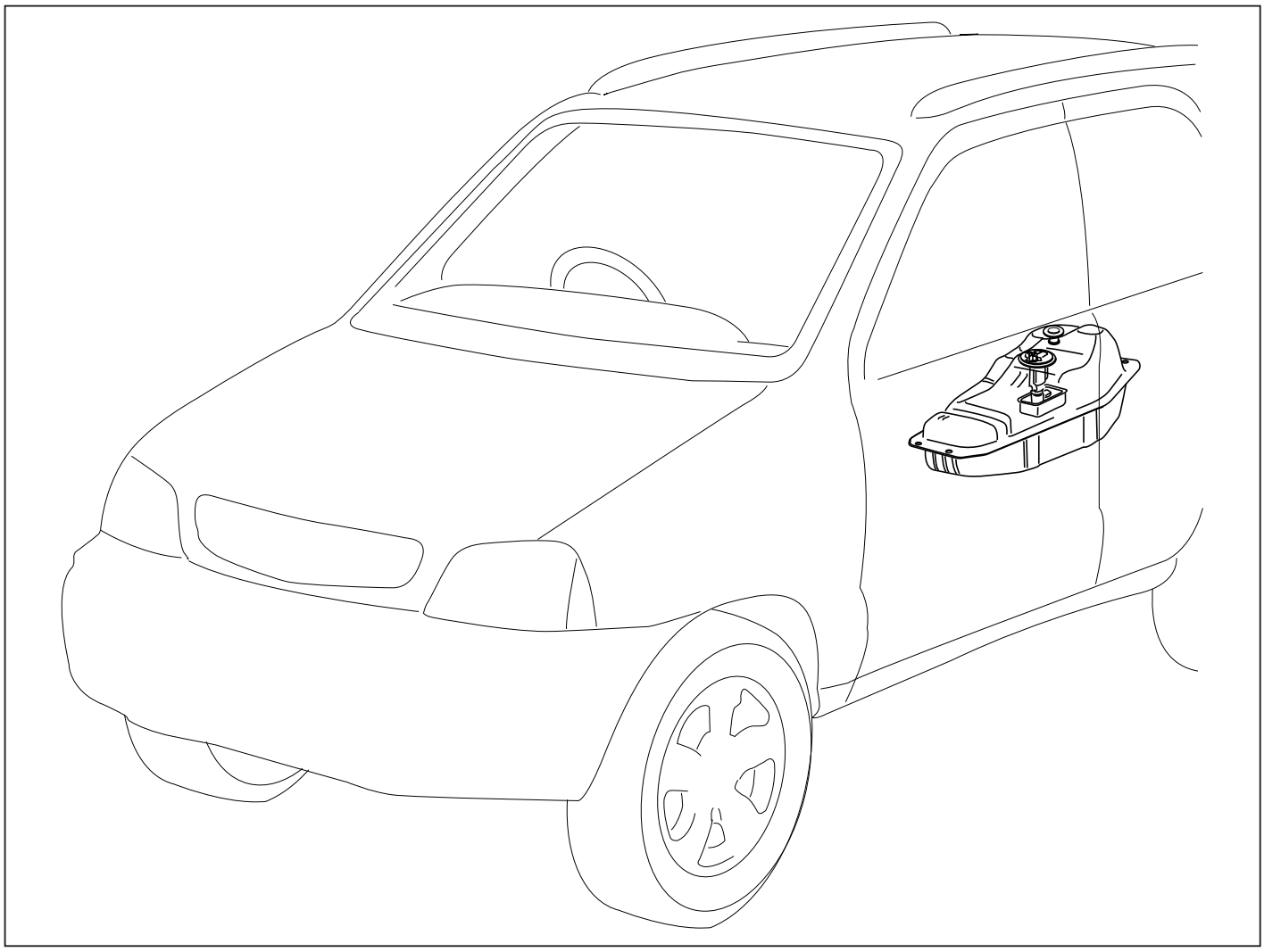
INSPECTION OF FUEL SYSTEM

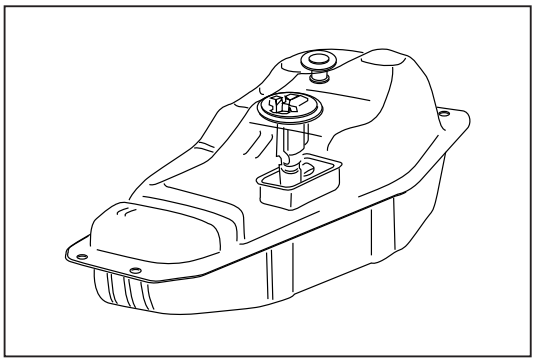


JEF00137-01001

FUEL TANK

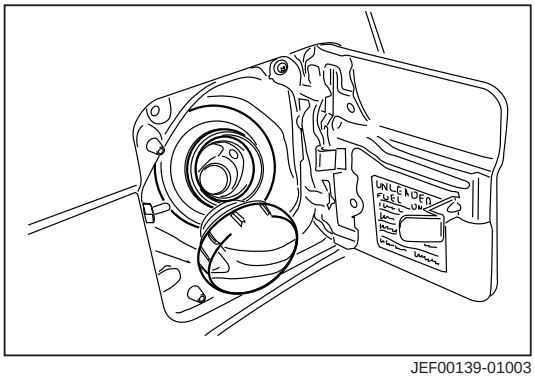
UNIT INSPECTION

1. Check the fuel tank for deformation, cracks or fuel leakage.
2. Check the filler neck for damage or fuel leakage.
3. Check to see if the hose and tube connections are installed as shown in the right figure.



JEF00138-01002

4. Check to see if the fuel tank cap and gasket exhibit damage.
   NOTE:
   - If the fuel tank and its related parts exhibit any defect, repair or replace the fuel tank.
   - Replace the gasket if it is damaged. Also, replace the fuel tank cap if it exhibits damage.



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FUEL PUMP

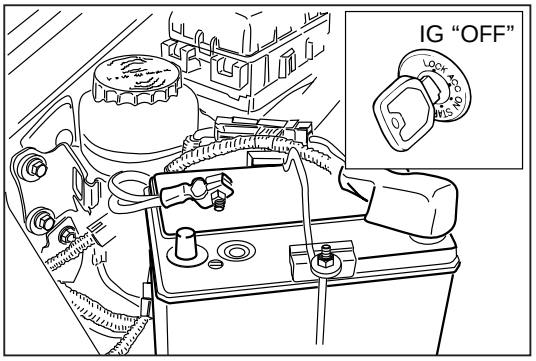
INSPECTION

See page EF–14, Check of fuel system.

REMOVAL

1. Disconnect the battery ground cable from the negative (–) terminal of the battery.
2. Remove the fuel tank.
   Refer to the BO section of the sevice manual.
   WARNING:
   - Never allow any fire to be brought near the working site.

3. Remove the fuel pump assembly.



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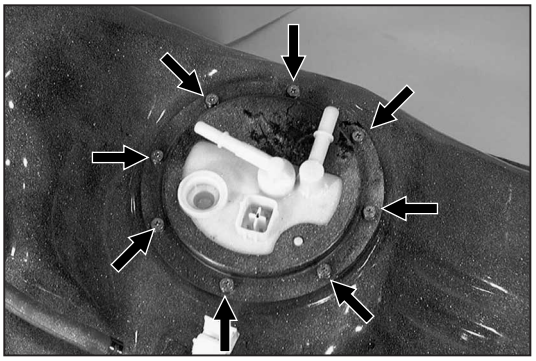

JEF00141-01012

INSTALLATION

1. Install a new fuel pump assembly to the fuel tank with a new gasket interposed.
2. Tighten the attaching screws.
   Tightening Torque: 1.5 - 2.5 N·m

3. Install the fuel tank and its related parts to the body.
   Refer to the BO section of the service manual.

FUEL LINE

REMOVAL & INSTALLATION OF QUICK CONNECTOR

Refer to the BO section of the service manual.

WARNING:

- Always keep fire away from the working site.

NOTE:

- Always use a new gasket and a hose band (clip) when replacing the fuel tank or components.
- Each part should be tightened securely to the specified torque.

JEF00142-01013

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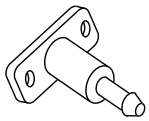
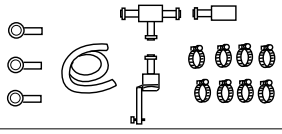
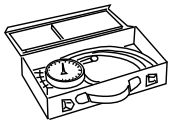
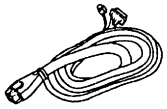
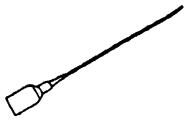
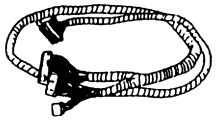
SST (Special Service Tools)

Shape	Part No. and name	Purpose	Remarks
	09283-87703-000 Pressure regulator adapter	* Inspection of injectors * Inspection of pressure regulator * Inspection of fuel pressure	Used in combination with 09268-87702-000
	09268-87702-000 Injection measuring tool set	* Inspection of injectors * Inspection of pressure regulator * Inspection of fuel pressure	Used in combination with 09283-87703-000
	09268-87701-000 EFI fuel pressure gauge	Inspection of fuel pressure	
	09842-30070-000 EFI inspection wire	Inspection of fuel injectors	
	09991-87401-000 Engine control system inspection wire	Measurement of engine revolution speed Shorting terminal T	
	09991-87402-000 Tacho-pluse pick-up wire	Measurement of engine revolution speed	
	09991-87403-000 Diagnosis check wire	Shorting terminal T	
	09842-87706-000 EFI-II computer check subharness	Inspection of computer input/output voltage	

JEF00143-01101

TIGHTENING TORQUE

Tightening components	Tightening torque		Remarks
	N·m	kgf-m	
Ignition coil × Cylinder head over	5.9 - 8.8	0.6 - 0.9	
Spark plug × Cylinder head	14.7 - 21.6	1.5 - 2.2	
Cam angle sensor × Cylinder head	14.7 - 21.6	1.5 - 2.2	
Oxygen sensor × Exhaust manifold	29.4 - 39.2	3.0 - 4.0	
Cooling water temperature sensor × Cylinder head	24.5 - 34.3	2.5 - 3.5	
Intake air temperature sensor × Intake head	29.5 - 39.2	3.0 - 4.0	
Idle-up VSV × Intake manifold	14.7 - 21.6	1.5 - 2.5	
Delivery pipe × Intake manifold	14.7 - 21.6	1.5 - 2.2	
Fuel pump × Intake manifold	1.5 - 2.5	0.15 - 0.25	

JEF00144-01201

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LU

LUBRICATION SYSTEM

OIL PRESSURE WARNING ..... LU– 2
OIL PRESSURE CHECK ..... LU– 2
OIL PUMP ..... LU– 3
COMPONENTS ..... **LU– 3**
REMOVAL ..... **LU– 3**
DISASSEMBLY ..... **LU– 4**
ASSEMBLY ..... **LU– 7**
INSTALLATION ..... **LU– 8**
TIGHTENING TORQUE LU–10

JLU00001-00001

NO. 9710-JE

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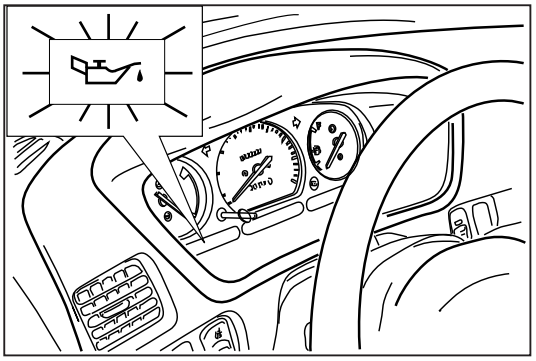
OIL PRESSURE WARNING

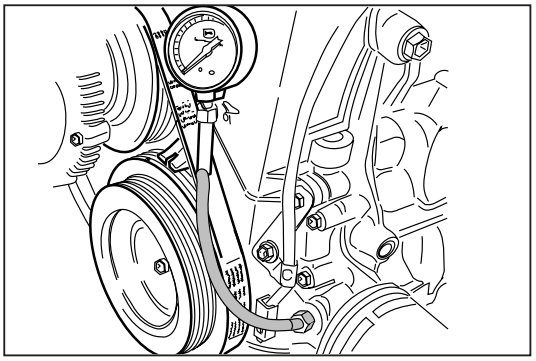
1. Check to see if the oil pressure warning will be illuminated when the ignition switch is turned on.
   NOTE:
   - If the warning lamp will not go on, check to see if the bulb in the combination meter is burnt out.
     (Refer to the BE section of the service manual.)
   - If the warning lamp is illuminated when the engine has started, perform the following checks.
     (In advance, be sure to check that the engine oil is at a sufficient level.)



JLU00002-00011

OIL PRESSURE CHECK

1. Remove the engine undercover.
2. Disconnect the oil pressure switch connector.
3. Remove the oil pressure switch.
   NOTE:
   - Use a hexagonal long box wrench for removal.



JLU00003-00101

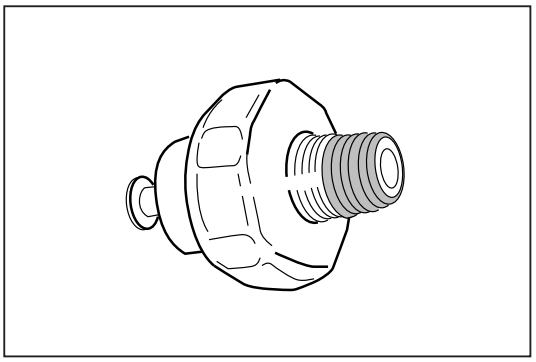
4. Install a suitable oil pressure gauge.

5. Measuring of oil pressure
   Start the engine and warm it up to the normal operating temperature.
   Ensure that the oil pressure is within the specification.
   Specified Oil Pressure
   At Idle Speed: 20 kPa or more
   At 3000 rpm: 245 - 490 kPa

   NOTE:
   - If the measured value fails to conform to the specified value, check and repair the oil pump.

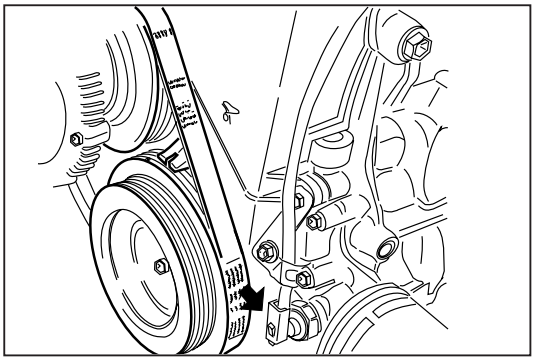
JLU00004-00102

6. Stop the engine.
7. Remove the oil pressure gauge.
8. Clean the threaded portion of the oil pressure switch.
9. Wind seal tape around the threaded portion of the oil pressure switch.
10. Install the oil pressure switch to the oil pump.
    Tightening Torque: 11.8 - 19.6 Nm



JLU00005-00103

    NOTE:
    - Use a hexagon long box wrench for the installation of the oil pressure switch.
    - The new oil pressure switch is coated with sealer.
    - Therefore, when replacing the oil pressure switch with the new one, remove the sealer thoroughly before winding seal tape.
    - Be sure to clean the hole threads at the oil pump side before installation of the oil pressure switch.



JLU00006-00104

11. Connect the connector of the engine wire to the oil pressure switch.
12. Start the engine and check it for oil leakage.

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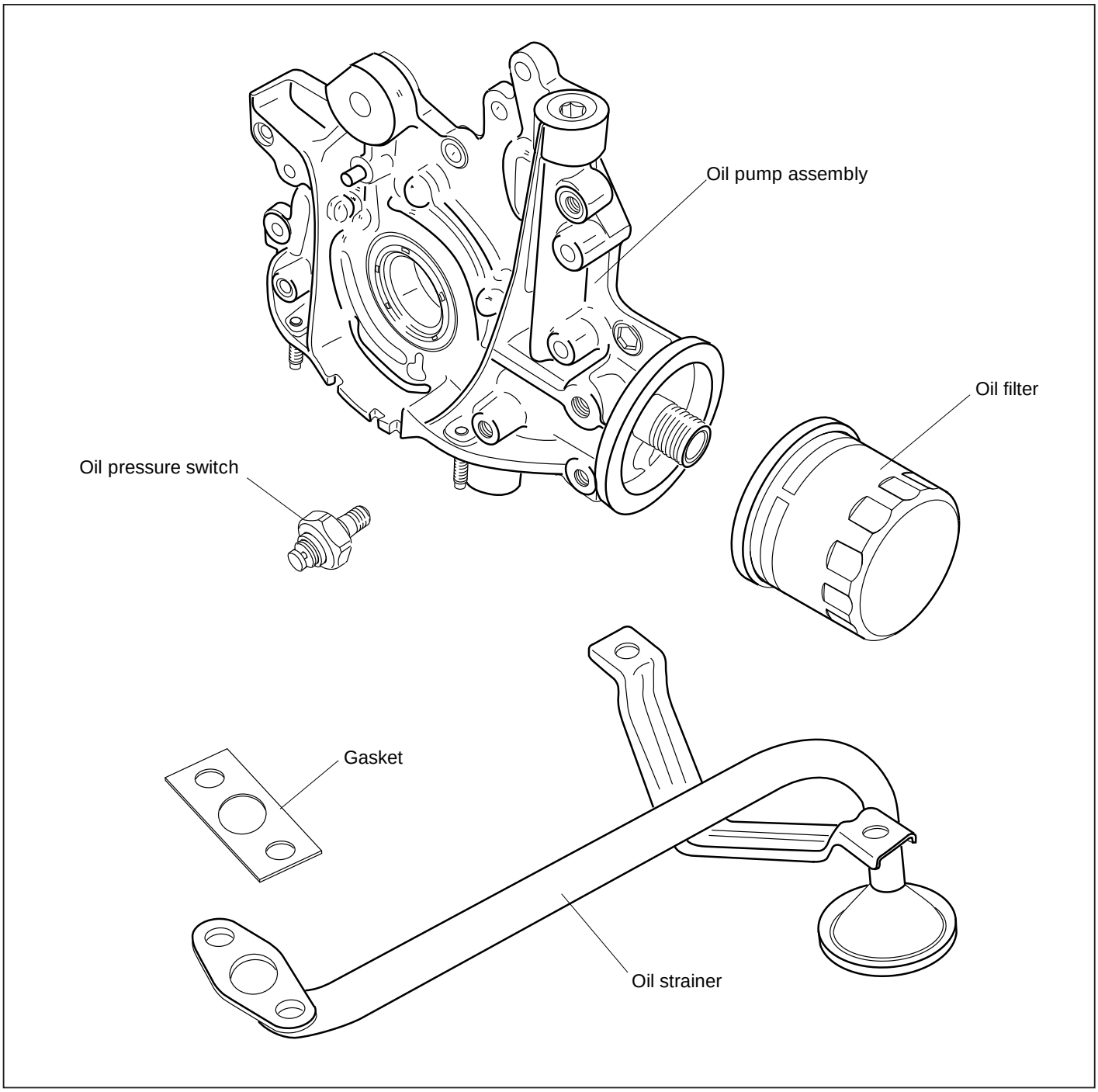
OIL PUMP

COMPONENTS

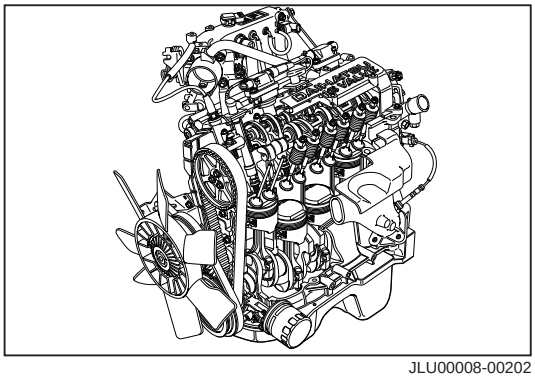


JLU00007-00201

REMOVAL

NOTE:

- In order to remove/install the oil pump, it is necessary to remove the oil pan. For a reliable service, it is not recommended to perform this operation with the engine mounted on the vehicle. Therefore, this manual describes only for the operation that is to be performed after the engine has been removed from the vehicle.
- For the operations that precede the removal of the oil pump, refer to the EM section of this manual.



JLU00008-00202

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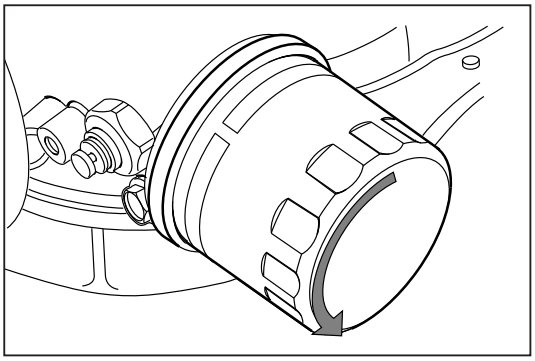
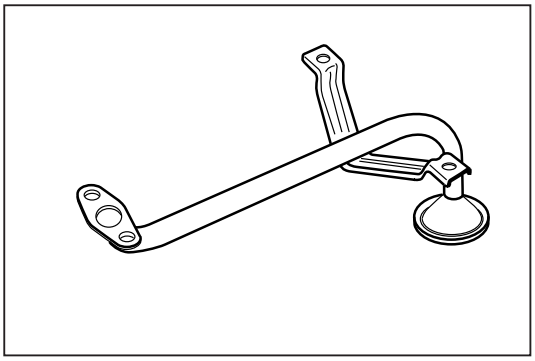
1. Install the engine unit to the suitable engine stand. Refer to EM section of the service manual.
2. Remove the oil filter element.
3. Remove the attaching bolts and nuts of the oil pan.
4. Separate the oil pan from the cylinder block.



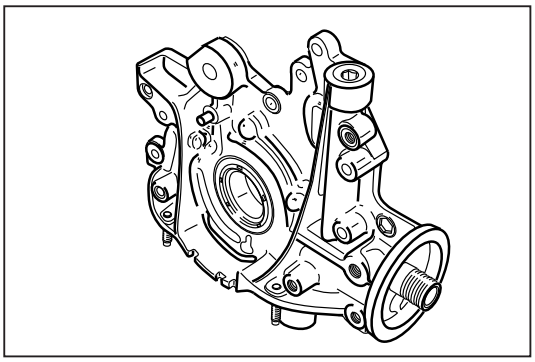
JLU00009-00203

5. Remove the oil strainer by removing the attaching bolts.



JLU00010-00204

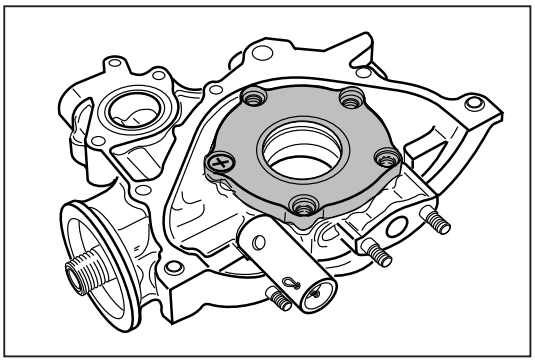
6. Remove the attaching bolts of the oil pump assembly evenly.
7. Remove the oil pump from the cylinder block.



JLU00011-00205

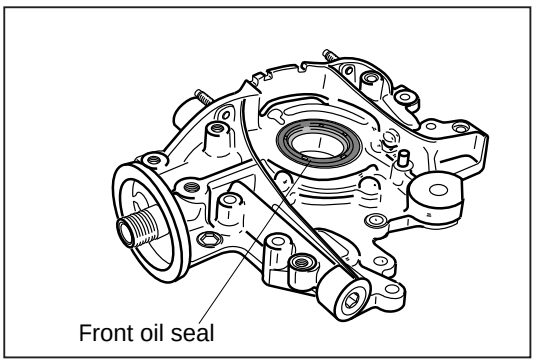
DISASSEMBLY

1. Detach the oil pump cover by removing the attaching screws.



JLU00012-00301

2. Remove the front oil seal.



JLU00013-00302

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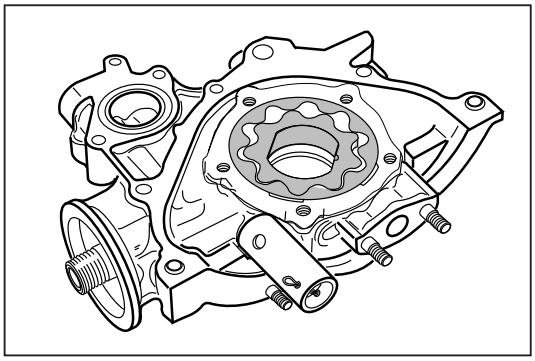
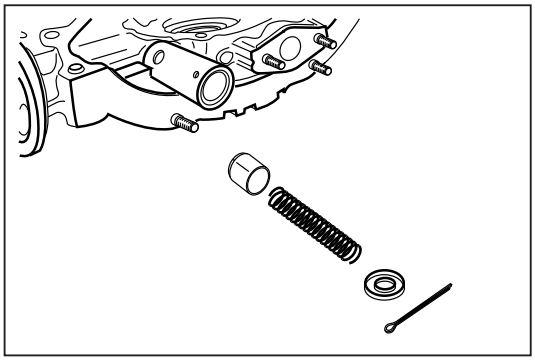
3. Remove the oil pump rotor set.



JLU00014-00303

4. Pull out the cotter pin, while pushing the spring retainer with nose pliers or the like.
   NOTE:
   - Put an appropriate cloth, etc. on the retainer spring so that it may not jump out.

5. Remove the oil pump relief valve spring retainer, compression spring and oil pump relief valve.



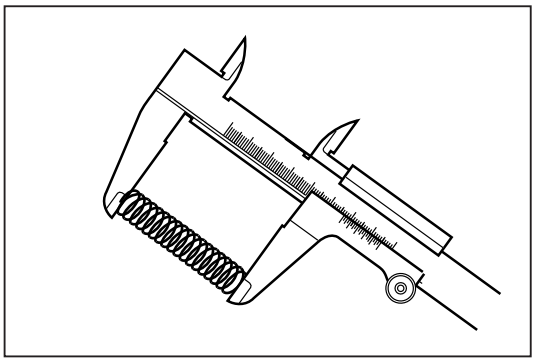
JLU00015-00304

6. Inspection of each part
   (1) Wash the disassembled parts in cleaning solvent.
   (2) Check the pump body for damage.
   (3) Check the rotor set for damage.
   (4) Check the oil pump relief valve for damage.
   (5) Check the oil pump relief valve spring retainer for damage.
   NOTE:
   - Replace the each parts if it exhibits damage.

JLU00016-00305

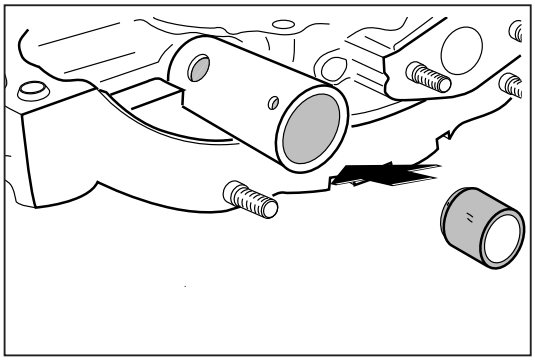
   (6) Check the compression spring for damage. Also, measure its free length.
   Specified Free Length: 57 mm

   NOTE:
   - Replace the compression spring if it exhibits damage or the free length is less than the specified value.



JLU00017-00306

   (7) Apply engine oil to the oil pump relief valve. Insert the oil pump relief valve into the oil pump body. Check to see if the valve slides smoothly.
   NOTE:
   - Replace the oil pump body if the valve fails to slide smoothly.



JLU00018-00307

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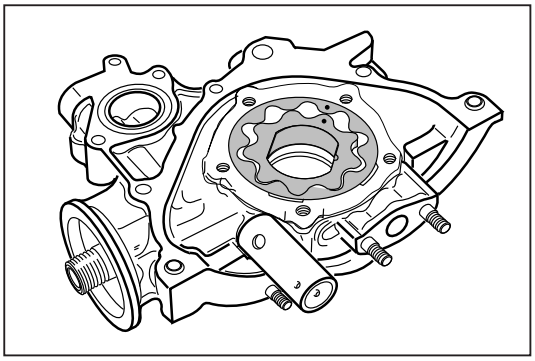
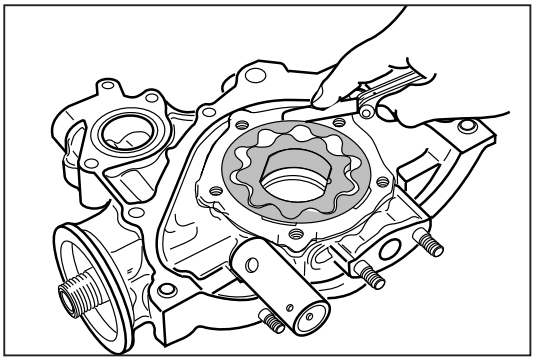
7. Measurement of body clearance, tip clearance and side clearance
   (1) Apply a thin film of engine oil to the rotor mate surface of the oil pump body as well as to the rotor set. Assemble the rotor set in the oil pump body in such a way that the drilled mark may be seen from the outside.



JLU00019-00308

   (2) Measure the body clearance between the oil pump body and the outer rotor, using a thickness gauge.
   Body Clearance: 0.20 - 0.28 mm

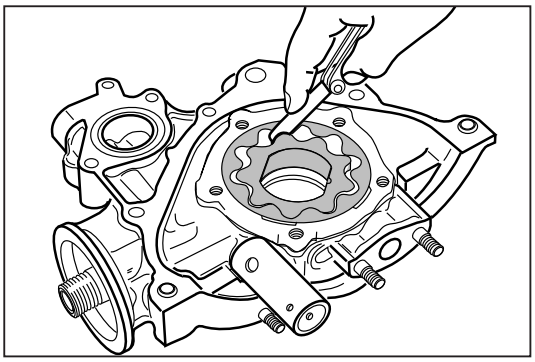
   NOTE:
   - Replace the oil pump if the body clearance exceeds the specified value.



JLU00020-00309

   (3) Measure the tip clearance of the rotor set, using a thickness gauge.
   Tip Clearance: 0.16 - 0.24 mm

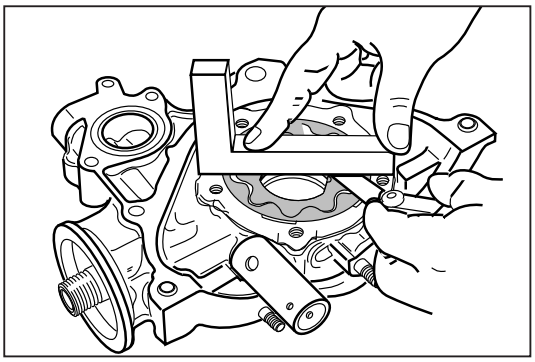
   NOTE:
   - Replace the rotor set if the tip clearance exceeds the specified value.



JLU00021-00310

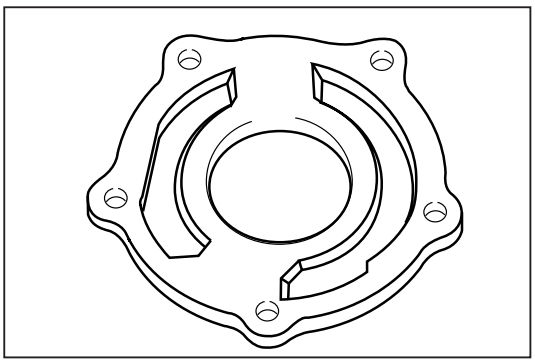
   (4) Measure the side clearance between the oil pump body and the rotor set, using and a straightedge and a thickness gauge.
   Side Clearance: 0.04 - 0.08 mm

   NOTE:
   - Replace the oil pump if the side clearance exceeds the specified value.



JLU00022-00311

8. Check to see if any wear is present at the rotor set mate surface of the pump cover.
   NOTE:
   - Replace the oil pump cover if it exhibits wear.



JLU00023-00312

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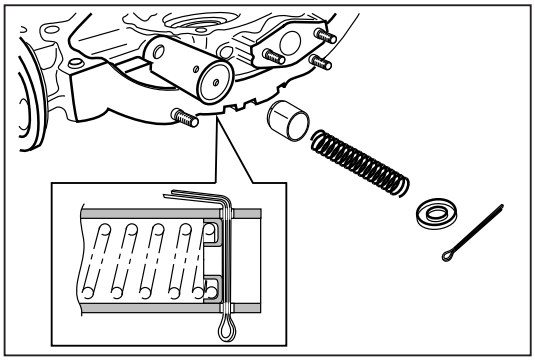
ASSEMBLY

NOTE:
- Wash those parts to be assembled in cleaning solvent. Dry them using compressed air.

WARNING:
- When you use compressed air, be sure to protect your eyes, wearing goggles.

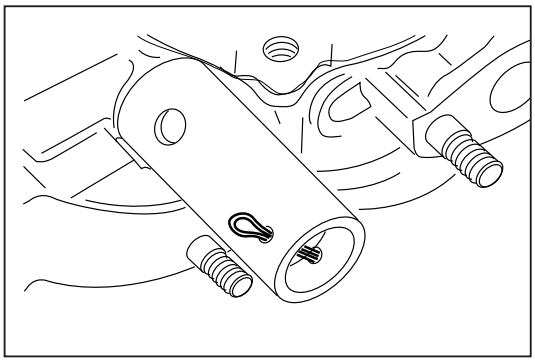
JLU00024-00411

1. Apply engine oil to the relief valve. Then, insert the relief valve into the oil pump body.
2. Insert the compression spring and retainer into the oil pump body.
   CAUTION:
   - Install the retainer in such a direction that its projected side may come at the compression spring side.



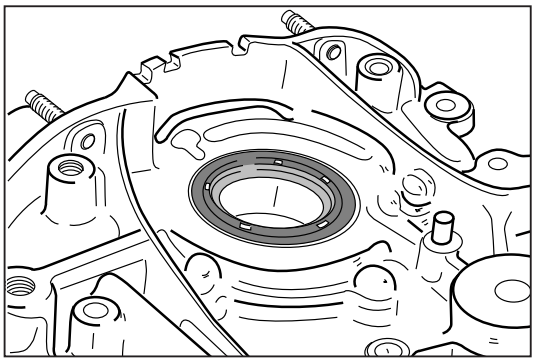
JLU00025-00412

3. Insert a new cotter pin into the retainer while the retainer is being compressed with pliers, etc. Split the end of the cotter pin to form an anchor-like shape.



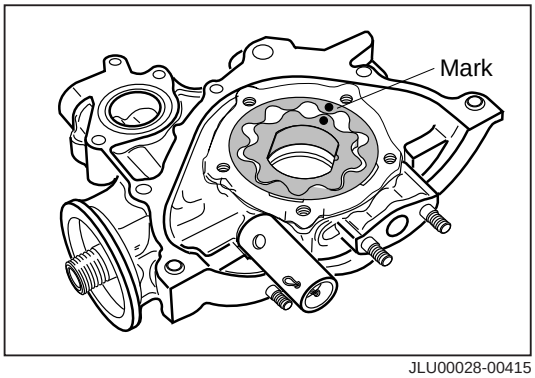
JLU00026-00413

4. Drive a new oil seal into position if the oil seal exists damaged, using a hydraulic press.
   NOTE:
   - Be very careful not damage the oil pump during the removal and the installation of the oil seal.
   - Make sure that the oil seal is not driven into position in a tilted state.



JLU00027-00414

5. Apply engine oil to the rotor set. Assemble the rotor set in the pump body in such a direction that the drilled mark of the rotor may be seen from the outside.



JLU00028-00415

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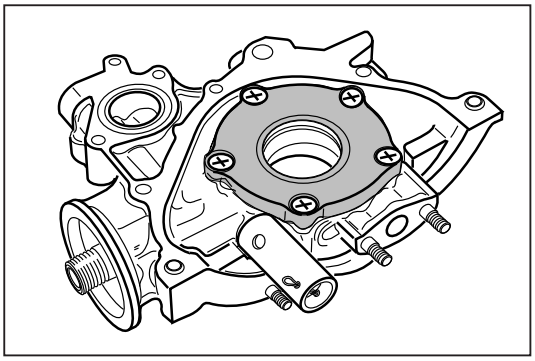
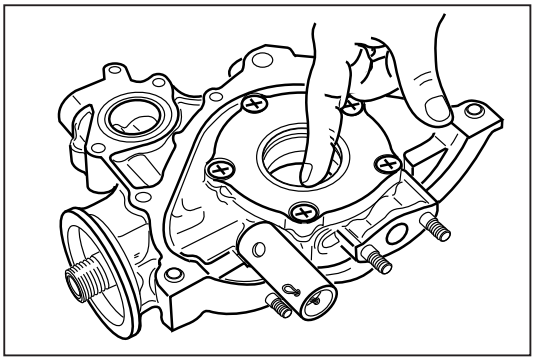
6. Install the oil pump cover. Tighten the cover to the specified torque.
   Tightening Torque: 7.8 - 12.7 N·m



JLU00029-00416

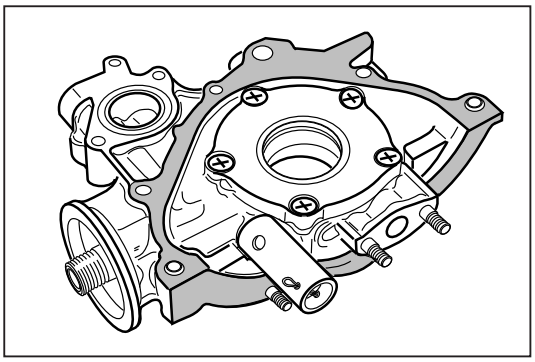
7. Turn the rotor by hand. Ensure that the rotor turns smoothly.
   If the rotor will not turn smoothly, overhaul the oil pump.



JLU00030-00417

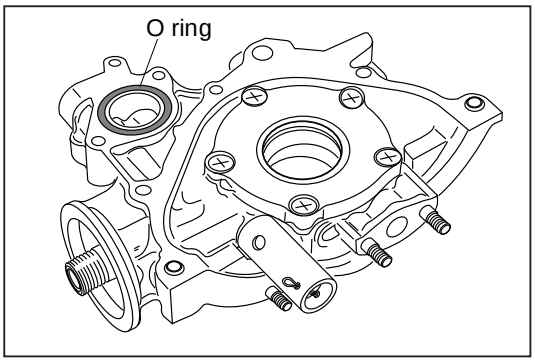
INSTALLATION

1. Remove the gasket material of the sealer from the oil pump and cylinder block.
2. Apply the Three Bond 1207-F (or 1207-C) to the oil pump installation surface of the cylinder block, as indicated in the illustration.



JLU00031-00511

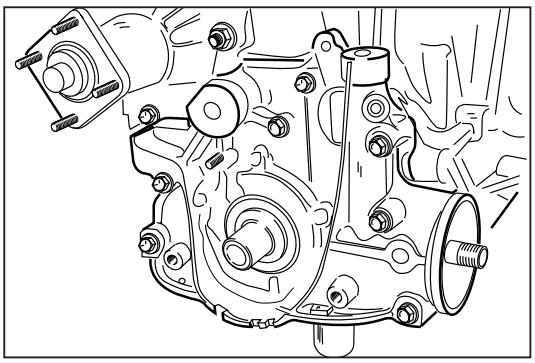
3. Apply engine oil to the inner surface of the oil seal.
4. Replace the O-ring of the oil pump with a new part.



JLU00032-00512

5. Install the oil pump to the cylinder block with the attaching bolts.
   Tightening Torque: 5.9 - 8.8 N·m

   CAUTION:
   - Be very careful not to damage the crankshaft oil seal during the oil pump installation.
   - Be very careful not to drop the O-ring during the oil pump installation.



JLU00033-00513

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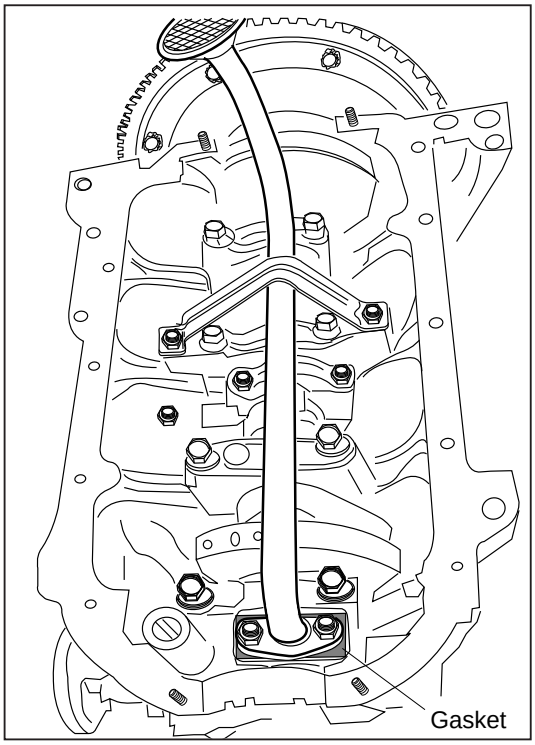
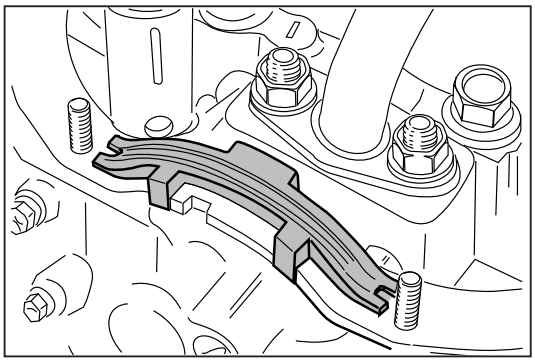
6. Install the oil strainer to the cylinder block with a new gasket interposed.
   Tightening Torque: 14.7 - 21.6 N·m

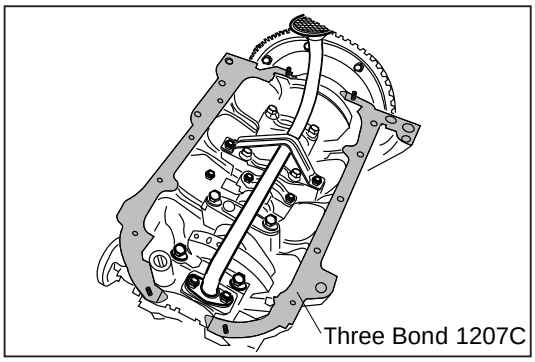


JLU00034-00514

7. Attach the oil pan gaskets to the cylinder block.
   NOTE:
   - The oil pan gaskets are provided at two points; one at the oil pump side and the other at the flywheel side. Fit the protruding section of the gasket into the cut-out section of the cylinder block.

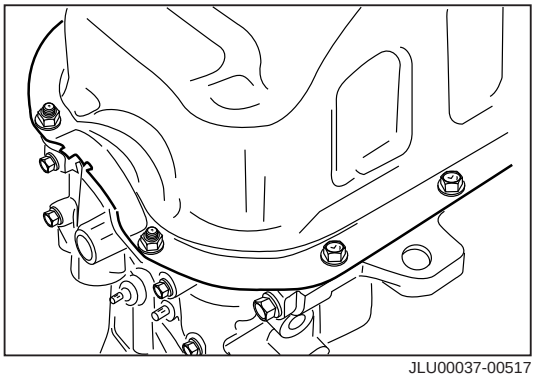

JLU00035-00515

8. Apply the Three Bond 1207-F (or 1207-C) to the cylinder block attaching section of the oil pan as shown in the right figure.
   NOTE:
   - Be sure to apply the Three Bond to both ends of the oil pan gasket in such a way that the applied portions may be overlapped.



JLU00036-00516

9. Install the oil pan to the cylinder block with the attaching bolts and nuts.
10. Tighten the oil pan attaching bolts and nuts to the specified torque evenly over two or three stages.
    Tightening Torque: 6.9 - 11.8 N·m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TIGHTENING TORQUE

Tightening components	Tightening torque		Remarks
	N·m	kgf-m	
Oil pressure switch × Oil pump	11.8 - 19.6	1.2 - 2.0	
Oil pump cover × Oil pump	7.8 - 12.7	0.8 - 1.3	
Oil pump × Cylinder block	5.9 - 8.8	0.6 - 0.9	
Oil strainer × Cylinder block	14.7 - 21.6	1.5 - 2.2	
Oil pan × Cylinder block	6.9 - 11.8	0.7 - 1.2	

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CO

COOLING SYSTEM

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RADIATOR ..... CO– 3
RADIATOR CAP ..... **CO– 3**
RADIATOR RESERVE TANK ..... **CO– 3**
RADIATOR HOSES & PIPES ..... **CO– 4**
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JCO00001-00000

NO. 9710-JE

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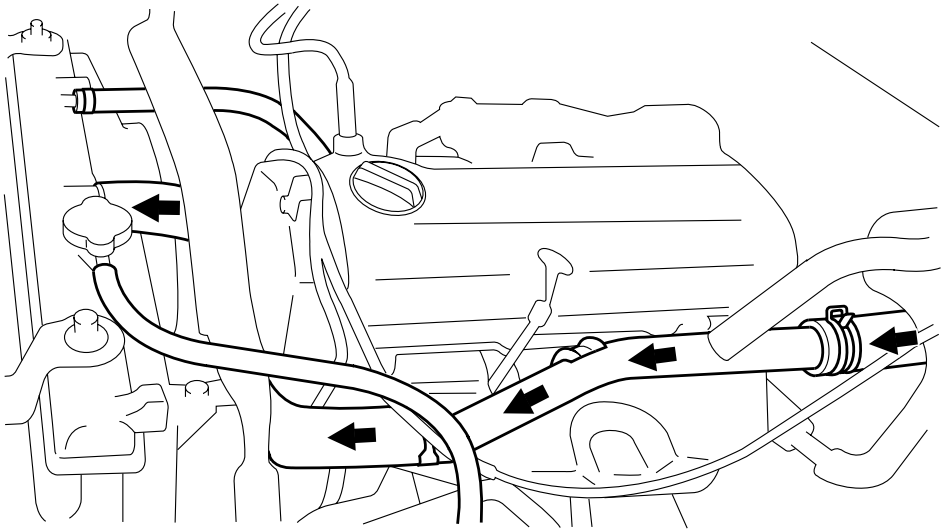
DESCRIPTION

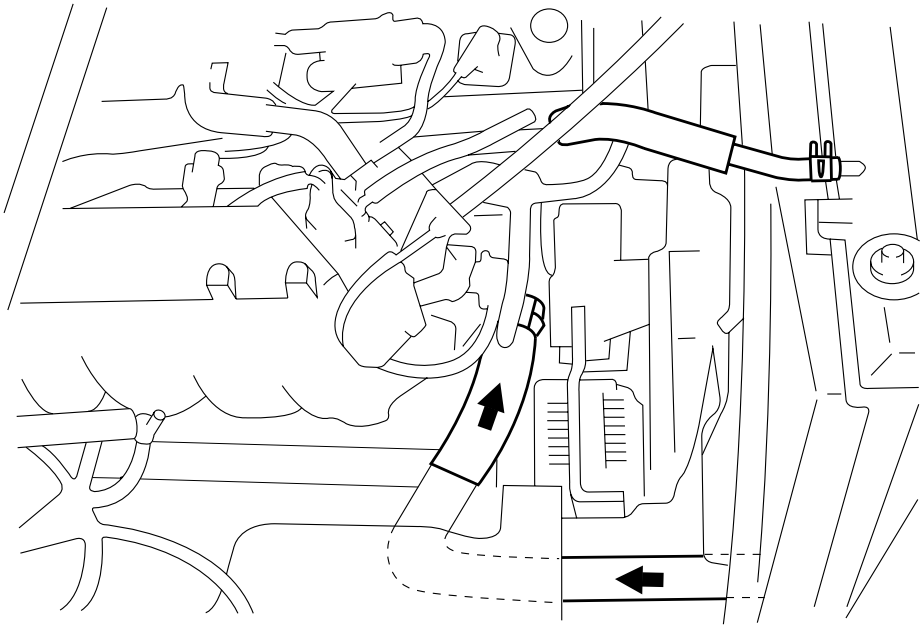
The cooling system is a water-cooled, forced-circulation type. Furthermore, it employs a fluid coupling fan.
The cooling system employs a bottom by-pass type in which the thermostat equipped with a by-pass valve is provided at the inlet side.
The cooling system is composed of the radiator, water pump, thermostat, cylinder head, water jackets of cylinder block, water hoses and their connecting parts.
The total capacity of the cooling water is approximately 5.4 L (for manual transmission models) and 5.3 L (for automatic transmission models)

[HC-E Engine]

[View from left side]



[View from right side]



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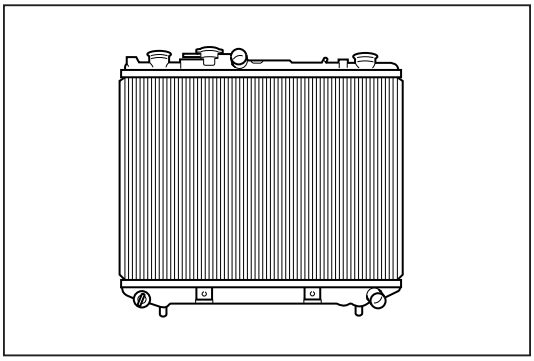
RADIATOR



JCO00003-00002

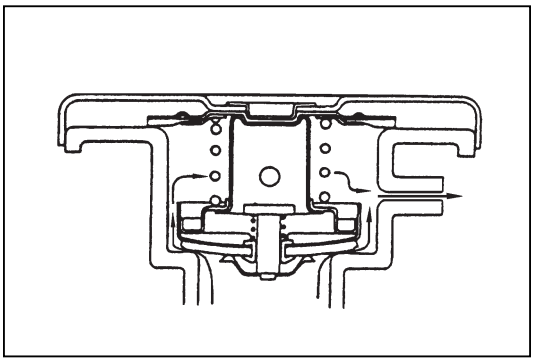
Radiator specification

Item		Specification
Fin pitch	mm	1.6
Radiator water capacity	L	1.66 (M/T) · 1.54 (A/T)
Heat radiating rate	W/h	48.3
Core dimensions (width × height × thickness)	mm	572 × 425 × 27

JCO00004-00000

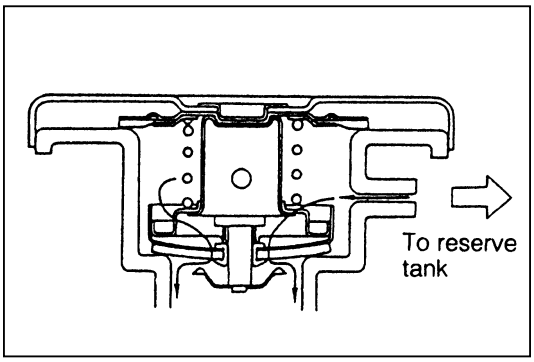
RADIATOR CAP

A pressure type radiator cap is installed at the upper part of the radiator.
The radiator cap has two valves: a pressure regulating valve and a negative pressure valve.
When the pressure of the cooling system exceeds a specified limit, the rising pressure opens the pressure regulating valve of the radiator cap. As a result, the coolant in the radiator flows to the reserve tank.



JCO00005-00003

On the other hand, the negative pressure valve opens when the inner pressure drops below the atmospheric pressure due to a dropped water temperature after the engine has stopped. Thus, the coolant returns from the reserve tank to the radiator.



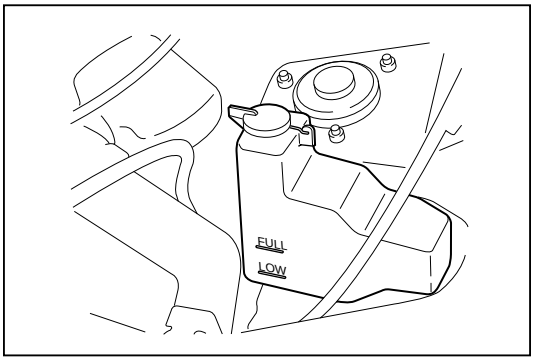
JCO00006-00004

Radiator cap specifications

Item	Specifications
Radiator cap opening pressure kPa (kgf/cm^2)	88.3 (0.9)

RADIATOR RESERVE TANK

A reserve tank with an overflow hose is employed.



JCO00007-00005

Specifications

Total capacity			L	1.1 or more
Cooling water capacity	L	F level		0.6
		L level		0.15

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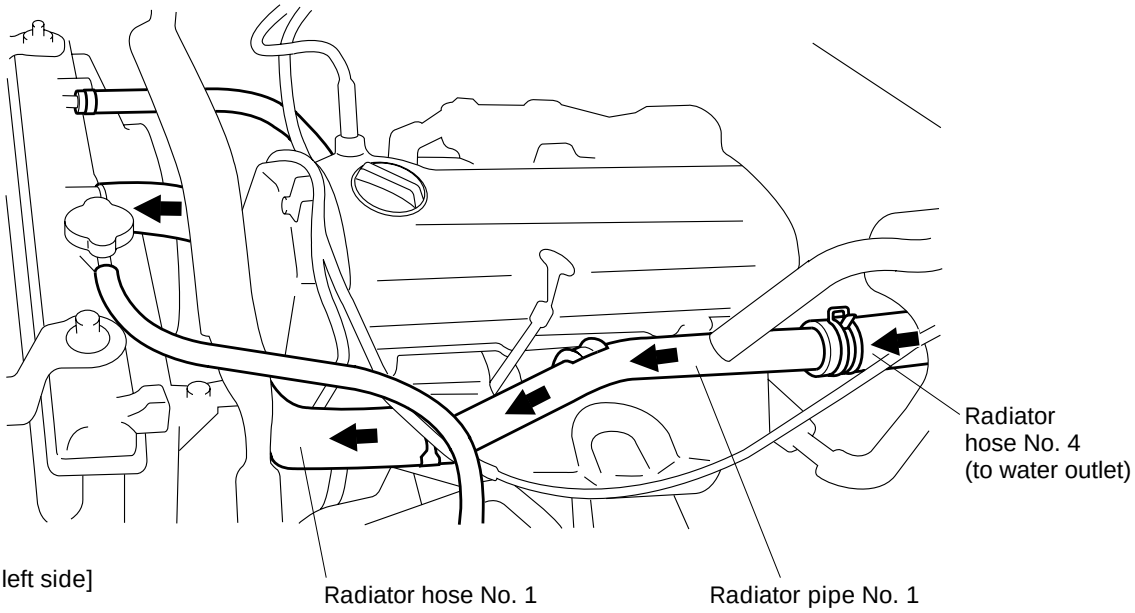
RADIATOR HOSES & PIPES

These components come in four radiator hoses and two radiator pipe subassemblies.

Radiator hose	No. 1 No. 2 No. 4	Radiator pipe No. 1 to radiator upper tank Radiator lower tank to inlet of cylinder block section Outlet at rear of cylinder head to radiator pipe No. 1
Radiator pipe	No. 1	Radiator hose No. 4 to radiator hose No. 1

JCO00008-00000



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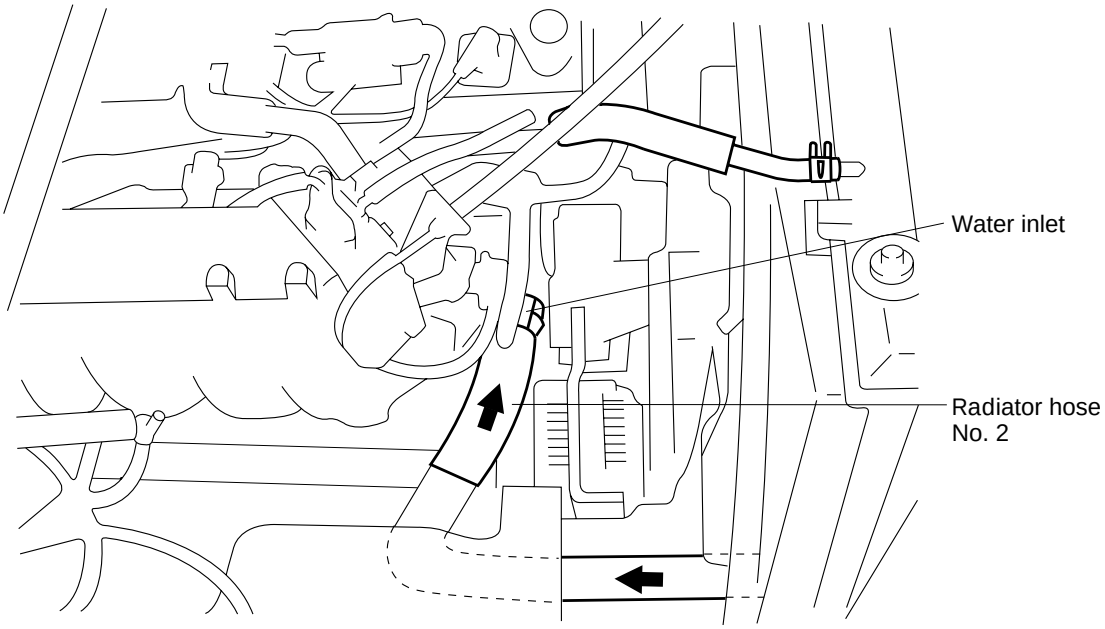

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JCO00000-00006

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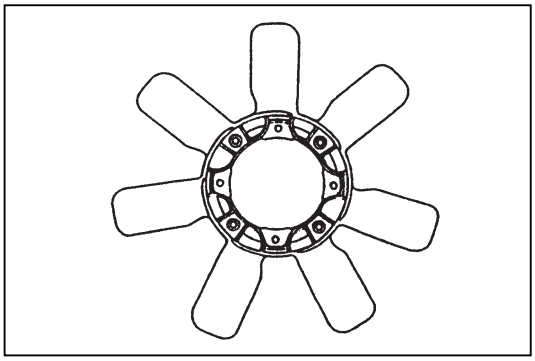
FAN-EQUIPPED FLUID COUPLING

The fan-equipped fluid coupling with a temperature control device is employed in order that the noise level may be reduced.
Furthermore, the drop in engine output due to the installation of cooling fan has been kept to a minimum level.

JCO00009-00000

1. COOLING FAN

The fan made of propylene is a seven-blade fan.



JCO00010-00007

Specifications

Item		Specification
Fan outer diameter	mm	380
Number of blades		7
Type		Axial flow
Air flow rate	m^3/sec	0.40 at 1000 rpm
		0.85 at 2000 rpm

JCO00011-00000

2. FLUID COUPLING WITH FAN

The fluid coupling employs a two-stage temperature control type.
The fluid coupling is available in two kinds. The optimum fluid coupling can be selected and installed in accordance with the vehicle specifications.

JCO00012-00000

Specifications

Item		Specifications	
		M/T	A/T
Fluid coupling outer diameter	mm	136	
Fan revolution speed (when the water pump revolution speed is 4000 rpm)	rpm	1300 at 70ϒC	
		2500 at 80ϒC	2900 at 80ϒC

JCO00013-00000

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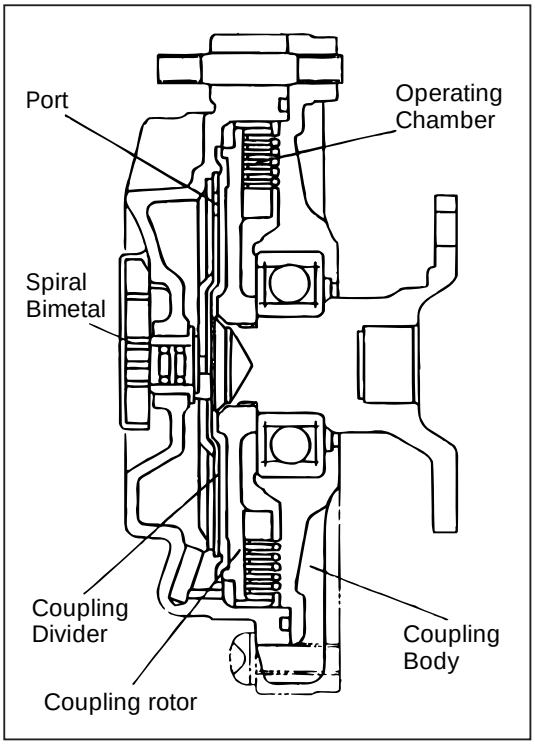
Operation of coupling fan
During cold operation (Below about 55°C)
When the cooling water temperature is low, the port is closed by the coupling divider. Consequently, the silicon oil will not move into the operating chamber. Hence, the coupling body remains at its low speed operation.

During hot operation
(Above about 70°C)
When the spiral bimetal detects the temperature of the air passing through the radiator, this rotates the coupling divider integral with the bimetal shaft. As a result, the silicon oil flowing out from the port enters into the operating chamber, thus pushing the coupling rotor. Consequently, the coupling body is rotated.
As is explained above, the revolution speed of the coupling fan is switched over two stages. In this way, the output loss due to the cooling fan has been kept at a minimum level and the fan noise level has been reduced.



JCO00014-00008

3. WATER PUMP PULLEY

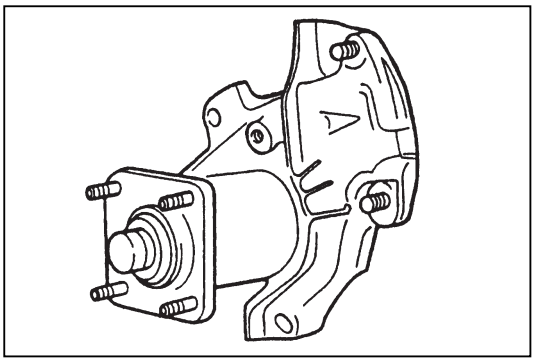
The water pump pulley is made of sheet metal. This pulley is attached to the water pump pulley seat along with the fluid coupling by means of four nuts.
All water pump pulleys use a V rib belt.

JCO00015-00000

Water pump
The water pump used for circulating the cooling water is installed at the front section of the cylinder block.

Specifications

Item		Specifications
Type		Centrifugal type
Delivery output (When shaft revolution speed is 2000 rpm)	L/min	35
Rotor outer diameter	mm	62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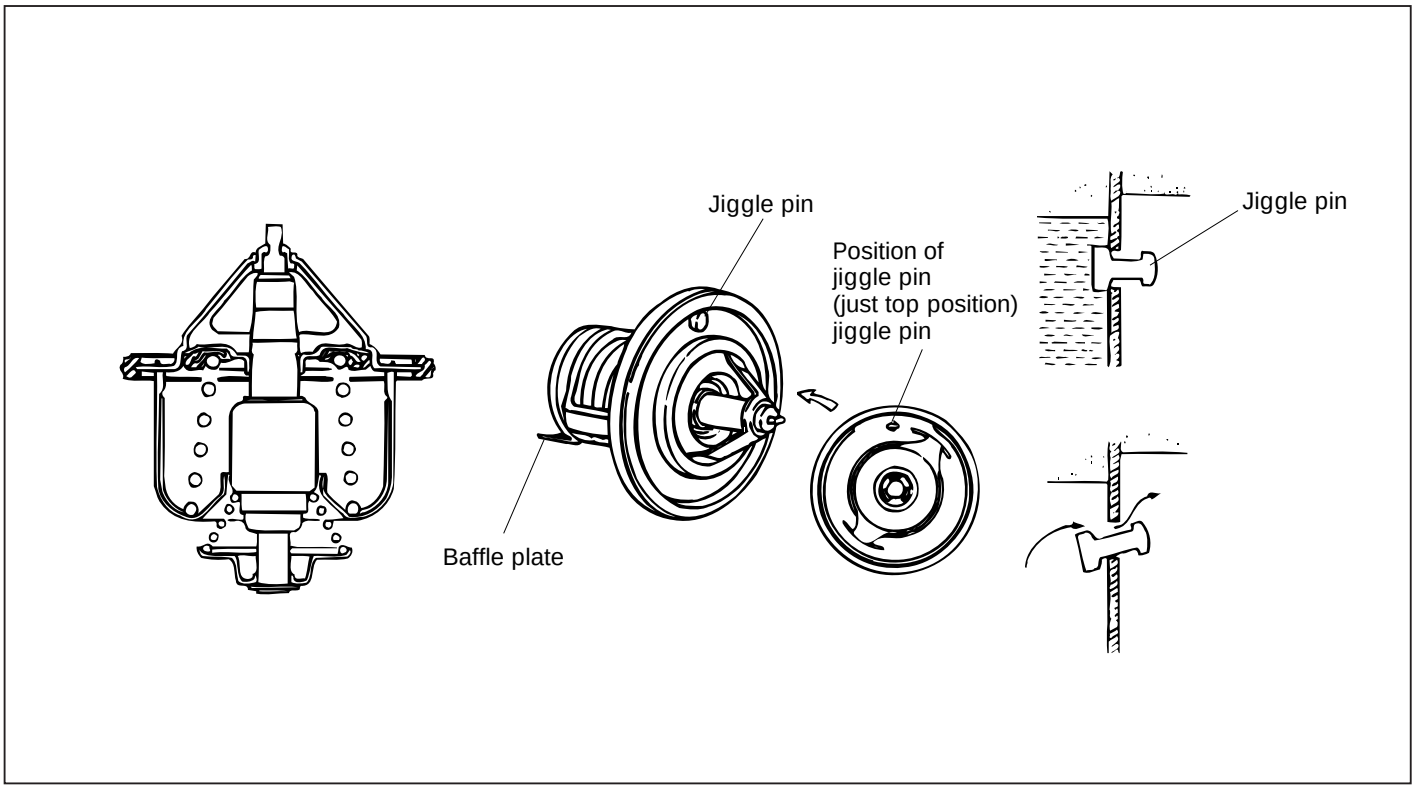
THERMOSTAT

The thermostat is a wax type with a bypass valve. The thermostat helps the engine to warm up quickly by allowing the cooling water to be recirculated through the cylinder block and cylinder head without passing through the radiator.
Furthermore, the thermostat is equipped with a jiggle pin which performs the air bleeding while the engine is stopped. Also, the jiggle pin allows the temperature of the cooling water to rise quickly during the warming-up period.
Moreover, a baffle plate attached to the thermostat makes it possible to get better temperature sensing characteristics.



JCO00017-00011

Thermostat specifications

Item		Standard specifications	Cold region specifications
Type		Wax type	
Valve opening temperature	℃	78	84
Valve full opening temperature	℃	91	97

JCO00018-00000

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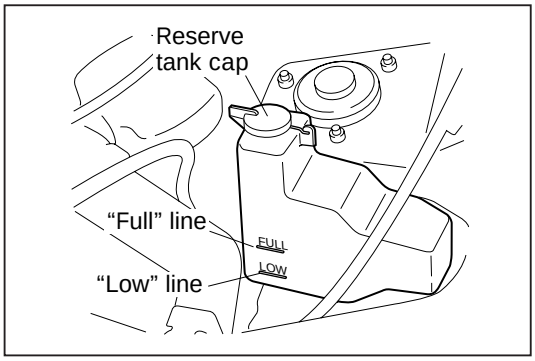
PRECAUTIONS

- As regards water to be used as cooling water, use soft water which does not contain salts of minerals, calcium, magnesium and so forth.
- If the coolant gets to the vehicle body, immediately flush away the coolant using water.
- Never open the radiator cap when the cooling water is hot.
  WARNING:
  - The inside of the radiator is under a pressurized condition when the cooling water is hot. Therefore, if the radiator cap should be removed, the cooling water will blow off, possibly causing injuries such as scald.

JCO00019-00000

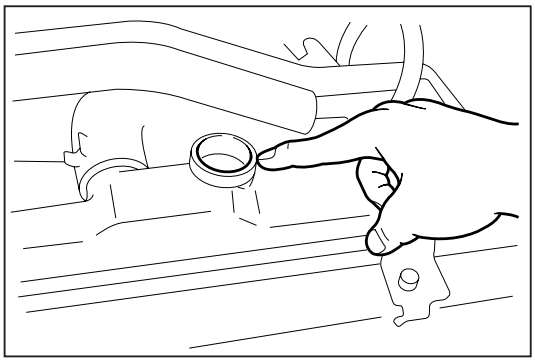
CHECK & CHANGE OF ENGINE COOLANT

1. Check of coolant level
   Check to see if the coolant level is between the LOW and FULL lines of the reserve tank.
   If the coolant level is near the low level or below the low level, add the coolant up to the full level.



JCO00020-00012

2. Check of coolant quality
   There should not be any excessive deposits of rust or water scales around the radiator cap or the radiator filler hole. Also, the coolant should be free of oil.
   Change the coolant if it is excessively dirty or the time due to change the coolant has already arrived.
   WARNING:
   - Never open the radiator cap when the engine is hot.

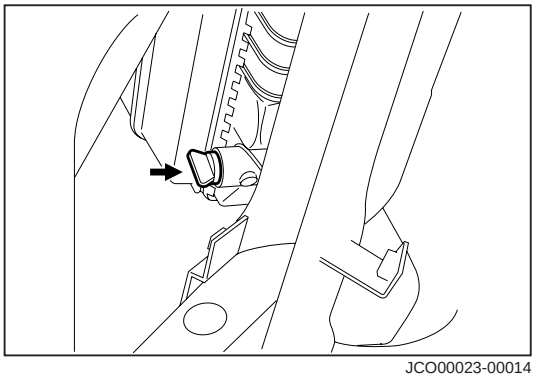


JCO00021-00013

3. Change of engine coolant
   (1) Remove the radiator cap.
   WARNING:
   - Never open the radiator cap and/or the drain plug when the engine is still hot. Care must be exercised to avoid getting scalded.

JCO00022-00000

   (2) Remove the engine under cover.
   (3) Place an adequate container below the radiator drain plug. Drain the coolant by removing the drain plug.
   (4) Close the drain plug.
   (5) Fill the system with water.
   (6) Start the engine, and stop it.
   (7) Repeat the steps (1) through (5) two to three times.
   NOTE:
   - Replace the drain plug gasket with a new one.



JCO00023-00014

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(8) Fill the radiator and reserve tank with antifreeze solution in accordance with the instructions of the manufacturer of the antifreeze solution.

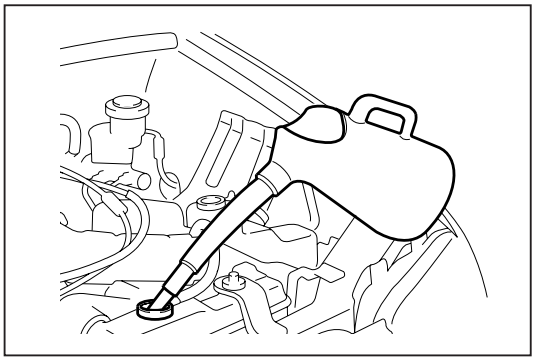
CAUTION:

- Use a Good brand of ethylene-glycol base antifreeze solution.

  Coolant Capacity (Vehicle with front heater):

  5.3 liter (for automatic transmission)

  5.4 liter (for manual transmission)



JCO00024-00015

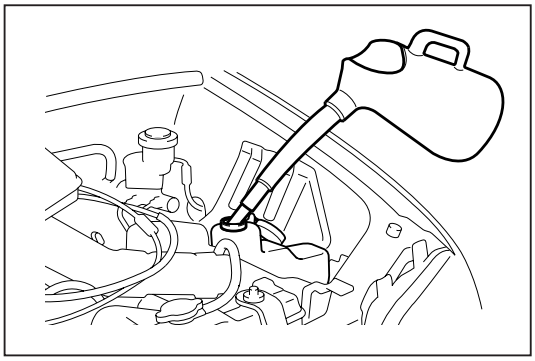
(9) Fill the system with water.

(10) Start the engine. Check the coolant level. Add water, as required.

(11) Tighten the radiator cap.

(12) Warm the engine. Afterwards, allow the coolant to cool down to the atmospheric temperature. Recheck the coolant level at the reserve tank. Add coolant to the full level, as required.

If no coolant remains at all in the reserve tank, recheck the coolant level in the radiator. Replenish the radiator with water, as required. Replenish the reserve tank with coolant up to the full level.



JCO00025-00016

NOTE:

- Here, the coolant refers to the mixture of water and antifreeze that has been mixed in accordance with the instructions of the antifreeze manufacturer.

(13) Install the engine under cover with attaching bolts.

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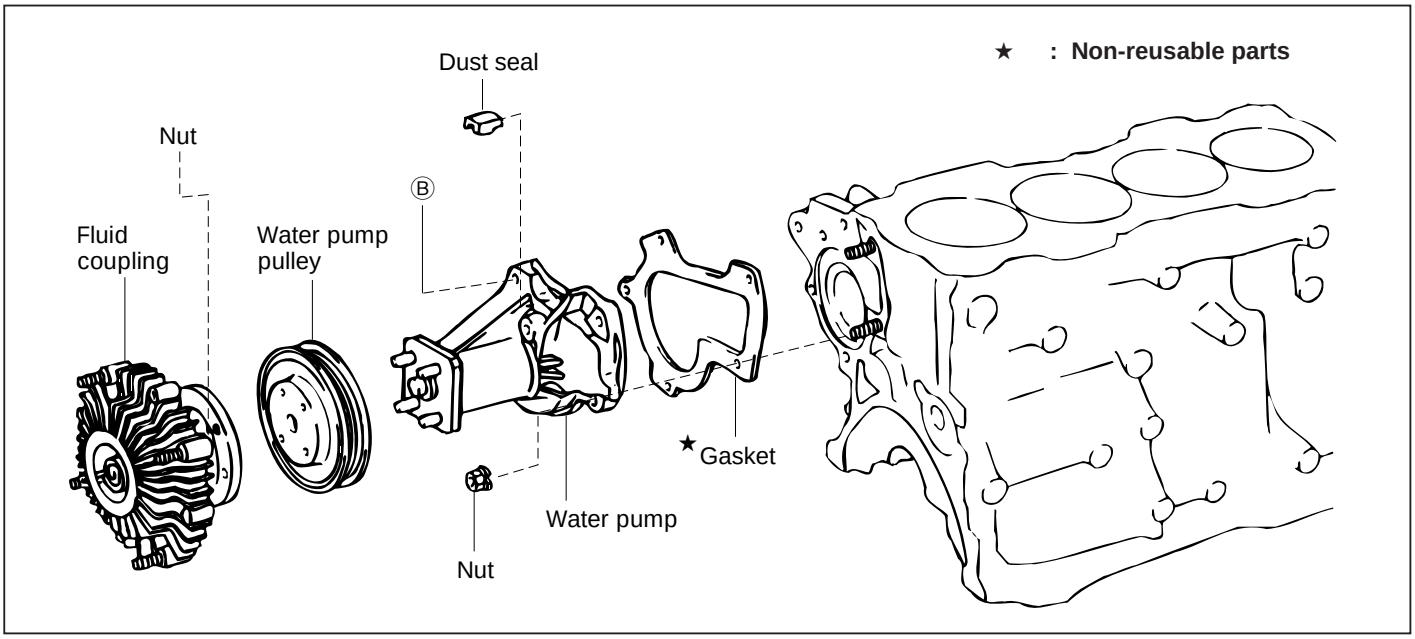
WATER PUMP

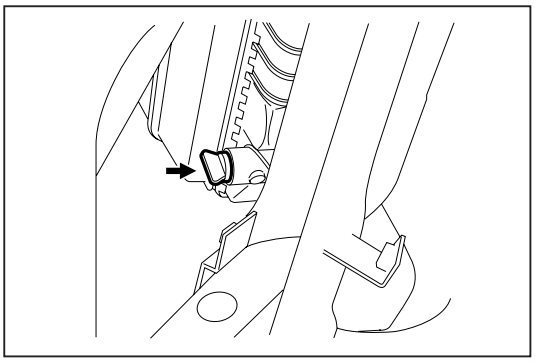
COMPONENTS



JCO00026-00017

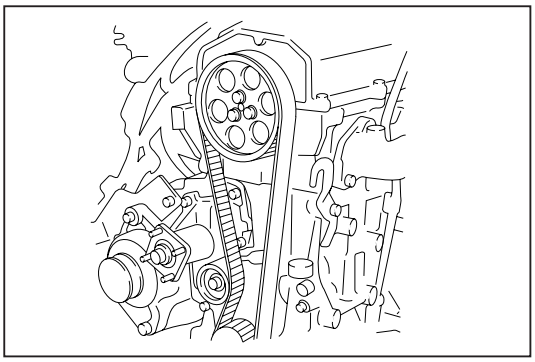
REMOVAL OF WATER PUMP

1. Disconnect the battery ground cable from the negative (–) terminal of the battery.
2. Remove the engine under cover.
3. Drain the coolant. (See page CO–8.)
   Open the radiator cap and drain plug, and allow the coolant to drain into a container.
   WARNING:
   - Never open the radiator cap and/or drain plug. When the engine is hot.



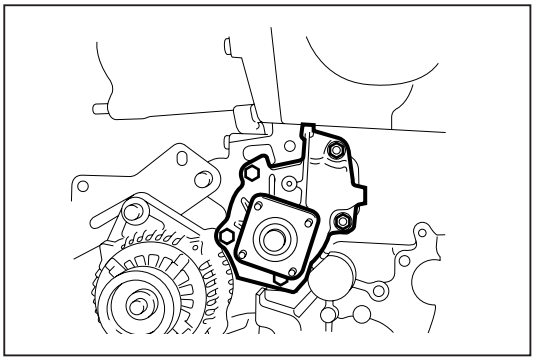
JCO00027-00018

4. Remove the timing belt.
   (Refer to the EM section.)



JCO00028-00019

5. Remove the water pump by removing the attaching bolts and nuts of the water pump.



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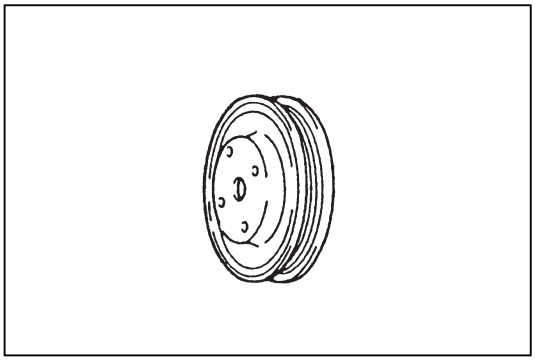
INSPECTION OF WATER PUMP-RELATED PARTS

1. Check the water pump pulley for damage or deformation.
   Replace the water pump if it exhibits damage or deformation.



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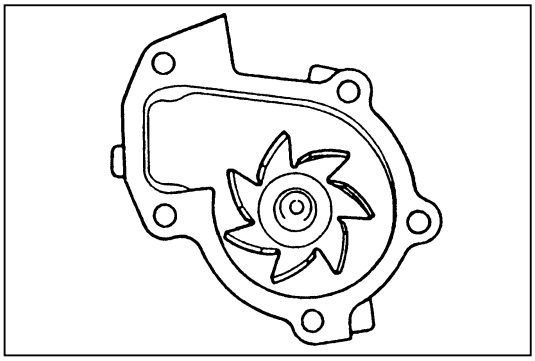
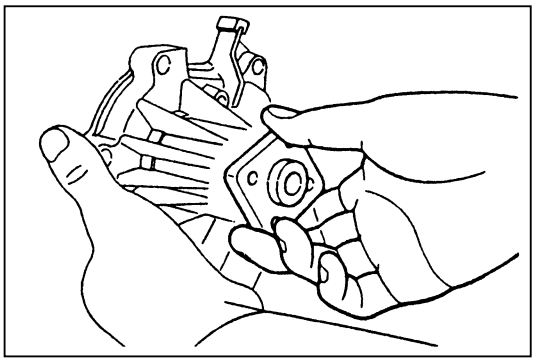
2. Visually inspect the water pump rotor for damage or deformation.
   Replace the water pump if the water pump rotor exhibits damage or deformation.



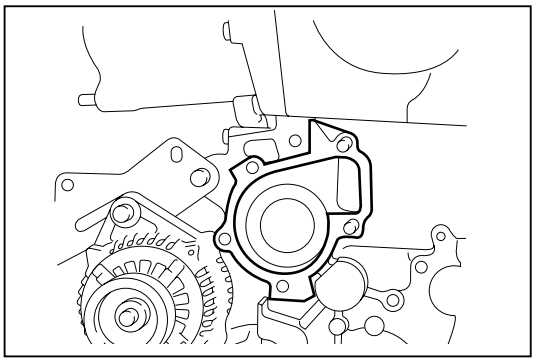
JCO00031-00022

3. Ensure that the water pump rotates smoothly by hand.
   Replace the water pump if it will not rotate smoothly.



JCO00032-00023

4. Check the water pump cover section of the cylinder block for damage or wear.
   Replace the cylinder block if the water pump cover section exhibits damage or wear.



JCO00033-00024

INSTALLATION OF WATER PUMP

1. Remove the gasket material from the water pump installing surface of the cylinder block, using a gasket scraper.

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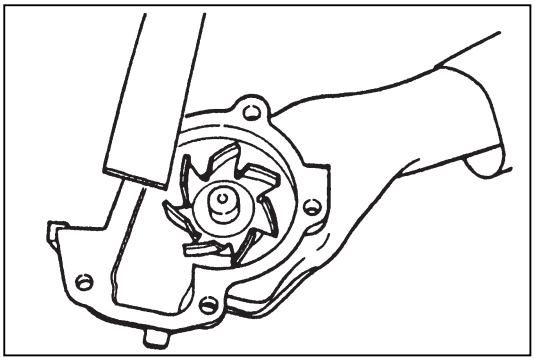
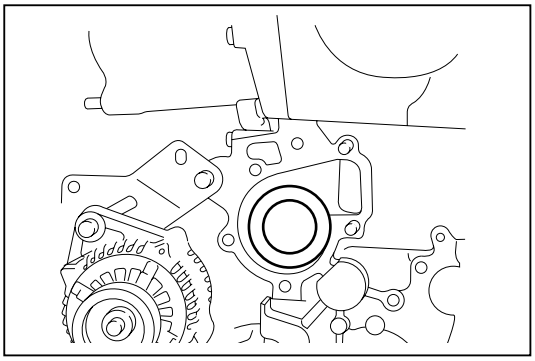
2. Remove the gasket material from the water pump, using a gasket scraper.



JCO00035-00025

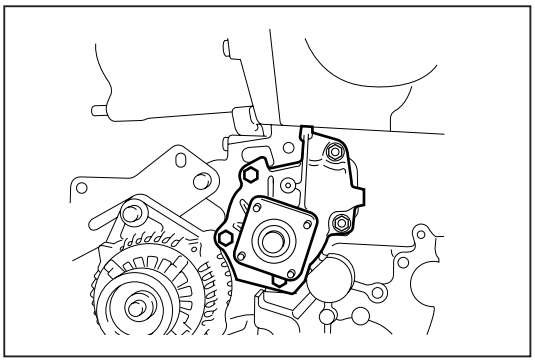
3. Install a new gasket to the cylinder block.



JCO00036-00026

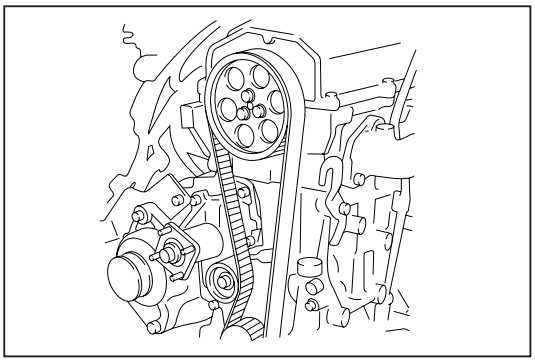
4. Install the water pump to the cylinder block. Tighten the attaching bolts and nuts evenly over two or three stages to the specified torque.
   Tightening Torque:
   14.7 - 21.6 N·m (1.5 - 2.2 kgf-m)

   NOTE:
   - After tightening bolts, ensure that the water pump rotates smoothly by hand.



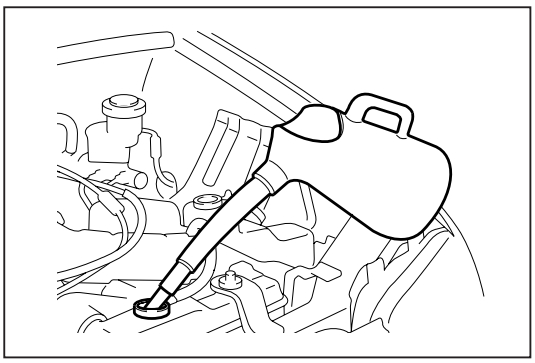
JCO00037-00027

5. Install the timing belt.
   (Refer to the EM section.)



JCO00038-00028

6. Fill coolant.
   (See page CO–9.)
7. Install the engine under cover.
8. Connect the battery ground cable to the negative (–) terminal of the battery.



JCO00039-00029

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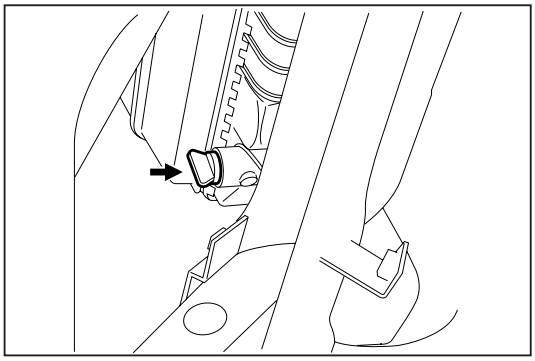
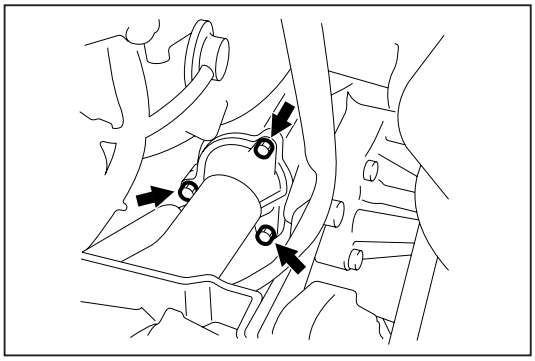
THERMOSTAT

REMOVAL OF THERMOSTAT

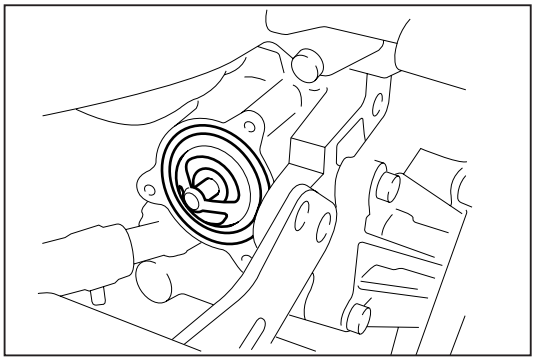
1. Disconnect the ground cable terminal from the negative (–) terminal of battery.
2. Drain the coolant
   (See page CO–8.)
   WARNING:
   - Never open the radiator cap and/or drain plug when the coolant is hot.


JCO00040-00030

3. Remove the power steering vane pump assembly.
   (Refer to the EM section.)
4. Remove the radiator hose No. 2 from the water inlet.
   CAUTION:
   - Cover the alternator to prevent entering the cooling water to the alternator.

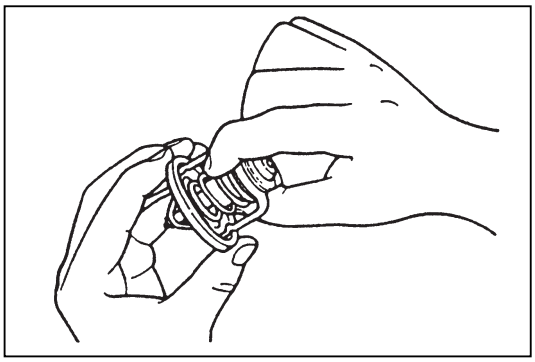

JCO00041-00031

5. Remove the water inlet and the thermostat.

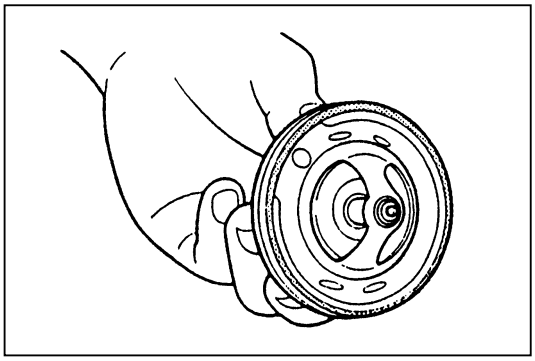

JCO00042-00032

INSPECTION OF THERMOSTAT

1. Ensure that the thermostat valve is closed completely at room temperature 20°C and the spring has no play.
   Replace the thermostat if the valve is open or the spring has a play.


JCO00043-00033

2. Check the rubber grommet of the thermostat for damage or crack.
   Replace the thermostat if the rubber grommet exhibits damage or crack.


JCO00044-00034

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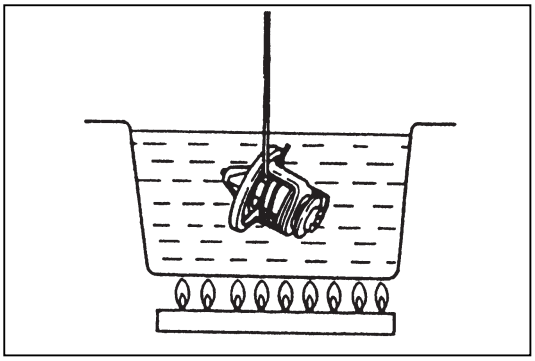
3. Immerse the thermostat in water, and check the valve opening temperature by heating the water gradually.

Specifications	Valve opening temperature ϒC	Valve lift
Cold region specifications	82 - 86	8.5 mm or more at 97ϒC
Standard specifications	76 - 80	8.5 mm or more at 91ϒC

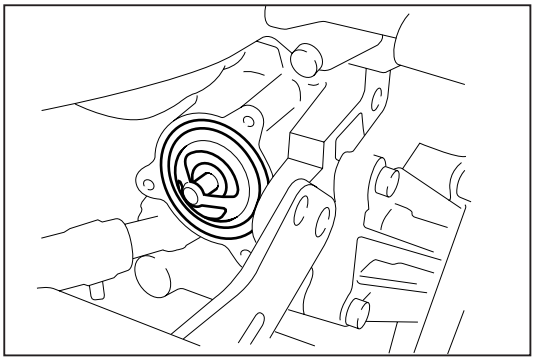
Replace the thermostat if the valve operation fails to conform to the specifications.



JCO00045-00035

INSTALLATION OF THERMOSTAT

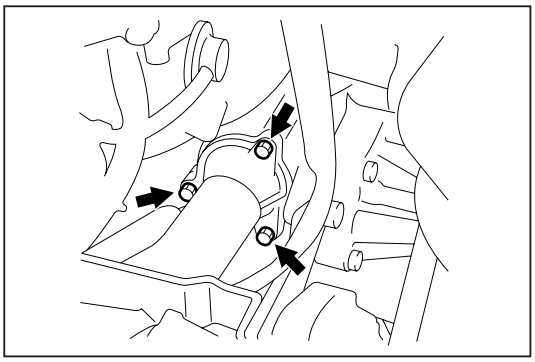
1. Assemble the thermostat in such a way that the jiggle pin comes exactly at the top of the engine.
   NOTE:
   - The thermostat should be installed in such a way the jiggle pin may face upward. Failure to observe this caution may cause engine malfunction.



JCO00046-00036

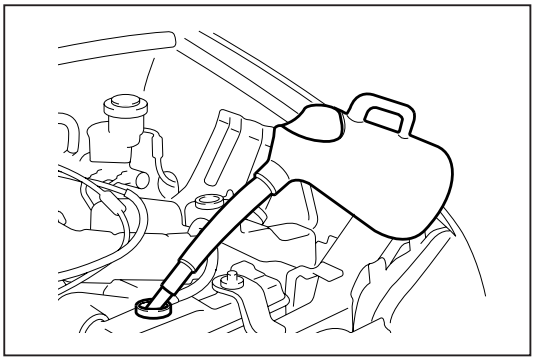
2. Install the water inlet.
   Tightening Torque: 5.9 - 8.8 N·m (0.6 - 0.9 kgf-m)

3. Install the power steering vane pump assembly into position.
   (Refer to the EM section.)



JCO00047-00037

4. Fill coolant.
   (See page CO–9.)
5. Connect the battery ground cable to the negative (–) terminal of battery.
6. Start the engine and check it for leakage.
   Repair the leaky point if the leakage exists.



JCO00048-00038

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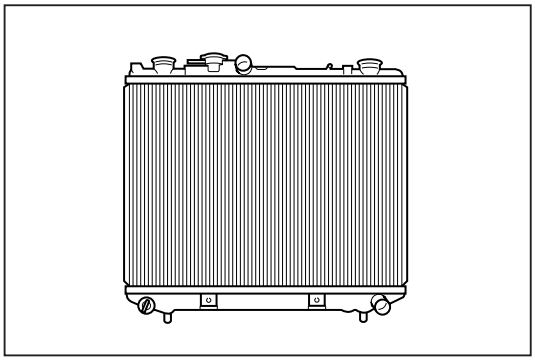
RADIATOR

CLEANING OF RADIATOR

Using water or steam cleaner, remove mud and dirt from the radiator core.

CAUTION:

- When using a high pressure type cleaner, be careful not to deform radiator core fins.
- Keep a distance of more than 40 - 50 cm between the radiator core and cleaner nozzle when the cleaner nozzle pressure is 2.9 - 3.4 MPa (30 - 35 kgf/cm^2). Also, the injection angle of pressurized water should be right angles to the radiator.



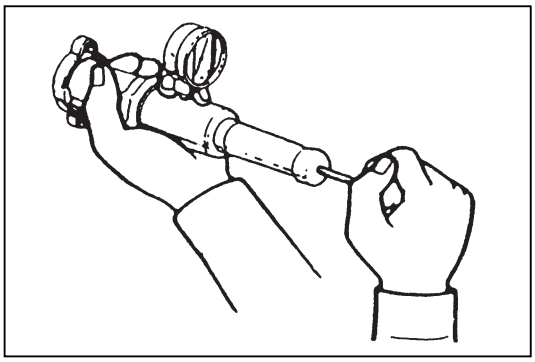
JCO00049-00039

INSPECTION OF RADIATOR

1. Check of radiator cap
   (1) Check the radiator cap by means of a radiator cap tester to see if the relief valve opens at a pressure of 74 - 103 kPa (0.75 - 1.05 kgf/cm^2).
   If the radiator cap does not conform to the specification, replace the radiator cap.

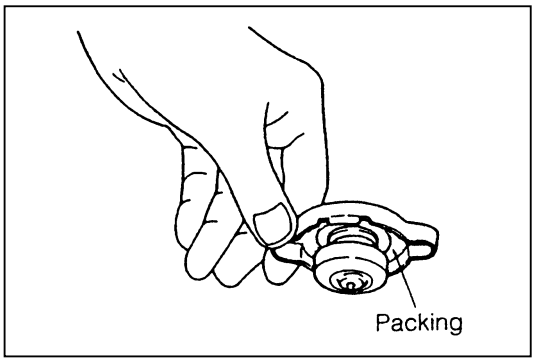
   WARNING:

   - Never open the radiator cap when the engine is hot.



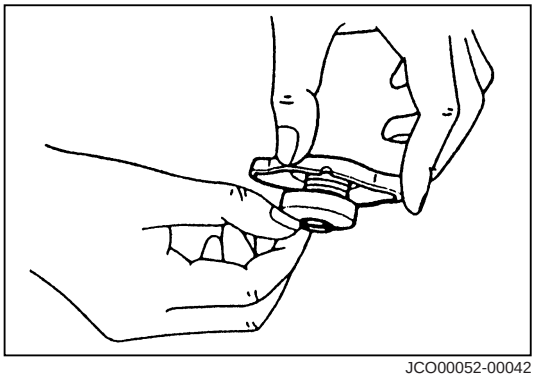
JCO00050-00040

   (2) Check the seal packing of the radiator cap for damage.
   Replace the radiator cap with a new one, if any damage exists.



JCO00051-00041

   (3) Lift the valve at the vacuum side with your fingers.
   Ensure that the valve is functioning properly.
   Replace the radiator cap with a new one, if the valve fails to function.



JCO00052-00042

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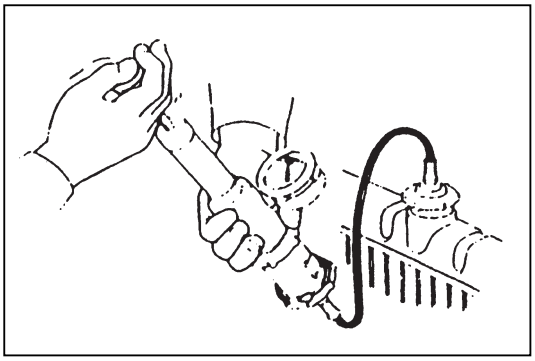
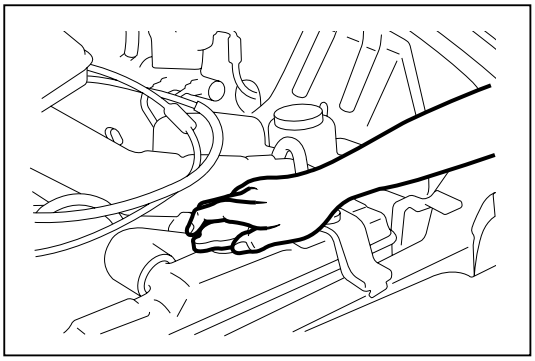
2. Check of cooling system for leakage
   (1) Fill the radiator with coolant. Attach a radiator cap tester.
   (2) Warm up the engine.
   (3) Apply a pressure of 118 kPa (1.2 kgf/cm^2) to the cooling system by means of a radiator tester.
   If the pressure drops, check the hoses, radiator, water pump and heater for evidence of leakage.
   If no external leakage is found, check the heater core, cylinder block, cylinder head, oil cooler and throttle body for evidence of leakage.
   Check the hoses for deterioration, cracks, bulge or damage.
   Replace the defective part(s) if necessary.
   (4) Remove the radiator cap tester from the radiator.
   WARNING:
   - Never remove the radiator cap tester when the coolant temperature is high.

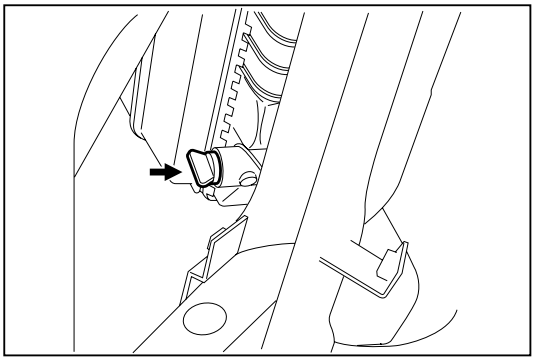

JCO00053-00043

REMOVAL OF RADIATOR

1. Disconnect the battery ground cable terminal from the negative (–) terminal of the battery.
2. Drain the coolant as follows:
   (1) Remove the radiator cap.
   WARNING:
   - Never open the radiator cap and/or drain plug when the coolant is hot.

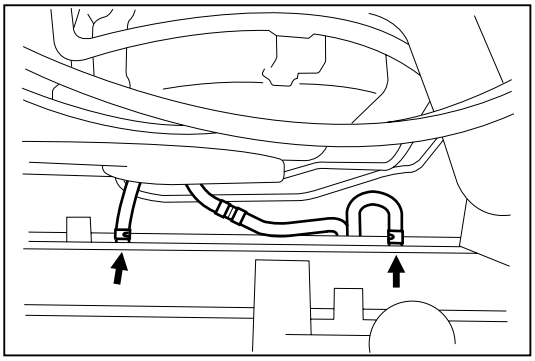

JCO00054-00044

   (2) Remove the engine under cover.
   (3) Place a suitable container below the radiator drain plug. Drain the coolant by removing the drain plug.
   (4) Tighten the drain plug.


JCO00055-000045

3. Disconnect the two oil cooler hoses for the automatic transmission. (A/T vehicle for European market only)
   NOTE:
   - Receive the oil with a suitable container because the torque converter oil flows out.
   - Prevent oil flowing by installing suitable plugs to the disconnected hoses.

   CAUTION:
   - Never reuse the oil cooler hoses and hose bands for automatic transmission use. Failure to observe this caution will cause the hoses to be disconnected.


JCO00056-00046

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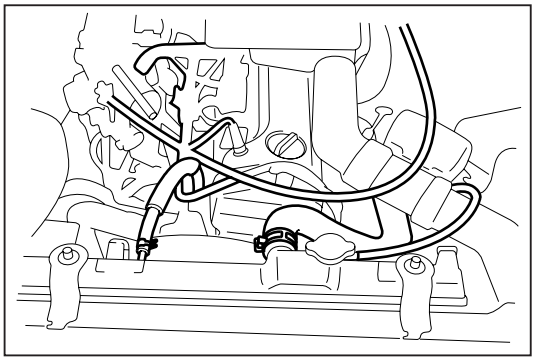
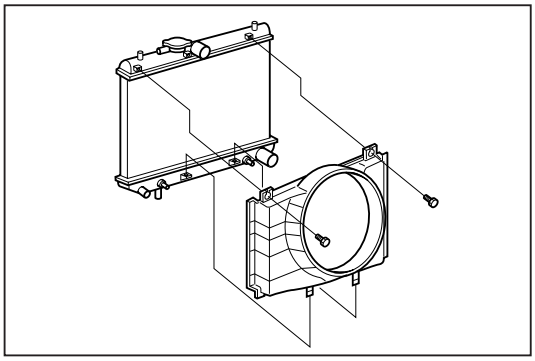
4. Removal of radiator
   (1) Temporarily detach the power steering vane pump.
   (2) Remove the radiator hose No. 1 and the breather hoses at radiator side.
   CAUTION:
   - When the radiator hose is loosened, be sure to protect the alternator because the coolant flows out.

   (3) Disconnect the radiator hose No. 2 from the radiator lower tank.

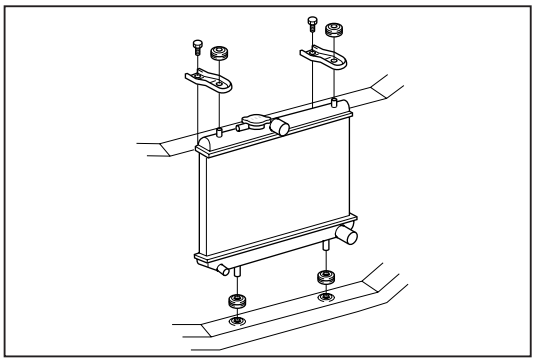
   (4) Remove the two attaching bolts of the radiator upper tank.
   (5) Remove the two attaching bolts of the fan shroud. Then, disconnect the lock section of the fan shroud from radiator.
   (6) Remove the four attaching nuts of the cooling fan.
   (7) Remove the fan shroud and the cooling fan at the same time.
   (8) Remove the radiator.



JCO00057-00047



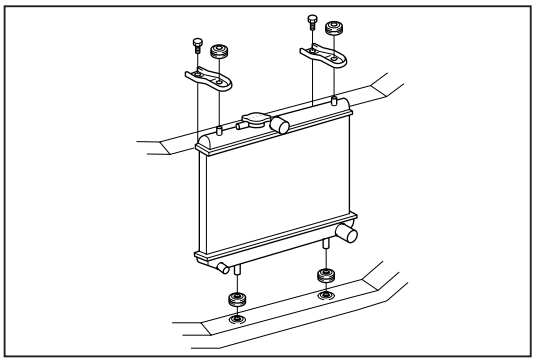
JCO00058-00048



JCO00000-00049

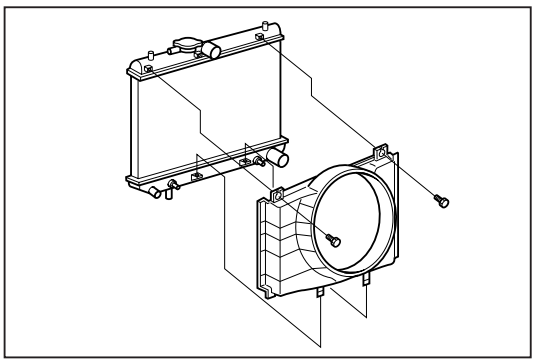
INSTALLATION OF RADIATOR

1. Radiator installation
   (1) Place the radiator fan shroud to the cooling fan side.
   (2) Install the radiator in the engine room.
   NOTE:
   - Before attaching the fan shroud to the radiator, insert the lock section of the fan shroud to the lower section of the radiator.



JCO00060-00050

   (3) Tighten the two attaching bolts of the radiator upper tank.
   (4) Tighten the two attaching bolts of the fan shroud.



JCO00061-00051

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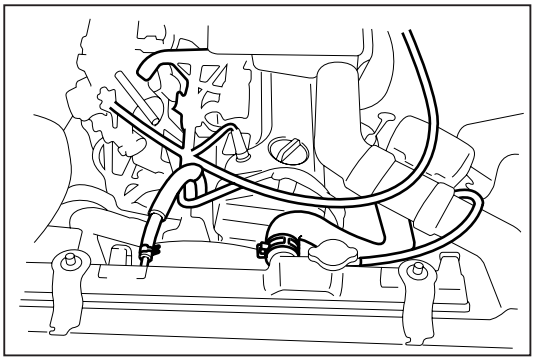
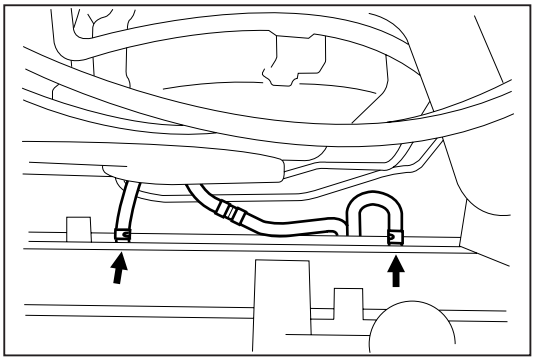
(5) Connect the radiator hose No. 1 and the breather hoses to the radiator upper tank.
(6) Connect the radiator hose No. 2 to the radiator lower tank.

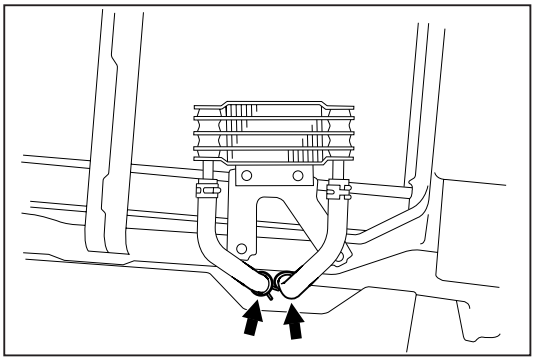

JCO00062-00052

(7) Connection of oil cooler hoses (A/T vehicle for European market only)
① Remove the oil cooler hoses.
② Wipe off any oil from the connecting section of the oil cooler hoses.
③ Connect new oil cooler hoses. Install new hose clips.

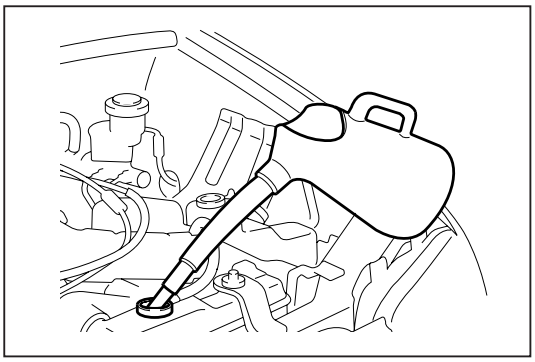
CAUTION:
- Never reuse the oil cooler hoses and hose clips.
- Make sure that no oil or dirt gets to the connected sections.
- Failure to observe this caution will cause the hoses to be disconnected.


JCO00063-00053

(8) Add automatic transmission oil
(See the Chassis Workshop Manual)
(9) Install the power steering vane pump.


JCO00064-00054

2. Fill the coolant.
(See page CO–9.)
3. Connect the battery ground cable to the negative (–) terminal of the battery.
4. Start the engine and check it for leakage.
Repair the leaky point if leakage exists.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TIGHTENING TORQUE

Tightening component	Tightening torque		Remark
	N·m	kgf-m	
Cylinder head × Water temperature sensor	24.5 - 34.3	2.5 - 3.5	Dry
Cylinder block × Water inlet	5.9 - 8.8	0.6 - 0.9	Dry
Cylinder block × Water pump	14.7 - 21.6	1.5 - 2.2	Dry
Fluid coupling × Water pump pulley × Water pump	10 - 18	1.0 - 1.8	Dry
Cooling fan × Fluid coupling	4.3 - 6.5	0.44 - 0.66	Dry

JCO00066-00000

SERVICE SPECIFICATION

Coolant capacity w/heater [Excluding 1.1 L for reserve tank]			5.4 L (M/T) · 5.3 L (A/T)
Radiator cap	Relief valve opening pressure		
		Standard	73.5 - 103.0 kPa (0.75 - 1.05 kgf/cm^2)
		Minimum	58.8 kPa (0.6 kgf/cm^2)
Thermostat	Valve opening temperature		
	Valve lift	Cold region specifications	82 - 86ϒC
		Standard specifications	76 - 80ϒC
		Cold region specifications	8.5 mm or more at 97ϒC
		Standard specifications	8.5 mm or more at 91ϒC

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DAIHATSU

TERIOS

J100

IG

IGNITION SYSTEM

WIRING DIAGRAM ..... IG– 2
SPARK TEST ..... IG– 3
SPARK PLUG ..... IG– 3
POWER SUPPLY ..... IG– 4
IGNITION WIRE ..... IG– 5
IGNITION COIL ..... IG– 5
CAM ANGLE SENSOR ..... IG– 5
EFI ECU ..... IG– 7
IGNITION TIMING ..... IG– 9
TIGHTENING TORQUE IG–10
SSTs IG–10

JIG00001-00001

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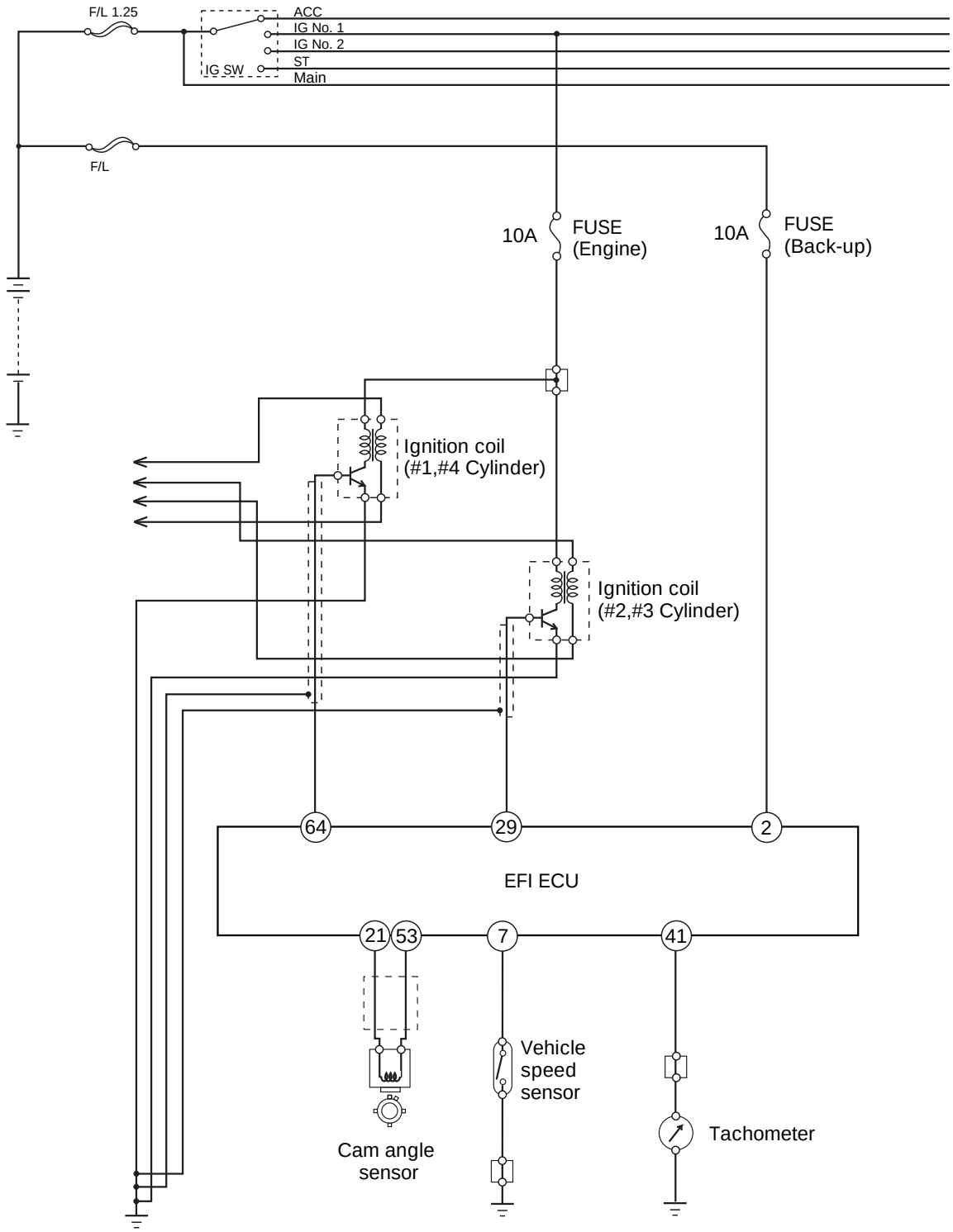
WIRING DIAGRAM



JIG00002-00011

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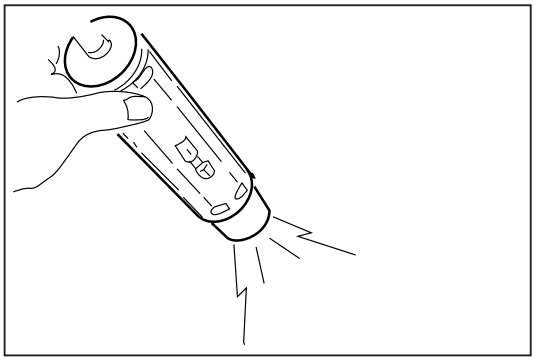
SPARK TEST

SPARK PLUG

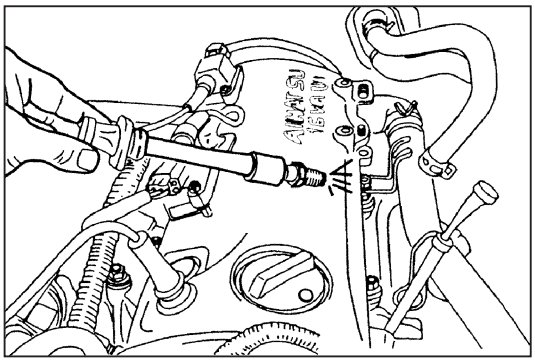
1. Remove the air cleaner case and relative parts.
2. Connect a timing light to the ignition wire of the No. 1 cylinder.
3. Ensure that the timing light flashes while the engine is being cranked by the starter motor.
   NOTE:
   - If the timing light will not flash, perform the following inspection.



JIG00003-00101

4. Remove the ignition wire from the spark plug at the cylinder No. 1.
5. Connect a spark plug to the ignition wire.
6. Check ignition sparks while the engine is being cranked by the starter motor.
   WARNING:
   - Before performing this operation, check that no fuel is spilled inside the engine compartment. Remove any spilled fuel. Also, be sure to perform this operation at a well-ventilated place where no volatile liquid, gas, etc. exist nearby.

   NOTE:
   - If no ignition sparks occur, check power supply.



JIG00004-00102

7. Remove the spark plug.
   CAUTION:
   - When the operation of the step 7 is performed, care must be exercised to avoid getting scalded, for the spark plugs may be still very hot.

8. Cleaning of spark plug
   NOTE:
   - If there are traces of oil, remove it with gasoline before the spark plug is cleaned by the spark plug cleaner.
   - If the electrode has traces of wet carbon, dry the electrode and clean it with a spark plug cleaner.
     Air Pressure: Not to exceed 588 kPa
     Duration: Less than 20 seconds

JIG00005-00103

9. Visually inspect the spark plug for electrode wear, thread or insulator damage.
   NOTE:
   - Replace the spark plug if it exhibits damage.

JIG00006-00104

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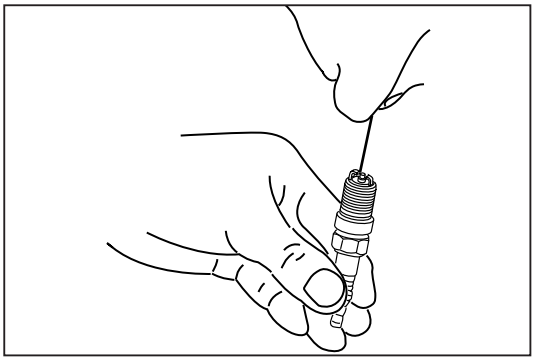
10. Inspection of electrode gap
    Measure the electrode gap, using the plug gap gauge.
    Electrode Gap: See page IG–9

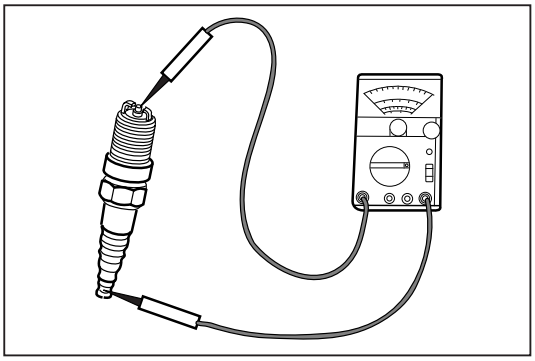
    NOTE:
    - If the electrode gap of a used spark plug is not within the specification, replace the spark plug with a new one.
    - If the electrode gap of a new spark plug is not within the specification, adjust the gap by bending the base of the ground electrode, being careful not to touch the tip.
    - All four plugs should be the same heat range and be ones manufactured by the same manufacturer.



JIG00007-00105

11. Inspection of spark plug insulation resistance
    More Than 20 MΩ

    NOTE:
    - If the insulation resistance is less than the specified value, replace the spark plug.



JIG00008-00106

12. Install the spark plugs. Tighten them to the specified torque.
    Tightening Torque: 14.7 - 21.6 N·m

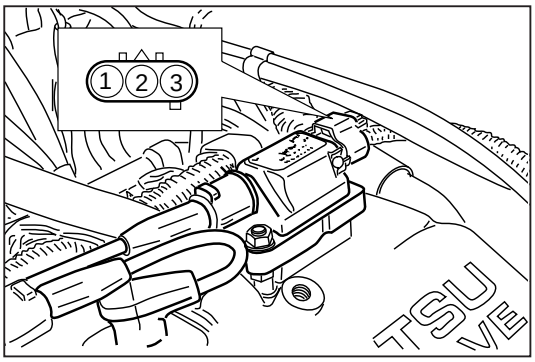
13. Install the ignition coil with ignition wire to the cylinder head cover.
14. Connect the ignition wire to the spark plug.
15. Install the air cleaner case and relative parts.

JIG00009-00107

POWER SUPPLY

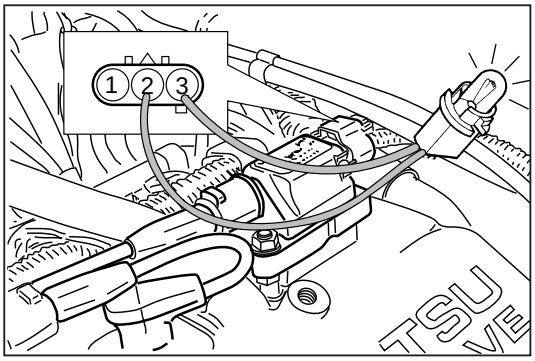
1. Remove the air cleaner case and relative parts.
2. Disconnect the connector of the ignition coil.
3. Measure the voltage between the terminals 1 and 3 of the wire harness connector side when the ignition switch is turned on.
   Specified Value: Battery voltage

   NOTE:
   - If the voltage is not the specified value, check the fuse and wiring harness.



JIG00010-00201

4. Connect a test lamp (12 V, 6 W) between the terminals 2 and 3 of the wire harness connector side. Check to see if the lamp will illuminate while the engine is being cranked.
   NOTE:
   - Under this condition, the test lamp flashes. If the test lamp will not flash, check the outputs of the cam angle sensor and EFI ECU. (Refer to the EF section of the service manual.)



JIG00011-00202

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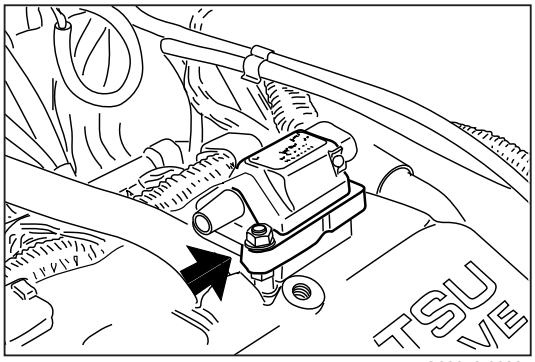
IGNITION WIRE

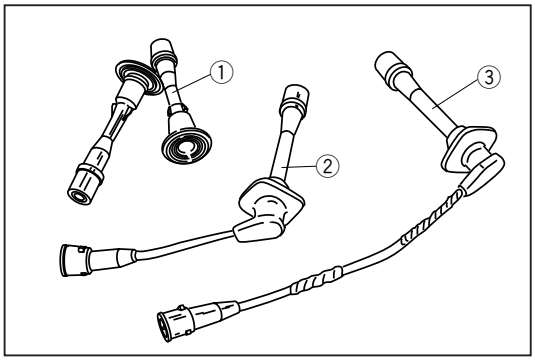
1. Remove the air cleaner case and relative parts.
2. Disconnect the connector of the ignition coil.
3. Remove the ignition coil by removing the attaching nuts.
4. Disconnect the spark plug distance piece and the ignition wire from the ignition coil.
   NOTE:
   - Carefully remove the ignition wire from the spark plugs and ignition coil by holding their rubber boots.



JIG00012-00301

5. Check that the ignition wire resistance is about same as the specification.
   Ignition Wire 3: 5.6 kΩ

   NOTE:
   - Spark plug distance piece 1: 0.3 Ω (Cylinder No. 2 and No. 4)
     Ignition wire 2: 3.8 kΩ (Cylinder No. 3)
   - If the above inspection will conform to the specification, perform the following procedure.

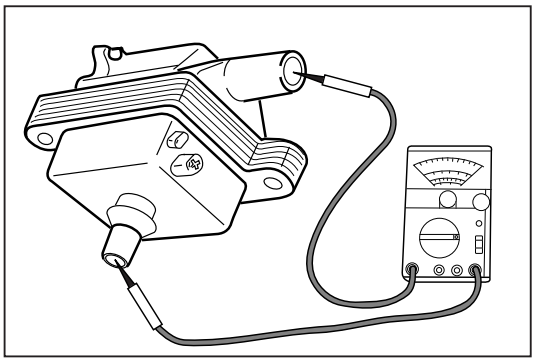


JIG00013-00302

IGNITION COIL

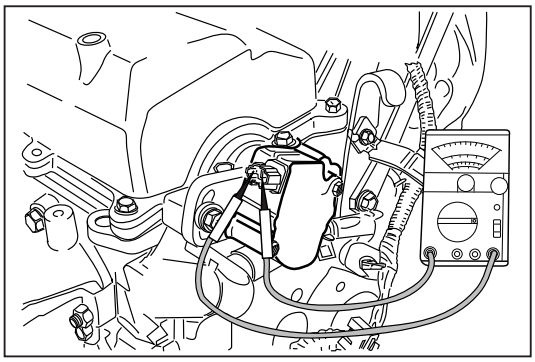
1. Remove the air cleaner case and relative parts.
2. Disconnect the connector of the ignition coil.
3. Remove the ignition coil by removing the attaching nuts.
4. Disconnect the spark plug distance piece and the ignition wire from the ignition coil.
5. Check that the ignition coil resistance is within the specification.
   Secondary Coil: 13.6 ± 2.0 kΩ

   NOTE:
   - For the primary coil, it is impossible to check the resistance because it incorporates electronic parts.

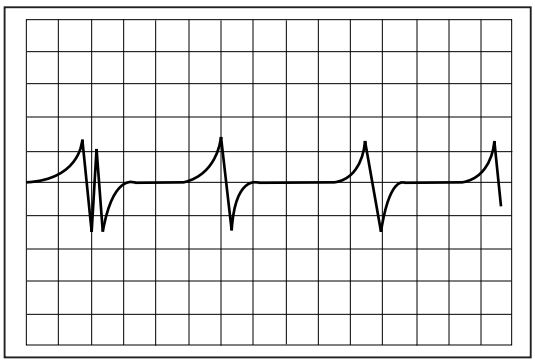

JIG00014-00401

CAM ANGLE SENSOR

1. Remove the air cleaner case and relative parts.
2. Disconnect the connector of the cam angle sensor.
3. Measure the resistance between each terminal of the connectors.
   Specified Value: 230 ± 25 Ω (at 20°C)


JIG00015-00501

4. Check to see if a signal shown in the graph appears at the terminals when the engine is being cranked by the starter motor.
   NOTE:
   - When the voltage across the connector terminals is measured during the engine cranking period, using an oscilloscope, you will get wave forms as indicated in the illustration, if the signal generator is functioning normally.


JIG00016-00502

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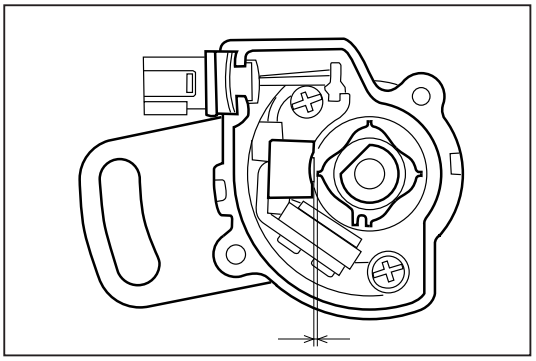
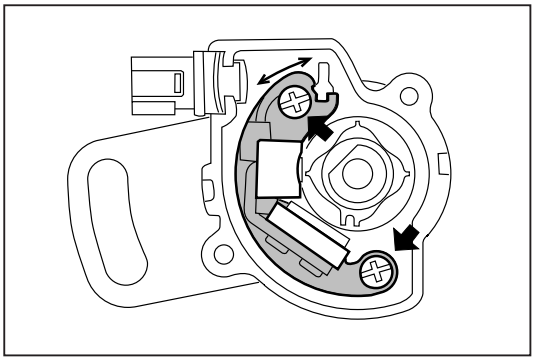
5. Remove the cam angle sensor from the cylinder head by removing the attaching bolt.
6. Remove the cam angle sensor cover.
7. Turn the shaft of the rotor, until the signal rotor faces toward the signal generator.
8. At all four points, check to see if the air gap between the signal generator and the signal rotor conforms to the specified value.
   Specified Air Gap: 0.2 - 0.4 mm

   NOTE:
   - If the air gap fails to conform to the specified value, adjust the air gap.

9. Adjustment of air gap.
   (1) Loosen the attaching screws of the signal generator.
   (2) Adjust the air gap between the signal generator and the signal rotor to specified value.
   (3) Tighten the attaching screws of the signal generator.

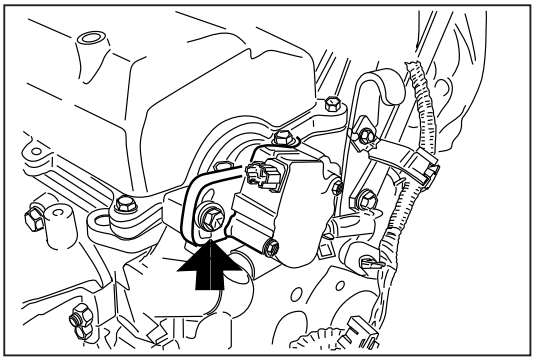


JIG00017-00503



JIG00018-00504

10. Install the cam angle sensor cover.
11. Install the cam angle sensor to the cylinder head. tighten the attaching bolt.
    Tightening Torque: 14.7 - 21.6 N·m



JIG00019-00505

12. Check the ignition timing and adjust it, as required.
    (See page IG–9)

JIG00020-00506

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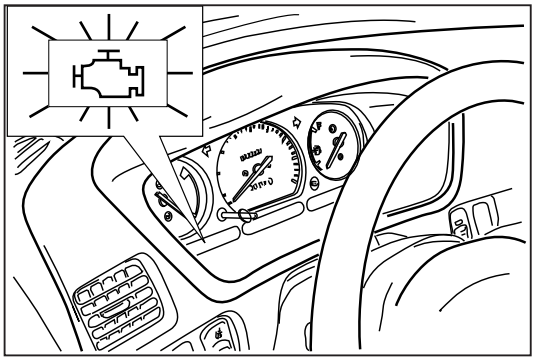
EFI ECU

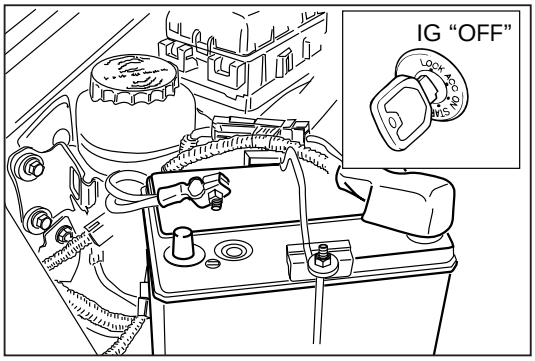
1. Check to see if diagnosis detect malfunction code.
   (Refer to EF section of the service manual)



JIG00021-00701

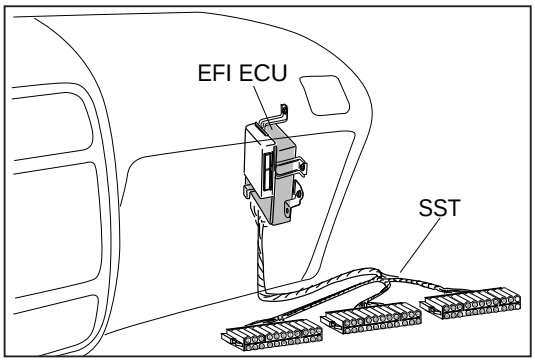
2. Connection of SST
   (Refer to EF section of the service manual)
   NOTE:
   - The EFI unit can be checked by measuring the resistance or voltage at the SST terminals.

   (1) Disconnect the battery ground cable from the negative (–) terminal of the battery.
   CAUTION:
   - Be sure to memorize the malfunction code before disconnecting the battery cable. Otherwise the malfunction code(s) is erased by disconnecting of the battery code.



JIG00022-00702

   (2) Disconnect the wire harness connectors from the EFI ECU connectors at the upper side of the glove compartment.
   (3) Connect the following SST between the wire harness connectors and the EFI ECU connectors.
   SST: 09842-87706-000



JIG00023-00703

   (4) Reconnect the battery ground cable to the negative (–) terminal of the battery.
   CAUTION:
   - When disconnecting or reconnecting the EFI ECU connectors, be sure to disconnect the battery ground cable from the negative (–) terminal of the battery when the ignition switch and all accessory switches are in the off state.
   - When installing new battery, care must be exercised not to mistake the battery polarity. Failure to observe this caution could cause ECU malfunction.
   - Before using the SST, be sure to check to see if short or open wire exists between the terminals of the SST.

JIG00024-00704

   NOTE:
   - Even when the replacement of the ECU is required in previous check, make sure that the ECU malfunction has not been caused by factors other than the ECU by carrying out the following checks. Then, proceed to replace the ECU.
   - The measurement of voltage should be conducted while all of the connectors are connected.

JIG00025-00705

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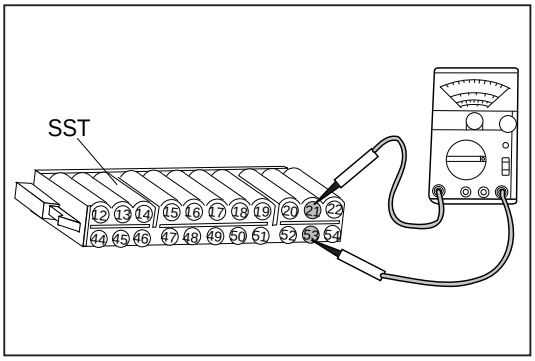
CAUTION:
- In cases where the ECU is replaced with a new EFI ECU, be sure to use the master key and connect the test terminal with the earth terminal, to start the engine for the first time. The engine will not start with a key other than the master key.
  Refer to BE section of service manual. (Immobilizer system)
- In cases where the ECU is replaced with an EFI ECU other than a new one, the engine will not start even if the master key is used.
  For details, refer to the immobilizer manual.

3. Measurement of the voltage or resistance
   (1) Measure the voltage or resistance between each terminal.
   (2) Check that if the measured voltage or resistance conform to the specifications in accordance with the following table.

JIG00026-00706



JIG00027-00707

CHARACTERISTICS OF ECU OUT PUT
Followings are standard voltage or resistance at ECU.

Family	Terminal	Condition	Standard voltage or resistance	Remedies
Power supply	2 - 62	All time	Battery voltage	Check back up fuse in the relay box
	11 - 62 43 - 62	Ignition switch is turned on	Battery voltage	Check main relay in the relay box
Earth group	20 52 62 63	All time	1 Ω or less	Check ground earth of wiring harness
Cam angle sensor	21 - 53	While the engine is being cranked by the starter motor.	0.1 - 0.3 V (AC range)	Check crank angle sensor
Ignition coil drive	63 - 29 63 - 64	Ignition switch is turned on.	3 V or less	Check ignition coil

JIG00028-00708

NOTE:
- If the measured voltage or resistance is not conform to the specified value, check the wiring harness.
- Even when the trouble has not been solved by the repair the wire harness or parts, replace the EFI ECU.

JIG00029-00709

After completion of the inspection
1. Disconnect the ground cable terminal from negative (–) terminal of the battery.
2. Remove the SST by disconnecting its connectors from the ECU and engine wire connectors.
3. Connect the wire harness connectors to the ECU.
4. Reconnect the ground cable terminal to the negative (–) terminal of the battery.

JIG00030-00710

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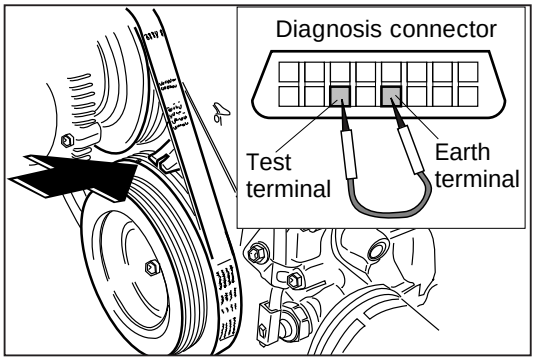
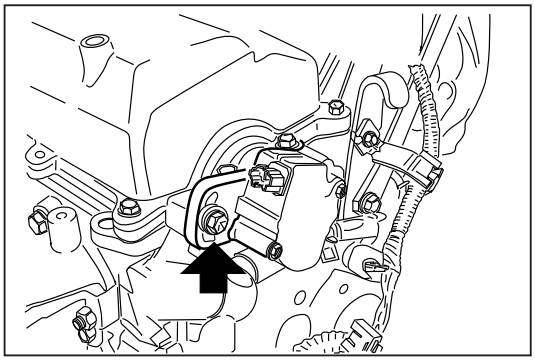
IGNITION TIMING

1. Connect the test terminal and the earth terminal with a jumper wire of the diagnosis connector.
2. Connect a timing light to the ignition wire of the No. 1 cylinder.
3. Start the engine.
4. Check to see if the ignition timing mark of the crankshaft pulley is aligned with the indicator of the timing belt cover, using the timing light.
5. Adjust the ignition timing by turning the cam angle sensor, if the ignition timing mark is not aligned with timing belt cover.
   Ignition Timing: B.T.D.C. 0° ± 2°/Idle speed

6. Adjustment of ignition timing
   (1) Loosen the cam angle sensor attaching bolts.
   (2) Adjust the cam angle sensor installation angle by turning the cam angle sensor, until the ignition timing mark of the crankshaft pulley is aligned with the indicator of the timing belt cover.



JIG00031-00801


JIG00032-00802

NOTE:
- If the cam angle sensor is turned clockwise, the timing will be advanced. Conversely, if the cam angle sensor is turned counterclockwise, the ignition timing will be retarded.

   (3) Tighten the cam angle sensor attaching bolts to the specified torque, making sure that the ignition timing is not disturbed.
   Tightening Torque: 14.7 - 21.6 N·m

JIG00033-00802

Recommended spark plug

Manufacturer	Type	Electrode air gap
NGK	BKUR6EK	0.9 - 1.0 mm
DENSO	K20TNR-S	0.9 - 1.0 mm

JIG00034-00803

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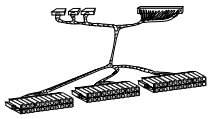
TIGHTENING TORQUE

Tightening components	Tightening torque		Remarks
	N·m	kgf-m	
Cam angle censor × Cylinder head	14.7 - 21.6	1.5 - 2.2	
Spark plug × Cylinder head	14.7 - 21.6	1.5 - 2.2	

JIG00035-00901

SSTs

Shape	Part number	Part name	Remarks
	09842-87706-000 EFI computer check sub harness	Inspection of computer input/output voltage & resistance	

JIG00036-00902

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DAIHATSU

TERIOS

J100

STARTING SYSTEM

ST

STARTING SYSTEM CIRCUIT ..... ST– 2
STARTER MOTOR ..... ST– 3
COMPONENTS ..... **ST– 3**
SERVICING INSTRUCTIONS OF STARTER ..... **ST– 4**
IN-VEHICLE INSPECTION ..... **ST– 4**
REMOVAL ..... **ST– 5**
PLANETARY TYPE STARTER MOTOR ..... **ST– 5**
INSTALLATION OF STARTER MOTOR **ST–19**
SERVICE SPECIFICATIONS ST–21
TROUBLE SHOOTING ST–21

JST00001-00000

NO. 9710-JE

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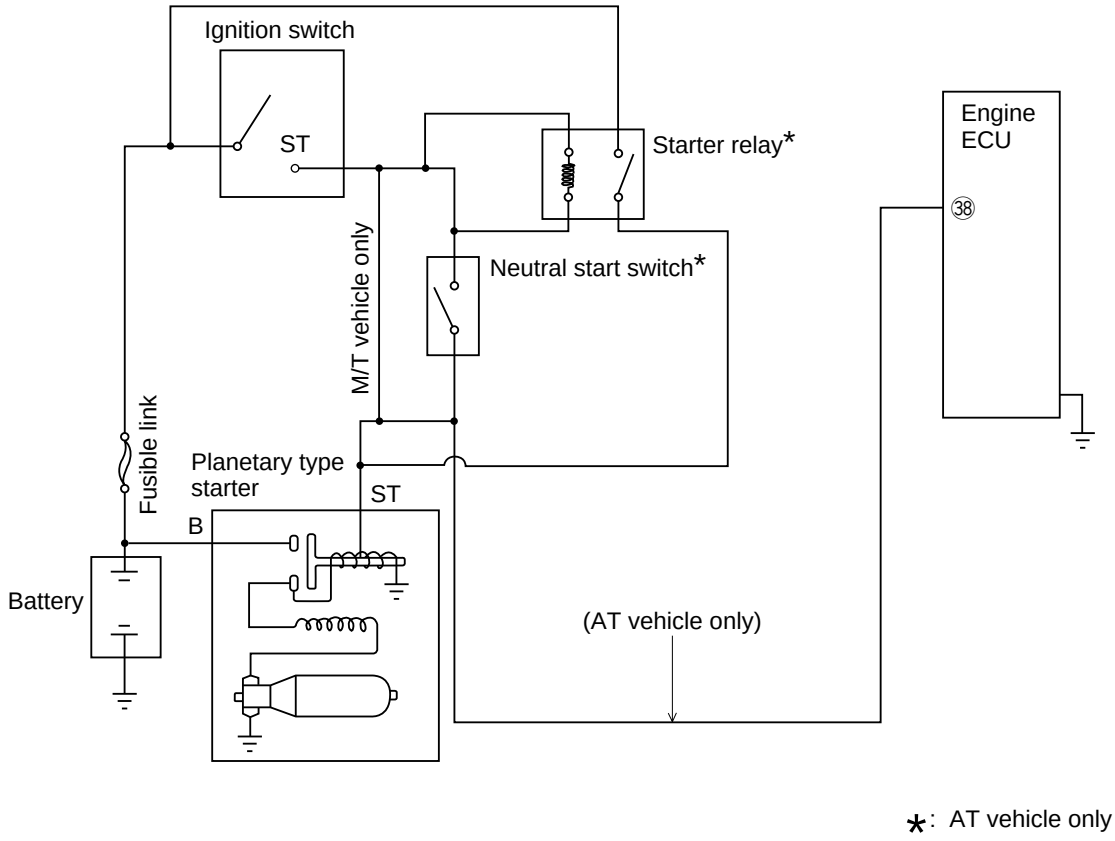
STARTING SYSTEM CIRCUIT



JST00002-00001

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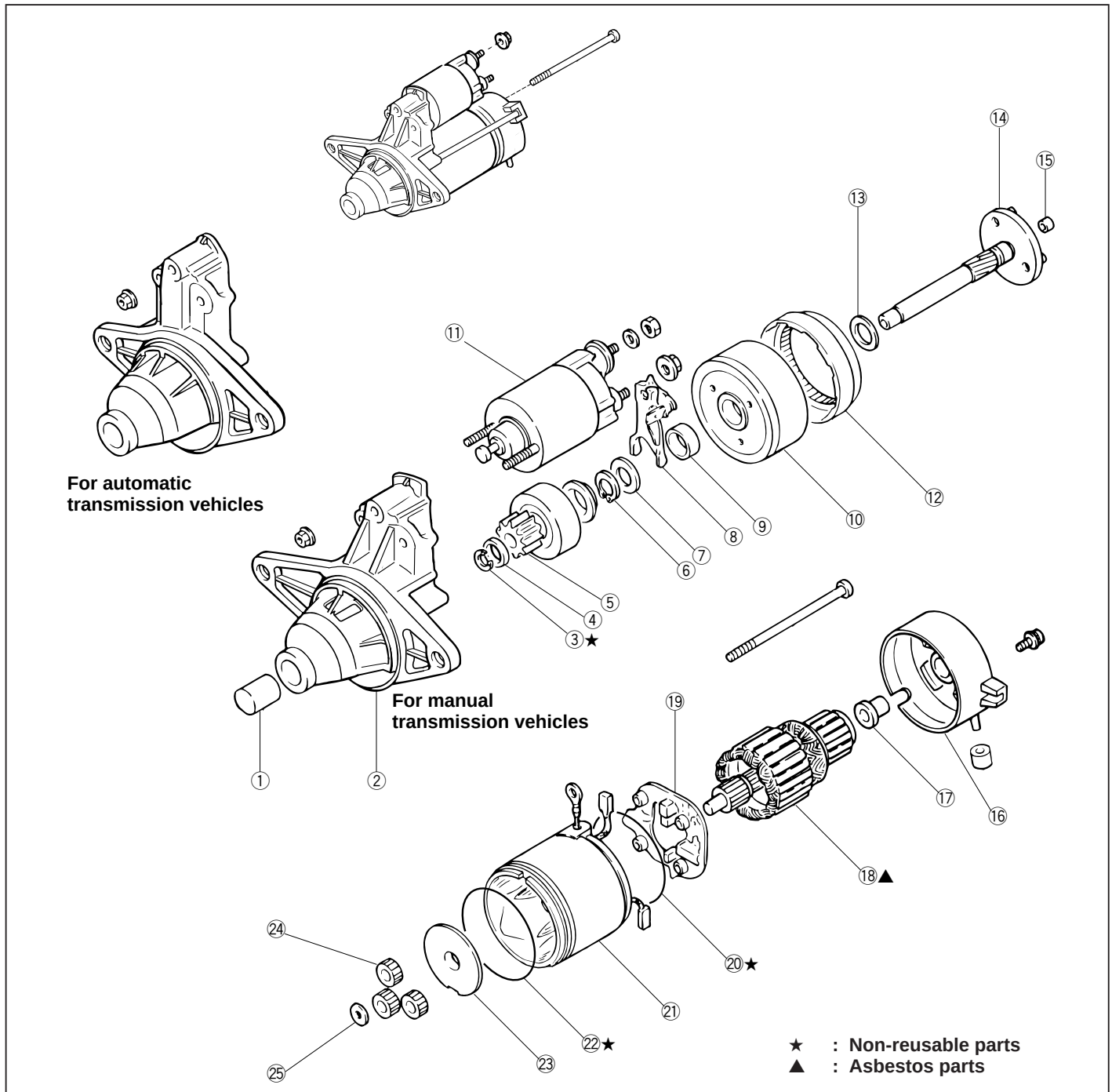
STARTER MOTOR

COMPONENTS

0.8 kW, Planetary Type Starter Motor



① Bearing
② Drive housing
③ Snap ring
④ Stop collar
⑤ Clutch
⑥ Snap ring
⑦ Washer
⑧ Drive lever
⑨ Bearing
⑩ Center bearing
⑪ Magnet switch
⑫ Internal gear
⑬ Washer
⑭ Planet carrier shaft
⑮ Bearing
⑯ End frame
⑰ Bearing
⑱ Armature
⑲ Brush holder
⑳ O-ring
㉑ Yoke
㉒ O-ring
㉓ Plate
㉔ Planet gear
㉕ Washer

JST00003-00002

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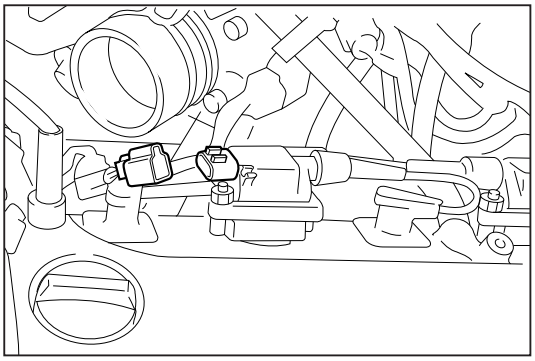
SERVICING INSTRUCTIONS OF STARTER

1. When connecting the starter terminal or battery terminal, perform positive tightening so as to avoid poor connection.
   If poor connection should exist, it presents the hazard of serious danger that a large amount of current flowing during starter operation can overheat the poor connection.
2. When removing the starter, first disconnect the negative ⊖ terminal of the battery. Then, disconnect the positive terminals (+B, ST) at the starter side. Since the battery voltage is always applied to the starter +B terminal, failure to observe this removing sequence may lead to battery short, which is extremely dangerous.
3. When installing the starter, install the starter in the clutch housing positively and be sure to tighten the attaching bolts to the specified torque. Improper installation can cause premature wear of the teeth of the pinion gear or ring gear and also can cause breakage of the clutch housing.

JST00004-00000

IN-VEHICLE INSPECTION

1. Place the shift lever to the neutral position. Apply the parking brake lever.
2. Disconnect the ignition coil coupler so that the engine will not start.



JST00005-00003

3. Set the ignition switch to the ST position. Check to see if the engine cranks.
4. If the engine will not crank, perform the following checks.
   - Inspect the battery for damage. Charge the battery.
   - Perform harness continuity test.
5. If the starter motor still will not rotate even after the checks above have been performed, remove the starter motor and perform the unit check.

JST00006-00000

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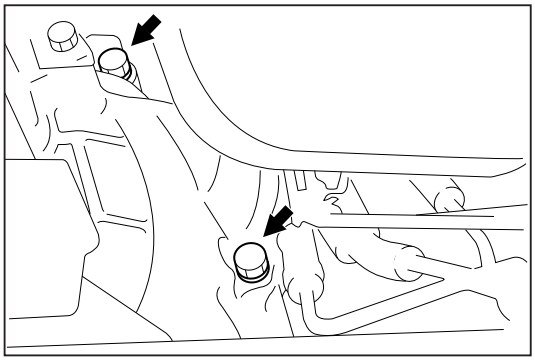
REMOVAL

1. Disconnect the ground cable terminal from the negative (–) terminal of the battery.

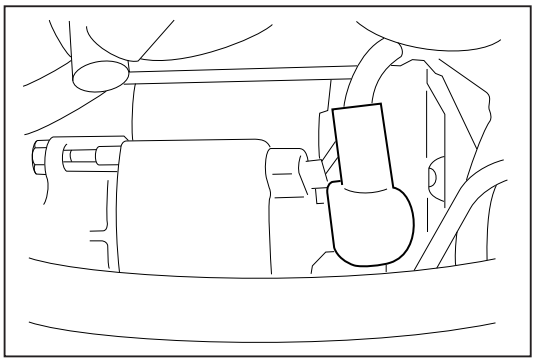
JST00007-00000

2. Remove the battery and battery carrier.
3. Jack up the vehicle and support it with safety stands. (Refer to the GI Section of the service manual.)
4. Removal of starter motor attaching bolt
   (1) Remove the upper side and lower side attaching bolt from the under side of the vehicle.



JST00008-00004

5. Disconnection of two wires from starter
   (1) Disconnect the starter terminal ST of the alternator wire from the starter.
   (2) Disconnect the starter terminal B of the alternator wire from the starter.
6. Remove the starter motor.



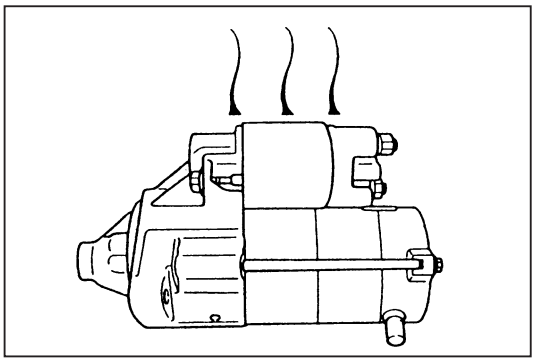
JST00009-00005

PLANETARY TYPE STARTER MOTOR

UNIT CHECK OF PLANETARY TYPE STARTER MOTOR

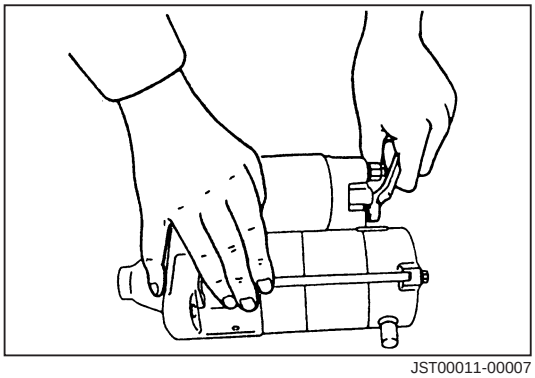
CAUTION:

- Each of the following tests must be performed within three to five seconds. If you fail to observe this caution and the starter should be energized for more than this duration, the coil may be burnt out.



JST00010-00006

1. Pull-in test
   (1) Disconnect the lead wire form the magnetic switch terminal.



JST00011-00007

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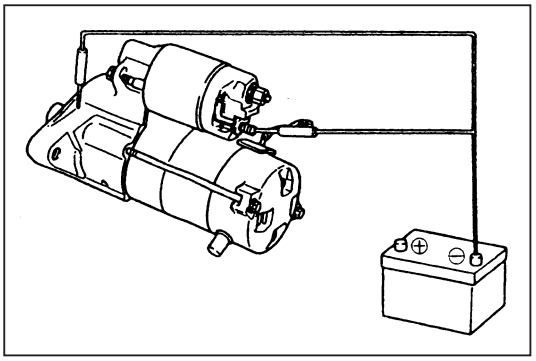
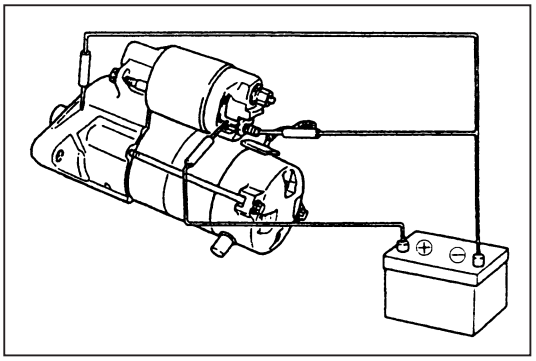
(2) Connect the negative (–) terminal of the battery to the starter body and magnetic switch terminal.



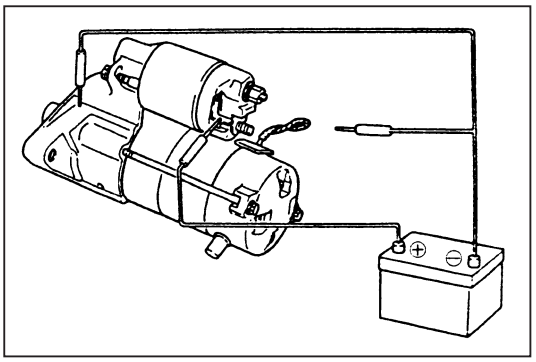
JST00012-00008

(3) Connect the positive (+) terminal to the terminal ST.
Ensure that the pinion is pushed outward.
If the drive pinion fails to move out, replace the magnetic switch.



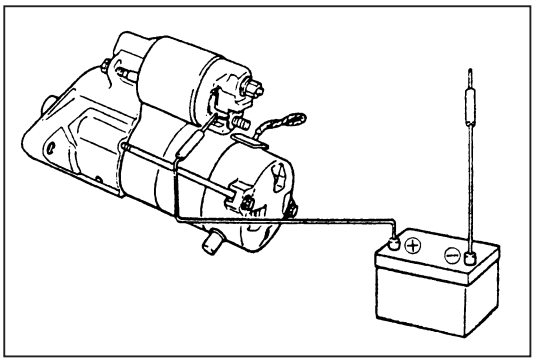
JST00013-00009

2. Hold-in test
After the check has been performed following the same procedure as with the pull-in test, disconnect the negative terminal of the magnetic switch terminal.
Ensure that the drive pinion is held in a pushed-out state.
If the drive pinion fails to be held, replace the magnetic switch.



JST00014-00010

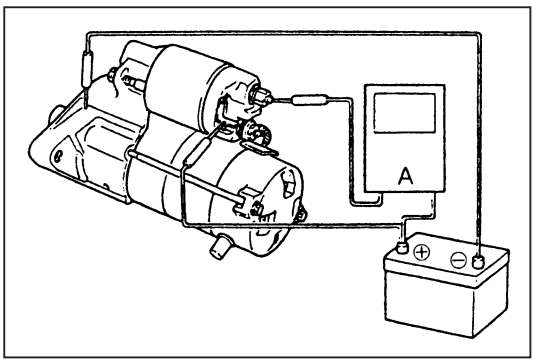
3. Inspection of plunger return
After the check has been performed following the same procedure as with the hold-in test, disconnect the ground terminal of the starter body. Ensure that the drive pinion is drawn into the drive housing.
If the drive pinion fails to be drawn, replace the magnetic switch.



JST00015-00011

4. No-load performance test
Connect the battery and an ammeter to the starter as shown in the right figure. Ensure that the starter rotates smoothly with the pinion moving out.
Measure the current the starter is drawing.
Specified Current: Less than 90A at 11.5V

NOTE:
- Prior to the test, be sure to connect the lead wire to the magnetic switch.



JST00016-00012

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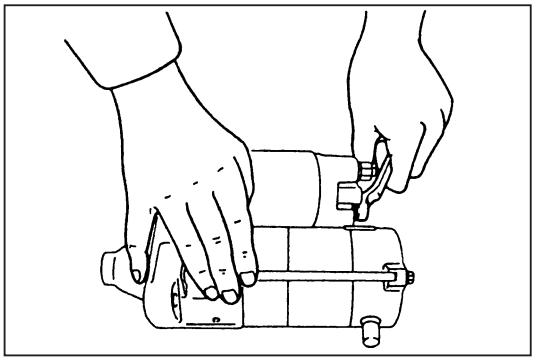
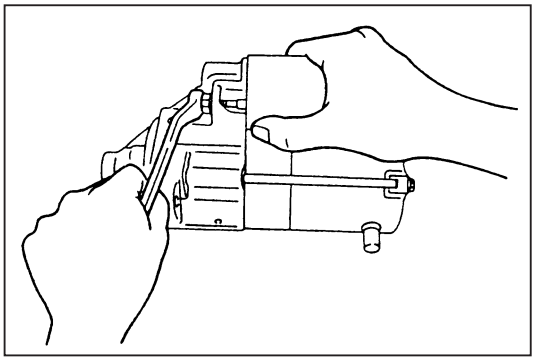
DISASSEMBLY OF PLANETARY TYPE STARTER MOTOR

1. Disconnect the lead wire from the magnetic switch.



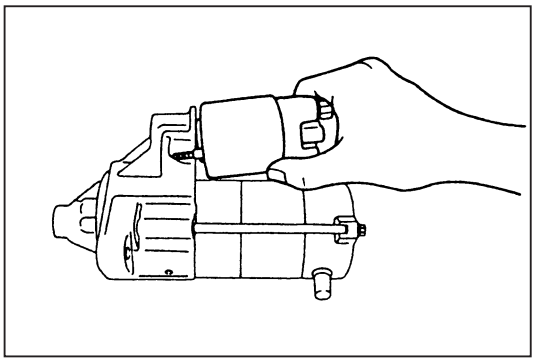
JST00017-00013

2. Remove the attaching nut of the magnetic switch from the drive housing.



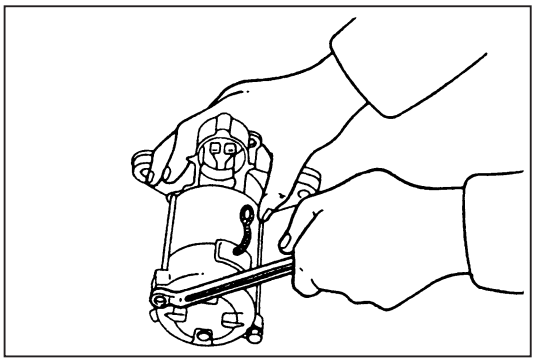
JST00018-00014

3. Remove the magnetic switch from the drive housing.



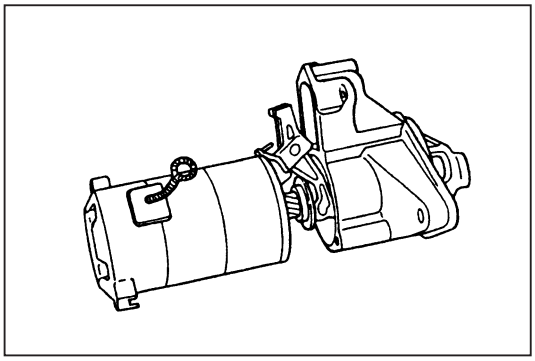
JST00019-00015

4. Remove the two through bolts from the commutator end frame.



JST00020-00016

5. Remove the yoke with armature and the drive lever from the drive housing.



JST00021-00017

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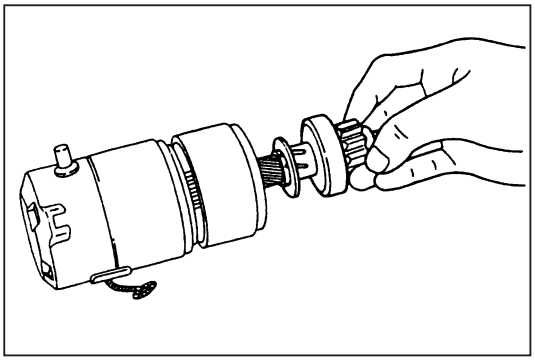
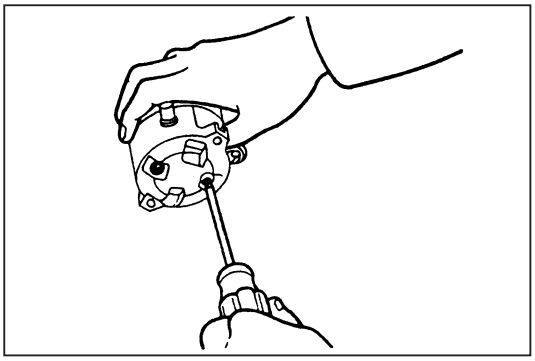
6. Separate the yoke with armature from the clutch with center bearing.
7. Remove the O-ring.



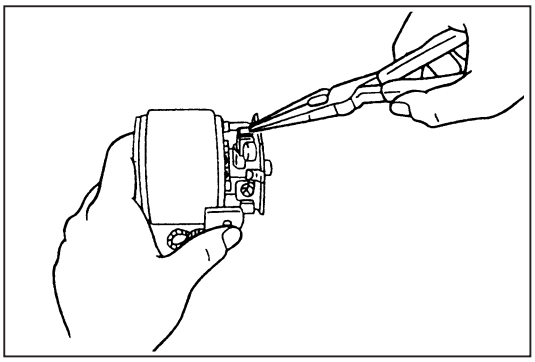
JST00022-00018

8. Remove the end frame cover by removing the two screws.



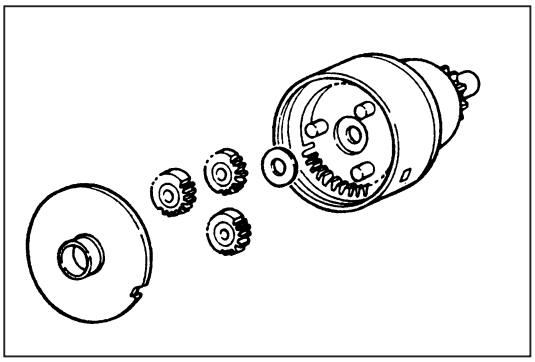
JST00023-00019

9. Remove the brushes from the brush holder by lifting the brush springs by means of nose pliers or the like.
   NOTE:
   - Care must be exercised not to damage the brushes during the removal.
10. Then, remove the armature from the yoke.



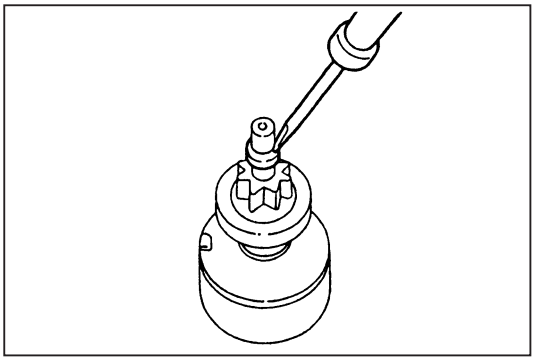
JST00024-00020

11. Removal of planetary gear
    (1) Remove the plate for starter armature.
    (2) Remove the three planetary gears.
    (3) Remove the plate washer.



JST00025-00021

12. Remove the stop collar from the snap ring by tapping the collar with a screwdriver or the like placed on it.



JST00026-00022

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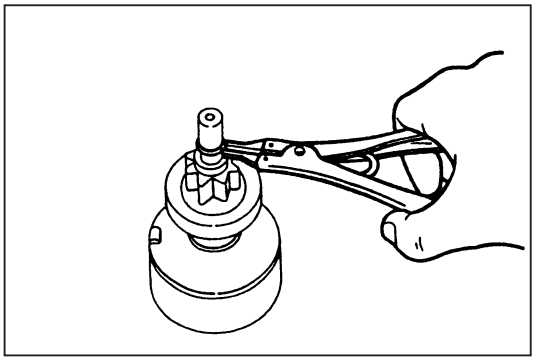
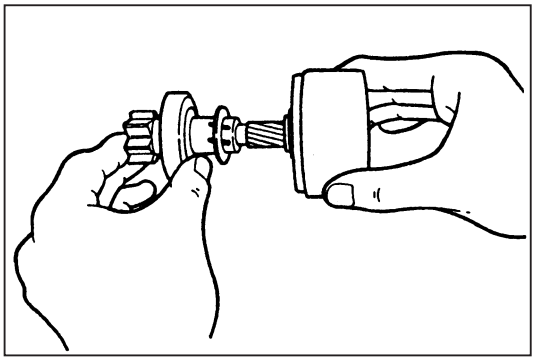
13. Detach the snap ring by prying it off with snap ring pliers. Then, remove the collar.



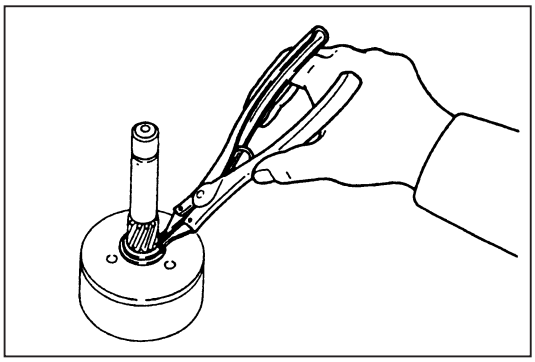
JST00027-00023

14. Remove the clutch.



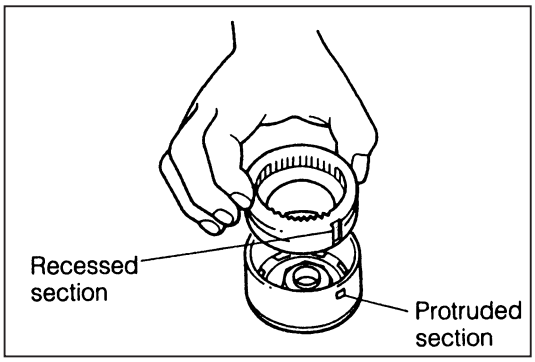
JST00028-00024

15. Detach the snap ring. Separate the center bearing from the planetary carrier shaft.



JST00029-00025

16. Remove the internal gear by aligning the recessed section provided at the outer periphery of the internal gear with the protruded section provided at the inner periphery of the center bearing.

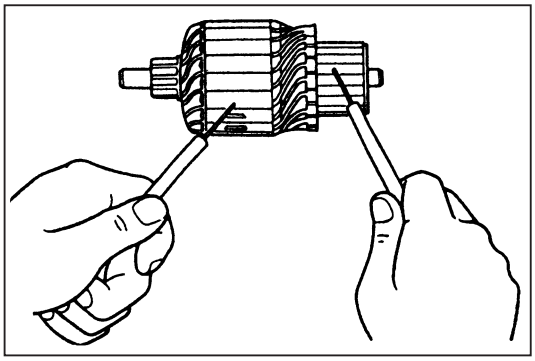


JST00030-00026

INSPECTION OF PLANETARY TYPE STARTER MOTOR

Check of armature

1. Check of armature insulation
   Ensure that no continuity exists between the commutator and the armature coil, using an ohmmeter.
   If continuity exists, replace the armature.



JST00031-00027

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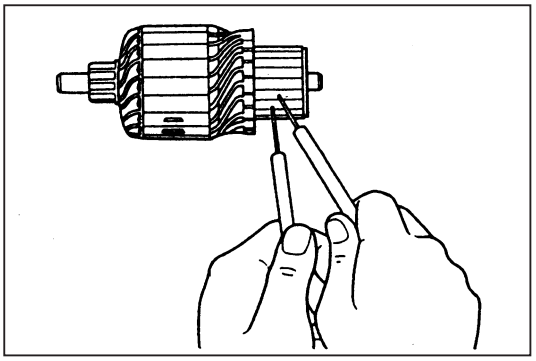
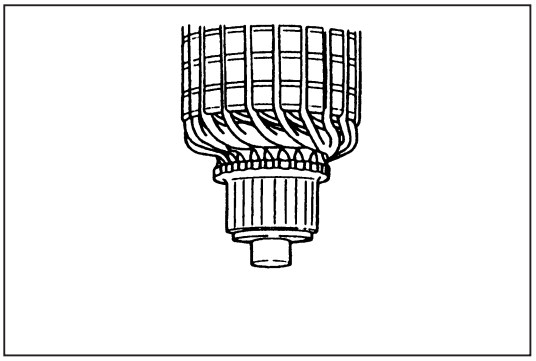
2. Check of commutator continuity
   Check continuity between each adjacent segment of the commutator, using an ohmmeter.
   If no continuity exists between any adjacent segments, replace the armature.


JST00032-00028

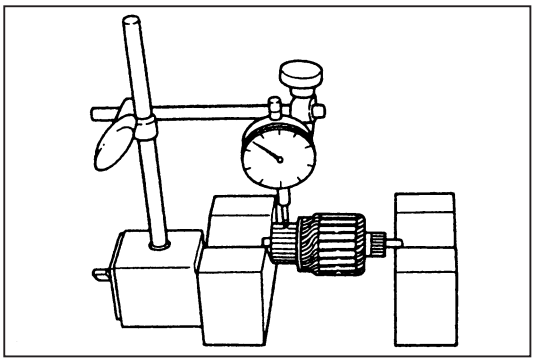
Check of commutator

1. Check each contact surface of the commutator segments with the brushes for burning.
   If the surfaces are dirty or burnt, correct the commutator surfaces, using abrasive paper (No. 400) or a lathe.


JST00033-00029

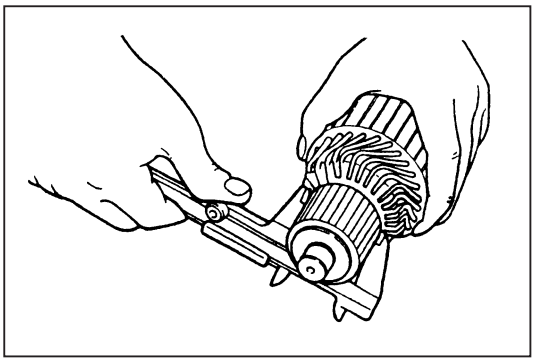
2. Check of commutator for circle runout
   Support the armature at its both ends on a Vee block.
   Check the commutator for circle runout, using a dial gauge.
   Circle Runout Limit: 0.05 mm

   If the circle runout exceeds the allowable limit, turn down the commutator on a lathe.
   At this point, care must be exercised to ensure that the commutator diameter is not less than the minimum requirement diameter of 27 mm.


JST00034-00030

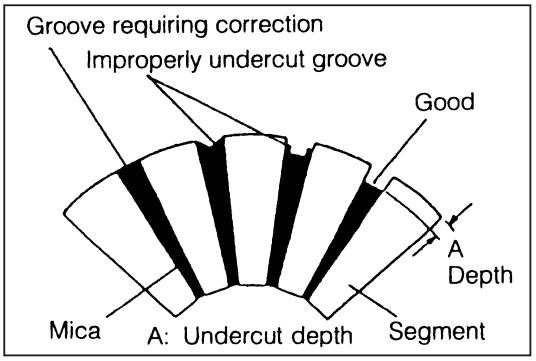
3. Measurement of commutator diameter
   Measure the commutator diameter by means of a micrometer or vernier calipers.
   Standard Diameter: 28 mm
   Minimum Diameter: 27 mm

   If the commutator diameter is less than the minimum diameter, replace the armature.


JST00035-00031

4. Check of commutator undercut
   Measure the insulator groove depth between commutator segments.
   Minimum Depth: 0.2 mm

   If the insulator groove depth becomes less than the limit value, replace the commutator.



JST00036-00032

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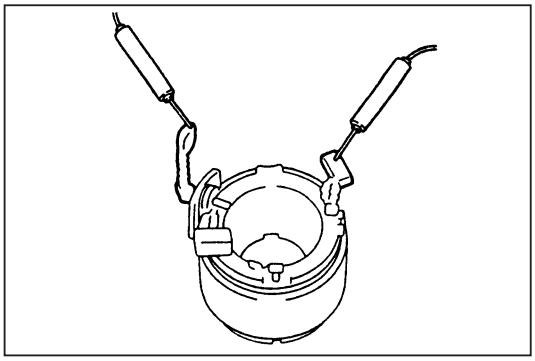
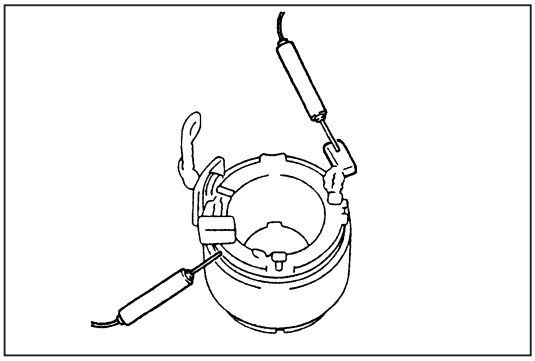
Check of field coil

1. Field coil continuity test
   Perform field coil continuity test at a point between the lead wire and the brush, using an ohmmeter.
   If no continuity exists, replace the yoke.



JST00037-00033

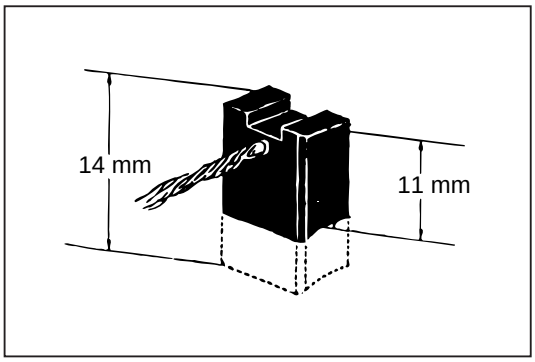
2. Field coil short test
   Perform field coil short test at a point between the brush and the yoke proper, using an ohmmeter.
   If no continuity exists, replace the yoke.



JST00038-00034

Check of brushes

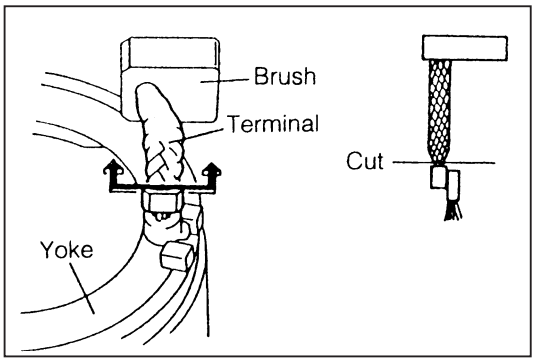
1. Measurement of brush length
   Measure the brush length, using vernier calipers.
   Standard Length: 14 mm
   Minimum Length: 11 mm



JST00039-00035

2. Replacement of brush.
   If the length is less than the minimum requirement, replace the brush holder or the yoke, as required.

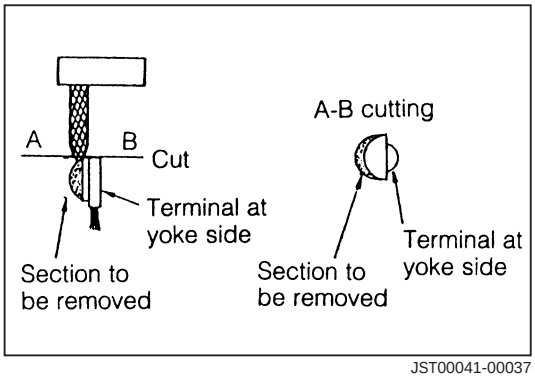
3. Procedure for brush replacement
   (1) Cut the brush lead wire at the terminal side.
   NOTE:
   - Replacement can be made only for the two brushes at the yoke side (positive (+) side). The brush at the negative (–) side should be replaced together with the brush holder.



JST00040-00036

   (2) Remove welding traces with a file or the like to correct the brush terminal to the specified dimensions.
   Specified Dimensions:
   Thickness: 1.5 mm - 1.7 mm
   Width: 5 mm

   NOTE:
   - Be sure to remove the ▭ section of the brush terminal as indicated in the right figure. Since the section to be removed is narrow, be very careful not to damage the field coil.



JST00041-00037

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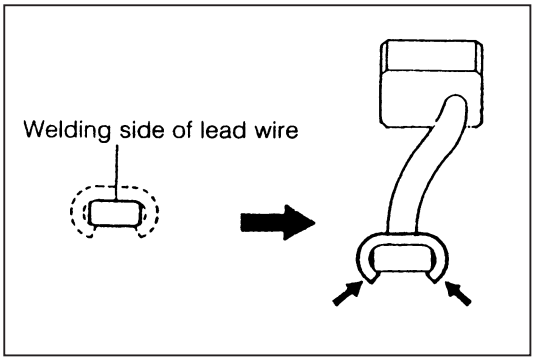
(3) Stack the plate section of a replacement brush onto the welding side of the lead wire. Make pressure connection over the overlaid section by pinching it with pliers.

NOTE:

- Be sure to take out the brush lead wire in the correct direction.

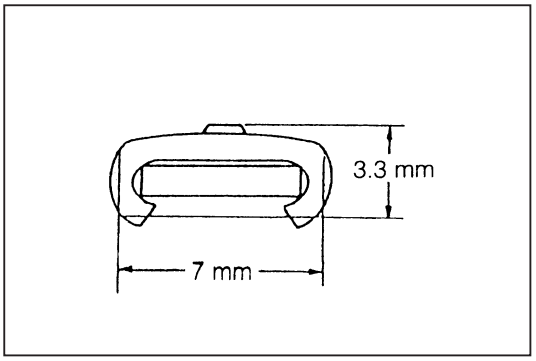


JST00042-00038

(4) Solder the pressure connection section. Correct the section, using a file or the like, so that the section conforms to the dimensions, as indicated in the right figure.

NOTE:

1. When performing the soldering, heat the section to be soldered thoroughly. Be very careful not to allow any solder to flow into the positive side lead wire.
2. Be sure to allow solder in a sufficient amount to flow into the inside of the plate.
3. Ensure that no solder oozes to the field side.

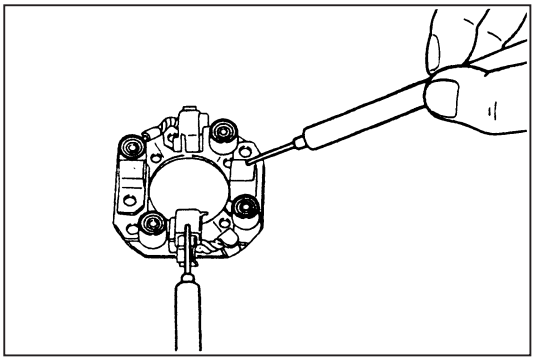


JST00043-00039

Check of brush holder

1. Check of brush holder for insulation
   Measure the insulation between the positive and negative terminals of the brush holder, using an ohmmeter.
   Insulation Resistance: 0.1 MΩ or more

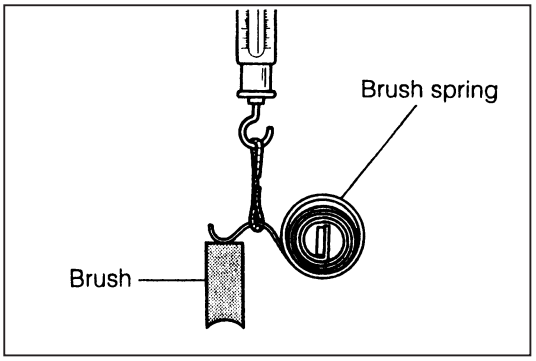
2. Replacement of brush holder.
   If the insulation resistance is less than the specification, replace the brush holder.



JST00044-00040

Check of brush spring

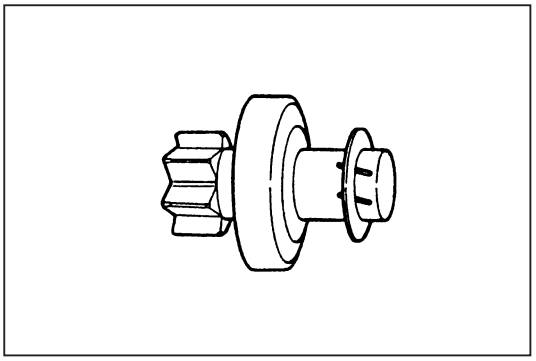
Measure the brush spring tension, using a spring scale.
Standard Tension: 15.7 N (1.6 kgf)



JST00045-00041

Check of clutch

1. Inspection of pinion gear and spline teeth
   Check the teeth of the pinion gear and spline for wear or damage.
   If the teeth exhibit any damage, replace the clutch. Also, inspect the flywheel ring gear for wear or damage.



JST00046-00042

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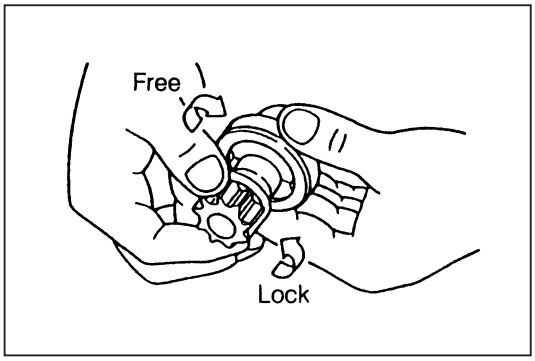
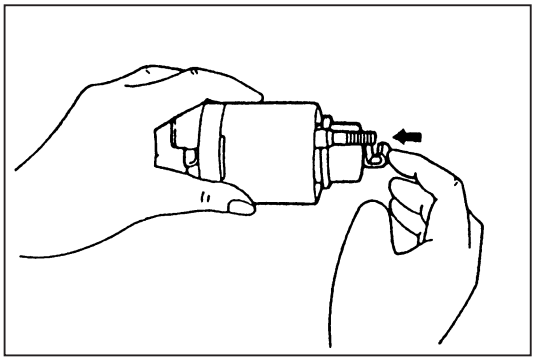
2. Check of starter clutch
   While holding the clutch, turn the pinion clockwise. Ensure that the pinion turns smoothly.
   Turn the pinion counterclockwise. Ensure that the pinion is locked.
   If the check results are unsatisfactory, replace the starter clutch.



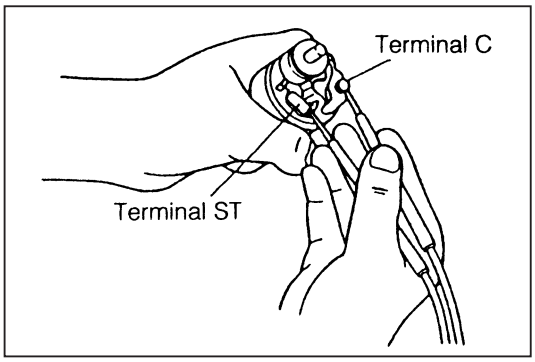
JST00047-00043

Check of magnetic switch

1. Plunger check
   Push in the plunger with your fingers and release your fingers. Ensure that the plunger returns quickly to the original position. If the plunger exhibits poor returning or fails to return, replace the magnetic switch.

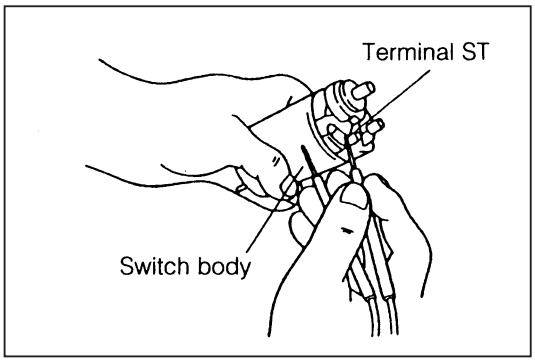

JST00048-00044

2. Pull-in coil open circuit test
   Using an ohmmeter, ensure that continuity exists between the terminal ST and terminal C.
   If no continuity exists, replace the magnetic switch.



JST00049-00045

3. Hold-in coil open circuit test
   Ensure that continuity exists between the terminal ST and the switch body.
   If no continuity exists, replace the magnetic switch.

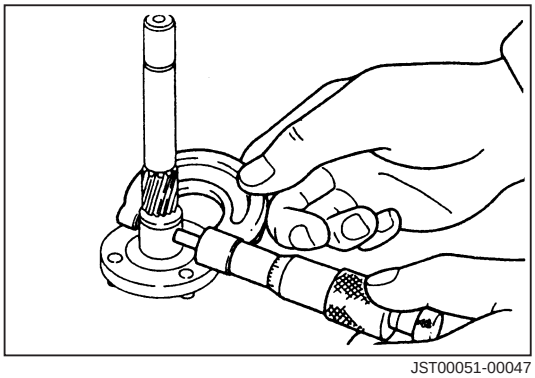


JST00050-00046

Check of bearing

Center bearing

1. Measure the outer diameter of the center bearing sliding section of the planetary carrier shaft.
   Specified Value: 15 mm


JST00051-00047

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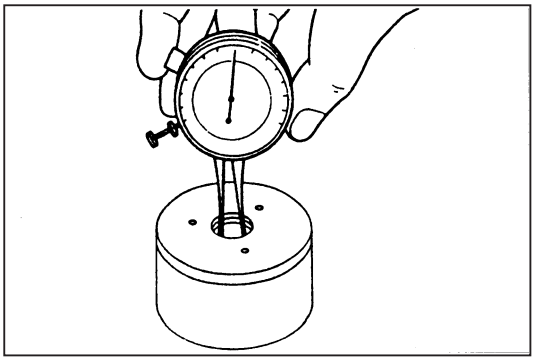
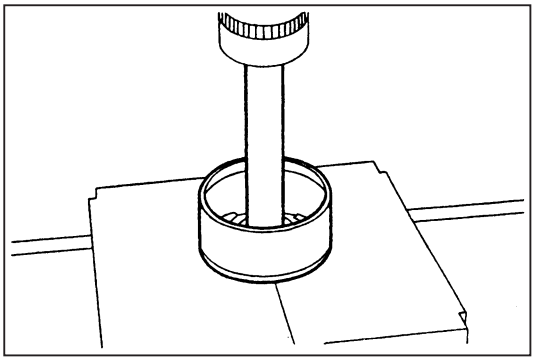
2. Measure the inner diameter of the center bearing so as to determine the clearance.
   Specified Value: 0.04 mm
   Allowable Limit: 0.15 mm

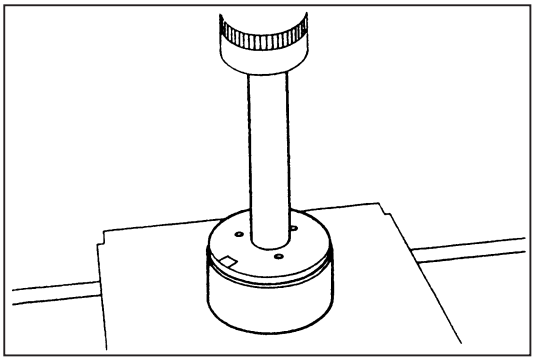
   If the clearance exceeds the allowable limit, replace the oilless bearing or the planetary carrier shaft.


JST00052-00048

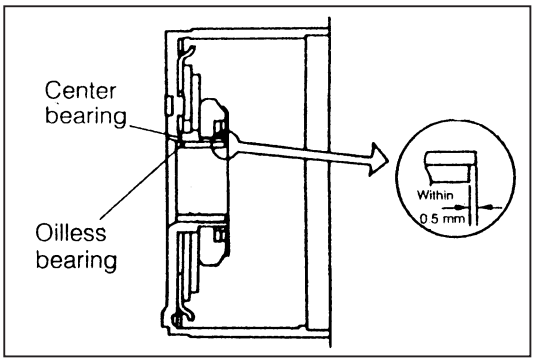
3. Bearing replacement
   (1) Remove the bearing, using a suitable tool in combination with a press or the like.
   NOTE:
   - When pulling out the bearing, be sure to remove it from the inside.


JST00053-00049

   (2) Install the bearing, using a suitable tool in combination with a press or the like.
   NOTE:
   - When installing the bearing, be sure to install it from the outside.


JST00054-00050

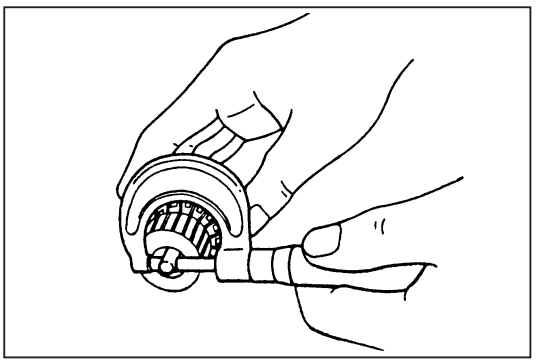
   NOTE:
   - The bearing should be driven into position in such a way that the bearing is recessed within 0.5 mm from the edge of the center bearing.



JST00055-00051

End frame bearing

1. Measure the outer diameter of the end frame sliding section of the armature shaft.
   Specified Value: 7 mm


JST00056-00052

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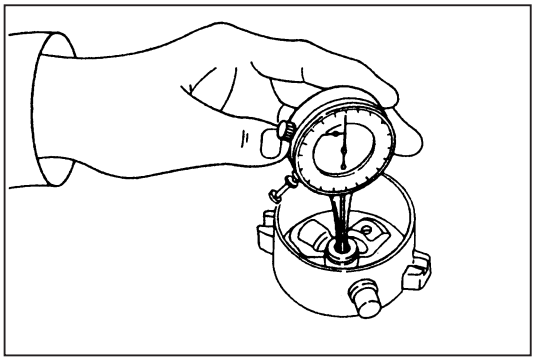
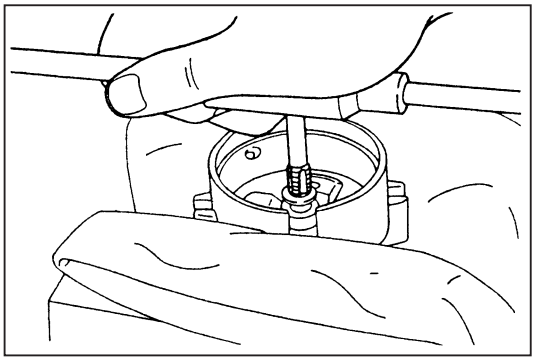
2. Measure the inner diameter of the end frame bearing so as to determine the clearance.
   Specified Value: 0.035 mm
   Allowable Limit: 0.1 mm

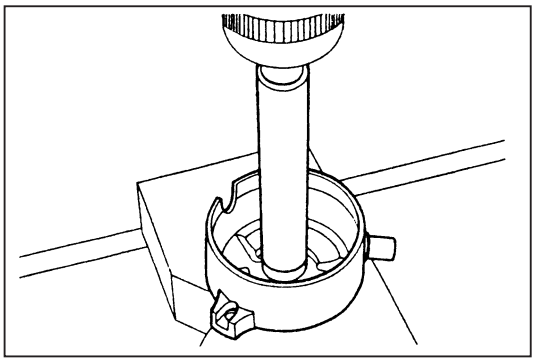
   If the clearance exceeds the allowable limit, replace the oilless bearing or the armature.


JST00057-00053

3. Bearing replacement
   (1) Remove the bearing, using a tap having an outer diameter of 8 mm.
   NOTE:
   - Be certain to clamp the end frame in a vise with a cloth interposed so that no scratch may be made on the end frame.

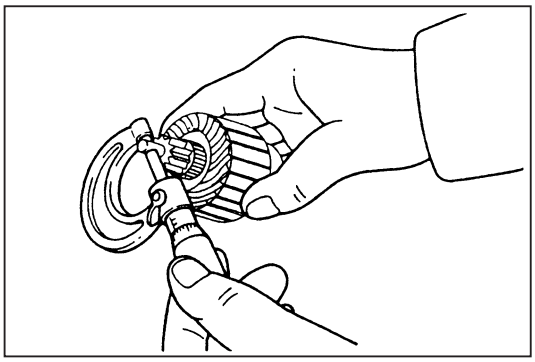

JST00058-00054

   (2) Install a new bearing, using a suitable tool in combination with a press or the like.


JST00059-00055

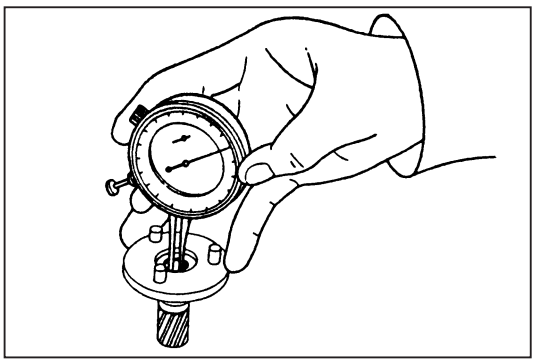
Planetary carrier shaft bearing

1. Measure the outer diameter of the front sliding section of the armature shaft.
   Specified Value: 7 mm


JST00060-00056

2. Measure the inner diameter of the planetary carrier shaft bearing so as to determine the clearance.
   Specified Value: 0.06 mm
   Allowable Limit: 0.10 mm

   If the clearance exceeds the allowable limit, replace the oilless bearing or the armature.


JST00061-00057

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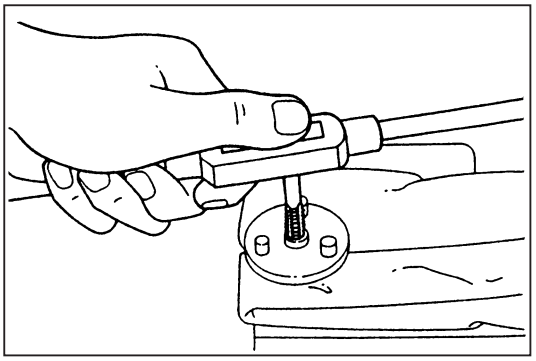
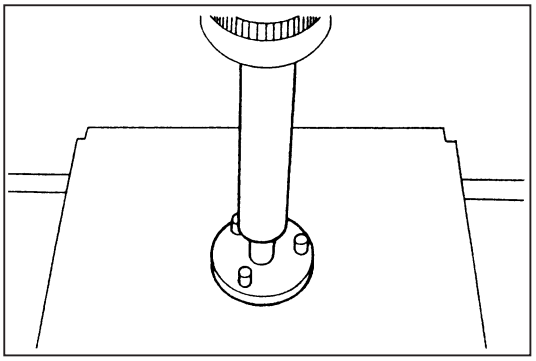
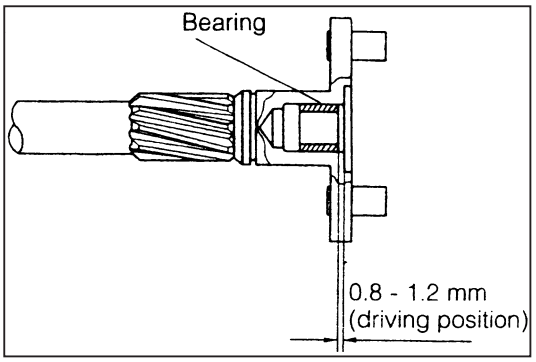
3. Bearing replacement
   (1) Remove the bearing, using a tap having an outer diameter of 8 mm.
   NOTE:
   - Be certain to clamp the planetary carrier shaft in a vice with a cloth interposed so that no scratch be made on the planetary carrier shaft.


JST00062-00058

   (2) Install a new bearing, using a suitable tool in combination with a press or the like.


JST00063-00059

   NOTE:
   - The bearing should be driven into the position, as indicated in the right figure.

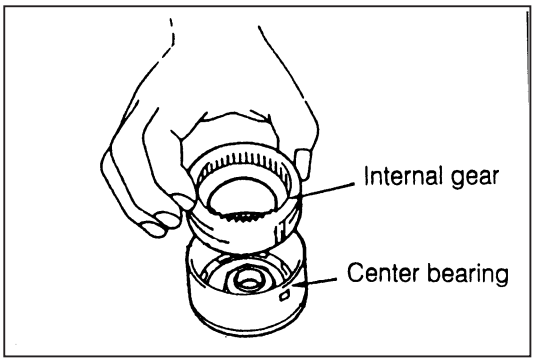


JST00064-00060

ASSEMBLY OF PLANETARY TYPE STARTER MOTOR

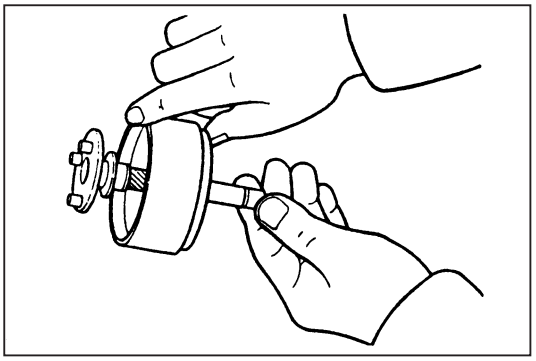
   NOTE:
   - Use high-temperature grease to lubricate the bearings and sliding parts when assembling the starter motor.

1. Install the internal gear by aligning the recessed section provided at the outer periphery of the internal gear with the protruded section provided at the inner periphery of the center bearing.



JST00065-00061

2. Put the plate washer onto the planetary carrier shaft. Then, install the center bearing to the planetary carrier shaft.


JST00066-00062

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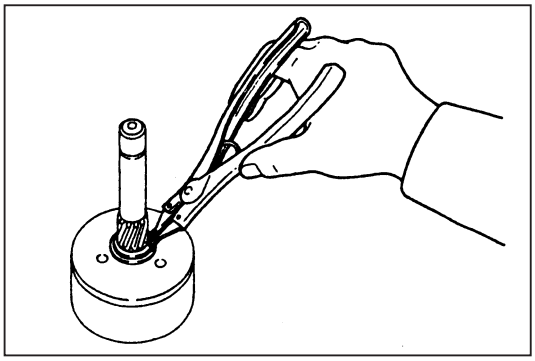
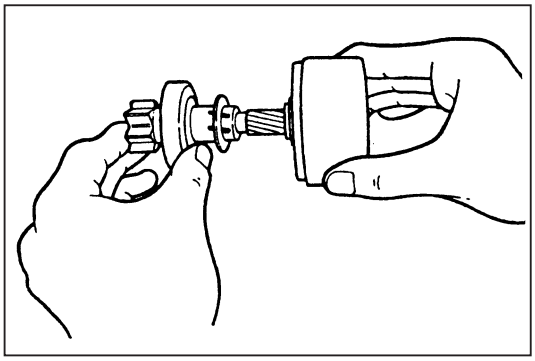
3. Install the plate washer in place.
   Install the snap ring.



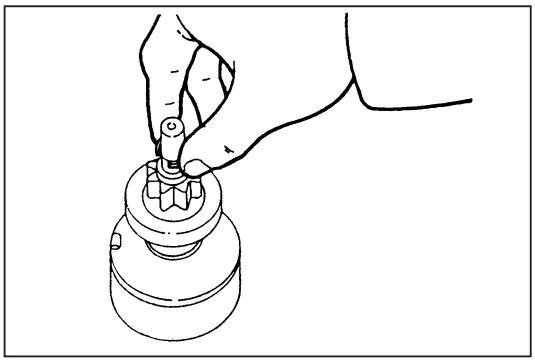
JST00067-00063

4. Install the clutch.



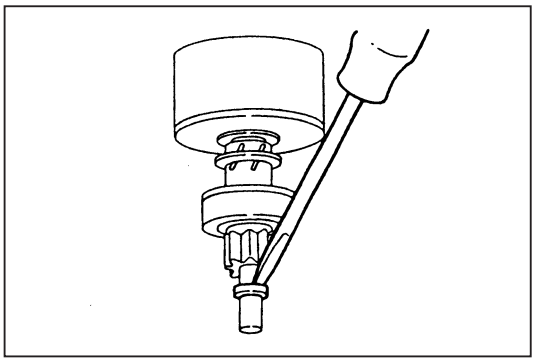
JST00068-00064

5. Install the stop collar and a new snap ring. Compress the snap ring, using a vise or the like.



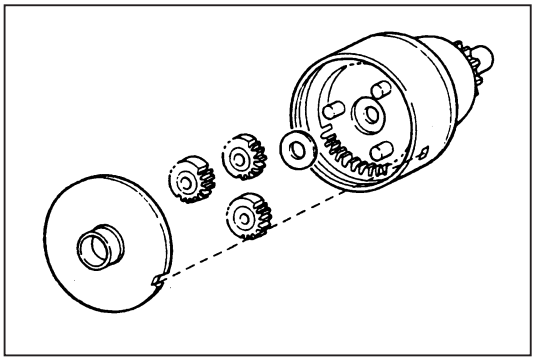
JST00069-00065

6. Tap the collar so that it may come onto the snap ring, using a screwdriver.



JST00070-00066

7. Installation of planetary gear
   (1) Install the plate washer.
   (2) Install the three planetary gears.
   (3) Install the plate for starter armature.
   NOTE:
   - Be certain to install the plate, aligning with the mate mark on the center bearing.



JST00071-00067

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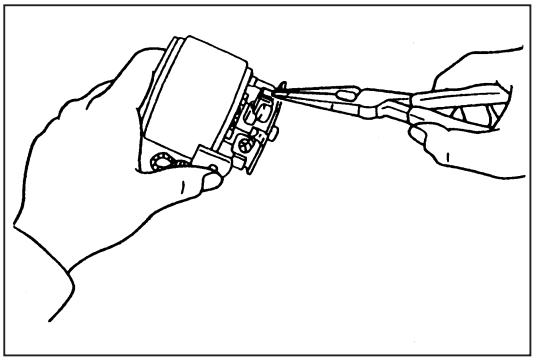
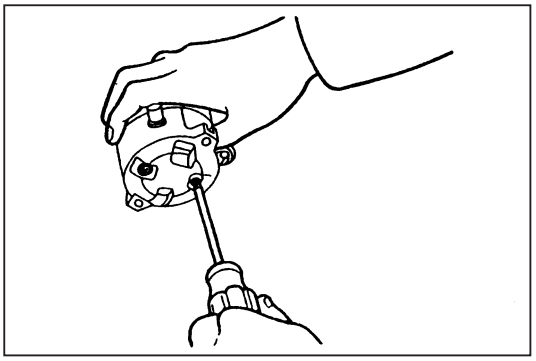
8. Install the yoke to the armature. Install the brushes to the brush holder while lifting the brushes by means of nose pliers or the like.



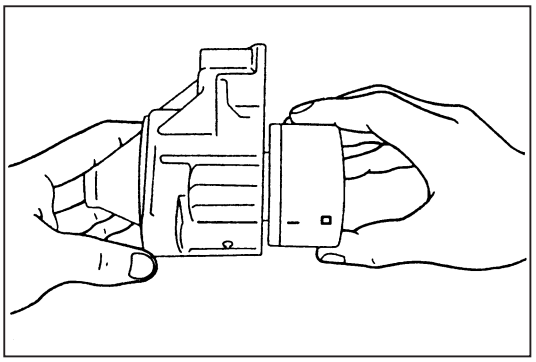
JST00072-00068

9. Install the commutator end frame, together with a new O-ring, to the yoke by means of the two screws.



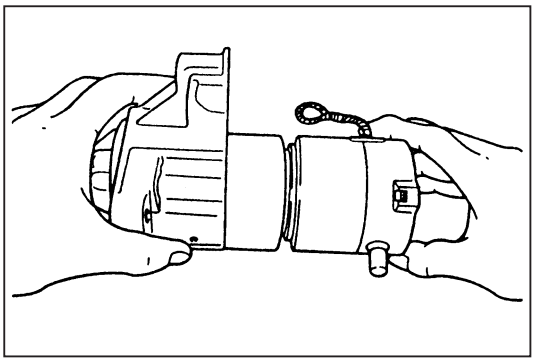
JST00073-00069

10. Install the drive lever and the clutch with center bearing to the drive housing.
    NOTE:
    - Apply high-temperature grease to the sliding section of the drive lever.
    - Make sure to align the mate mark of the drive housing with that of the yoke during the assembly.



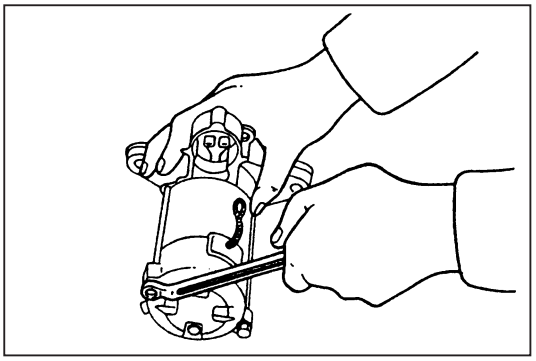
JST00074-00070

11. Install the armature with yoke and a new O-ring to the drive housing.
    NOTE:
    - Make sure to align the mate mark of the center bearing with that of the yoke during the assembly.



JST00075-00071

12. Install the two through-bolts.



JST00076-00072

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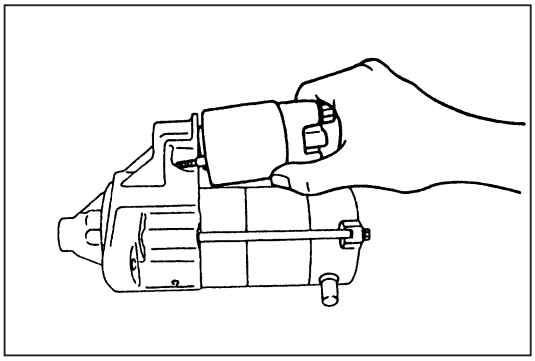
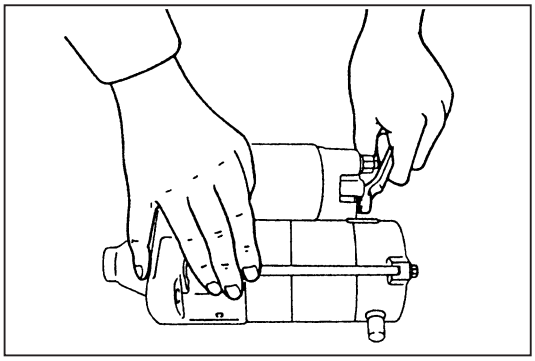
13. While hooking the magnetic switch over the drive lever, install the magnetic switch onto the drive housing. Secure the magnetic switch with the two nuts.
    NOTE:
    - Be sure to install the rubber boot in the spring section securely.



JST00077-00073

14. Connect the lead wire to the magnetic switch.



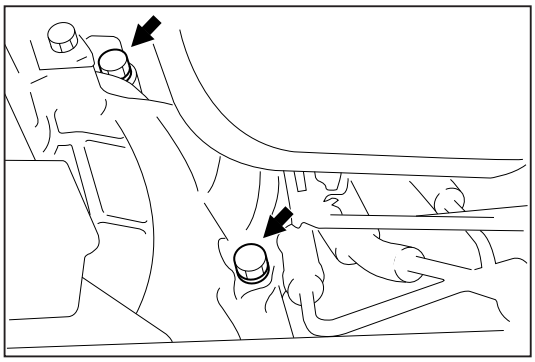
JST00078-00074

INSTALLATION OF STARTER MOTOR

1. Install the starter motor to the bell housing.

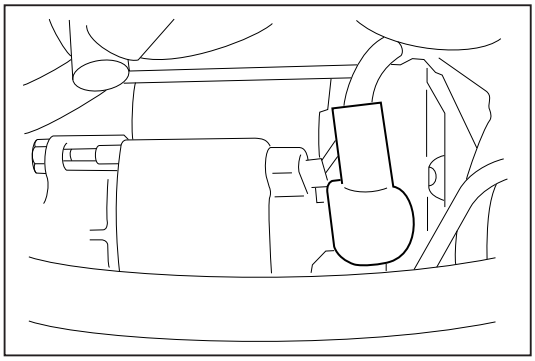
JST00079-00000

2. Tighten the lower side and upper side attaching bolt from the under side of the vehicle.
    Tightening Torque: 31.2 - 46.8 N·m (3.2 - 4.8 kgf-m)



JST00080-00075

3. Connect the starter terminal B of the alternator wire to the starter.
4. Connect the starter terminal ST of the alternator wire to the starter.



JST00081-00076

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5. Jack up the vehicle. Remove the safety stands from the vehicle. Then, remove the jack.
6. Install the battery and battery carrier.
7. Connect the ground cable terminal to the negative (–) terminal of the battery.

JST00082-00000

8. Ensure that the starter motor rotates smoothly.
   NOTE:
   - The battery should be in the full charged condition.

JST00083-00000

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SERVICE SPECIFICATIONS

Reduction type starter motor	Rating voltage and output power	12V 0.8 kW
	No-load characteristic at 11.5V Amperage	Less than 90A
	Brush length Standard	14.0 mm
	Minimum	11.1 mm
	Commutator Outer diameter Standard	28 mm
	Minimum	27 mm
	Undercut depth Standard	0.45 - 0.75 mm
	Minimum	0.2 mm
	Maximum circle runout	0.05 mm
	Spring installed load	15.7 N (1.6 kgf)

JST00084-00000

TROUBLE SHOOTING

Problem	Possible cause	Remedies	Page
Engine will not crank	Battery not fully charged	Check specific gravity of battery electrolyte.	CH–6
		Charge or replace battery.	
	Battery cables loose, corroded or worn	Repair or replace cables.	CH–6
	Neutral start switch faulty	Adjust or replace Neutral start switch.	
	Fusible link blown	Replace fusible link.	
	Starter faulty	Repair starter.	ST–4
	Ignition switch faulty	Replace ignition switch.	
Engine cranks slowly	Battery not fully charged	Check specific gravity of battery electrolyte.	CH–6
		Charge or replace battery.	
	Battery cables loose, corroded or worn	Repair or replace cables.	
	Starter faulty	Repair starter.	ST–4
Starter keeps running	Starter faulty	Repair starter.	ST–4
	Ignition switch faulty	Replace ignition switch.	
	Short in wiring	Repair wiring.	
Starter spins – engine will not crank	Pinion gear teeth broken or faulty starter	Repair starter.	ST–4
	Flywheel teeth broken	Replace flywheel.	

JST00085-00000

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DAIHATSU

TERIOS

J100

CHARGING SYSTEM

CH

OUTLINE OF CHARGING SYSTEM ..... CH– 2
CHARGING SYSTEM CIRCUIT ..... CH– 2
PRECAUTIONS ..... CH– 3
IN-VEHICLE INSPECTION ..... CH– 3
ALTERNATOR ..... CH– 9
SERVICE SPECIFICATIONS CH–22
TROUBLE SHOOTING CH–22

JCH00001-00000

NO. 9710-JE

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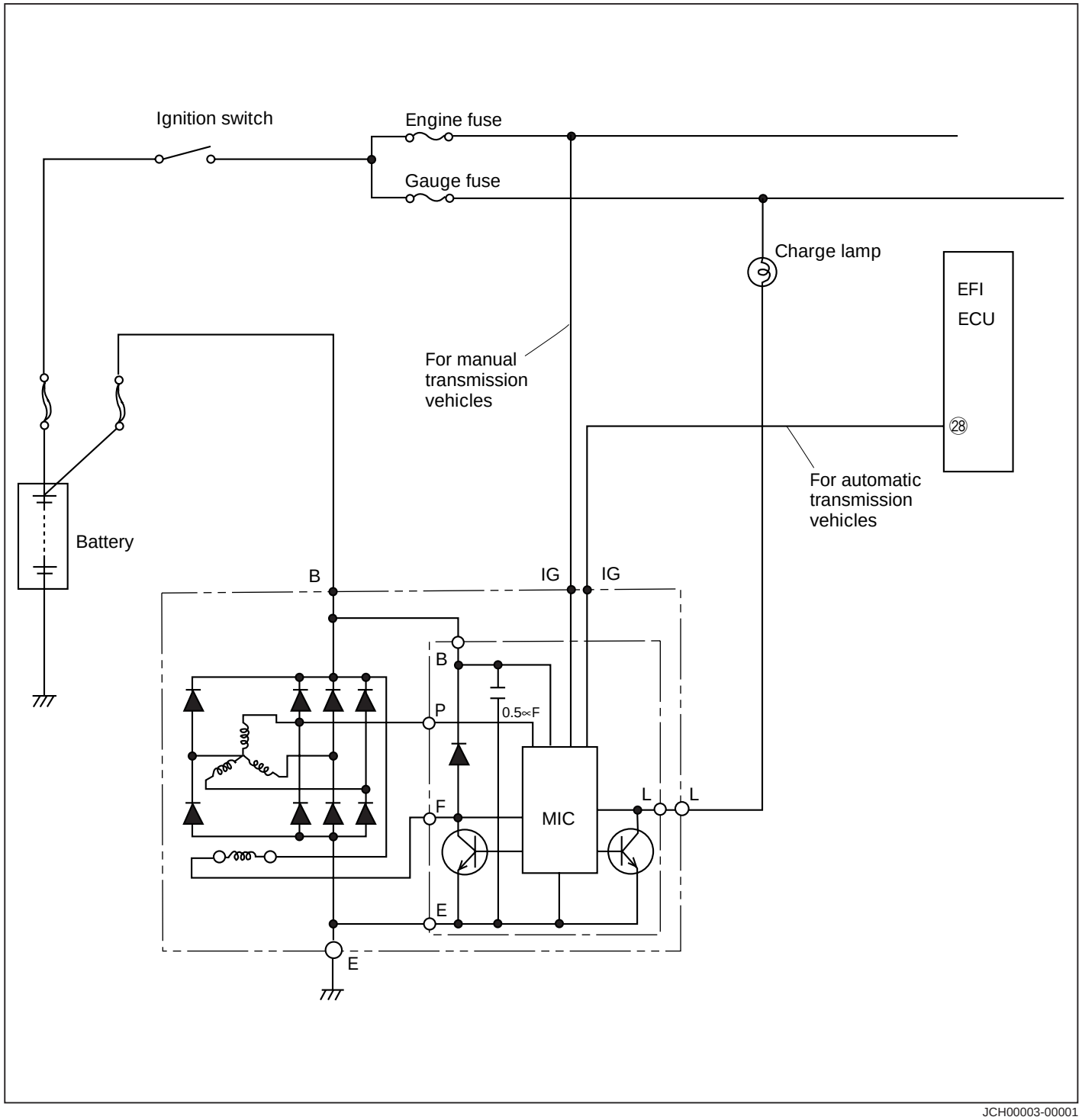
OUTLINE OF CHARGING SYSTEM

An IC regulator type alternator is employed on this model.
Moreover, an alternator cut-off system is adopted on automatic transmission vehicles to shut off the alternator operation so that the startability of the engine may be enhanced when the ambient temperature is extremely low at the starting period.
This system is controlled by the EFI ECU.

JCH00002-00000

CHARGING SYSTEM CIRCUIT



JCH00003-00001

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PRECAUTIONS

1. Prior to the inspection, make sure that the battery cables are connected securely.
2. When a quick charging operation is carried out, first be sure to disconnect the battery cables.
3. Never use a high-voltage insulation resistance tester for the purpose of conducting this inspection.
4. Under no circumstances should the battery cables be disconnected while the engine is rotating.

JCH00004-00000

IN-VEHICLE INSPECTION

1. Inspection of battery

<Reference>

- First-aid treatment for dilute sulfuric acid

Nature of accident	First-aid treatment
Acid gets to vehicle body.	Immediately flush the affected area using a large amount of clean running water, until no acid content remains any more.
* Acid gets into your eyes.	Immediately flush your eyes using a large amount of clean running water for at least 15 minutes with your eyes in open state.
* Acid gets to your skin or clothes.	Immediately flush the affected area using a large amount of clean running water, until no acid content remains any more. Afterwards, neutralize them with a soap. Finally flush them with water.
Acid is spilled.	Immediately flush the affected area using a large amount of water, until no acid content remains any more. Afterwards, neutralize the area with slacked lime, sodium or the like.
* Acid is swallowed.	Immediately flush the mouth with clean water. Let him drink raw eggs. Milk or a large amount of water. Let him lie quietly.

* After the aforesaid first-aid treatment has been done, call a physician immediately.

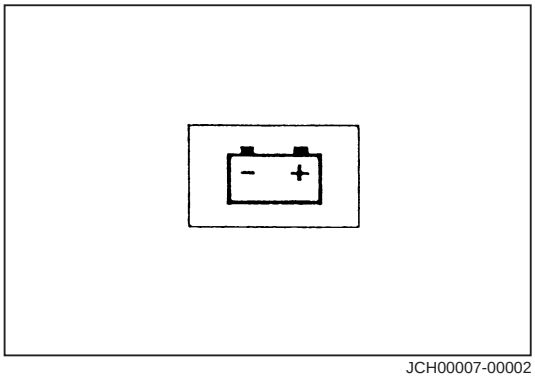
JCH00005-00000

2. Inspection of drive belt
   (Refer to the MA section of the service manual.)
3. Check of fuses for continuity
   Fusible link
   Fusible link block
   EFI No. 1 fuse
   Engine fuse
   Gauge fuse
4. Checking alternator wiring and listening for abnormal noises
   (1) Check to see if the alternator wire is connected properly to the alternator.
   (2) Ensure that the alternator emits no abnormal noise while the engine is running.

JCH00006-00000

5. Check of charge warning lamp circuit
   (1) Turn OFF all accessory switches.
   (2) Start the engine and warm up the engine thoroughly. Turn OFF the ignition switch.
   (3) When the ignition switch is turned ON, ensure that the charge warning lamp goes on.
   (4) After the engine has started, ensure that the charge warning lamp goes out.

   If the warning lamp does not function as specified, troubleshoot the warning lamp circuit.



JCH00007-00002

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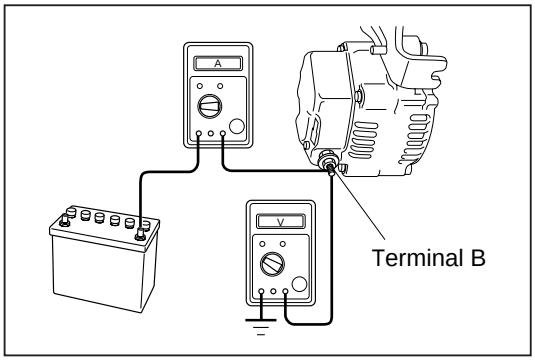
6. Check of charging circuit under unloaded state
   NOTE:
   - If a battery/alternator tester is available, connect such tester to the charging circuit according to the manufacturer's instructions of the alternator tester.

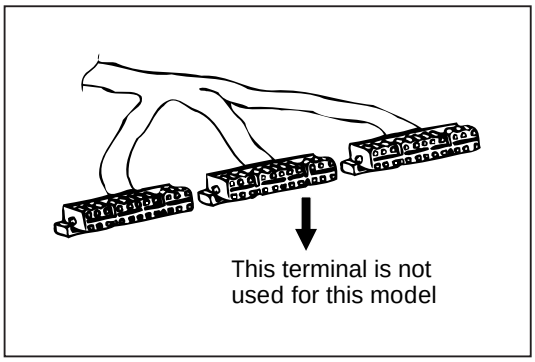
JCH00008-00000

(1) If a battery/alternator tester is not available, connect a voltmeter and an ammeter to the alternator wiring and alternator as follows:
   - Disconnect the battery ground cable from the negative (–) terminal of the battery.
   - Connect an ammeter in series between the alternator wire terminal B and the alternator as indicated in the right figure.
   - Connect the positive (+) terminal of a voltmeter to the terminal B of the alternator as indicated in the right figure.
   - Connect the negative (–) terminal of the voltmeter to the engine ground.
   - Wind vinyl tape around each connection section so as to prevent short.
   - Reconnect the battery ground cable to the negative terminal of the battery.



JCH00009-00003

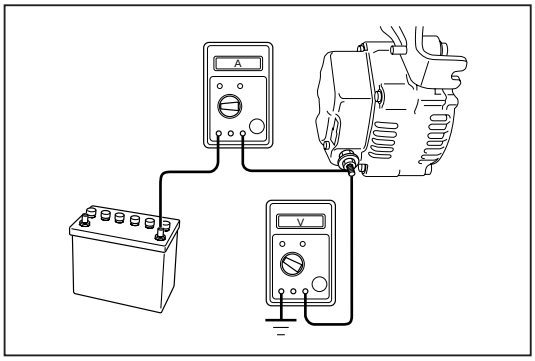
(2) Connection of SST
   Install the following SST between EFI ECU and EFI ECU connectors of the engine wire.
   (Refer to the EF section of the service manual for installation of the SST.)
   SST: 09842-87706-000



JCH00010-00004

(3) Checking the charging circuit as follows:
   ① Start the engine and warm it up.
   ② Raise the engine speed from the idle speed to 2000 rpm.
   ③ Ensure that the ammeter and voltmeter reading are within the specified value.
   Standard Amperage: Not to exceed 10 A.
   Standard Voltage: 13.6 - 14.4 Volts

   If the voltage reading is greater than the standard voltage, replace the IC regulator.



JCH00011-00005

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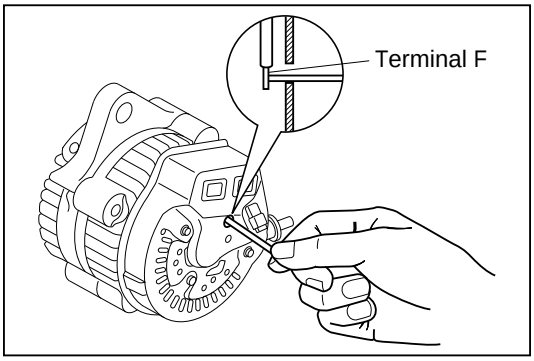
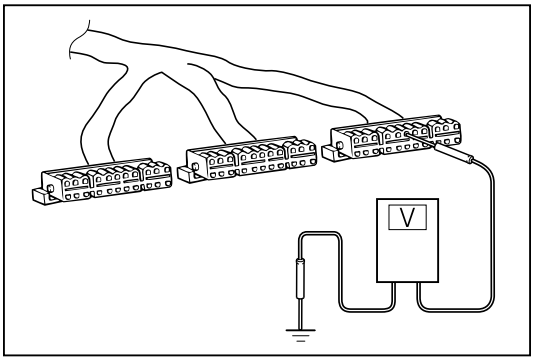
For automatic transmission models, ensure that a voltage of 4.0 volts or higher is applied to between the terminal ㉘ of the SST and the body ground.
If the specified voltage is not applied, check the wiring between the EFI ECU and the alternator as follows:



JCH00012-00006

a. Turn OFF the ignition switch.
b. Disconnect the battery ground cable terminal from the negative terminal of the battery.
c. Disconnect the EFI ECU terminal of the SST from the EFI ECU. (Do not disconnect the engine wire side connector of the SST.)
d. Connect the battery ground cable terminal to the negative terminal of the battery.
e. Turn ON the ignition switch.
f. Ensure that a voltage of 4.0 volts or higher is applied to between the terminal ㉘ of the SST and the body ground.



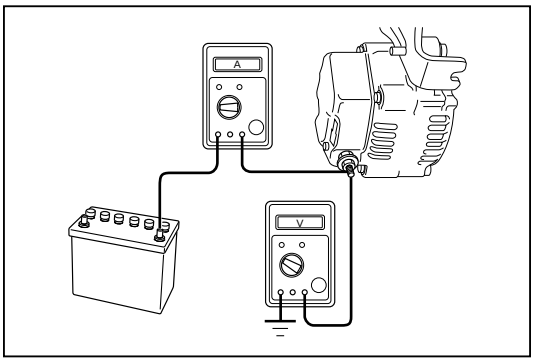
JGCH00013-00007

If the voltage between the terminal ㉘ of the SST and the body ground is 2.5 volts or less, check the EFI computer and its related circuits for short or open circuit.

<Reference>
The standard voltage between the terminal ㉘ of the SST and the body ground is approximately equal to the battery voltage.

7. Check of charging circuit under loaded state
(1) Start the engine. Maintain the engine speed at 2000 rpm. Turn ON the high beams of the headlamps and set the blower fan motor switch to the Hi position. Take a reading of the ammeter.
Standard Amperage: 30 A or more

If the ammeter reading is less than 30 A, repair the alternator.
(Refer to the overhaul of the alternator.)



JCH00014-00008

NOTE:
- When the battery is in a fully-charged state, the ammeter reading may be less than 30 A during the aforesaid test.

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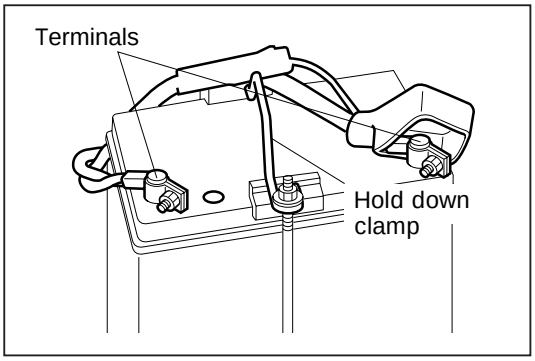
Removal of battery

WARNING:
- Never touch the battery terminals immediately after the engine stopped.
- Be certain to turn OFF the ignition switch.
- Never allow any fire to be brought near the battery.

CAUTION:
- Be very careful not to drop the battery or apply strong vibration to the battery.

1. Ensure that the ignition switch is turned OFF.
2. Disconnect the battery ground cable from the negative terminal of the battery.
3. Disconnect the positive cable terminal from the positive terminal of the battery.
4. Remove the battery hold-down clamp.

JCH00015-00000



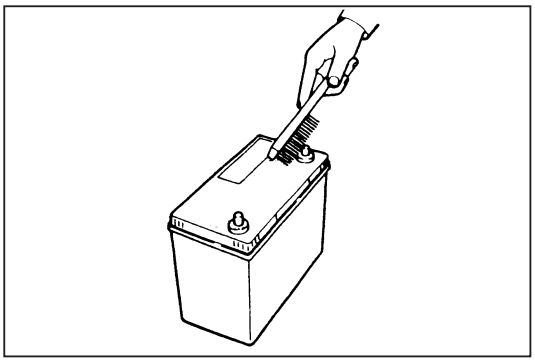
JCH00016-00009

5. Remove the battery.

JCH00017-00000

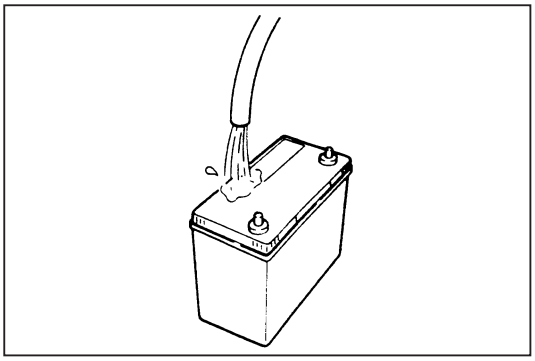
CLEANING AND INSPECTION OF BATTERY

1. Remove any rust from the battery terminals by means of a wire brush, a fine abrasive paper, or sodium water and a soft brush.
   NOTE:
   - After the battery terminals have been cleaned, make sure that no rust particle remains on the terminals.



JCH00018-00010

2. Using adhesive tape or the like, seal the vent hole of each cell plug.
3. Flush the battery with clean water, using a soft brush.
4. Wipe off the battery surface using a cloth dampened with clean water.
5. Dry the battery case surface.



JCH00019-00011

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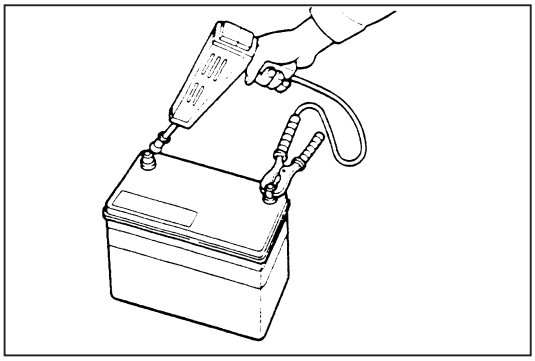
Battery capacity check

1. Reserve capacity check, using hydrometer

2. Reserve capacity check, using battery tester
   CAUTION:
   - The battery tester should be operated in accordance with the operating instructions of the service manual.
   - The battery to be check should be fully charged.

   (1) Connect a battery tester to the battery.
   (2) Check the battery capacity.
   NOTE:
   - If the check results are not satisfactory, recheck the reserve capacity, after having checked the electrolyte level and/or replenished distilled water. Then, charge the battery until the battery capacity reaches the specified level.
   - Replace the battery with a new one, if the check results are still unsatisfactory after the rechecking of the battery reserve capacity.



JCH00020-00012

Battery recharging (Except Delco freedom battery)

CAUTION:
- If the Delco Freedom Battery requires the recharging, be sure to consult with the distributor or agent of Delco Freedom Battery.

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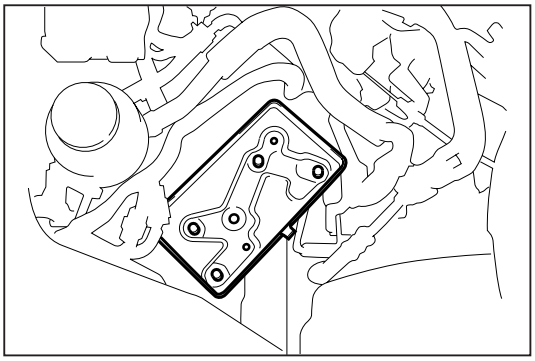
INSTALLATION OF BATTERY

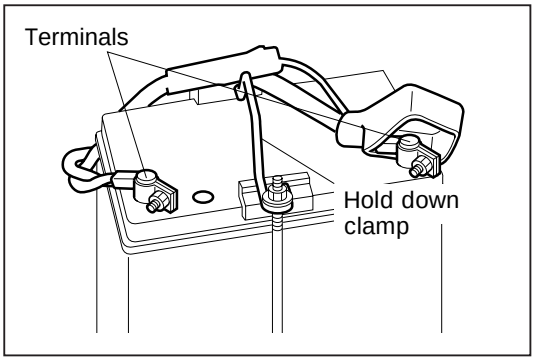
1. Clean any dust from the battery carrier.



JCH00021-00013

2. Place the battery on the battery carrier in such a direction that the negative terminal of the battery may come at the front side of the vehicle.
3. Install the battery hold-down clamp.
   CAUTION:
   - Be very careful not to tighten the hold-down clamp excessively.

   NOTE:
   - Install the battery hold-down clamp in such a direction that the hold-down clamp on the battery may come to the straight position against the battery not in a tilted state.



JCH00022-00014

4. Connect the positive cable terminal to the battery positive terminal of the battery.
   NOTE:
   - Ensure that the terminal at the wiring exhibits no rust or the like.
   - If any rust is present, remove the rust, using a wire brush or a fine abrasive paper.

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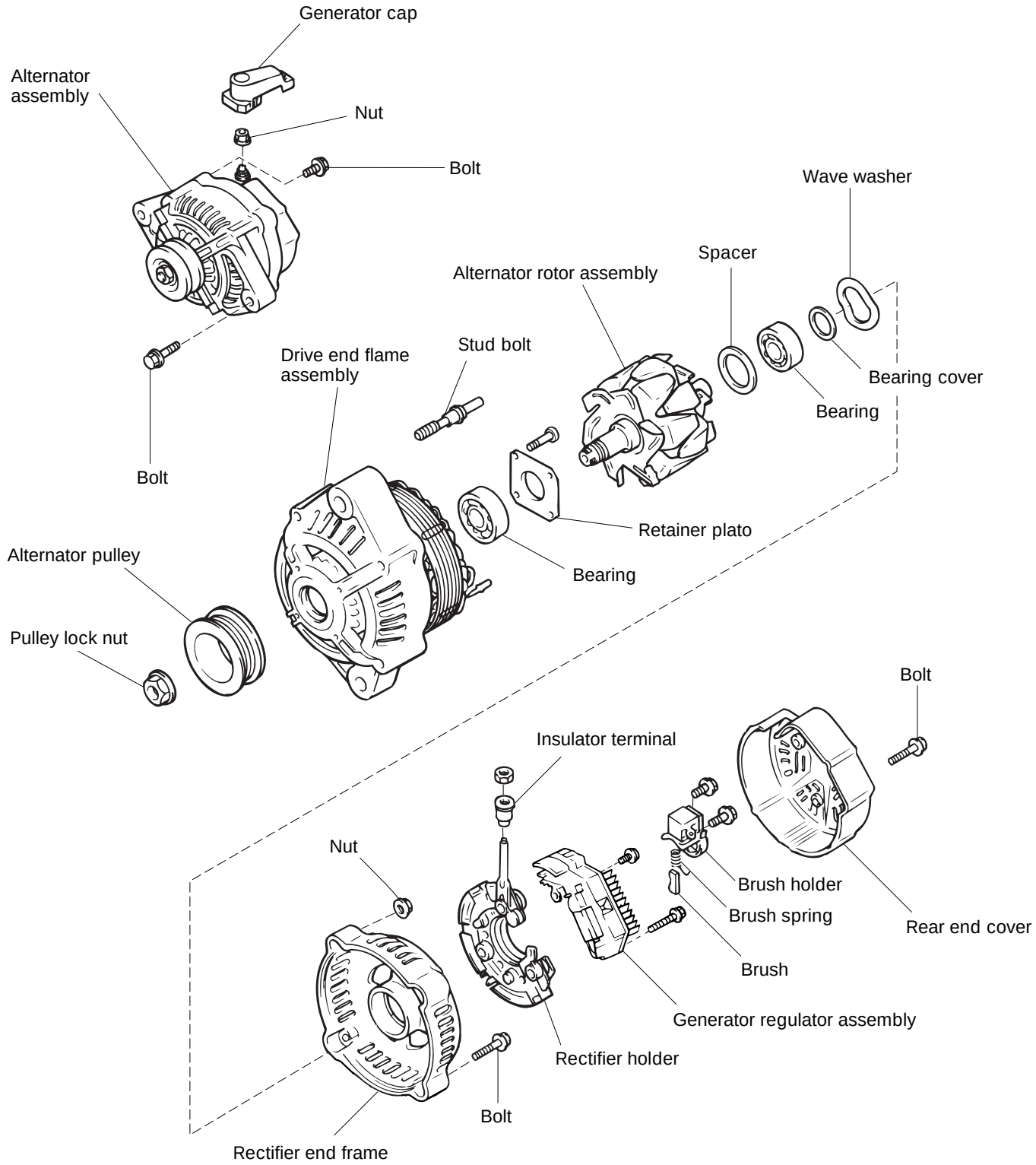
ALTERNATOR

COMPONENTS



Alternator 50A for manual transmission vehicles and 55A for automatic transmission vehicles

JCH00023-00015

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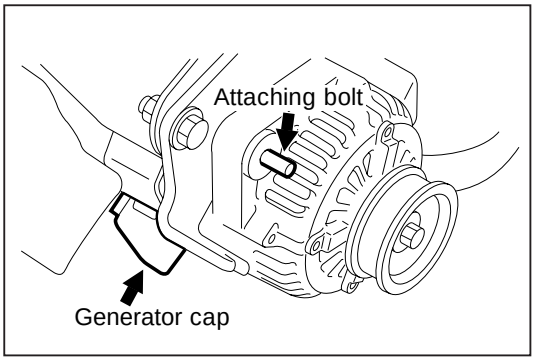
REMOVAL OF ALTERNATOR

1. Disconnect the ground cable terminal from the negative terminal of the battery.
2. Remove the generator cap.
3. Disconnect the terminal B of the alternator wire from the alternator.
4. Disconnect the alternator connector of the alternator wire from the alternator.
   NOTE:
   - Be sure to disengage the lock of the connector before disconnection.



JCH00024-00016

5. Removal of alternator drive belt
   (1) Remove the air conditioner drive belt.
   (Refer to the air conditioner installation manual issued by DENSO CO., LTD.)
   (2) Remove the upper attaching bolt of alternator.

   (3) Remove the engine undercover.

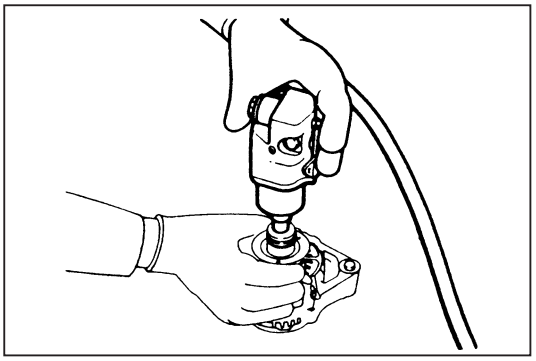
JCH00025-00017

   (4) Remove the lower attaching bolt of the alternator.
   (5) Take out the alternator from the vehicle.

JCH00026-00000

DISASSEMBLY OF ALTERNATOR

1. Remove the alternator pulley lock nut by means of an impact wrench.
   NOTE:
   - Be sure to use an impact wrench having a hexagonal hole.



JCH00027-00018

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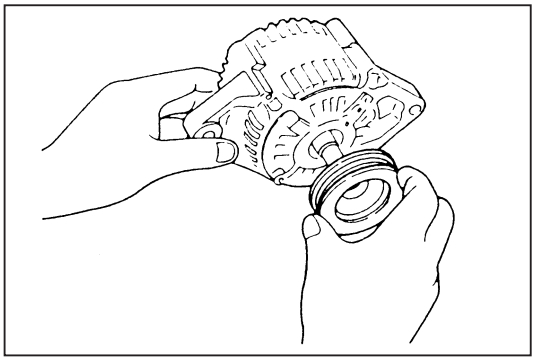
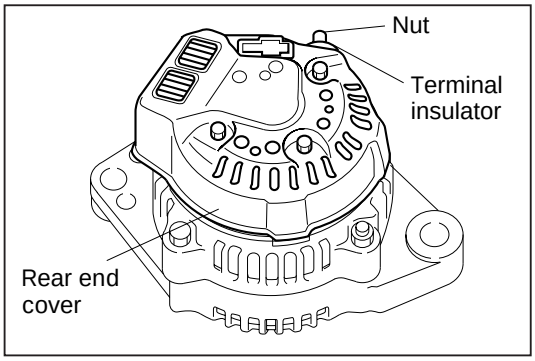
2. Remove the alternator pulley.



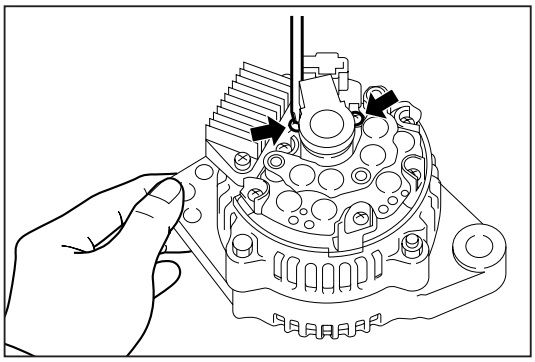
JCH00028-00019

3. Remove the attaching nut of the terminal insulator.
4. Pull out the terminal insulator.
5. Remove the three rear end cover attaching nuts.
6. Remove the terminal plate attaching bolt.
7. Remove the rear end cover.



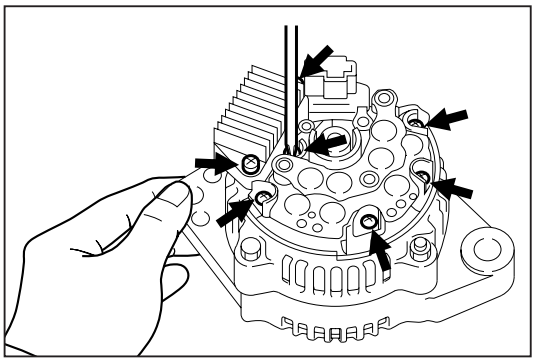
JCH00029-00020

8. Remove the brush holder by removing the two attaching bolts.



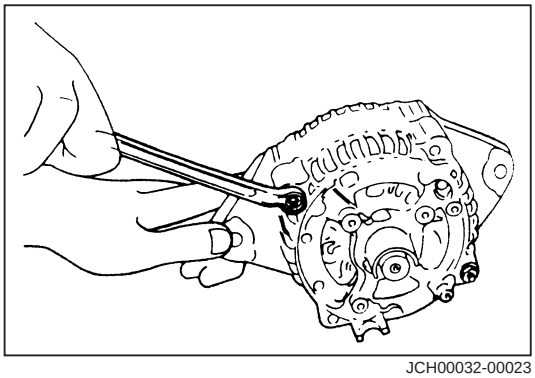
JCH00030-00021

9. Remove the rectifier holder and regulator assembly attaching bolts.
10. Remove the regulator assembly.
11. Remove the rectifier holder.



JCH00031-00022

12. Remove the rectifier end frame assembly by removing the four attaching nuts or two bolts and two nuts.



JCH00032-00023

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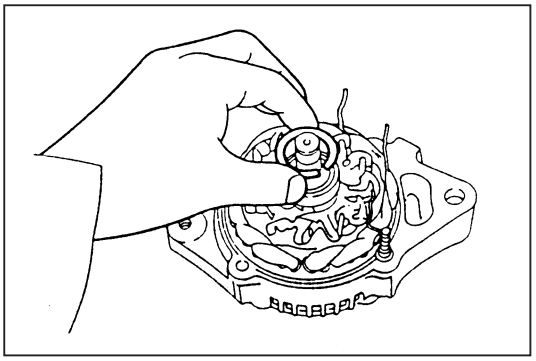
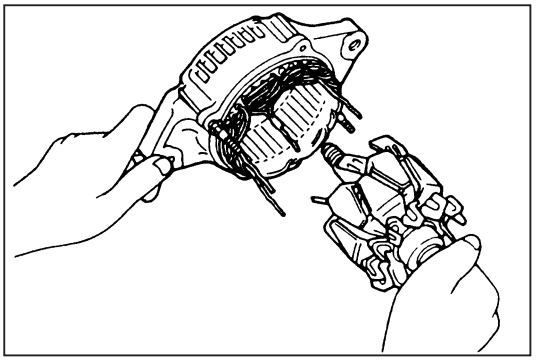
13. Remove the wave washer from the alternator rotor assembly.



JCH00033-00024

14. Remove the alternator rotor assembly from the drive end frame assembly.



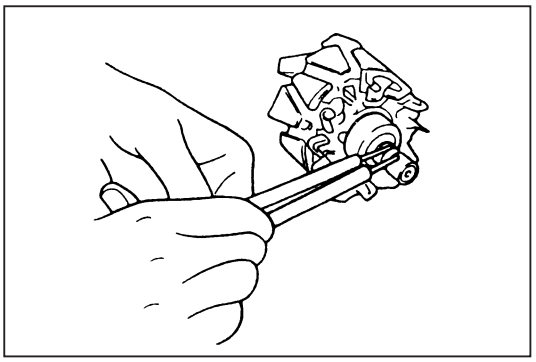
JCH00034-00025

INSPECTION OF ALTERNATOR

Rotor

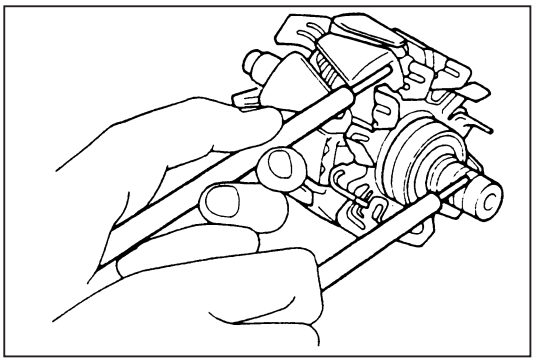
1. Inspection of rotor for open circuit
   Using an ohmmeter, check to see if the specified resistance exists between the rotor slip rings.
   Standard Resistance: 2.9 ± 0.2 ohm

   If the resistance does not conform to the specification, replace the rotor.



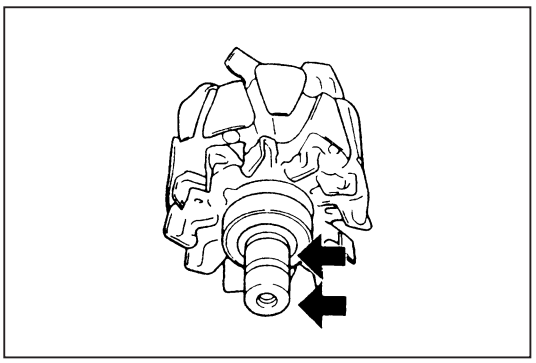
JCH00035-00026

2. Inspection of rotor for ground
   Ensure that no continuity exists between the rotor slip rings and the rotor core.
   If continuity exists, replace the rotor.



JCH00036-00027

3. Inspection of slip rings
   (1) Check to see if the slip ring surface exhibits roughness, abnormal wear and/or burning.
   Replace the rotor, if necessary.



JCH00037-00028

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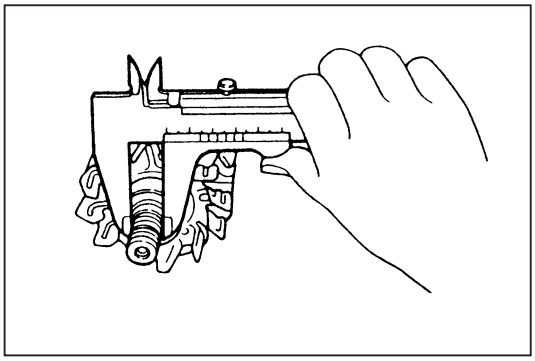
(2) Measure the outer diameter of the slip ring, using vernier calipers.
Standard Diameter: 14.4 mm
Minimum Diameter: 14.0 mm

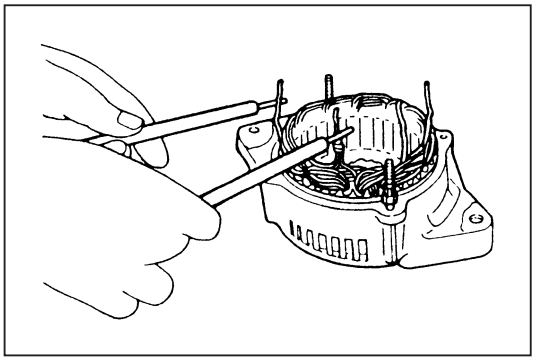
If the slip ring diameter is less than the minimum diameter, replace the rotor assembly.



JCH00038-00029

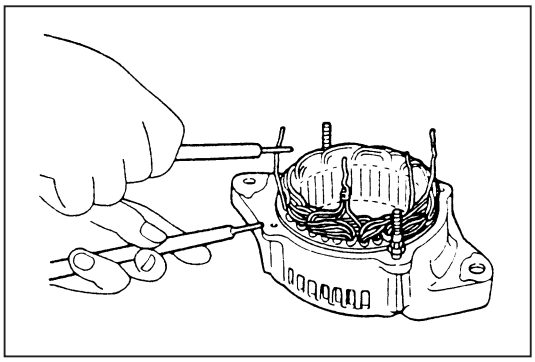
Stator

1. Inspection of stator for open circuit
Using an ohmmeter, check to see if any open circuit of the stator coil is present between the leads.
If no continuity exists, replace the end frame assembly.



JCH00039-00030

2. Inspection of stator for short circuit
Using an ohmmeter, check to see if any short circuit of the stator coil is present between the coil lead and the drive end frame.
If continuity exists, replace the drive end frame assembly.

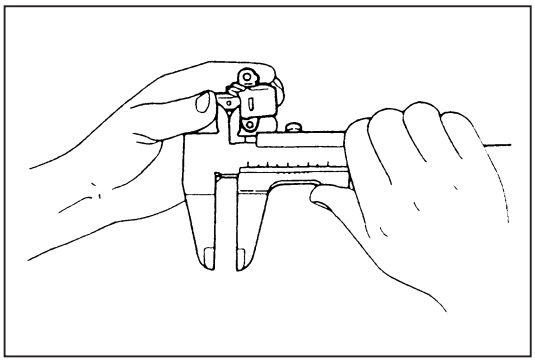


JCH00040-00031

Brush and brush holder

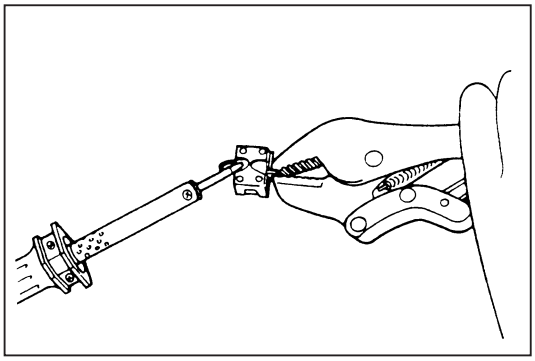
1. Measurement of exposed brush length
Measure the exposed brush length, using a scale.
Standard Exposed Length: 10.5 mm
Minimum Exposed Length: 8.4 mm

If the exposed length is less than the minimum requirement, replace the brushes.



JCH00041-00032

2. Replacement of brushes (If necessary)
(1) Remove the brush and spring from the brush holder by melting the solder by means of a soldering iron.



JCH00042-00033

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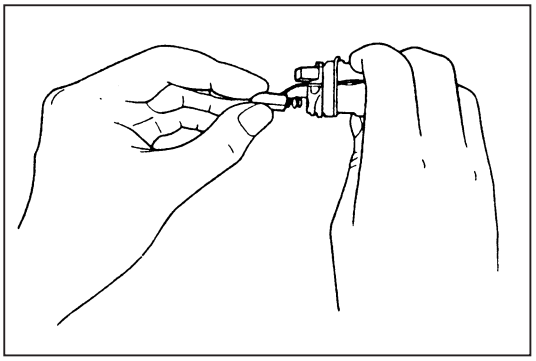
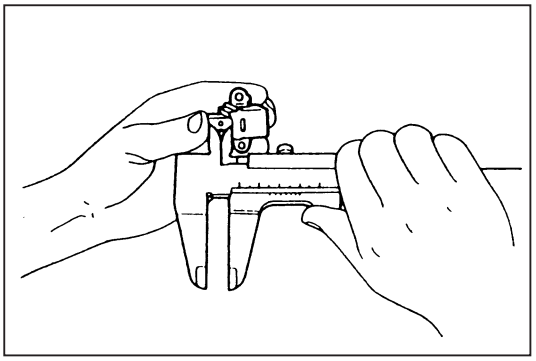
(2) Install the brush cord in the brush holder with the spring fitted in place.



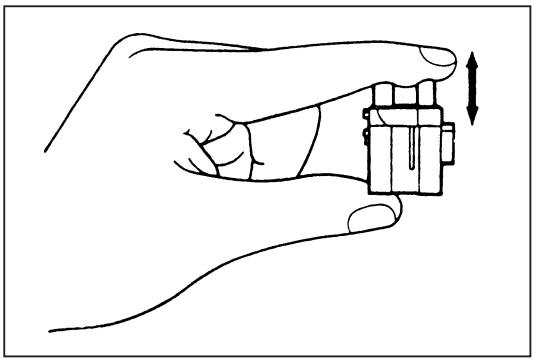
JCH00043-00034

(3) Solder the brush cord in the brush holder in such a way that the exposed length of the brush meets the specification.
Standard Exposed Length: 10.5 mm



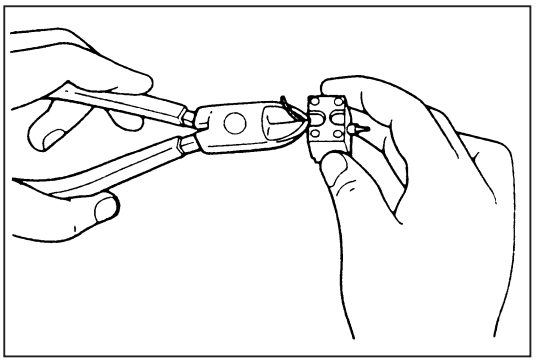
JCH00044-00035

(4) Ensure that the brush moves freely in the brush holder.



JCH00045-00036

(5) Cut off any excess remaining wire and apply an insulation paint.



JCH00046-00037

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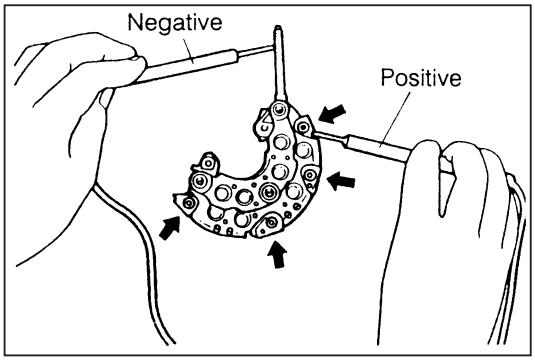
Rectifier

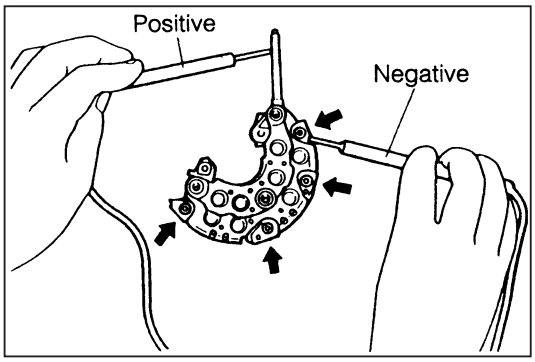


JCH00047-00038

NOTE:
- Be sure to confirm the specification of the ohmmeter to be used for inspection before putting it into use.
- The current flow direction differs according to the design of an ohmmeter.
- This manual is described, based on a digital tester manufactured by DENSO Japan.

<Reference>
- The measured resistance should be about the same as those of other rectifiers, for the measurement results differ according to the input voltage of each tester.
- If the measured resistance of the rectifier differs more than 20 percent, replace the rectifier holder.

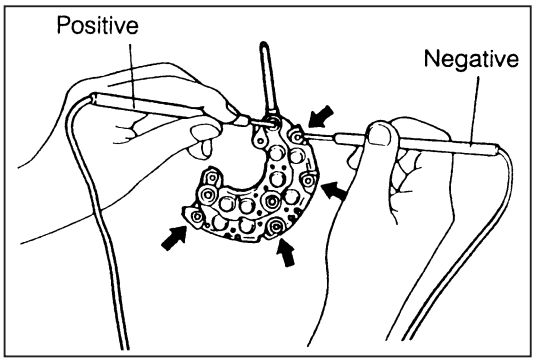
1. Inspection of rectifier at positive side
   (1) Ensure that continuity exists between the positive stud bolt of the rectifier holder and the rectifier terminal by connecting an ohmmeter as indicated in the right figure.
   If no continuity exists, replace the rectifier holder.



JCH00048-00039

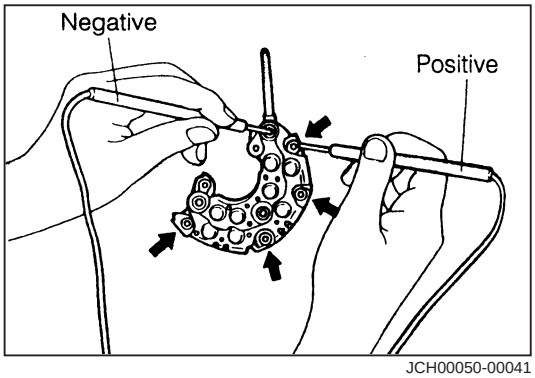
   (2) Ensure that no continuity exists between the positive stud bolt of the rectifier holder and the rectifier terminal by connecting an ohmmeter as indicated in the right figure.
   If continuity exists, replace the rectifier holder.

2. Inspection of rectifier at negative side
   (1) Ensure that continuity exists between each of the negative terminals of the rectifier holder and each rectifier terminal by connecting an ohmmeter as indicated in the right figure.
   If no continuity exists, replace the rectifier holder.



JCH00049-00040

   (2) Ensure that no continuity exists between each of the negative terminals of the rectifier holder and each rectifier terminal by connecting an ohmmeter as indicated in the right figure.
   If continuity exists, replace the rectifier holder.



JCH00050-00041

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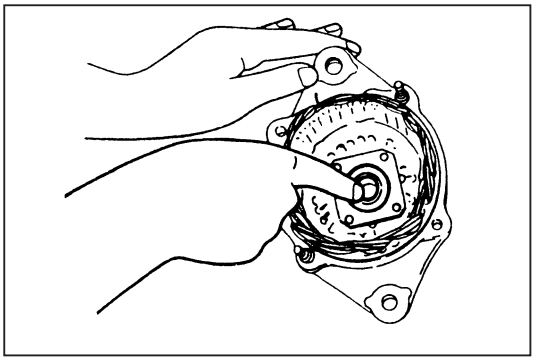
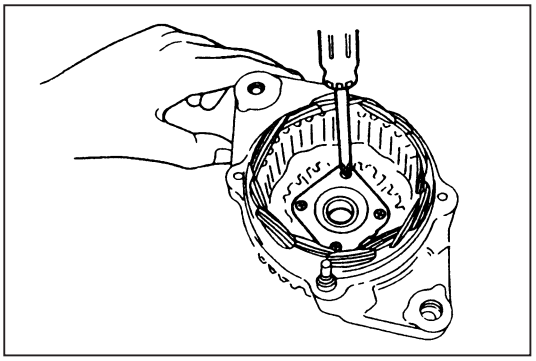
Bearings

1. Inspection of front bearing
   Ensure that the bearing turns smoothly.
   Replace the bearing, if necessary.



JCH00051-00042

2. Replacement of bearing
   (1) Remove the four screws and retainer plate.

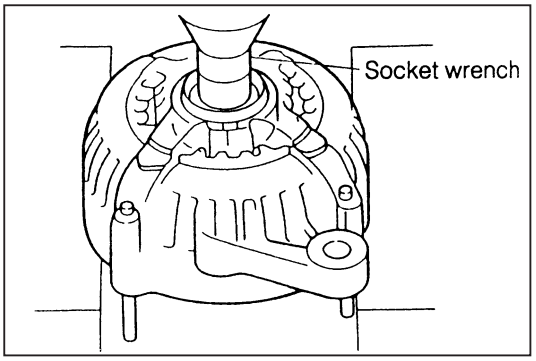


JCH00052-00043

   (2) Remove the front bearing from the drive end frame, using a suitable socket wrench in conjunction with a press.

CAUTION:

- Be very careful not to damage the coil and stud bolts during bearing removal.

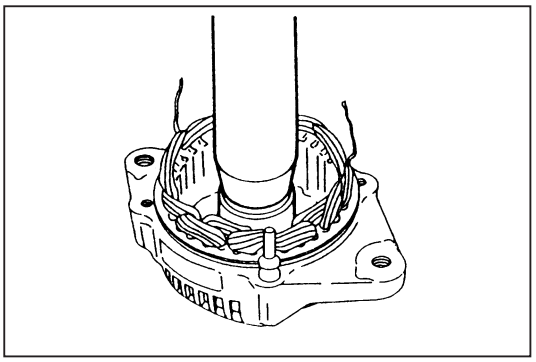


JCH00053-00044

   (3) Press a new front bearing into the drive end frame, using a suitable socket wrench in conjunction with a press.

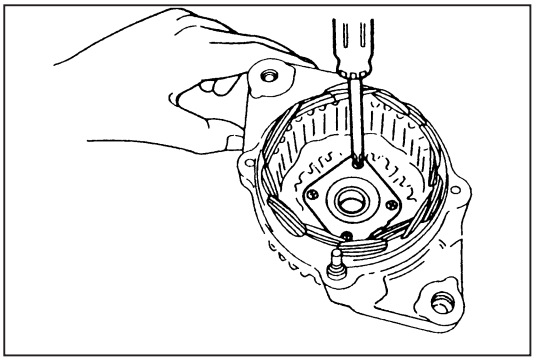
CAUTION:

- Be sure to hold the outer race of the new bearing during installation. Holding of the inner race or side cover will cause bearing damage.



JCH00054-00045

   (4) Attach the retainer plate to the drive end frame with the four screws.



JCH00055-00046

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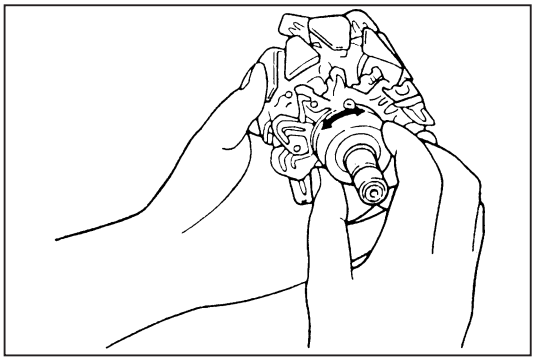
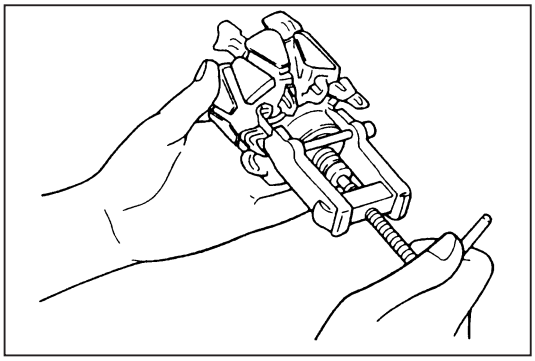
3. Inspection of rear bearing
   Ensure that the bearing turns smoothly.
   Replace the bearing, if necessary.

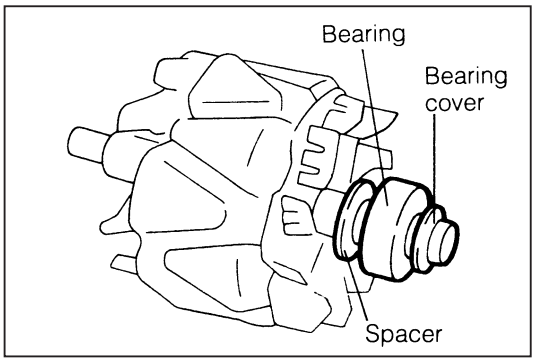

JCH00056-00047

4. Replacement of rear bearing
   (1) Remove the rear bearing cover from the rotor, using the armature bearing puller.
   CAUTION:
   - Be very careful not to damage the fan during the removal.

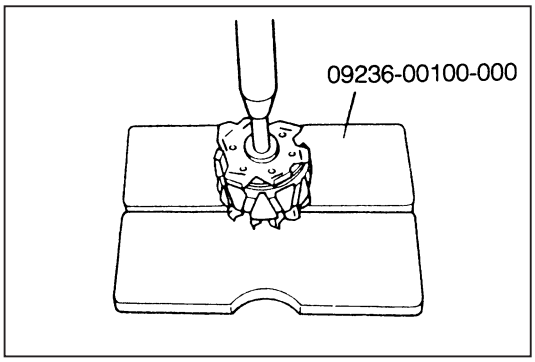

JCH00057-00048

   (2) Place the parts on the rotor in the following order.
   Spacer
   New rear bearing
   New bearing cover
   (3) Press the assembled parts into the rotor, using a hydraulic press in combination with a suitable attachment or following SST.
   SST: 09236-00100-000

   NOTE:
   - Care must be exercised so that the point where the bearing is assembled to the rotor shaft may not deform the bearing cover.
   Therefore, be sure to select a suitable attachment to assemble the bearing cover.

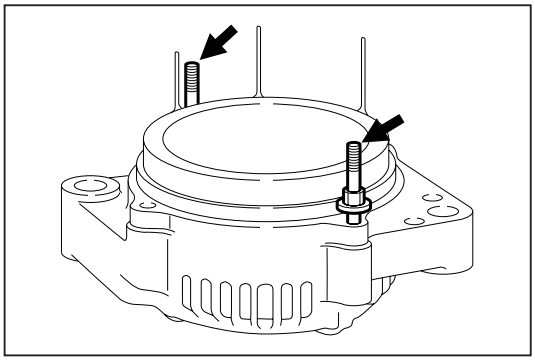


JCH00058-00049



JCH00000-00050

5. Inspection/replacement of stud bolt
   Visually inspect the thread portion of the stud bolt.
   If any damage exists, replace the stud bolt.


JCH00059-00051

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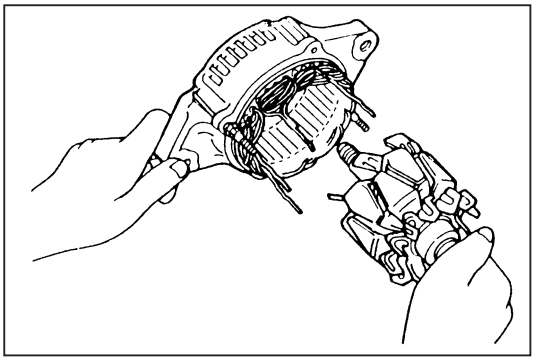
ASSEMBLY OF ALTERNATOR

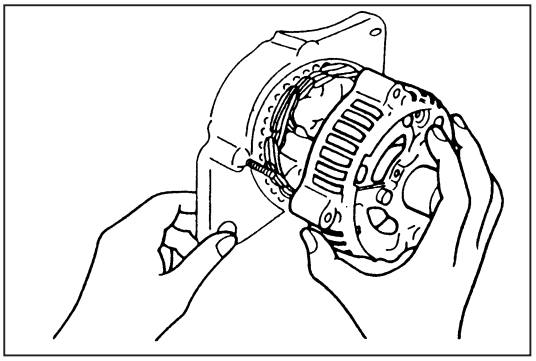
1. Install the rotor in the drive end frame assembly.



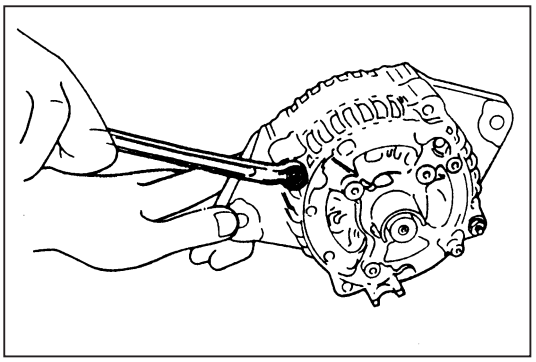
JCH00060-00052

2. Installation of rectifier end frame on drive end frame
   (1) Place the wave washer on the rear bearing.
   (2) Install the rectifier end frame on the drive end frame with the two bolts and two nuts or four attaching nuts.

   CAUTION:
   - Be very careful not to damage the coil cord during the installation.

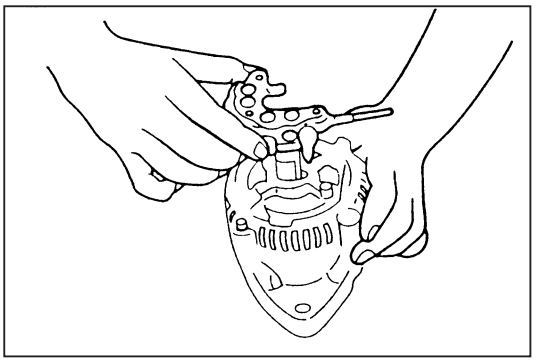


JCH00061-00053



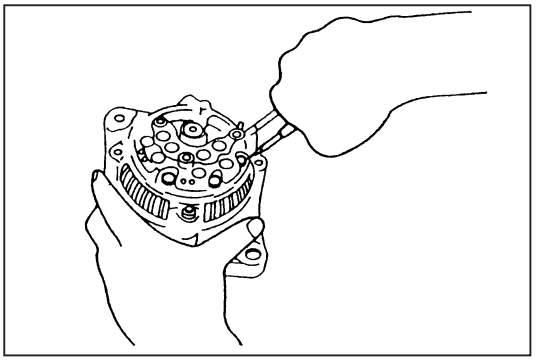
JCH00000-00054

3. Installation of rectifier holder, regulator assembly and brush holder
   (1) Attach the rectifier holder to the end frame with the coil wires passed through the aperture of the rectifier holder.



JCH00062-00055

   (2) Wind the coil wires around the installing section of the rectifier attaching bolt hole.



JCH00063-00056

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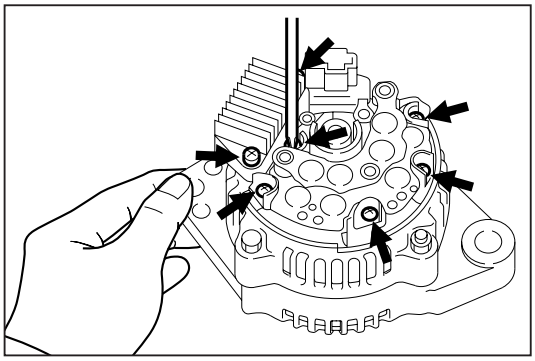
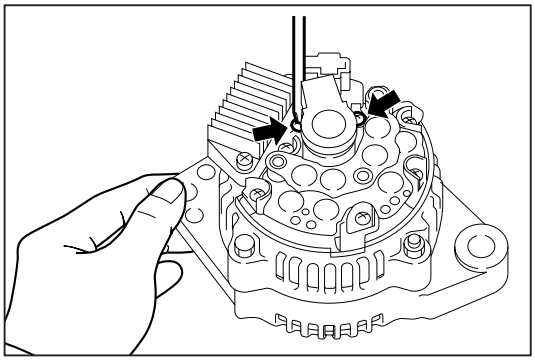
(3) Connect the coil wires to the rectifier holder with the attaching screws.
(4) Install the rectifier holder and regulator assembly with the attaching screws.

NOTE:
- Make sure that the regulator assembly is installed properly with the attaching screws as it works.



JCH00064-00057

(5) Install the brush holder in such a way that a gap of at least 1 mm is provided between the brush holder and the regulator assembly.
Secure the brush holder with the two screws.

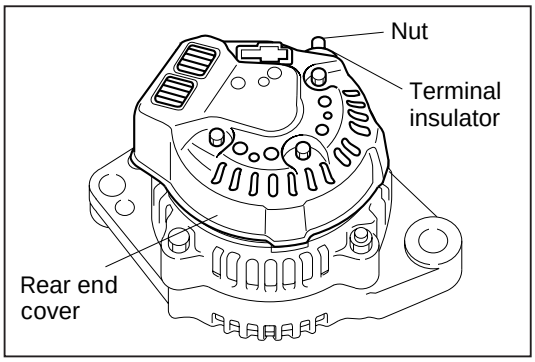


JCH00065-00058

4. Installation of rear end cover

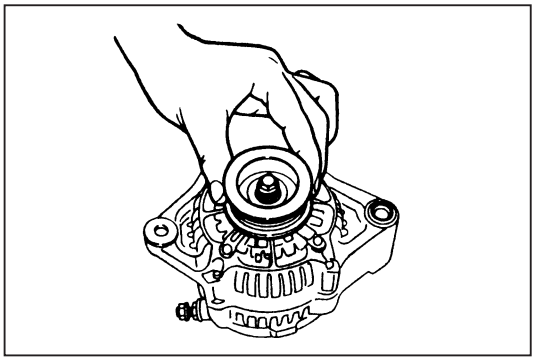
JCH00066-00000

(1) Install the rear end cover on the alternator.
(2) Secure the rear end cover with the three attaching nuts or screws.
(3) Install the terminal insulator.
(4) Secure the terminal insulator attaching nut.



JCH00067-00059

5. Attach the pulley to the rotor shaft.



JCH00068-00060

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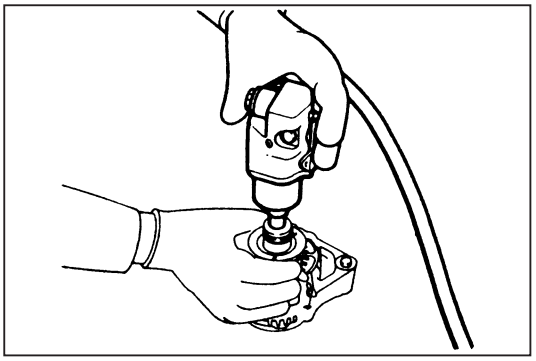
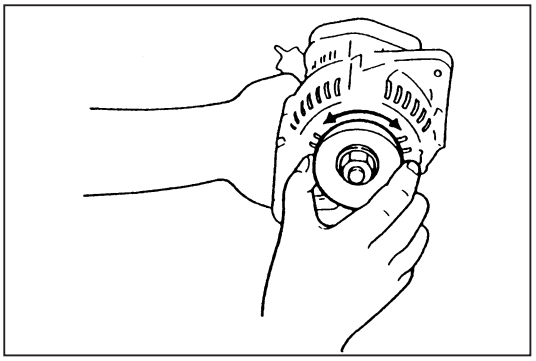
6. Install the pulley lock nut by means of an impact wrench.
   CAUTION:
   - Be sure to use an impact wrench having a hexagonal hole.
   - Be sure to set the tightening torque of the impact wrench as follows.
     Tightening Torque: 110.5 N·m



JCH00069-00061

7. Ensure that the rotor turns smoothly.



JCH00070-00062

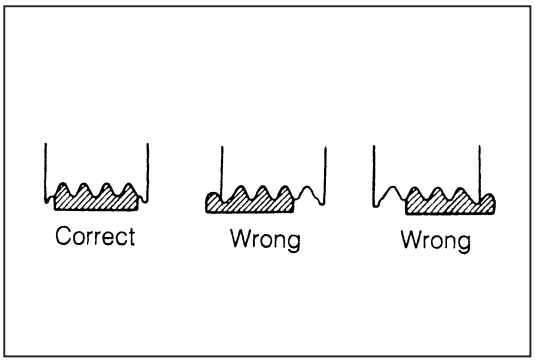
INSTALLATION OF ALTERNATOR

1. Insert the alternator from under side of the vehicle.

2. Install the alternator to the alternator bracket temporarily with the attaching bolt.

JCH00071-00000

3. Install the upper attaching bolt of the alternator temporarily.
4. Installation of alternator drive belt
   Install the alternator drive belt to the engine properly.
   CAUTION:
   - Make sure that the alternator drive belt is properly engaged in the groove of each pulley.



JCH00072-00063

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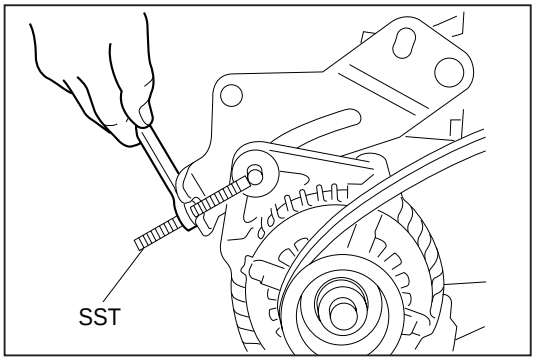
5. Tension adjustment of drive belt
   (1) Install the following SST to the alternator and adjusting bar as shown in the right figure.
   SST: 09286-87701-000

   (2) Adjust the drive belt tension to the specified value by adjusting the nut of the SST.
   Specified Belt Deflection
   New Belt: 4 - 5 mm
   [with a force of 10 kgf applied to the point shown in the figure]
   Used Belt: 5 - 6 mm
   [with a force of 10 kgf applied to the point shown in the figure]

   NOTE:
   - As for definition of new belts and used belts, refer to the MA section of the service manual.

   (3) Tighten the alternator attaching bolts to the specified torque.
   Tightening Torque: 34.3 - 54.9 N·m
   (3.5 - 5.5 kgf-m)

   (4) Remove the SST from the alternator and adjusting bar.



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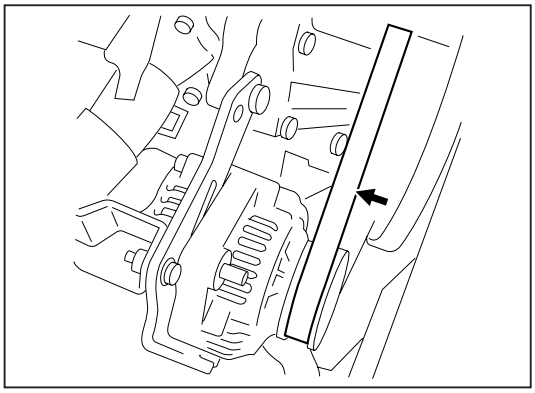
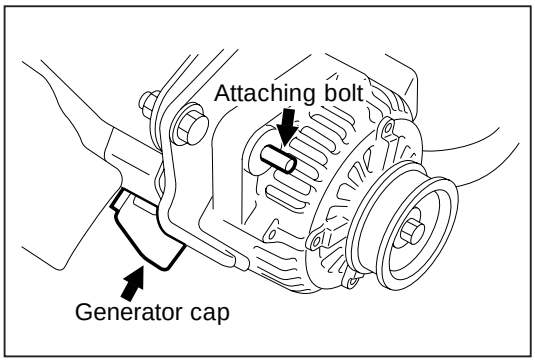

JCH00000-00066

6. Connect the alternator connector of the alternator wire to the alternator.
   NOTE:
   - Make sure that the lock of the connector is locked properly after connection.

7. Connect the terminal B of the alternator wire to the alternator with the attaching nut.
8. Install the generator cap.
9. Reconnect the ground cable terminal to the negative terminal of the battery.
10. Perform the in-vehicle inspection.
11. Install the right engine undercover.
12. Install the air conditioner drive belt.
    (Refer to the air conditioner installation manual issued by DENSO CO., LTD.)



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SERVICE SPECIFICATIONS

Battery specific gravity (Except Delco Freedom battery)			1.25 - 1.27
Alternator: 50A (For manual transmission vehicles)	Rated output Rotor coil resistance Slip ring diameter Brush exposed length IC regulating voltage	Amperage Resistance Standard Minimum Standard Minimum Hi level	50A 2.9 Ω at 20ϒC (68ϒF) 14.4 mm 14.0 mm 10.5 mm 8.4 mm 14.1 - 15.2 volts
Alternator: 55A (For automatic transmission vehicles)	Rated output Rotor coil resistance Slip ring diameter Brush exposed length IC regulating voltage	Amperage Resistance Standard Minimum Standard Minimum Hi level	55A 2.9 Ω at 20ϒC (68ϒF) 14.4 mm 14.0 mm 10.5 mm 8.4 mm 14.1 - 15.2 volts

JCH00075-00000

TROUBLE SHOOTING

Problem	Possible causes	Remedies	Page
Charge warning lamp will not glow even if ignition switch is turned ON.	Fuse blown Lamp bulb burnt Poor connection of wiring	Check gauge fuse. Replace bulb. Repair poor connection of wiring. Repair or replace. Replace regulator assembly.	BE–6 BE Section BE Section CH–3
Charge warning lamp will not go out even if engine has started.	Drive belt loose or worn Battery cables loose, corroded or worn Fuse blown Fusible link blown IC regulator or alternator faulty Wiring faulty	Adjust or replace. Repair or replace cables. Check gauge fuse. Replace fusible link. Check charging system. Repair or Replace.	MA–6 CH–3

JCH00076-00000

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DAIHATSU

TERIOS

J100

CLUTCH

CL

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CLUTCH SECTIONAL VIEW ..... **CL– 2**
CLUTCH PEDAL ADJUSTMENT ..... CL– 3
PEDAL INSTALLATION HEIGHT ..... **CL– 3**
ADJUSTMENT OF CLUTCH PEDAL FREE TRAVEL ..... **CL– 3**
CLUTCH PEDAL & CLUTCH CABLE ..... CL– 4
1. Main points of clutch pedal installation ..... **CL– 6**
2. Main points of clutch cable installation ..... **CL– 6**
CLUTCH RELEASE MECHANISM ..... CL– 7
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APPENDIX CL–12
SSTs (Special Service Tools) **CL–12**
SERVICE SPECIFICATIONS **CL–12**
TIGHTENING TORQUE **CL–12**

JCL00001-00000

NO. 9710-JE

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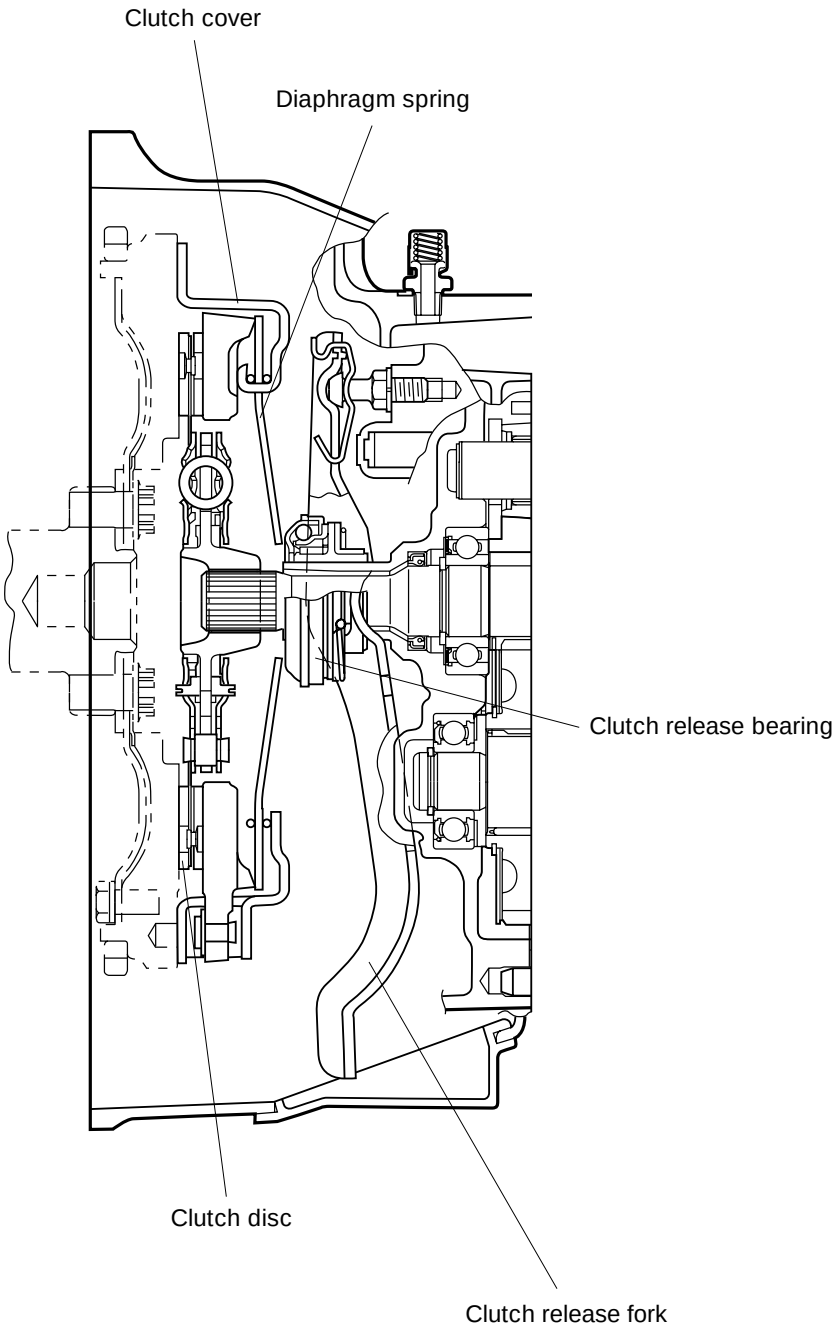
OUTLINE

1. The clutch mechanism has employed a cable-operated mechanical clutch. This clutch has adopted a dry, single disc type diaphragm type which features easy operation and excellent serviceability.
2. The release mechanism employs a lever type featuring superb stroke efficiency and load efficiency, as is the case with S100 series.
3. For improved cooling performance of the clutch friction surface, the clutch housing is provided with cooling holes at its front and rear sides.

JCL00002-00000

CLUTCH SECTIONAL VIEW



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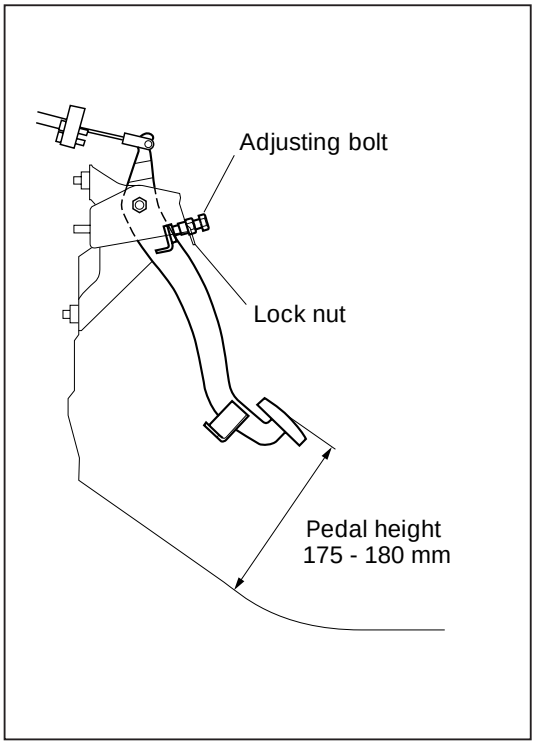
CLUTCH PEDAL ADJUSTMENT

PEDAL INSTALLATION HEIGHT

Loosen the lock nut. Adjust the pedal height by turning the adjusting bolt.

Pedal Installation Height: 175 - 180 mm
(Distance from center of pedal pad upper surface to dash panel)

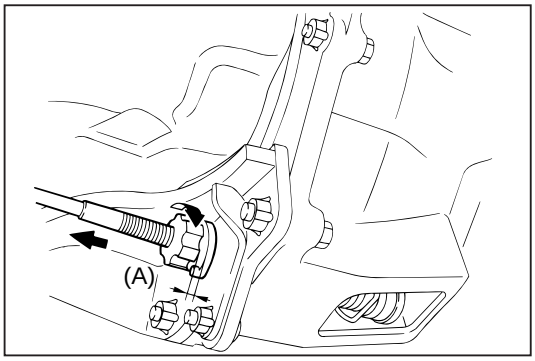
Lock Nut Tightening Torque: 11.8 - 27.4 N·m
(1.2 - 2.8 kgf-m)



JCL00004-00002

ADJUSTMENT OF CLUTCH PEDAL FREE TRAVEL

1. Pull the clutch outer cable toward the vehicle front, until the clutch release bearing hub is brought into contact with the diaphragm spring of the clutch cover.
2. Under the condition in the step 1, turn the adjusting nut in such a way that the gap relative to the grommet (dimension (A) in the right figure) may be adjusted to 4 - 7 mm.
3. Align the nearest groove of the adjusting nut with the protrusion of the grommet, and secure it.
4. Ensure that the free travel of the clutch pedal conforms to the specification.
   Clutch pedal free travel: 15 - 30 mm



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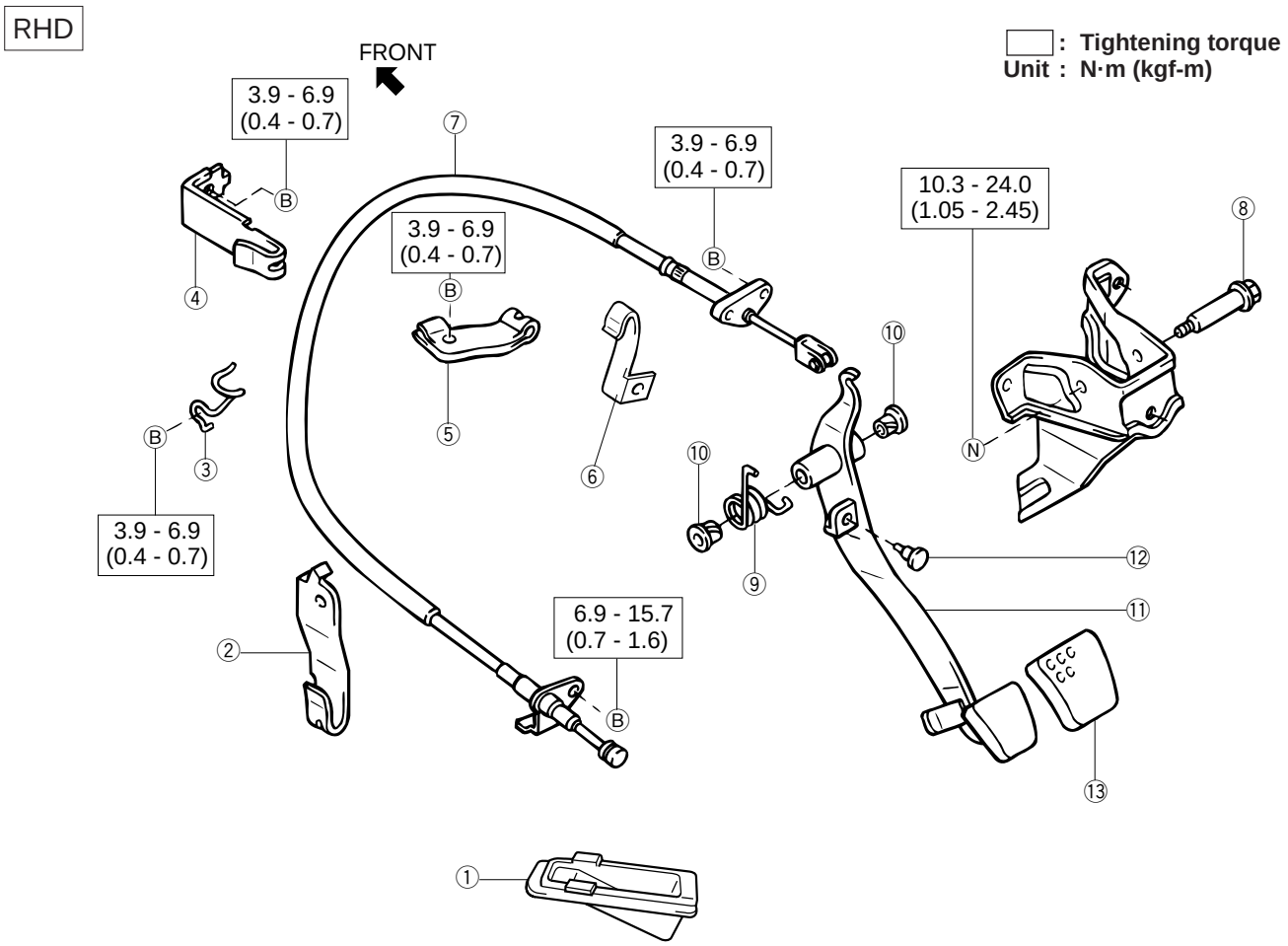
CLUTCH PEDAL & CLUTCH CABLE

COMPONENTS



① Clutch housing cover
② Clutch cable bracket
③ Clutch cable bracket
④ Clutch cable bracket
⑤ Clutch cable bracket
⑥ Clutch cable bracket (ABS vehicle only)
⑦ Clutch release cable assembly
⑧ Pedal shaft
⑨ Spring
⑩ Bush
⑪ Clutch pedal subassembly
⑫ Cushion
⑬ Clutch pedal pad.

JCL00006-00004

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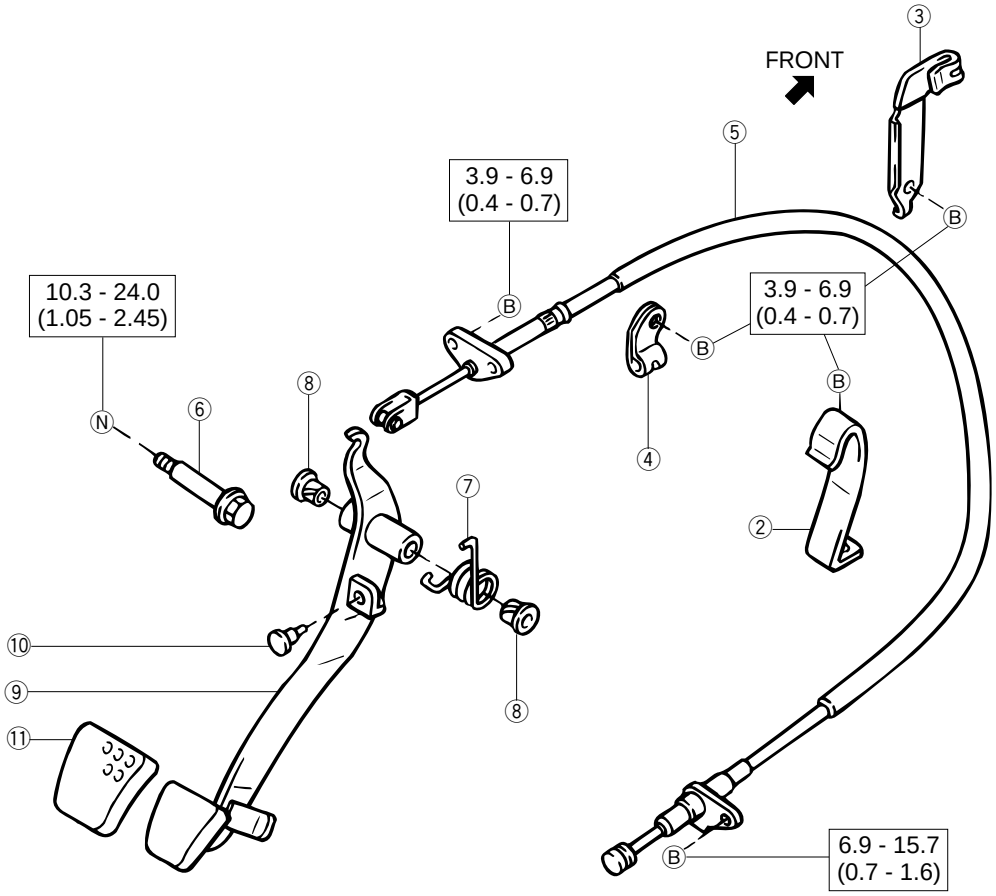
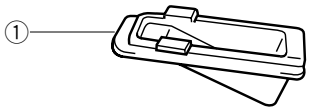
LHD





① Clutch housing cover
② Clutch cable bracket
③ Clutch cable bracket
④ Clutch cable bracket
⑤ Clutch release cable assembly
⑥ Pedal shaft
⑦ Spring
⑧ Bush
⑨ Clutch pedal subassembly
⑩ Cushion
⑪ Clutch pedal pad

□ : **Tightening torque**
Unit : N·m (kgf-m)

JCL00000-00005

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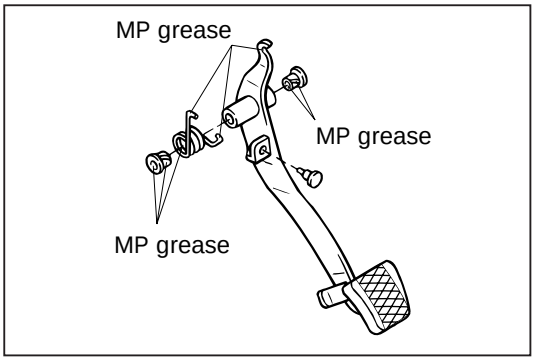
1. Main points of clutch pedal installation

(1) Apply MP grease to the points where the inner surface of the clutch pedal subassembly is connected to the clutch release cable assembly; the inner surface and hook section of the torsion spring; and the inner/outer surfaces of the bush.

NOTE:

- Be very careful not to allow grease to get to the threaded portion of the pedal shaft.



JCL00007-00006

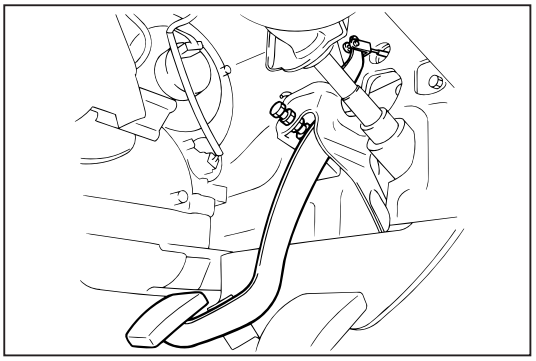
2. Main points of clutch cable installation

(1) Pull the clutch release cable assembly into the vehicle interior. Apply MP grease to the cable end section. Install the assembly to the clutch pedal.

(2) Install the clutch release cable assembly to the clutch re Clutch cable bracket (ABS vehicle only)
lease fork assembly in such a way that the end section of the clutch release cable assembly is aligned with the ellipse section of the clutch release fork assembly.

NOTE:

- Be sure to install all clamps.



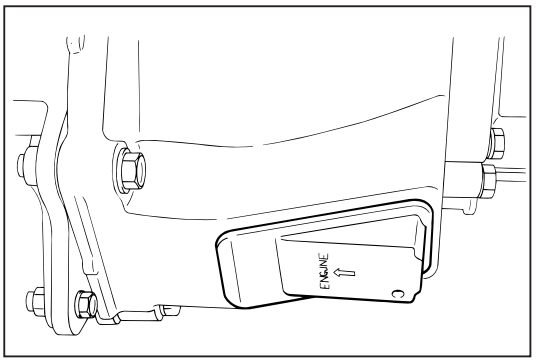
JCL00008-00007

(3) Adjust the clutch pedal free travel.

(4) Install the clutch housing cover.

NOTE:

- Be sure to install the clutch housing cover in the direction shown in the right figure.



JCL00009-00008

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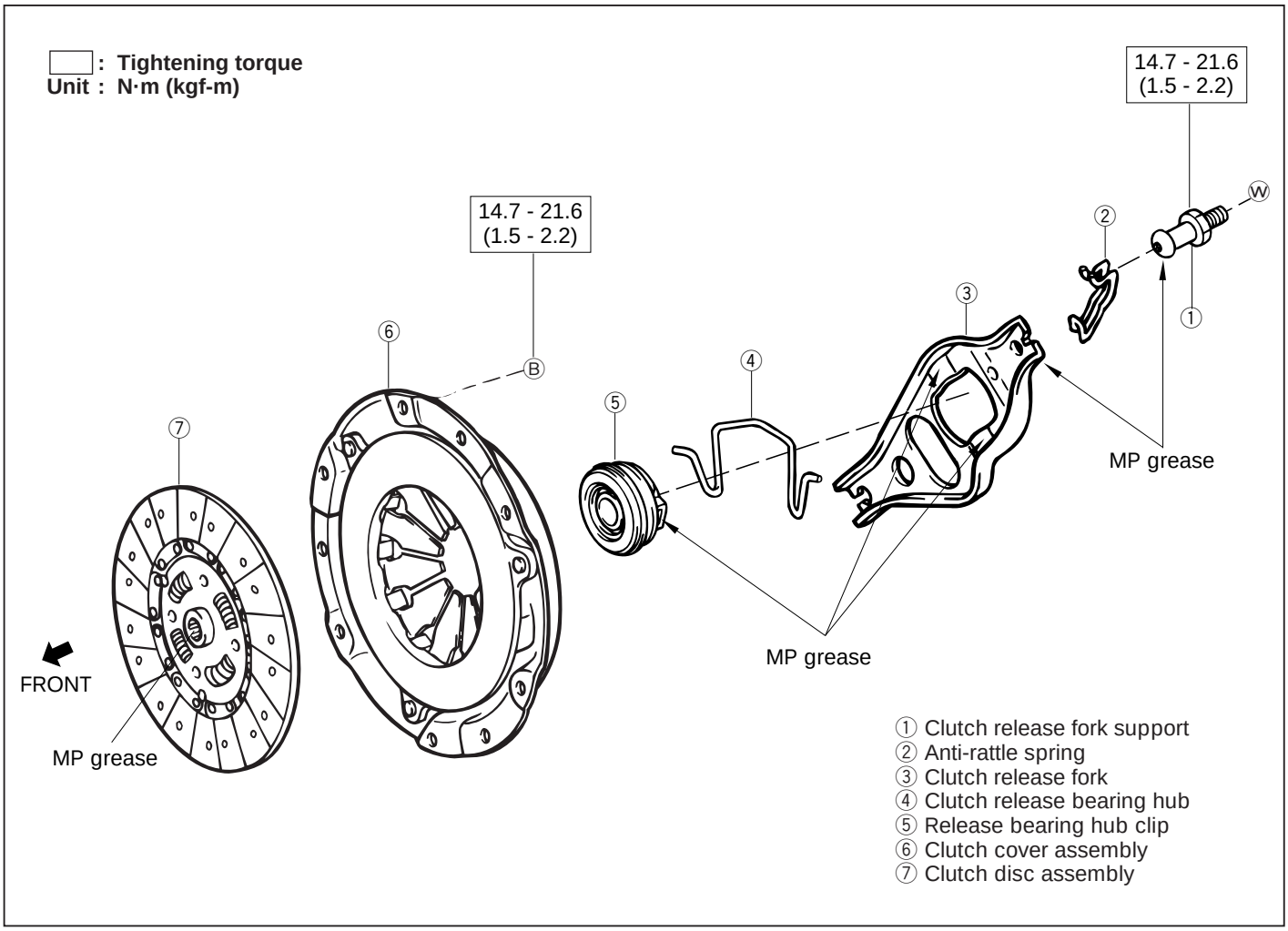
CLUTCH RELEASE MECHANISM

COMPONENTS



JCL00010-00009

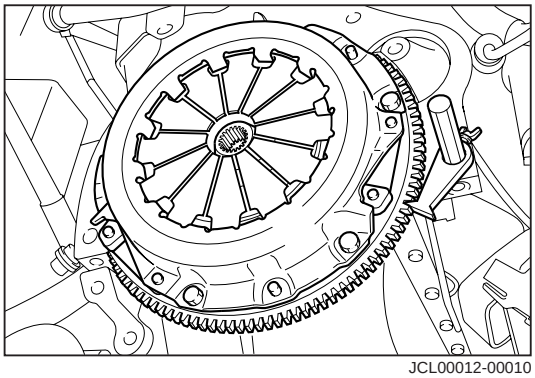
1. Operation prior to removal

(1) Remove the transmission assembly from the vehicle.
(Refer to the MT section.)

JCL00011-00000

2. Main points of removal

(1) Remove the clutch cover assembly and clutch disc assembly, while preventing the ring gear from turning by means of the following SST.
SST: 09210-87701-000



JCL00012-00010

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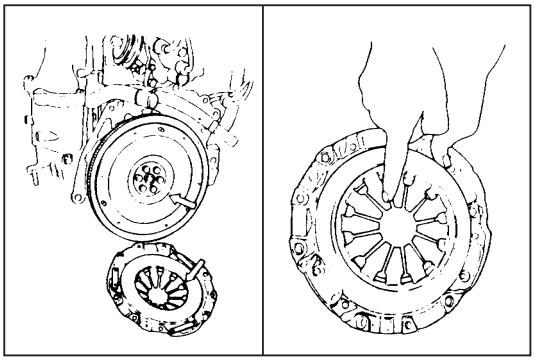
3. Check

Clutch cover and diaphragm spring

Inspect the following parts. Replace any parts which exhibit defects.

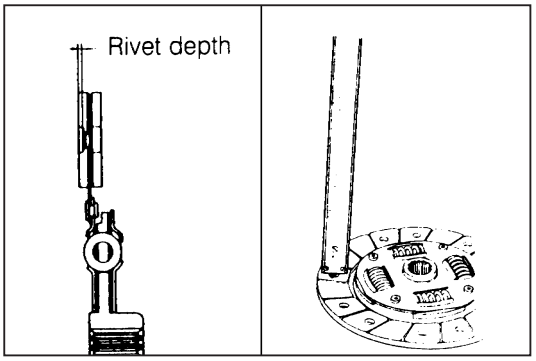
(1) Check the clutch pressure plate and the clutch disc contracting surface of the flywheel for evidence of wear or burns.
(2) Check the diaphragm spring lever for wear, corrosion or damage.



JCL00013-00011

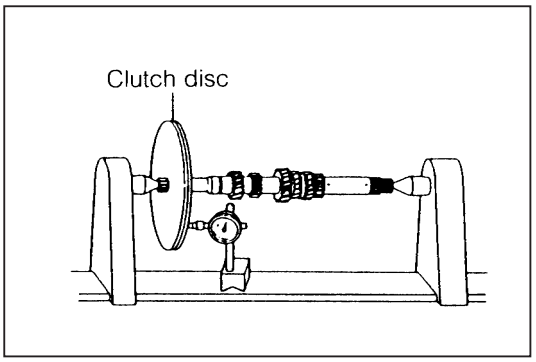
Clutch disc

(1) Check the clutch disc for wear.
Rivet Depth
Limit: 0.4 mm



JCL00014-00012

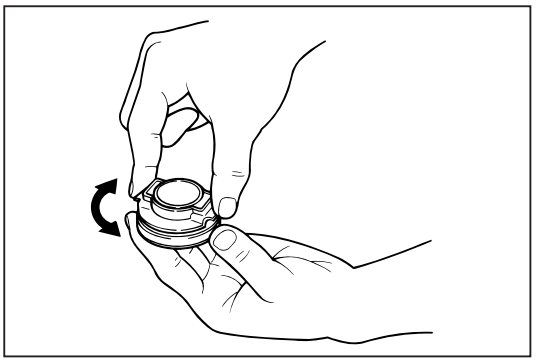
(2) Check the clutch disc for runout.
Runout
Limit:
(Longitudinal Runout): 1.0 mm
(Lateral Runout): 0.7 mm



JCL00015-00013

Release bearing

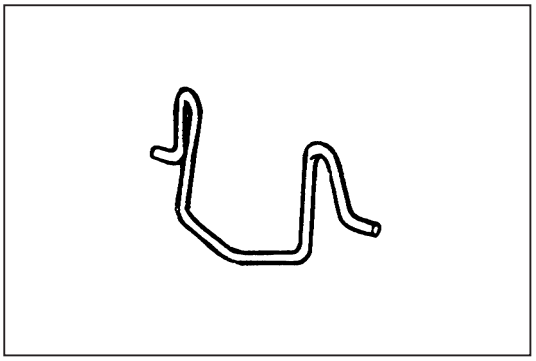
(1) Checking of release bearing for smooth turning. Turn the release bearing while applying a force to the bearing by your hand in the thrust direction. Ensure that you feel no abnormal stiffness or binding.
(2) Check the release bearing hub for damage or wear. Also, check to see if any damage or wear is present at the clip contact surface and the housing sliding section.



JCL00016-00014

Release bearing hub clip

(1) Check for wear or damage.



JCL00017-00015

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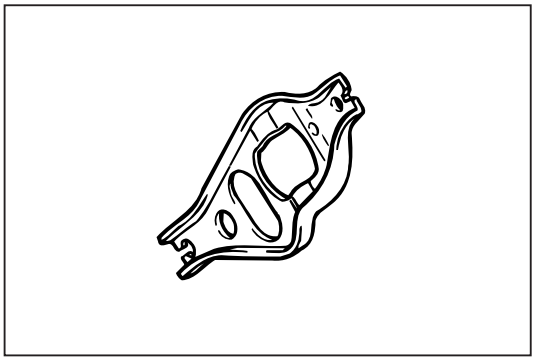
Clutch release fork

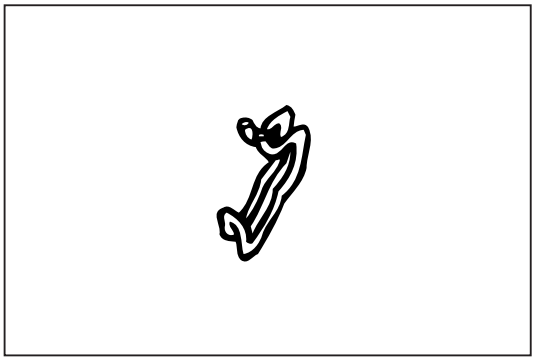
(1) Check for wear or damage.



JCL00018-00016

Anti-rattle spring

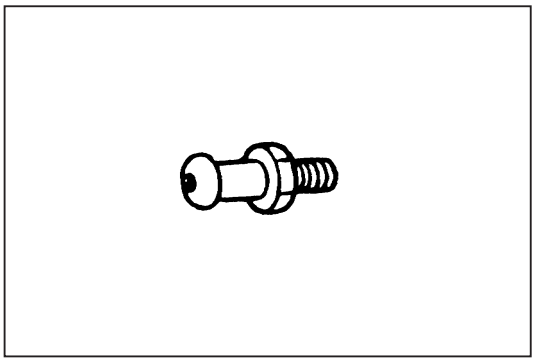
(1) Check for wear or damage.



JCL00019-00017

Clutch release fork support

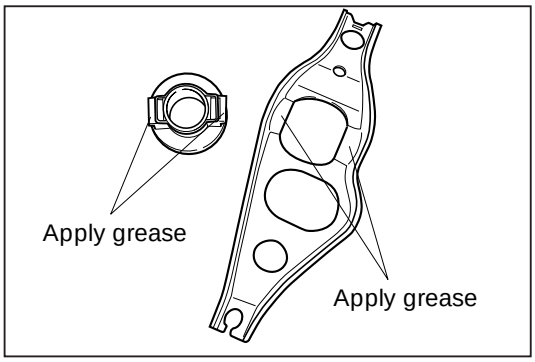
(1) Check for wear or damage.



JCL00020-00018

4. Main points of installation

(1) Thinly apply EP grease to the clutch release fork or the entire periphery of the sliding surface of the clutch release bearing hub assembly.

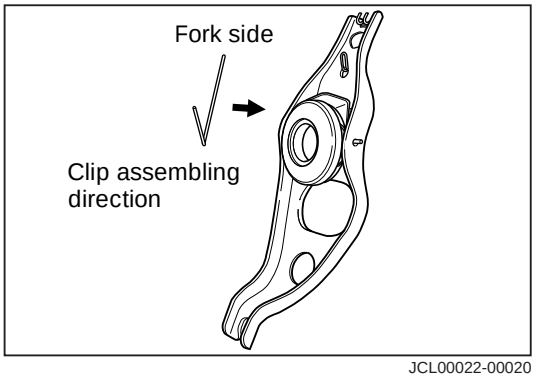


JCL00021-00019

(2) Install the release bearing hub clip to the clutch release fork.

NOTE:

- Be sure to assemble the release bearing hub clip in the direction shown in the right figure.



JCL00022-00020

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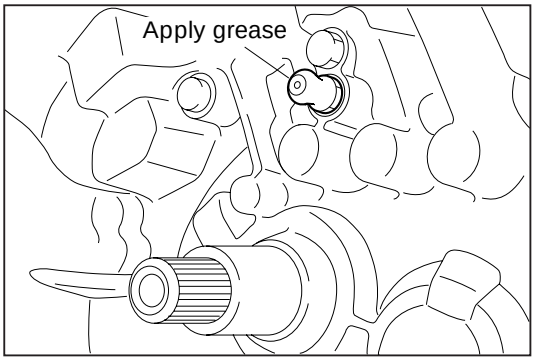
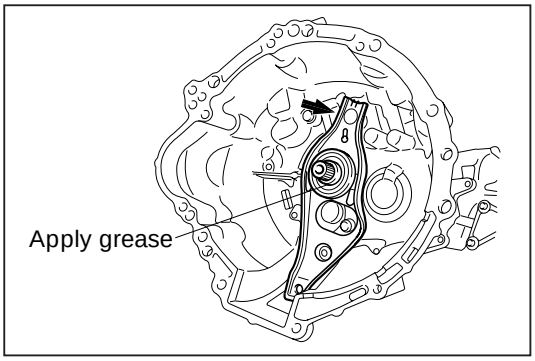
(3) Apply EP grease to the entire periphery of the sliding surface of the release fork support.



JCL00023-00021

(4) Apply EP grease to the entire inner periphery of the clutch release bearing hub assembly. Install the clutch release fork to the transmission.

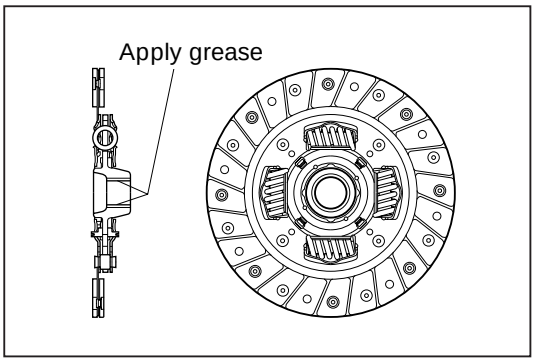


JCL00024-00022

(5) Thinly apply EP grease to the spline section of the clutch disc assembly.

NOTE:

- The grease should be applied from the clutch cover side. Be sure to apply the grease as sparsely as possible so that no excess grease may ooze out to the flywheel side.
  Specified Amount: 0.1 - 0.2 g

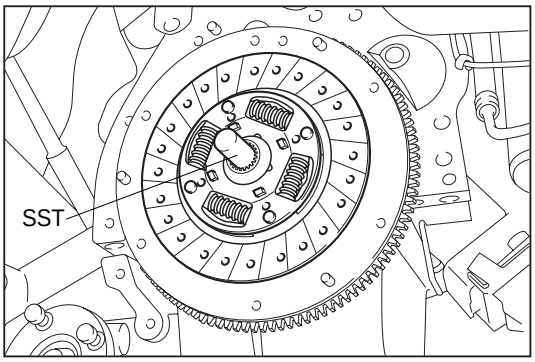


JCL00025-00023

(6) With the clutch disc assembly placed at the center position by means of the following SST, install the clutch disc assembly to the flywheel.
  SST: 09301-87703-000

NOTE:

- Be very careful not to mistake the installation direction of the clutch disc assembly.



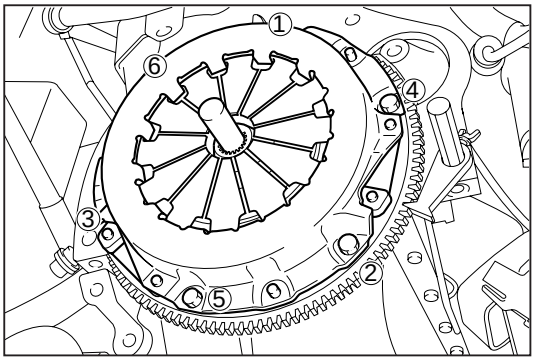
JCL00026-00024

(7) Install the clutch cover assembly, aligning with the locating pins of the flywheel at three points. Tighten the six bolts to the specified torque, while preventing the flywheel from turning by means of the following SST.
  SST: 09210-87701-000

NOTE:

- As for the tightening sequence of the bolts, first temporarily tighten the bolt (1). Then, fully tighten the bolts in order of (2) - (3) - (1) - (4) - (5) - (6). (Here, any bolt can be the bolt (1).)

  Tightening Torque: 14.7 - 21.6 N·m (1.5 - 2.2 kgf-m)



JCL00027-00025

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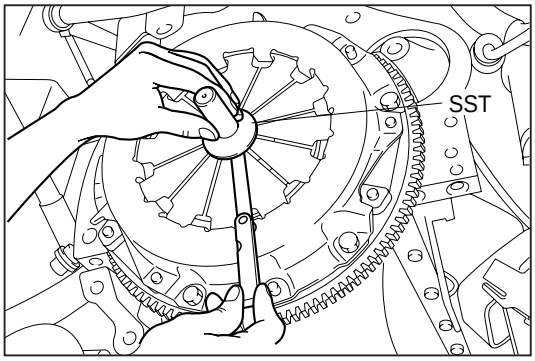
5. Operation after installation

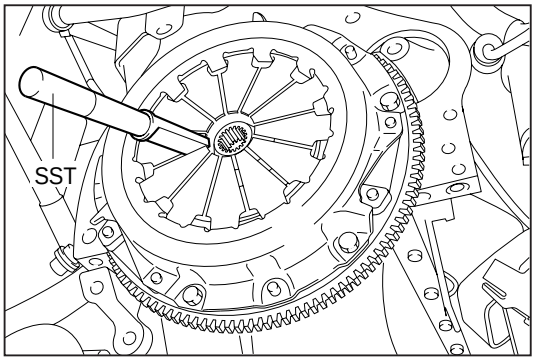
(1) Check the diaphragm spring section for unevenness in height, using the following SST.
SST: 09210-87701-000

Limit: 0.5 mm



JCL00028-00026

(2) If the check above reveals that the unevenness in height exceeds its limit, correct the unevenness, using the following SST.
SST: 09333-00016-000



JCL00029-00027

(3) Install the transmission assembly to the vehicle.

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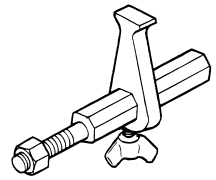
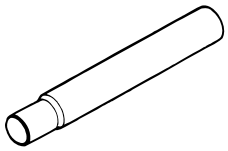
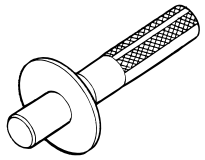
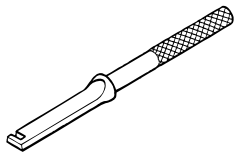
APPENDIX

SSTs (Special Service Tools)

Illustration	Tool No.	Tool name
	09210-87701-000	Flywheel holder
	09301-87703-000	Clutch guide tool
	09302-87702-000	Clutch diaphragm spring height gauge No.4
	09333-00013-000	Clutch diaphragm spring aligner

JCL00030-00028

SERVICE SPECIFICATIONS

Unit : mm

Item		Specified value	Allowable limit	Remark
Clutch pedal	Height	175 - 180	–	Distance from upper surface of pedal to floor
	Free travel	15 - 30	–	
Clutch disc	Run-out	–	Longitudinal: 1.0 Lateral: 0.7	
	Lining wear	–	0.4	Rivet depth

JCL00031-00000

TIGHTENING TORQUE

Tightening component	Tightening torque	
	N·m	kg-m
Clutch cover × Flywheel	14.8 - 21.5	1.5 - 2.2
Clutch release fork support × Clutch housing	14.7 - 21.6	1.5 - 2.2
Clutch release cable × Right stiffener plate	6.9 - 15.7	0.7 - 1.6
Clutch cable bracket attaching bolt	3.9 - 6.9	0.4 - 0.7
Clutch release cable × Dash panel	3.9 - 6.9	0.4 - 0.7
Pedal shaft attaching nut	10.3 - 24.0	1.05 - 2.45

JCL00032-00000

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DAIHATSU

TERIOS

J100

MANUAL TRANSMISSION

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MT

JMT00001–00000

NO. 9710-JE

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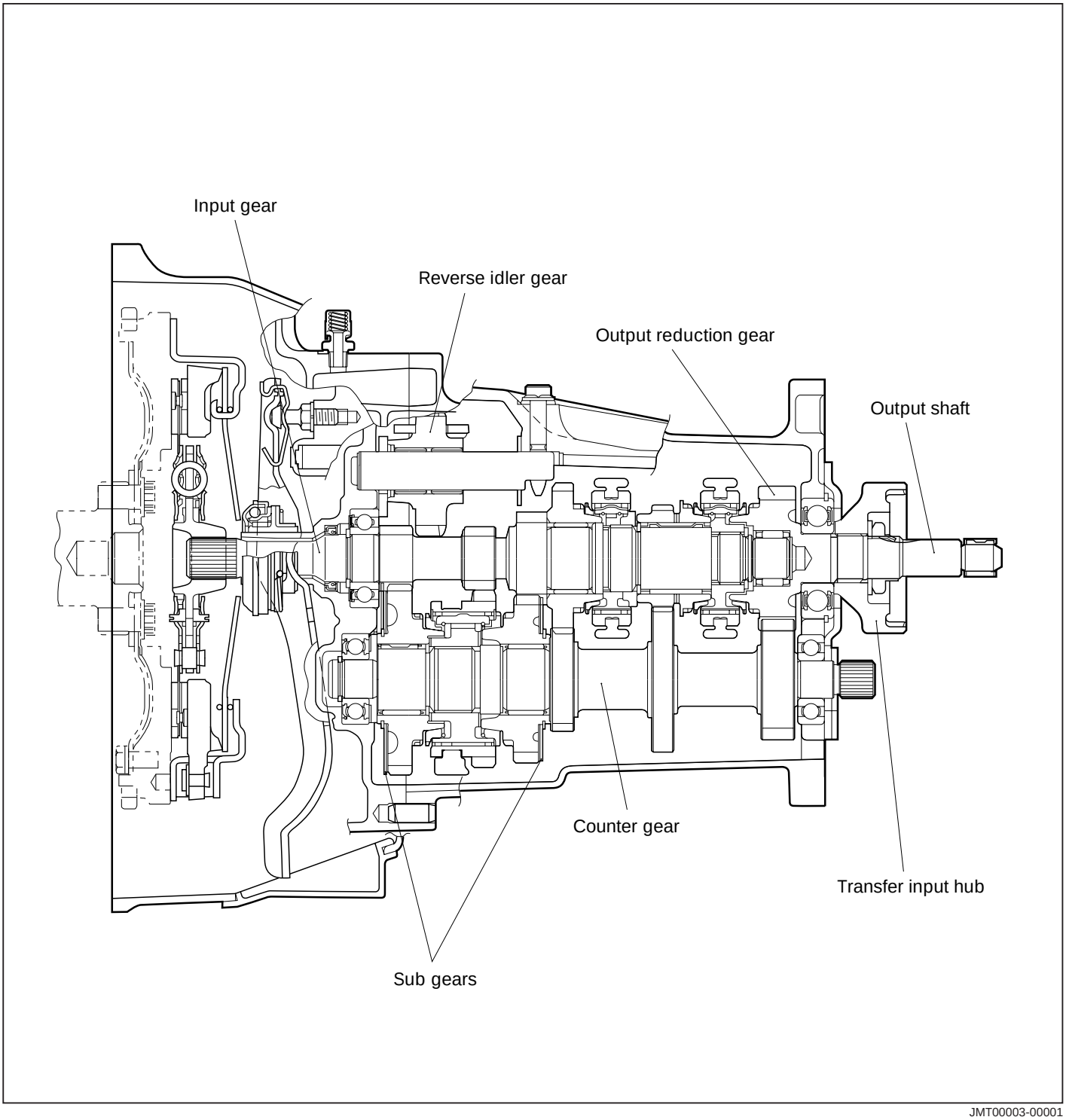
OUTLINE

1. The manual transmission employs five gears on all vehicles.
2. The gear train arrangement uses the output reduction type. This design has made possible the following features given below.
   (1) The number of pair of gears which are idling during the engine idling has been reduced to only two pairs (first gear and second gear). Consequently, the number of components emitting rattling noise has been decreased and the mechanism loss has been reduced.
   (2) For reduced mechanism loss, the counter gear is not rotating while the transmission is in neutral.
   (3) The shift feeling has been further improved by reducing the inertial weight at the time of synchronizing gears.

JMT00002-00000

SECTIONAL VIEW OF MANUAL TRANSMISSION



JMT00003-00001

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SPECIFICATIONS

Item		Specifications
Engine type		HC-EJ
Type	Forward gears	Constant-mesh type
	Reverse gear	Selective sliding type
Gear ratio	1st gear	4.059
	2nd gear	2.045
	3rd gear	1.376
	4th gear	1.000
	5th gear	0.838
	Reverse gear	4.128
Oil used	Type	SAE 75W-85 API GL-3 or GL-4
	Capacity liter	2.21 (including transfer)

JMT00004-00000

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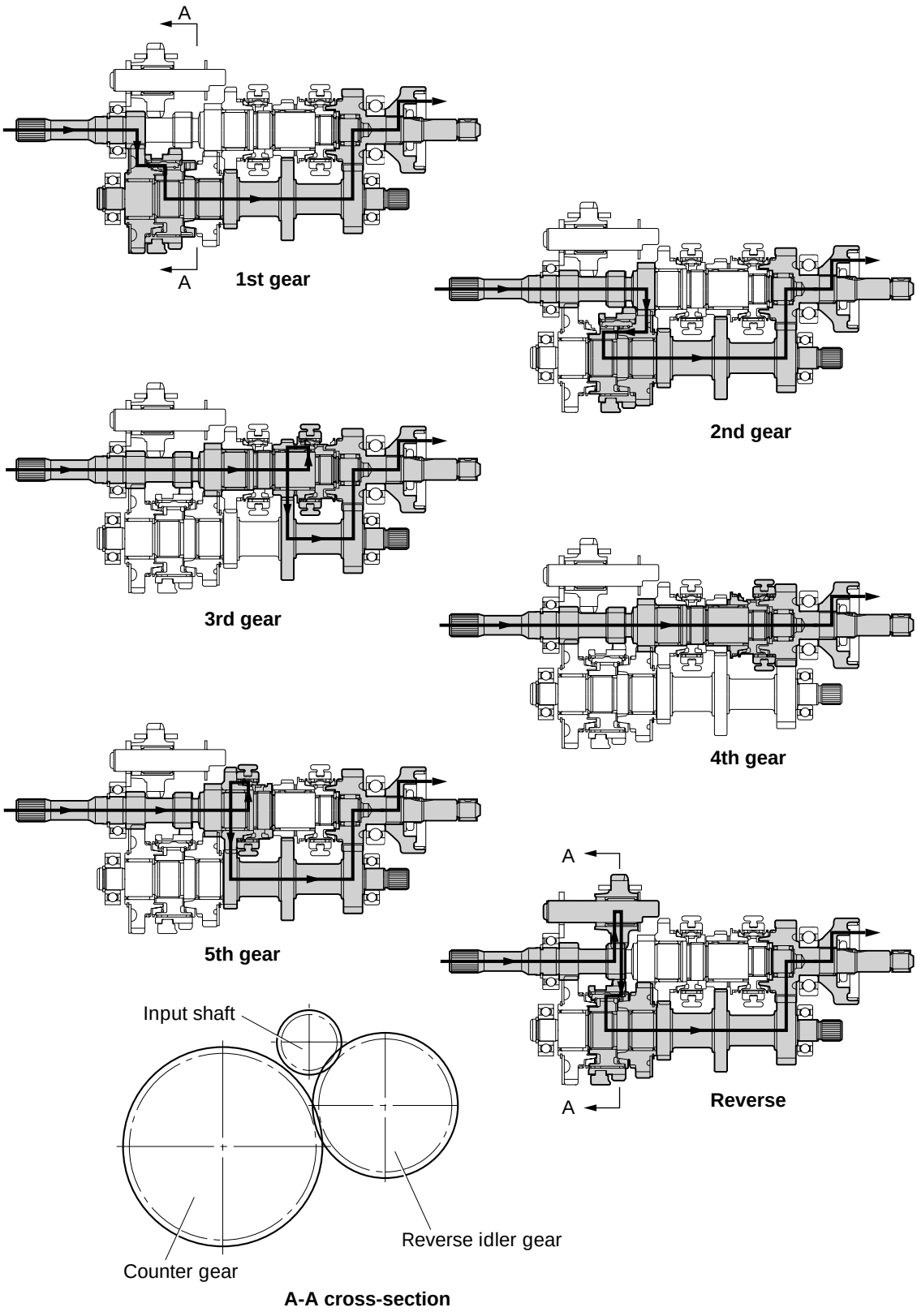
POWER FLOW ROUTE

The gear train has been so designed that the fourth gear makes direct connection, while the fifth gear makes overdrive. Furthermore, as for the gear arrangement, the first gear, reverse gear, second gear, fifth gear and output reduction are located in this sequence, counting from the front.



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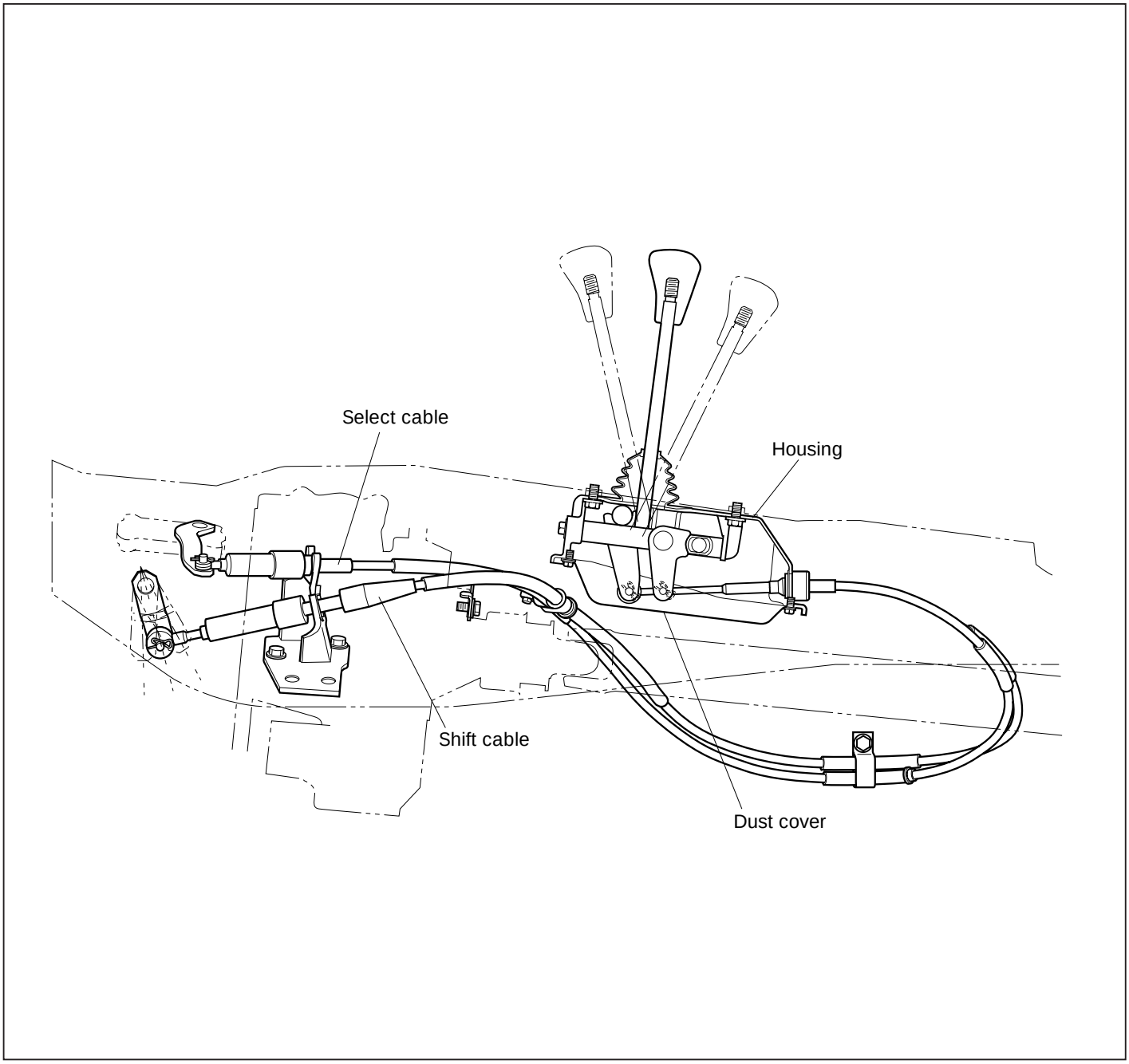
SHIFT CONTROL MECHANISM

1. The shift control mechanism employs the remote control method in which two push-pull cables are used, in the same way as with S100. Also, for improved shift feeling, an aluminum housing has been adopted.



JMT00006-00003

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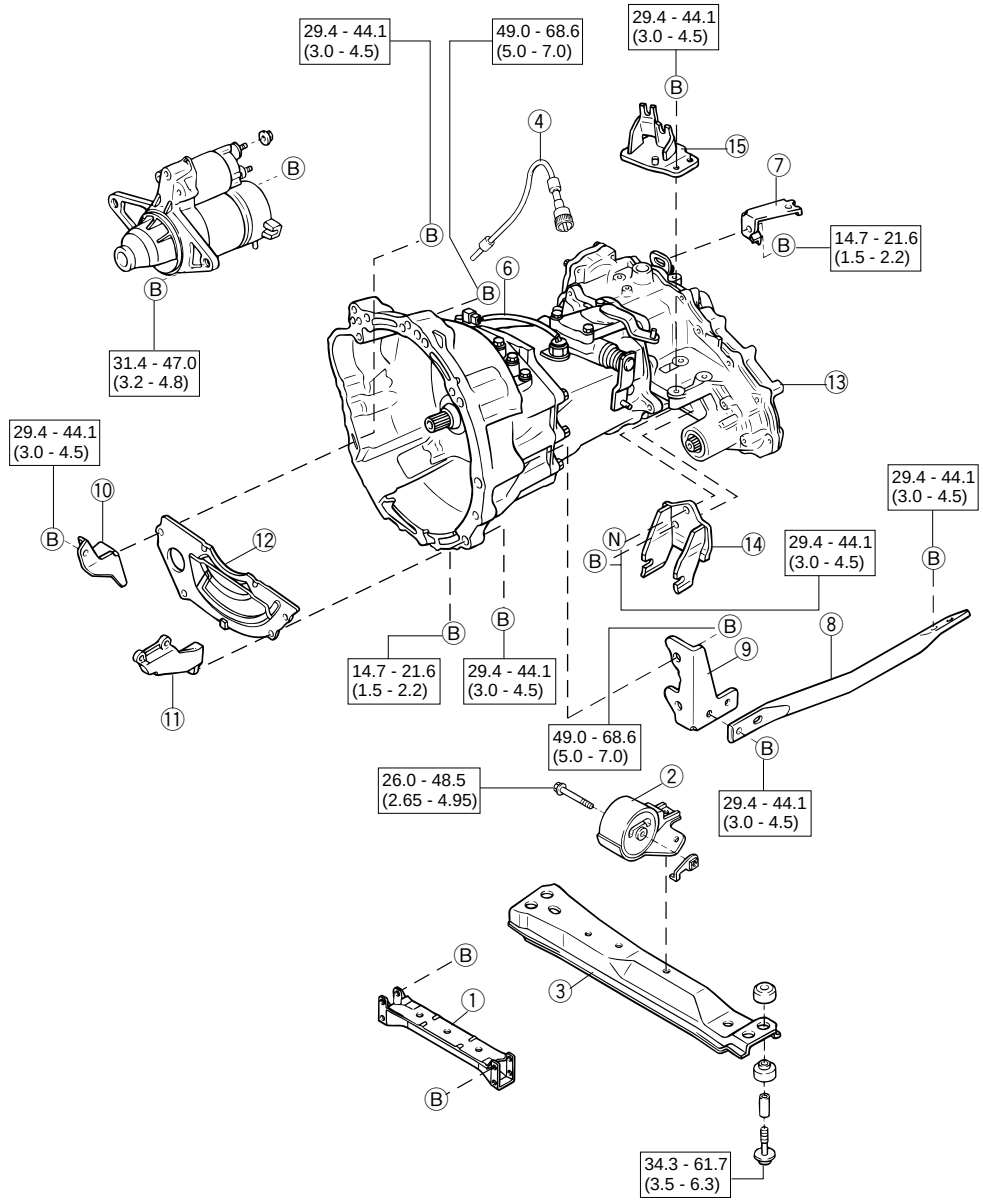
INSTALLATION/REMOVAL OF MANUAL TRANSMISSION

COMPONENTS

: Tightening torque
Unit : N·m (kgf-m)



① Frame front lower crossmember subassembly
② Engine mounting rear insulator
③ Engine rear support member subassembly
④ Speedometer driver cable assembly
⑤ Starter assembly
⑥ Backup lamp switch harness
⑦ Control cable bracket
⑧ Power train stiffener
⑨ Stiffener plate bracket
⑩ Stiffener right plate
⑪ Stiffener left plate
⑫ Clutch cover undercover
⑬ Transmission assembly with transfer
⑭ Engine mounting rear bracket
⑮ Transmission control cable bracket

JMT00007-00004

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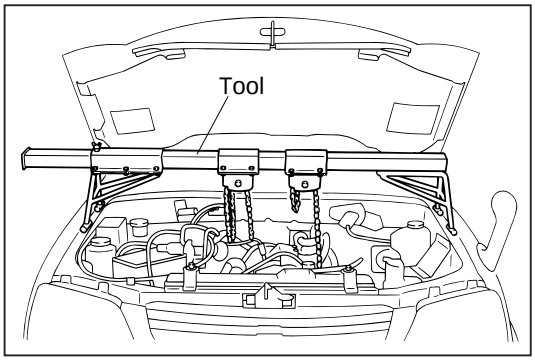
1. OPERATION PRIOR TO REMOVAL

(1) Disconnect the negative (–) terminal of the battery.
(2) Suspend the engine by means of an engine support bridge.
NOTE:
• Attach the hook to the engine hanger.

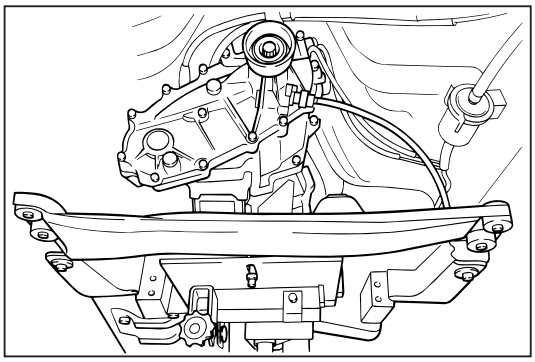


JMT00008-00005

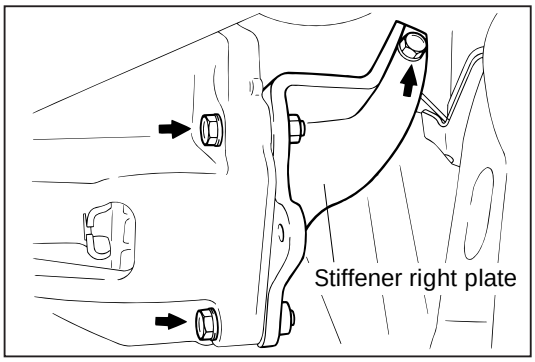
(3) Raise the vehicle with a lift.
(4) Drain the transmission oil.
(5) Remove the propeller shaft assembly and propeller front shaft assembly.
(6) Remove the front exhaust pipe assembly.
(7) Remove the clutch cable.
(8) Remove the shift cable assembly and select cable assembly.

2. MAIN POINTS OF REMOVAL

(1) Remove the front lower frame crossmember subassembly. With the transmission assembly supported by a transmission jack, etc., remove the attaching bolts of the engine mounting rear insulator and engine rear support member subassembly. Proceed to remove the engine rear support member subassembly.

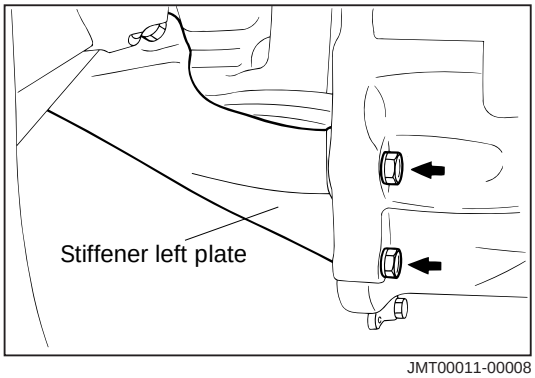

JMT00009-00006

(2) Remove the stiffener right plate by removing the three attaching bolts.



JMT00010-00007

(3) Separate the stiffener left plate from the transmission by removing the two attaching bolts.
(4) Remove the transmission assembly with transfer from the vehicle by removing the five attaching bolts.



JMT00011-00008

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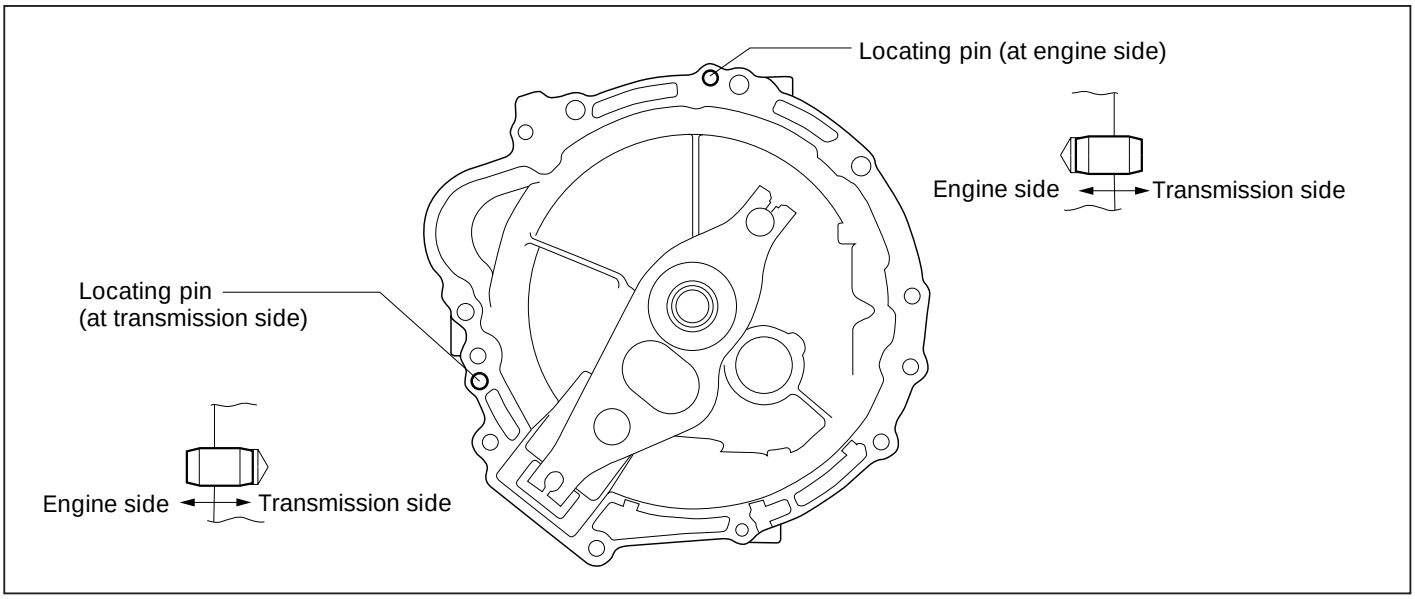
3. OPERATION AFTER REMOVAL

(1) Ensure that the locating pin is positioned securely at both the transmission and engine sides.

NOTE:

- Make sure to replace the locating pin that has exhibited severely scored.

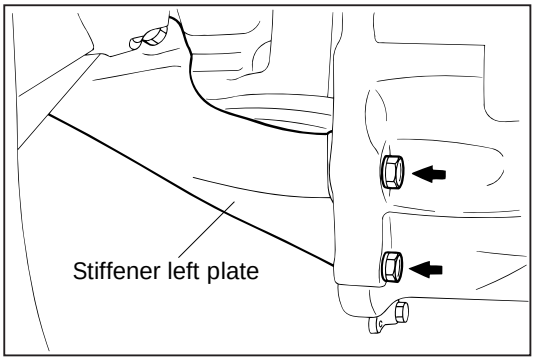


JMT00012-00009

4. MAIN POINTS OF INSTALLATION

(1) With the transmission assembly with transfer supported by a transmission jack, etc., bring the surface of the transmission in close contact with the surface of the engine. Tighten the attaching bolts to the specified torque.
Tightening Torque: 49.0 - 68.6 N·m (5.0 - 7.0 kgf-m)

(2) Tighten the attaching bolts of the stiffener left plate.
Tightening Torque: 29.4 - 44.1 N·m (3.0 - 4.5 kgf-m)

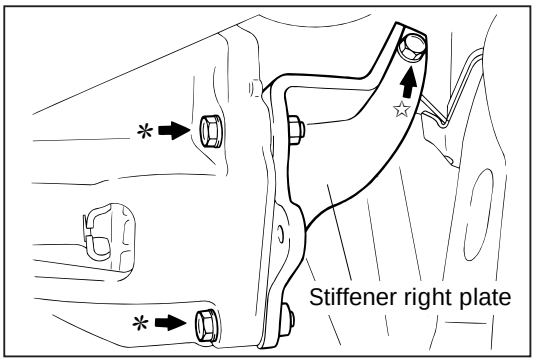


JMT00013-00010

(3) Tighten the attaching bolts of the stiffener right plate.

NOTE:

- Temporarily tighten the ⁎-marked bolts until the stiffener plate is brought in close contact with the transmission. Securely tighten the ☆-marked bolts.
Then, proceed to tighten the ⁎-marked bolts to the specified torque.
Tightening Torque: 29.4 - 44.1 N·m (3.0 - 4.5 kgf-m)

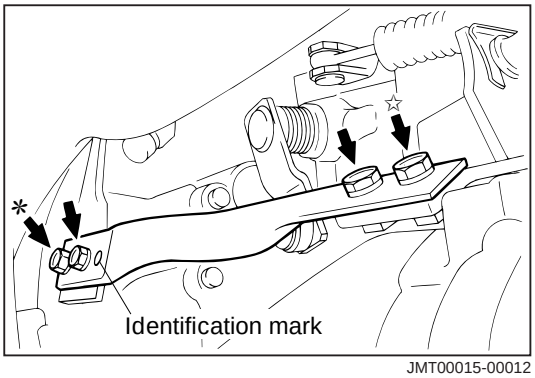


JMT00014-00011

(4) Install the power train stiffener in the direction as indicated in the right figure.

NOTE:

- Temporarily tighten the ⁎-marked bolts. Securely tighten the ☆-marked bolts. Then, proceed to tighten the remaining two bolts securely.
Tightening Torque: 29.4 - 44.1 N·m (3.0 - 4.5 kgf-m)



JMT00015-00012

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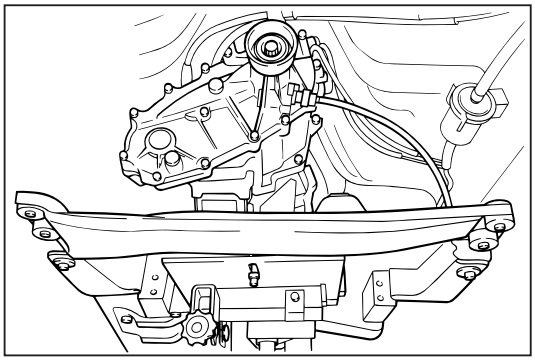
(5) Tighten the attaching bolts of the engine mounting rear insulator and engine rear support member subassembly. Proceed to install the attaching bolts of the engine rear support member subassembly to the body.
(6) Remove the transmission jack, etc. Install the front lower frame crossmember subassembly.

NOTE:
- For the tightening torque, refer to MT–6.



JMT00016-00013

5. OPERATION AFTER INSTALLATION

(1) Install the shift cable assembly and select cable assembly.
(2) Assemble the clutch release cable assembly to the clutch release fork. Adjust the clutch free travel.
(3) Install the front exhaust pipe assembly.
(4) Install the propeller shaft assembly and propeller front shaft assembly.
(5) Pour the transmission oil.
(6) Lower the vehicle.
(7) Remove the engine support bridge.
(8) Connect the negative (–) terminal of the battery.

JMT00017-00000

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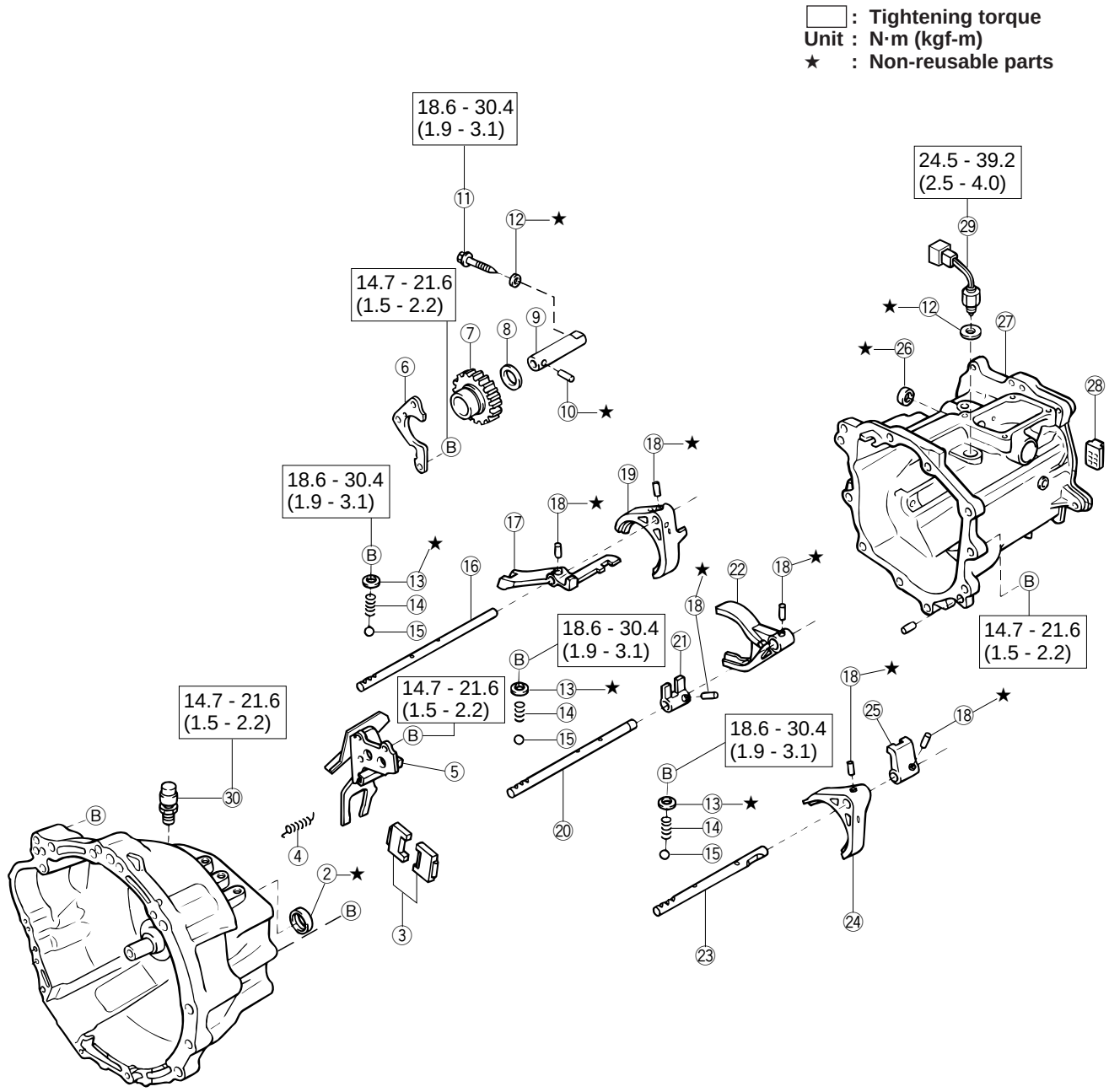
DISASSEMBLY/ASSEMBLY OF MANUAL TRANSMISSION

COMPONENTS (PART 1)



① Clutch housing
★② Type S oil seal
③ Shift interlock plate
④ Tension spring
⑤ Reverse shift arm
⑥ Input shaft bearing lock plate
⑦ Reverse idler gear
⑧ Reverse idler gear thrust washer
⑨ Reverse idler gear shaft
★⑩ Slotted spring pin
⑪ Hexagon bolt
★⑫ Gasket
★⑬ Gasket
⑭ Compression spring
⑮ Ball
⑯ 5th & reverse shift fork shaft
⑰ 5th & reverse shift head
★⑱ Slotted spring pin
⑲ 5th shift fork
⑳ 3rd & 4th shift fork shaft
㉑ 3rd & 4th shift head
㉒ 3rd & 4th shift fork
㉓ 1st & 2nd shift fork shaft
㉔ 1st & 2nd shift fork
㉕ 1st & 2nd shift head
★㉖ Tight plug
㉗ Transmission case
㉘ Transmission magnet
㉙ Backup lamp switch assembly
㉚ Breather plug

JMT00018-00014

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NOTICE PRIOR TO OPERATION

This section summarizes the main points of each section of the configuration drawings posted on those pages previous to MT–10, MT–12, MT–20 and MT–28. The description is so arranged that the removal and assembly may readily be understandable when the configuration drawings are referred to the contents posted at the lower section of the page.
For more details, refer to the relevant pages.

JMT00019-00000

COMPONENTS (PART 1)

① Clutch housing	The clutch housing is connected to the transmission case by means of eight bolts of M8 (ℓ = 40 mm) and two bolts of M8 (ℓ = 60 mm). Tightening torque: 14.7 - 21.6 N·m (1.5 - 2.2 kgf-m)
★② Type S oil seal	Be sure to apply gear oil to the lip section when assembling. Press this oil seal by means of a 35 mm dia. rod.
③ Shift interlock plate	Overall length = 23.25 - 23.55 mm Length at inside = 17.7 - 17.9 mm The same plate is used in common at two points.
④ Tension spring	The tension spring is provided between Items ⑤ and ⑥.
⑤ Reverse shift arm	Ensure that the operating pin moves lightly and freely between the neutral position and the 5th gear position. The reverse shift arm is installed with three bolts of M8 (ℓ = 20 mm). Tightening torque: 14.7 - 21.6 N·m (1.5 - 2.2 kgf-m)
⑥ Input shaft bearing lock plate	The input shaft bearing lock plate is installed with three bolts of M8 (ℓ = 20 mm).
⑦ Reverse idler gear	Bush bore diameter d = 20.03 - 20.06 mm Care must be exercised as to the correct assembling direction.
⑧ Reverse idler gear thrust washer	Nylon-made washer
⑨ Reverse idler gear shaft	D = 20 mm This shaft is secured by means of the hexagon bolt ⑪.
★⑩ Slotted spring pin	Ensure that the section protruding from the shaft is 2.5 mm or less.
⑪ Hexagon bolt	Black bolt, hexagon socket Be sure to pull out this bolt when disassembling the transmission. Tightening torque: 18.6 - 30.4 N·m (1.9 - 3.1 kgf-m)
★⑫ Gasket	
★⑬ Gasket	
⑭ Compression spring	The same spring is used in common at three points. L = 40 mm This compression spring is secured by means of a bolt of M10 (ℓ = 19 mm). Tightening torque: 18.6 - 30.4 N·m (1.9 - 3.1 kgf-m)
⑮ Ball	The same ball is used in common at four points, including the reverse restrict ball. D = 7.9375 mm
⑯ 5th & reverse shift fork shaft	This fork shaft is the longest one among the three shafts. L = 265 mm, D = 13.0 mm
⑰ 5th & reverse shift head	Width contacting with inner lever: 12.1 - 12.2 mm Width contacting with reverse shift arm pin: 15.0 - 15.043 mm
★⑱ Slotted spring pin	The same pin is used in common at six points. D = 5 mm, L = 23 mm
⑲ 5th shift fork	Thickness of rib section contacting with hub sleeve: 6.7 - 6.9 mm
⑳ 3rd & 4th shift fork shaft	This shaft has the middle length among three shafts. L = 259 mm, D = 13.0 mm
㉑ 3rd & 4th shift head	Groove width at section contacting with shift inner lever: 12.1 - 12.2 mm
㉒ 3rd & 4th shift fork	Thickness of rib section contacting with hub sleeve: 6.7 - 6.9 mm
㉓ 1st & 2nd shift fork shaft	This fork shaft is the shortest one among the three shafts. L = 224 mm, D = 13.0 mm
㉔ 1st & 2nd shift fork	Thickness of section contacting with hub sleeve: 9.7 - 9.9 mm (Only the 1st & 2nd shift fork is wider than other shift forks.)
㉕ 1st & 2nd shift head	Groove width at section contacting with shift inner lever: 12.1 - 12.2 mm
★㉖ Tight plug	This plug is not required to remove, unless exceptional situation, such as oil leakage, occurs.
㉗ Transmission case	The clutch housing is connected to the transmission case with 10 bolts. Tightening torque: 14.7 - 21.6 N·m (1.5 - 2.2 kgf-m) The transfer assembly is connected to the transmission case with 6 bolts. Tightening torque: 29.4 - 44.1 N·m (3.0 - 4.5 kgf-m)
㉘ Transmission magnet	This magnet is not secured with a bolt.
㉙ Backup lamp switch assembly	Tightening torque: 24.5 - 39.2 N·m (2.5 - 4.0 kgf-m)
㉚ Breather plug	Tightening torque: 14.7 - 21.6 N·m (1.5 - 2.2 kgf-m)

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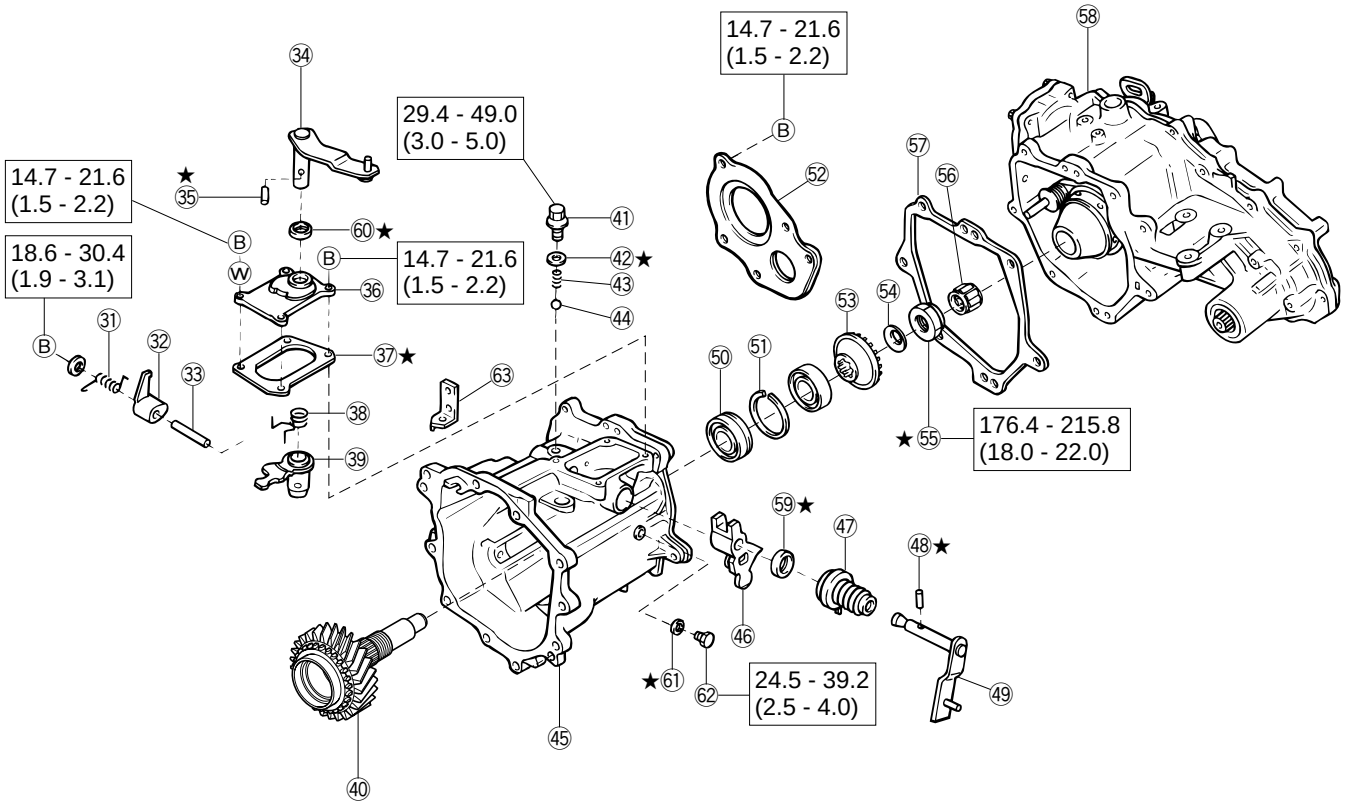
COMPONENTS (PART 2)

□ : Tightening torque
Unit : N·m (kgf-m)
★ : Non-reusable parts



㉛ Torsion spring
㉜ Reverse restrict cam
㉝ Reverse restrict shaft
㉞ Select lever subassembly
★㉟ Grooved pin
㊱ Control shaft cover
㊲ Transmission case cover gasket
㊳ Torsion spring
㊴ Select inner lever
㊵ Output shaft
㊶ Reverse restrict pin holder
★㊷ Gasket
㊸ Compression spring
㊹ Ball
㊺ Transmission case
㊻ Shift inner lever
㊼ Control shaft boot
★㊽ Grooved pin
㊾ Shift lever shaft subassembly
㊿ Radial ball bearing
(51) Hole snap ring
(52) Rear bearing retainer
(53) Transfer input hub
(54) Conical spring washer
(55) Lock nut
(56) Needle roller bearing
(57) Extension housing gasket
(58) Transfer assembly
(59) Type T oil seal
(60) Type K oil seal
(61) Gasket
(62) W/head straight screw plug
(63) Clamp

JMT00021-00015

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COMPONENTS (PART 2)

㉛ Torsion spring	Pay special attention to the assembling direction in the same way as with Item ㉜.
㉜ Reverse restrict cam	Pay special attention to the assembling direction during disassembly and assembly, for the reverse restrict cam has the correct assembling direction to be observed.
㉝ Reverse restrict shaft	D = 8 mm, L = 7.15 mm
㉞ Select lever subassembly	Pay special attention to the assembling direction of the lever when Items ㊳ and ㊴ are assembled.
★㉟ Grooved pin	D = 6 mm, L = 22 mm Drive this pin into position from the side where no groove is provided.
㊱ Control shaft cover	The transmission case cover is installed with a total of four bolts; two bolts of M8 and two reamer bolts (olive green) of M8 with Item ㊲ interposed.
★㊲ Transmission case cover gasket	(Non-asbestos)
㊳ Torsion spring	Pay special attention to the up-and-down direction of the spring during assembly.
㊴ Select inner lever	Width of section contacting with shift head: 14.88 - 14.98 mm
㊵ Output shaft	This shaft corresponds to the 4th gear.
㊶ Reverse restrict pin holder	Tightening torque: 29.4 - 49.0 N·m (3.0 - 5.0 kgf-m)
★㊷ Gasket	
㊸ Compression spring	Free length: 24.00 mm Length as installed: 17.00 mm
㊹ Ball	The same ball is used in common at four points, including the shift fork ball.
㊺ Transmission case	Description is made in the “Components (part 1).” Apply Three Bond® 1216 or 1217 to the mating sections with the clutch housing and extension housing.
㊻ Shift inner lever	Width of section contacting with shift head: 11.88 - 11.98 mm Width of section contacting with select inner lever: 15.1 - 15.2 mm
㊼ Control shaft boot	Install this boot in such a way that the air bleeding section faces downward.
★㊽ Grooved pin	D = 6 mm, L = 24 mm
㊾ Shift lever shaft subassembly	Pay special attention to the assembling direction of the lever during assembly.
㊿ Radial ball bearing	
(51) Hole snap ring	This ring can be reused.
(52) Rear bearing retainer	This retainer is installed with five bolts of M8 (ℓ = 20 mm). Tightening torque: 14.7 - 21.6 N·m (1.5 - 2.2 kgf-m)
(53) Transfer input hub	
(54) Conical spring washer	Pay special attention to the correct installing direction during the assembly.
★(55) Lock nut	Width across flats of lock nut: 32 mm Tightening torque: 176.4 - 215.8 N·m (18.0 - 22.0 kgf-m) Be sure to stake the lock nut after tightening.
(56) Needle roller bearing	
★(57) Extension housing gasket	
(58) Transfer assembly	The transmission case is connected to the transfer assembly by means of five bolts of M10 (ℓ = 40 mm) and two bolts of M10 (ℓ = 210 mm).
★(59) Type T oil seal	The protruding dimension should be observed strictly at the time of installation to be 5 ± 0.3 mm.
★(60) Type K oil seal	The seal inclination at the time of prese-fitting should be 1° or less. Apply MP grease to the lip section.
★(61) Gasket	
(62) W/head straight screw plug	Tightening torque: 24.5 - 39.2 N·m (2.5 - 4.0 kgf-m)
(63) Clamp	

JMT00022-00000

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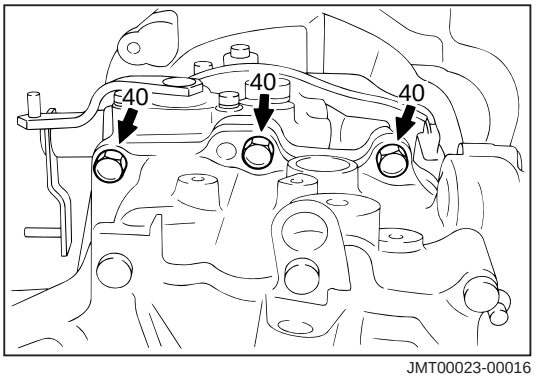
REMOVAL OF TRANSFER ASSEMBLY

NOTE:
- For disassembly of the transfer assembly, refer to Section TR.

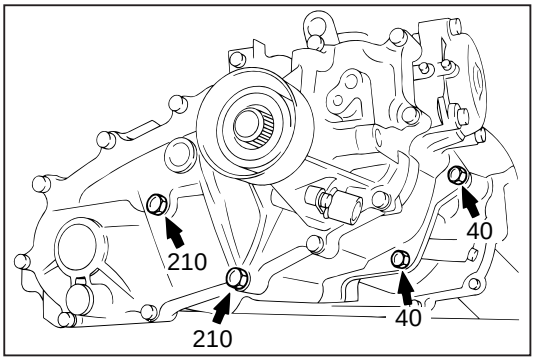
1. Remove the seven bolts indicated in the right figure.
   NOTE:
   - The numeral in the right figure denotes the nominal length of each bolt. (Unit: mm)



JMT00023-00016

2. Top the rib section of the transfer case. Then, pull out it toward you.
3. Remove the extension housing gasket.
   NOTE:
   - Never reuse the removed gasket.

4. Remove the needle roller bearing at the forward end of the transmission output shaft.



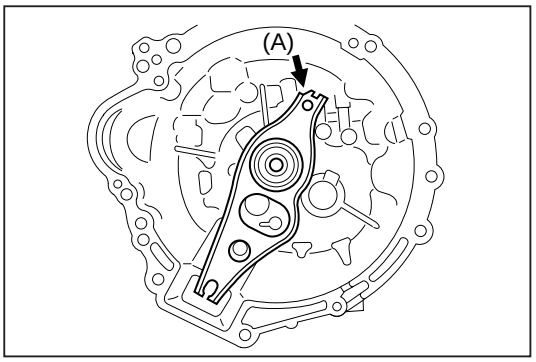
JMT00024-00017

DISASSEMBLY

DISASSEMBLY OF SHIFT AND SELECT LEVER RELATED PARTS

NOTE:
- After the sifting feeling and continuity for the reverse backup lamp switch have been checked.

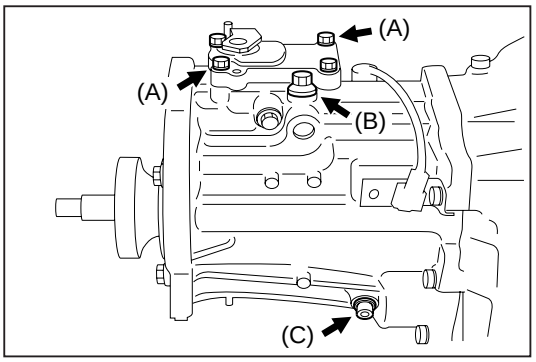
1. Remove the clutch-related parts.
   (Detach the engagement of the spring (A).)



JMT00025-00018

2. Remove the control shaft cover with gasket {(A) bolts are used for the reamer bolt}.
3. Remove the compression spring and ball of the reverse restrict pin holder (B) with the gasket.
   NOTE:
   - Disassemble the control shaft cover, as required.
   - Prior to the disassembly, drive out the grooved pin of the shift lever shaft.

4. Remove the hexagon bolt (C) of the reverse idler gear shaft with the gasket.
   NOTE:
   - This hexagon bolt is for securing the reverse idle shaft. Hence, be sure to remove this bolt before the transmission is disassembled.



JMT00026-00019

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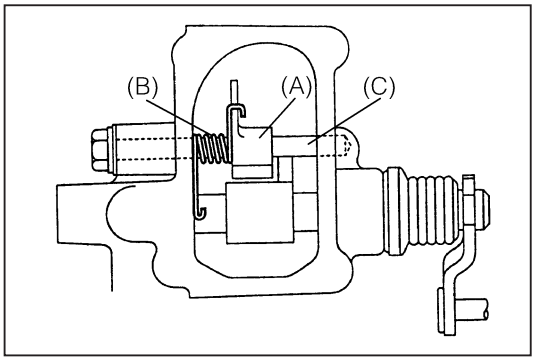
5. Pull out the shift lever subassembly and shift inner lever by driving out the grooved pin.
6. Remove the reverse restrict cam (A), torsion spring (B) and reverse restrict shaft (C) by removing the hexagon bolt with the gasket.
   NOTE:
   • The reverse restrict cam (A) has the correct assembling direction to be observed during assembly. Therefore, when disassembling the reverse restrict cam, make sure to remember the assembling direction in order that the part may be assembled correctly.



JMT00027-00020

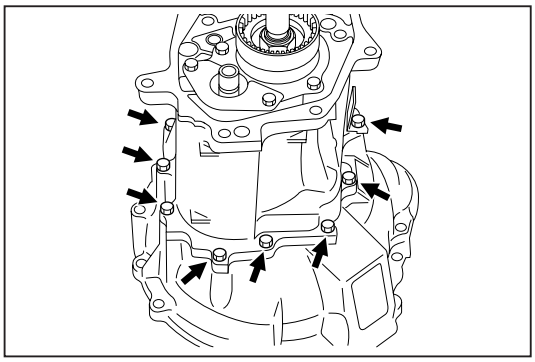
7. Remove the backup lamp switch assembly with the gasket.
   NOTE:
   • Do not reuse the gasket removed above.

DISASSEMBLY OF TRANSMISSION CASE

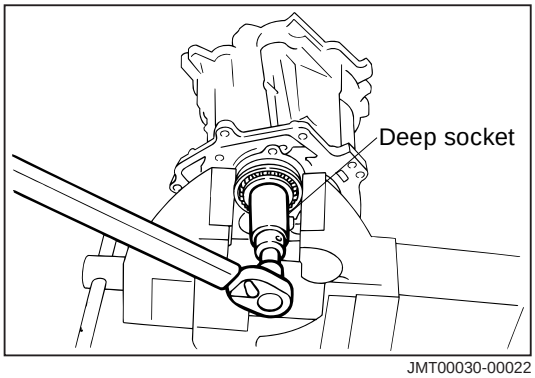
NOTE:
• Disassemble the transmission case after checking to see if any variation in rotation exists between the input and output shafts.

JMT00028-00000

1. Remove the 10 bolts of the transmission case, (including the two bolts to be removed from the side of the clutch housing).
   NOTE:
   • Of those bolts that are installed from the clutch housing side, one bolt is a hexagon socket head bolt due to a reason in the production line. However, here it is permissible to install the same hexagonal bolt as other bolts.


JMT00029-00021

2. Tap the rib section of the transmission case. Then, pull it out toward you.
3. Remove the lock nut by means of a deep socket.
   NOTE:
   • Do not reuse the removed lock nut.
   [Reference]
   • Deep socket dimensions (Tool commercially available)
   Width across flats: 32 mm × Overall length: 100 mm
4. Remove the conical spring washer.



JMT00030-00022

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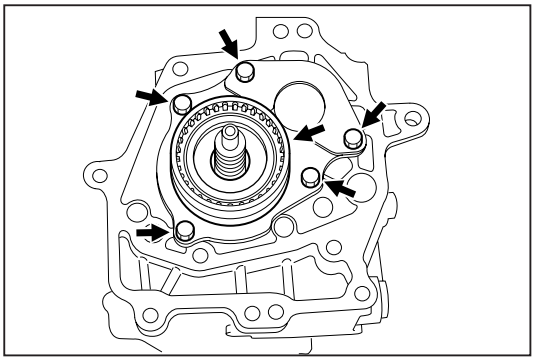
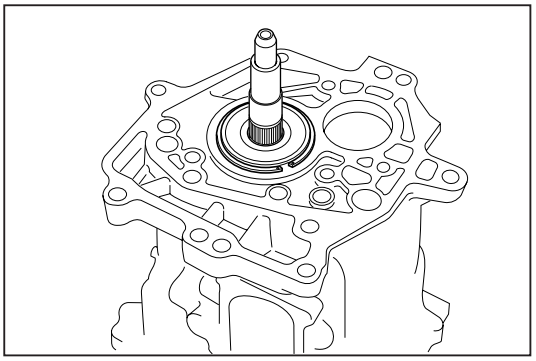
5. Remove the transfer input hub.
6. Remove the rear bearing retainer and transmission magnet by removing the five bolts.



JMT00031-00023

7. Remove the hole snap ring with a snap ring expander.
8. Remove the output shaft from the transmission case.



JMT00032-00024

REMOVAL OF SHIFT FORK

NOTE:

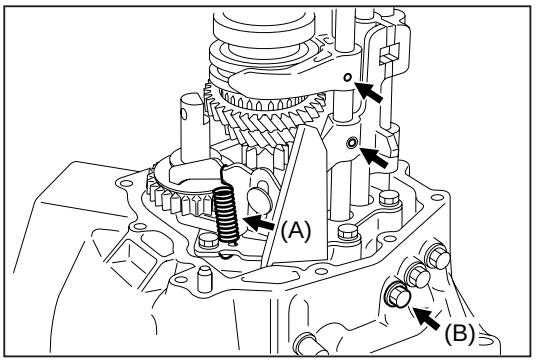
- Check the movement of reverse shift arm and contact width between the shift fork and the rib sleeve.
- Make sure that the shift fork is removed only after the gear concerned is placed in neutral.

JMT00033-00000

1. Detach the tension spring (A).
2. Remove the compression spring and ball by removing the hexagon bolt with the gasket (B).
3. Remove the 5th & reverse shift fork shaft by removing the slotted spring pin of the shift fork and shift head.

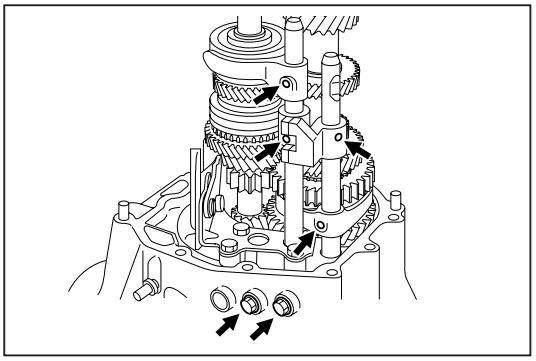
   NOTE:

   - When the slotted spring pin is driven out, a measure to sustain the reaction force for pulling out should be taken at the opposite side.



JMT00034-00025

4. Remove the 1st & 2nd shift fork shaft and the 3rd & 4th shift fork shaft progressively, following the procedure described in the steps 2 through 3 above.



JMT00035-00026

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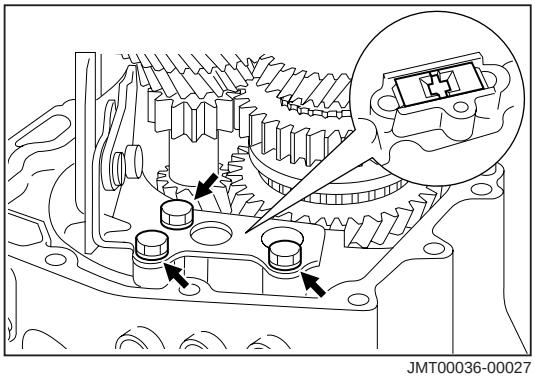
REMOVAL OF INPUT SHAFT AND COUNTER GEAR

NOTE:
- Confirm that each gear can be engaged properly.

1. Pull out the output shaft assembly with the needle roller bearing, synchronizer ring and wave spring.
2. Remove the reverse shift arm by removing the three bolts.
3. Pull out reverse idler gear shaft, thrust washer and reverse gear.
4. Remove the input shaft bearing lock plate by removing the three bolts.
5. While holding both the input shaft and counter gear assembly by your hands, pull out them in such a way that they face toward the upper side.

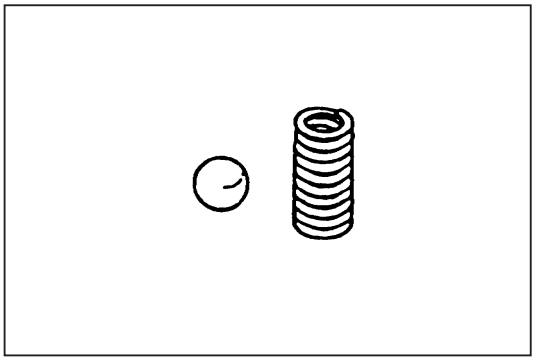


JMT00036-00027

INSPECTION

1. Measure the free length of the compression spring for shift fork shafts and reverse restrict pin.

	For shift fork shafts	For reverse restrict pin
Free length	40 mm	24 mm
Load as installed: N (kgf)	47.33 N (4.83 kgf)	23.83 N (2.43 kgf)
Height as installed	30 mm	17 mm



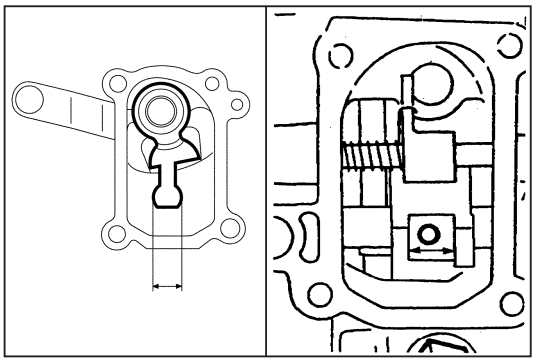
JMT00037-00028

2. Visually inspect the balls for deformation or scratches.

3. Measure the contact width section between the select inner lever shaft and shift heads.

Unit: mm

	Select inner lever	Shift inner lever heads
Specified Value	$15^{-0.02}_{-0.12}$	$15^{+0.2}_{+0.1}$



JMT00038-00029

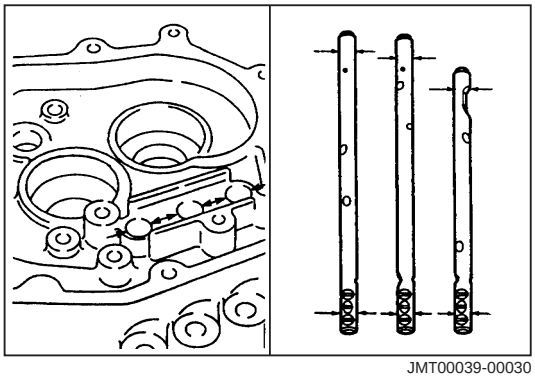
SHIFT FORKS AND HEADS

INSPECTION

1. Measure the outer diameter of the shift fork shafts and inner diameter of the case sides.

Unit: mm

	Case sides	Shift sides
Specified Value	$13.0^{+0.043}_{+0}$	$13.0^{-0.050}_{-0.077}$



JMT00039-00030

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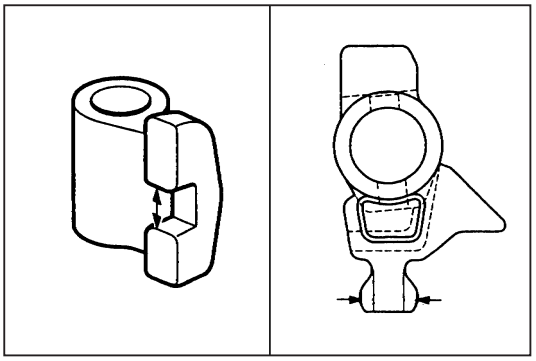
2. Measure the contact width section between the shift heads and the shift inner lever.

Unit: mm

	Shift heads	Shift inner lever
Specified Value	$12.1^{+0.1}_{+0}$	$12^{-0.02}_{-0.12}$



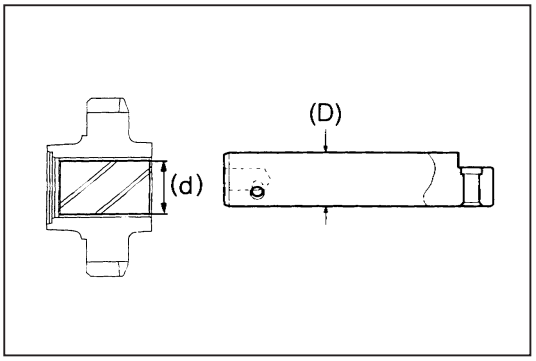
JMT00040-00031

REVERSE IDLER GEAR

1. Visually inspect the chamfered section of the reverse idle gear for damage.
2. Measure the bore diameter of the reverse idle gear bush.
3. Measure the outer diameter of the reverse idle gear shaft. Also, check its surface for scores, etc.

Unit: mm

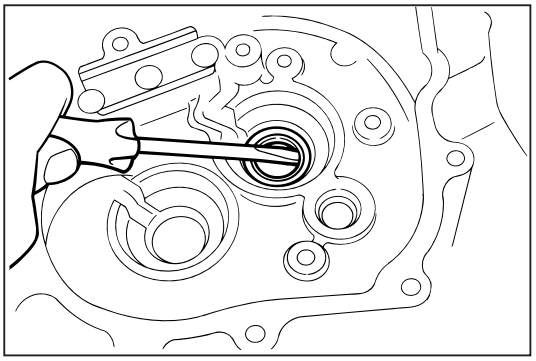
	(d)	(D)
Specified Value	$20^{+0.061}_{+0.032}$	$20.0^{+0}_{-0.013}$



JMT00041-00032

REPLACEMENT OF TYPE S OIL SEAL

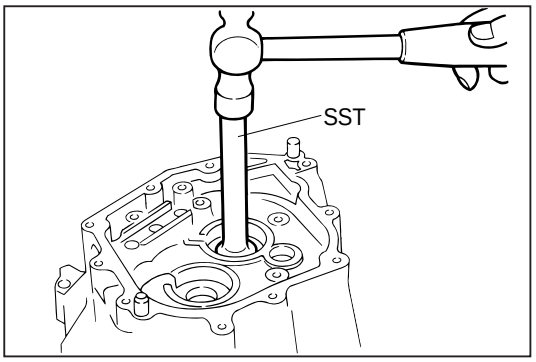
1. Remove the Type S oil seal with a common screwdriver.
   NOTE:
   - Do not reuse the removed Type S oil seal.



JMT00042-00033

2. Install a new Type S oil seal in the clutch housing, using the SST given below.
   SST: 09606-87201-000

   NOTE:
   - Prior to assembly, apply gear oil to the whole periphery of the lip section.

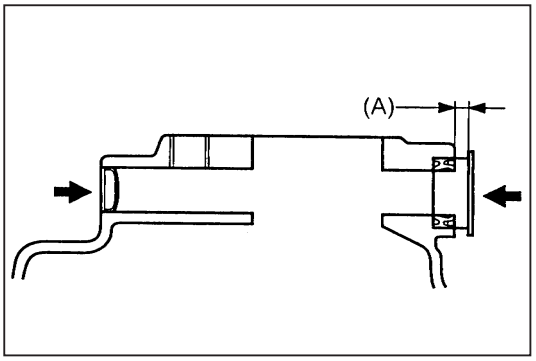


JMT00043-00034

SHIFT LEVER & SHIFT RELATED PARTS REPLACEMENT

REMOVAL

1. Remove the select lever boot.
2. Remove the tight plug (if necessary).
3. Remove the Type T oil seal.
   NOTE:
   - Do not reuse the removed tight plug and oil seal.



JMT00044-00035

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INSTALLATION

1. Install the new tight plug as shown in the right figure.
2. Install the new Type T oil seal as shown in the right figure.
3. Ensure that the protrusion section (A) of the Type T oil seal conforms to the specified value.
   Specified Value: 5 ± 0.3 mm

   CAUTION:
   - If the protrusion section (A) exceeds the specification above (i.e. above 5.3 mm), it would cause oil leakage.

4. Check that continuity exists at the backup lamp switch assembly.

JMT00045-00000

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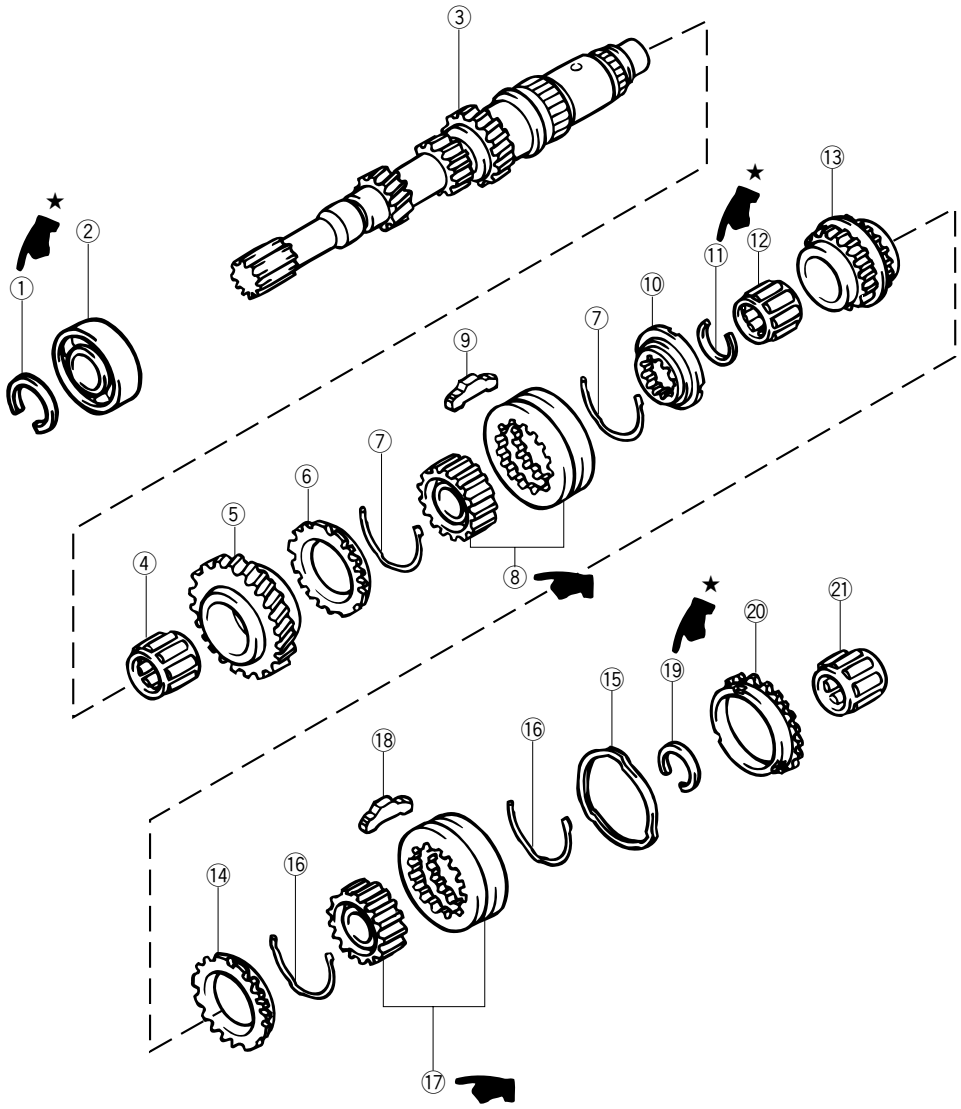
INPUT SHAFT

COMPONENTS

★ : Non-reusable parts
☛ : Selection parts



★① Shaft snap ring
② Radial ball bearing (front)
③ Input shaft
④ Split type needle roller bearing
⑤ 5th gear
⑥ Synchronizer ring No. 1
⑦ Synchromesh shifting key spring
⑧ Synchronizer No. 3 hub assembly
⑨ Synchromesh shifting key
⑩ Transmission hub sleeve stopper
★⑪ Shaft snap ring
⑫ Needle roller bearing
⑬ 3rd gear
⑭ Synchronizer ring No. 1
⑮ Wave spring
⑯ Synchromesh shifting key spring
⑰ Synchronizer No. 2 hub assembly
⑱ Synchromesh shifting key
★⑲ Shaft snap ring
⑳ Synchronizer ring No. 1
㉑ Needle roller bearing

JMT00046-00036

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COMPONENTS

★① Shaft snap ring	This is shared in common with the snap ring of Item ⑲. Thickness selection type snap ring
② Radial ball bearing	
③ Input shaft	Needle roller bearing rotating section: D = 31.971 - 31.991 mm, two points Needle roller bearing rear end section: D = 19.966 - 19.984 mm
④ Split type needle roller bearing	The opening width of mating ends of the bearing should not exceed the shaft diameter + 5 mm during installation and removal. The opening end should not exceed 37 mm. *-1
⑤ 5th gear	Bore diameter: 37.00 - 37.025 mm Width: 27.82 - 27.88 mm Thrust end play: 0.1 - 0.4 mm
⑥ Synchronizer ring No. 1	Items ⑥, ⑭ and ⑳ are used in common. Clearance between the gear and the synchronizer ring: 0.95 - 1.35 mm
⑦ Synchromesh shifting key spring	Items ⑦ and ⑯ are used in common. Make sure that no mating end of the spring comes in the same direction in assembly.
⑧ Synchronizer No. 3 hub assembly	Thickness at boss section: 12.37 - 12.43 mm The sleeve is shared in common with Item ⑰ However, be very careful not to mix the sleeve with others, for the hub and sleeve are assembled as a set. Assemble the hub in such a way that the oil-groove side of the hub comes at the front, namely the 5th gear side. The sleeve has no correct assembling direction to be observed. However, be sure to align the missing teeth provided at three points when the hub and sleeve are assembled.
⑨ Synchromesh shifting key	Items ⑨ and ⑱ are used in common. Therefore, a total of six pieces are used in common. Thickness: 4.6 - 4.8 mm
⑩ Transmission hub sleeve stopper	Thickness: 7.19 - 7.25 mm Assemble this retainer in such a way that the flat surface comes at the front; the oil-groove side comes at the rear.
★⑪ Shaft snap ring	This is shared in common with Item ① of the counter gear. Thickness selection type
⑫ Needle roller bearing	This is shared in common with Item ⑦ of the counter gear.
⑬ 3rd gear	Bore diameter: 37.00 - 37.025 mm Width: 37.95 - 37.98 mm Number of gear teeth: 33 Outer diameter: 63.7 Thrust end play: 0.1 - 0.52 mm
⑭ Synchronizer ring No. 1	Items ⑥, ⑭ and ⑳ are used in common. Clearance between the gear and the synchronizer ring: 0.95 - 1.35 mm *-2
⑮ Wave spring	This wave spring is provided between items ⑰ and ⑳
⑯ Synchromesh shifting key spring	Items ⑦ and ⑯ are used in common. Make sure that no mating end of the spring comes in the same direction in assembly.
⑰ Synchronizer No. 2 hub assembly	Thickness at boss section: 18.52 - 18.58 mm Assemble the hub in such a way that the oil-groove side of the hub comes at the front, namely the 3rd gear side. Be sure to align the missing teeth provided at three points when the hub and sleeve are assembled. The sleeve has no correct assembling direction to be observed. Width of shift fork groove: 7.05 - 7.12 mm
⑱ Synchromesh shifting key	Items ⑨ and ⑱ are used in common. Therefore, a total of six pieces are used in common. Thickness: 4.6 - 4.8 mm
★⑲ Shaft snap ring	This is shared in common with the snap ring of Item ①. Thickness selection type
⑳ Synchronizer ring No. 1	Items ⑥, ⑭ and ⑳ are used in common. Refer to Items ⑥ and ⑭.
㉑ Needle roller bearing	This needle roller bearing is located between the input shaft and the output shaft.

*-1 When the snap ring ⑪ is removed, those parts ④ to ⑩ can be removed collectively.
*-2 When the snap ring ⑲ is removed, those parts ⑫ to ⑱ can be removed collectively.

JMT00047-00000

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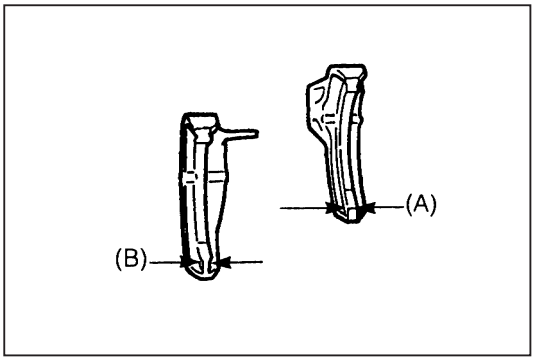
INSPECTION PRIOR TO OPERATION

1. Measure the contact section of the shift forks for 3rd gear (A), 5th gear (B) and with the hub sleeves.

Unit: mm

	3rd gear (A) and 5th gear (B)	
	Fork	Hub sleeve
Specified Value	$7^{-0.1}_{-0.3}$	$7^{+0.12}_{+0.05}$
Allowable Limit	6.6	7.2

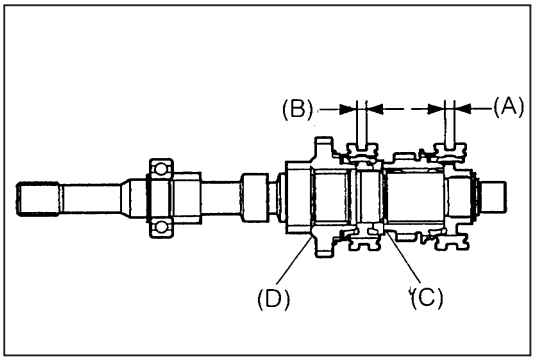


JMT00048-00037

2. Measure and record the thrust clearance for 3rd gear (C) and 5th gear (D), using a feeler gauge.

Unit: mm

	(C)	(D)
Specified Value	0.10 - 0.52	0.10 - 0.40

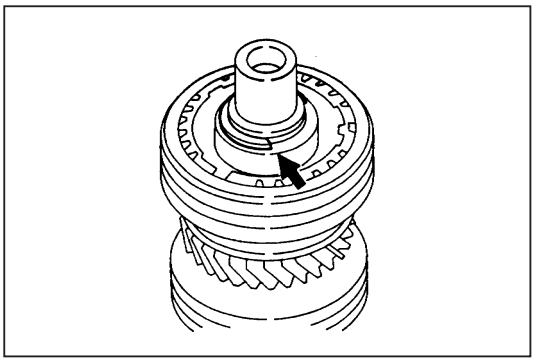


JMT00049-00038

NOTE:
- Ensure that the thrust clearance is measured at several points.
- If the measured thrust clearance fails to conform to the specification above, proceed to disassemble the input shaft assembly.

DISASSEMBLY

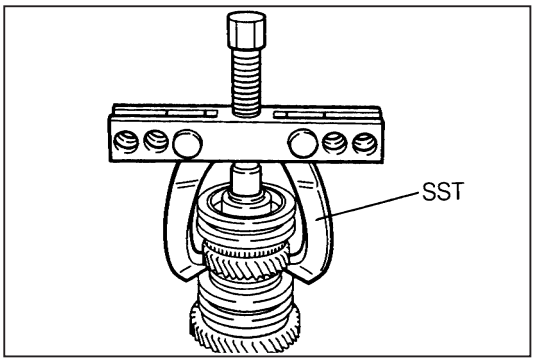
1. Using soft jaws, clamp the input shaft assembly in a vice so as to avoid the damage in the spline section.
2. Remove the selection type shaft snap ring at the rear side.
3. For reference at the time of installation, measure and record the removed shaft snap ring.


JMT00050-00039

4. Remove the following parts, using the following SST.
   SST: 09950-20017-000

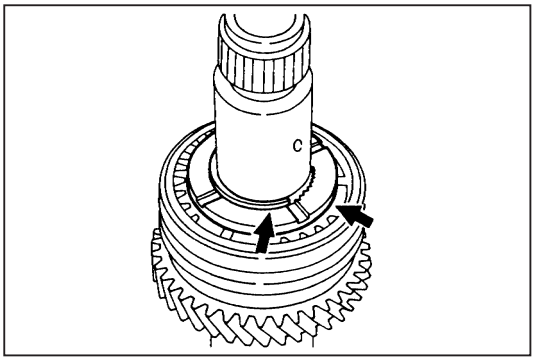
NOTE:
- The following parts can be removed by driving out the input shaft by means of a press, with the 3rd gear section sustained by the SST (09334-87301-000)

(1) Synchronizer No. 2 hub assembly
(2) Synchronizer ring No. 1
(3) 3rd gear



JMT00051-00040

5. Remove the needle roller bearing.
6. Remove the selection type shaft snap ring.
7. For reference at the time of installation, measure and record the removed shaft snap ring.
8. Remove the transmission hub sleeve stopper.


JMT00052-00041

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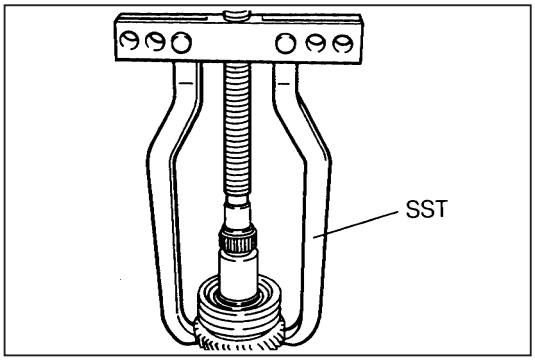
9. Remove the following parts, using the following SST.
   SST: 09950-20017-000

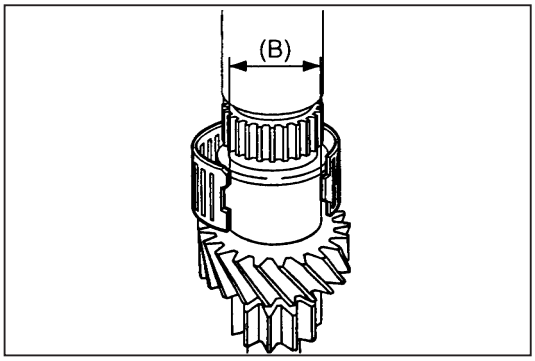
   NOTE:
   • The following parts can be removed by driving out the input shaft by means of a press, with the 5th gear section sustained by the SST (09334-87301-000).

   (1) Synchronizer No. 3 hub assembly
   (2) Synchronizer ring No. 1
   (3) 5th gear



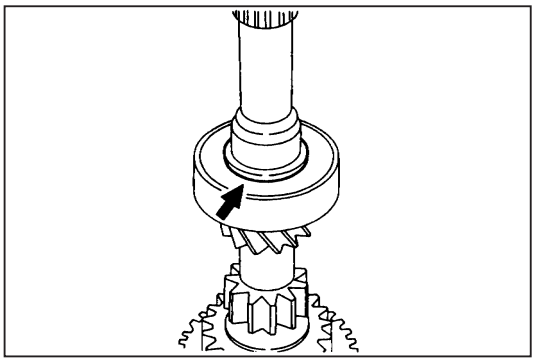
JMT00053-00042

10. Remove the split type needle roller bearing.
    CAUTION:
    • When the split type needle roller bearing is removed, make sure that the gap (B) at the opening of the needle roller bearing will not exceed the outer diameter of the input shaft by more than 5 mm.



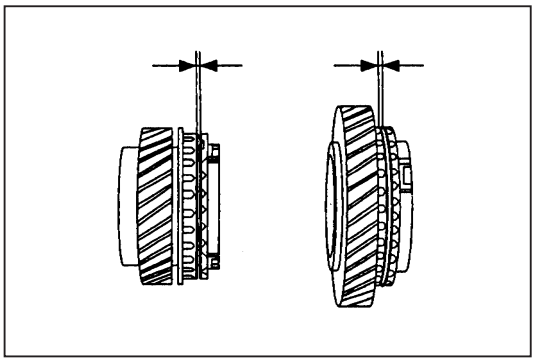
JMT00054-00043

11. Remove the selection type shaft snap ring.
12. Measure and record the thickness of the removed snap ring for the reference of installation.
13. Remove the radial ball bearing at the front side, using the following SST.
    SST: 09950-20017-000


JMT00055-00044

INSPECTION

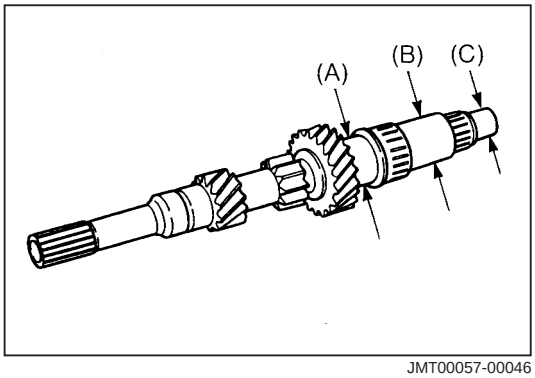
1. Check the clearance between the gear tapered section and the synchronizer rings.
   Specified Value: 0.95 - 1.35 mm


JMT00056-00045

2. Measure the outer diameter of the input shaft at the sections (A), (B) and (C) as shown in the right figure.
3. Visually inspect the sections (A), (B) and (C) for scratch or discoloration.

Unit: mm

	Specified Value
(A) and (B)	$32\ ^{-0.009}_{-0.029}$
(C)	$20\ ^{-0.016}_{-0.034}$



JMT00057-00046

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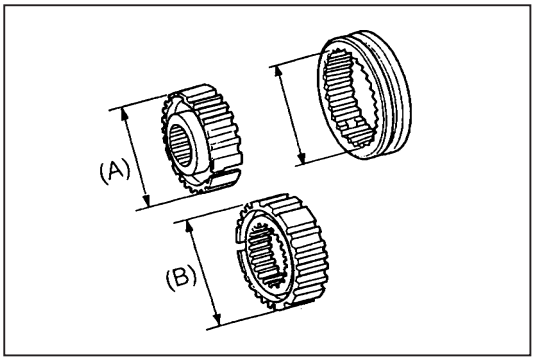
4. Measure the dimensions between the outer diameter of the synchronizer No. 2 for 3rd (A) and synchronizer No. 3 for 5th (B) and bore diameter of both hub sleeves.

Unit: mm

Classification	(A) and (B)	Hub sleeve	Identification
No. 2	57.78 - 57.84	57.871 - 57.97	Yellow
No. 1	57.68 - 57.74	57.771 - 57.87	None
No. 3	57.58 - 57.64	57.67 - 57.77	White



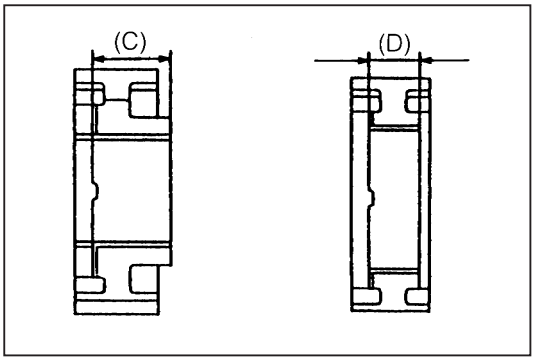
JMT00058-00047

CAUTION:
- If any part which has exceeded the value specified in the table above should be used, it would cause abnormal noise. Therefore, be certain to replace those parts as a set.

5. Measure the thickness of the synchronizer hub No. 2 (C) and No. 3 (D).

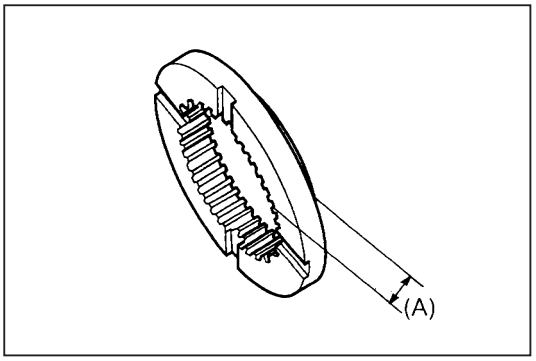
Unit: mm

	(C)	(D)
Specified Value	18.55 ± 0.03	12.4 ± 0.03



JMT00059-00048

6. Measure the height of the transmission hub sleeve stopper.
(A) section:
Specified Value: $7.2^{+0.05\ mm}_{-0.01\ mm}$



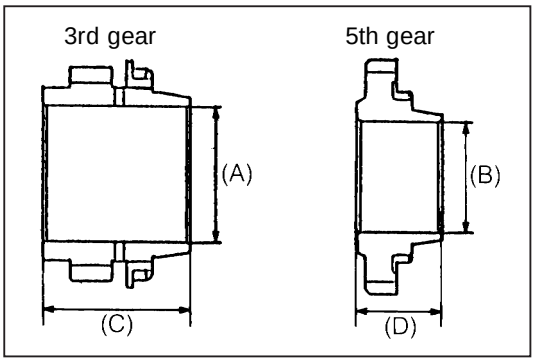
JMT00060-00049

7. Measure the thickness and inner diameter of the 3rd and 5th gears.

Unit: mm

	3rd gear (A)	5th gear (B)
Specified Value	$37.0^{+0.025}_{+0}$	

	3rd gear (C)	5th gear (D)
Specified Value	37.95 ± 0.03	27.85 ± 0.03

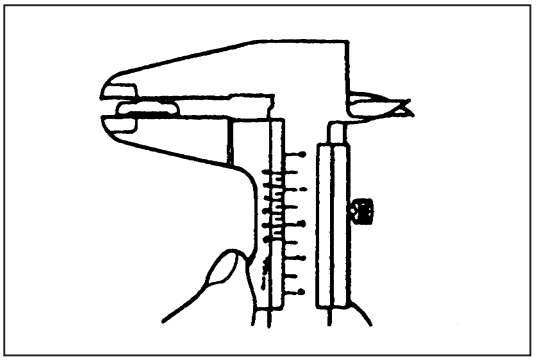


JMT00061-00050

8. Measure the height of the synchromesh shifting key.
Specified Value: $5^{-0.2\ mm}_{-0.4\ mm}$

NOTE:
- All of the six shifting keys assembled in the input shaft are common parts.

9. Visually inspect the synchromesh shifting key spring for wear or damage.


JMT00062-00051

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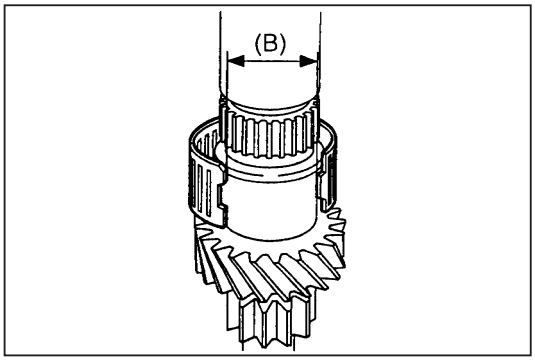
ASSEMBLY

NOTE:

- Be sure to apply gear oil to the relevant parts at every process.
- Never reuse those parts bearing an asterisked mark posted at the pages MT–20 and 21.

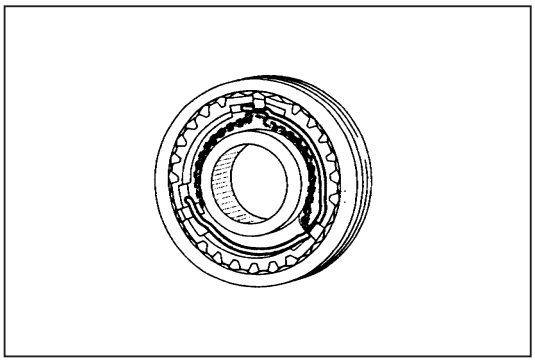
JMT00063-00000

1. Install the split type needle roller bearing and apply gear oil to it.
   CAUTION:
   - When the split type needle roller bearing is installed, make sure that the gap (B) at the opening of the needle roller bearing does not exceed the outer diameter of the input shaft by more than 5 mm.



JMT00064-00052

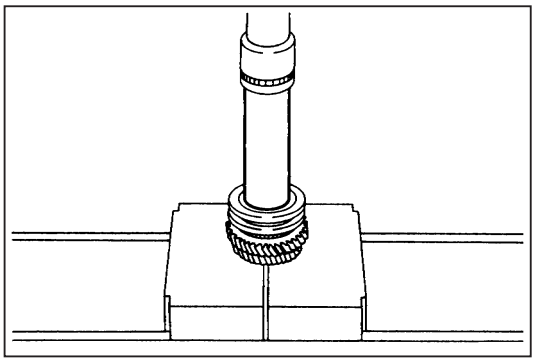
2. Install the 5th gear and synchronizer ring to the input shaft.
3. Assemble the synchromesh shifting key and key spring to the hub as shown in the illustration.
   NOTE:
   - Make sure that no opening end of the shifting key spring comes in the same direction in assembly.
   - Be sure to align the missing teeth provided at three points when the hub and sleeve are assembled.
   - The same hub sleeve is used for both the 3rd gear and 4th gear. However, the hub differs in shape between the 3rd gear and the 4th gear.



JMT00065-00053

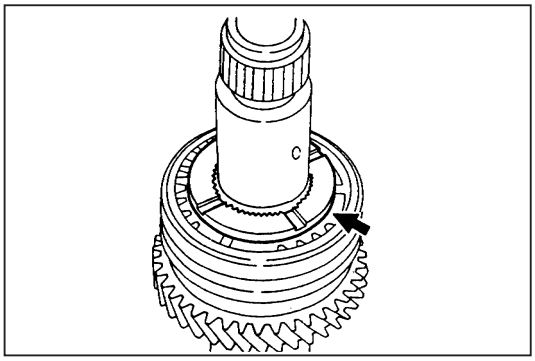
4. Ensure that the grooved section in the protrusion position of the synchronizer No. 3 hub faces toward the front (i.e. the 5th gear) side and press them, using the following SST.
   SST: 09310-87302-000

   NOTE:
   - Make sure that the synchronizer ring is aligned with the shifting key grooves (three points), while the synchronizer No. 3 hub is being pressed.



JMT00066-00054

5. Install the transmission hub sleeve stopper.
   NOTE:
   - Ensure that the oil groove section of the 5th shifting key retainer faces toward the 3rd gear side.



JMT00067-00055

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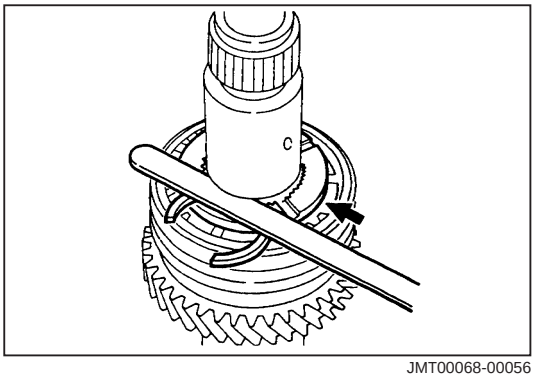
6. Selection procedure for new shaft snap ring
   (1) Using the table below, select a new shaft snap ring having the same thickness as that measured at the time of the removal, or the thinnest shaft snap ring.
   Then, install the thus-selected snap ring on the shaft snap ring installation groove of the input shaft.
   (2) Measure the end play, using a feeler gauge as shown in the right figure.
   (3) Select a snap ring shaft whose end play is zero or almost zero and that can be set readily, using the table below.



JMT00068-00056

   (4) Again, ensure that the end play between the 5th shifting key retainer and the shaft snap ring conforms to the specified value.
   End Play:
   Specified Value: 0
   Allowable Limit: Less than 0.16 mm

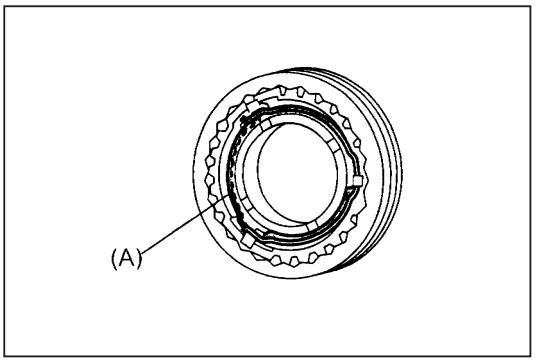
Unit: mm

Part No.	Thickness	Identification	Part No.	Thickness	Identification
90045-20263	2.06	None	90045-20267	1.90	Brown
90045-20264	2.02	Brown	90045-20268	1.86	Blue
90045-20265	1.98	Blue	90045-20269	1.82	None
90045-20266	1.94	None	90045-20270	2.10	Brown

NOTE:
- The shaft snap rings in the table above are the common parts as those used when the hub of the counter gear is set.

JMT00069-00000

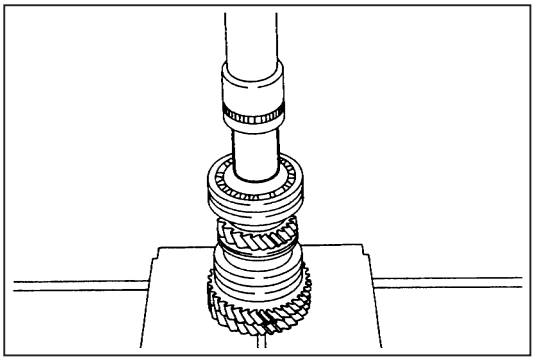
7. Install the needle roller bearing and apply gear oil.
8. Install the 3rd gear and synchronizer ring.
9. Assemble the synchromesh shifting key spring and shifting key to the synchronizer No. 2 hub assembly.
   NOTE:
   - For the handling of the hub sleeve, refer to the step 3 at page MT–25.



JMT00070-00057

10. Ensure that the oil grooved section (A) of the synchronizer No. 2 hub assembly faces toward the 3rd gear side.

NOTE:
- Make sure that the wave spring is interposed between the synchronizer hub No. 2 and the synchronizer ring in advance of the synchronizer hub No. 2 pressing, using the following SST.
  SST: 09310-87302-000



JMT00071-00058

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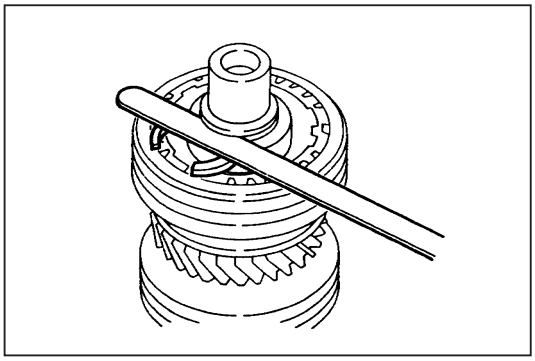
11. Selection procedure for new shaft snap ring
    (1) For the selection procedure of the shaft snap ring, refer to the step 6 at page MT–26.



JMT00072-00059

    (2) Again, ensure that the end play between the hub and the shaft snap ring conforms to the specified value.
    End Play:
    Specified Value: 0
    Allowable Limit: Less than 0.16 mm

Unit: mm

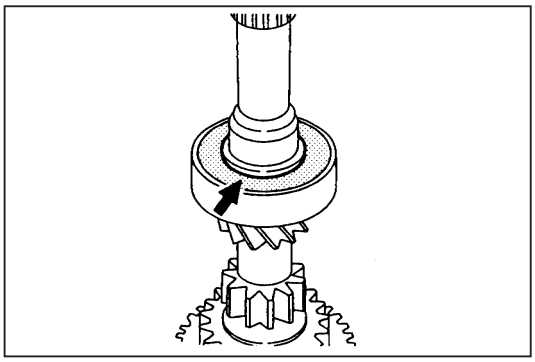
Part No.	Thickness	Identification	Part No.	Thickness	Identification
90045-20271	2.06	None	90045-20275	1.90	Brown
90045-20272	2.02	Brown	90045-20276	1.86	Blue
90045-20273	1.98	Blue	90045-20277	1.82	None
90045-20274	1.94	None	90045-20278	1.78	Brown

NOTE:
- The shaft snap rings in the table above are the common parts as those used at the front bearing section of the input shaft.

JMT00073-00000

12. Press the radial ball bearing.
    NOTE:
    - Be very careful not to drop and disassemble the synchronizer ring and hub sleeve, while the radial ball bearing is being pressed.
    - The assembling operation of the radial ball bearing may be conducted first.

13. In the same manner of the step 11 above, install the selection type shaft snap ring.



JMT00074-00060

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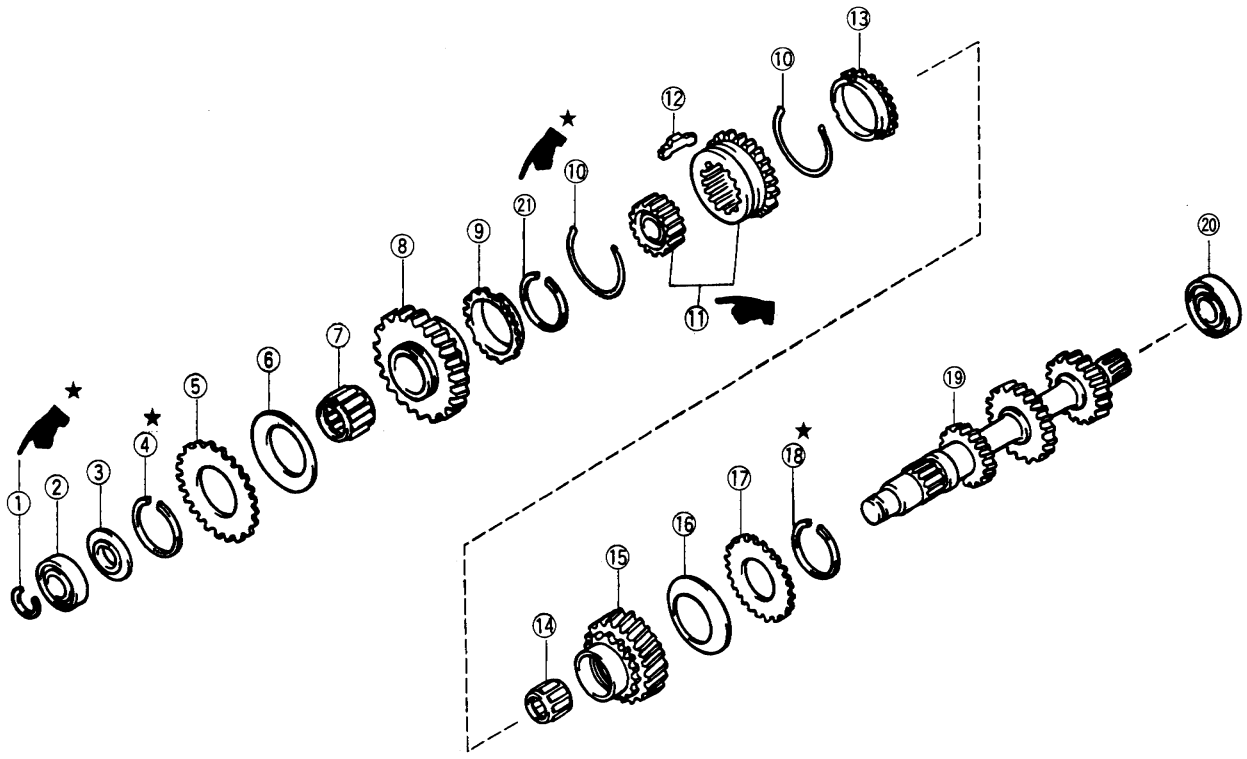
COUNTER GEAR

COMPONENTS

★ : Non-reusable parts
☛ : Selection parts



★① Shaft snap ring
② Radial ball bearing
③ 1st gear thrust washer
★④ Shaft snap ring
⑤ 1st sub-gear
⑥ Conical spring washer
⑦ Needle roller bearing
⑧ 1st gear
⑨ Synchronizer ring No. 2
⑩ Synchromesh shifting key spring
⑪ Synchronizer No. 1 hub assembly
⑫ Synchromesh shifting key
⑬ Synchronizer ring No. 3
⑭ Split type needle roller bearing
⑮ 2nd gear
⑯ Conical spring washer
⑰ 2nd sub-gear
★⑱ Shaft snap ring
⑲ Counter gear
⑳ Radial ball bearing
★㉑ Shaft snap ring

JMT00075-00061

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COMPONENTS

★① Shaft snap ring	Thickness selection type
② Radial ball bearing	Assemble the bearing so that the side having a seal comes at the front.
③ 1st gear thrust washer	Thickness = 3.97 - 4.03 mm Assemble the washer in such a way that the protruding side comes at the front; the oil-groove side comes at the 1st gear side. Thrust end play of 1st gear = 0.1 - 0.52 mm
★④ Shaft snap ring	
⑤ 1st sub-gear	∗-1 Items ④ and ⑱ are used in common. Items ④ to ⑧ are normally handled as assembled parts.
⑥ Conical spring washer	Items ⑥ and ⑯ are used in common.
⑦ Needle roller bearing	This bearing is shared in common with Item ⑫ of the input shaft.
⑧ 1st gear	Inner diameter: 37.00 - 37.025 mm Effective thickness: 27.31 - 27.37 mm Clearance with synchronizer ring: 0.95 - 1.35 mm Limit: 0.9 mm
⑨ Synchronizer ring No. 2	Not interchangeable with Item ⑬. To distinguish this from Item ⑬, missing teeth are provided at three points.
⑩ Synchromesh shifting key spring	Make sure that no mating end comes in the same direction in assembly.
⑪ Synchronizer No. 1 hub assembly	The hub and sleeve (reverse gear) are assembled as a set. Effective hub width: 26.97 - 27.03 mm Assemble the hub assembly so that the side having a larger boss protruding dimension comes at the front. As for the sleeve (reverse gear), make sure that the shift fork groove comes at the front side. Shift fork groove width: 10.05 - 10.12 mm ∗-2
⑫ Synchromesh shifting key	Thickness = 5.0 - 5.2 mm, composed of 3 pieces.
⑬ Synchronizer ring No. 3	Not interchangeable with Item ⑨.
⑭ Split type needle roller bearing	This is shared in common with Item ④ of the input shaft. The opening width of mating ends should not exceed 37 mm during installation and removal.
⑮ 2nd gear	Inner diameter: 37.00 - 37.025 mm Effective thickness: 36.27 - 36.33 mm Clearance with synchronizer ring: 0.95 - 1.35 mm Limit: 0.9 mm Thrust clearance: 0.1 - 0.4 mm
⑯ Conical spring washer	Items ⑥ and ⑯ are used in common. Assemble each part to the 2nd gear in such a way that the portion having a wider spring diameter comes at the sub-gear side.
⑰ 2nd sub-gear	Items ⑮ to ⑰ are serviced as assembled parts together with the ring ⑱.
★⑱ Shaft snap ring	Items ④ and ⑱ are used in common.
⑲ Counter gear	Outer diameter of roller bearing rotating section: 31.971 - 31.991 mm
⑳ Radial ball bearing	
★㉑ Shaft snap ring	This is used in common with Item ⑪ of the input shaft. Thickness selection type.

∗-1 When the snap ring ① is removed, those parts up to ⑧ can be removed collectively.
∗-2 When the snap ring ㉒ is removed, those parts ⑩ to ⑱ can be removed collectively.

JMT00076-00000

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INSPECTION PRIOR TO OPERATION

1. Measure the contact width section of the synchronizer No. 1 hub assembly (B) with the 1st & 2nd shift fork (A).

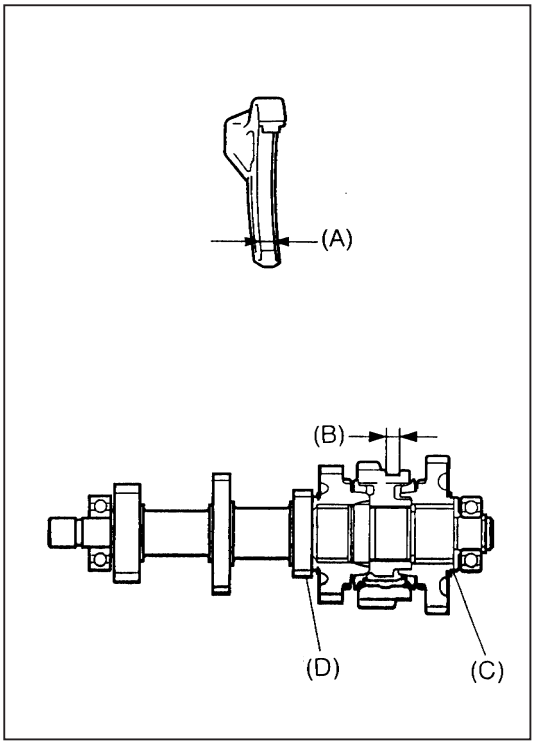
Unit: mm

	(A)	(B)
Specified Value	$10^{-0.1}_{-0.3}$	$10^{+0.12}_{+0.05}$
Allowable Limit	9.6	10.2

2. Measure and record the thrust clearance for 1st gear (C) and 2nd gear (D) as shown in the right figure.
   NOTE:
   - Prior to disassembling, make sure to measure the thrust clearance at several points.
   - If the measured thrust clearance exceeds the specified value in the table below, proceed to disassemble the counter gear.

Unit: mm

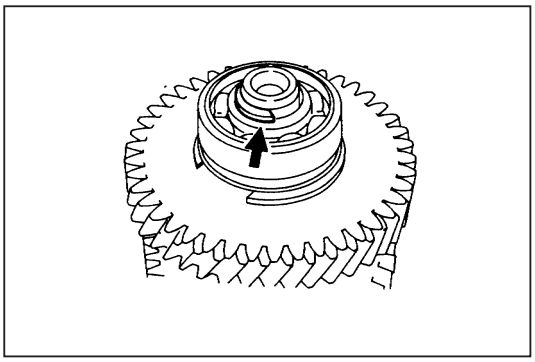
	1st gear (C)	2nd gear (D)
Specified Value	0.10 - 0.52	0.10 - 0.40



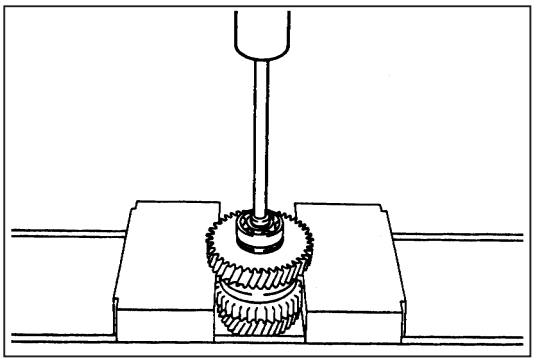
JMT00077-00062

DISASSEMBLY

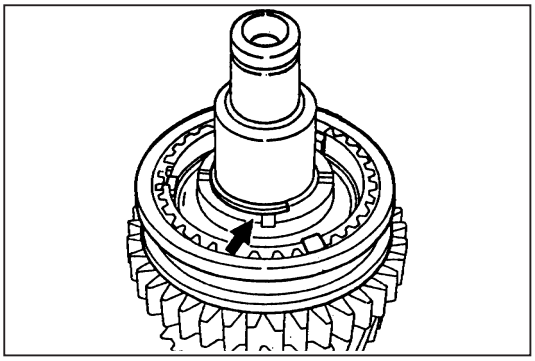
1. Using soft jaws, clamp the spline section of the counter gear assembly in a vice so as to avoid damage.
2. Remove the selection type shaft snap ring.
3. For reference at the time of installation, measure and record the removed selection type shaft snap ring.


JMT00078-00063

4. Remove the following parts by pressing the counter gear by means of a suitable rod.
   (1) Radial ball bearing
   (2) 1st gear thrust washer
   (3) 1st gear
   (4) Synchronizer ring No. 2
   (5) Needle roller bearing
   NOTE:
   - The parts described above can be removed by pressing the counter gear, while the 1st gear is supported by means of the following SST.
     SST: 09334-87301-000


JMT00079-00064

5. Remove the selection type shaft snap ring.
6. For reference at the time of installation, measure and record the removed selection type shaft snap ring.


JMT00080-00065

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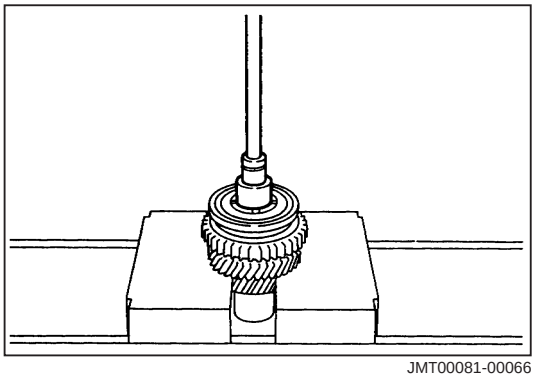
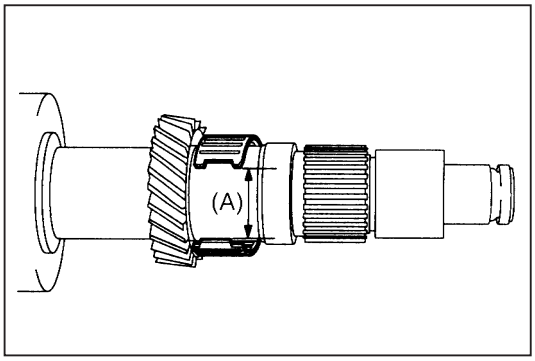
7. Remove the following parts.
   (1) Synchronizer No. 1 hub assembly
   (2) Synchronizer ring No. 3
   (3) 2nd gear with sub-gear
   NOTE:
   • The parts described above can be removed by pressing the counter gear, while the 2nd gear (sub-gear surface) is supported by means of the following SST.
   SST: 09334-87301-000

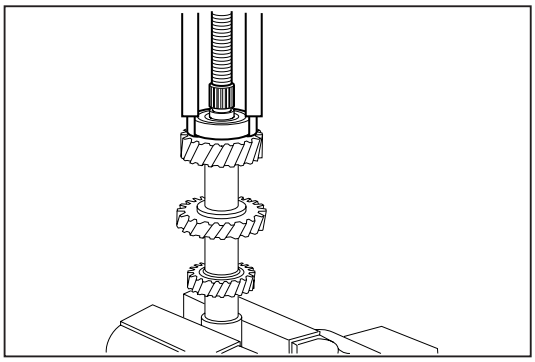

JMT00081-00066

8. Remove the split type needle roller bearing.
   CAUTION:
   • When the split type needle roller bearing is removed, make sure that the gap (A) at the opening of the needle roller bearing does not exceed the outer diameter of the counter gear by more than 5 mm. Failure to observe this caution would cause abnormal noise from the transmission.



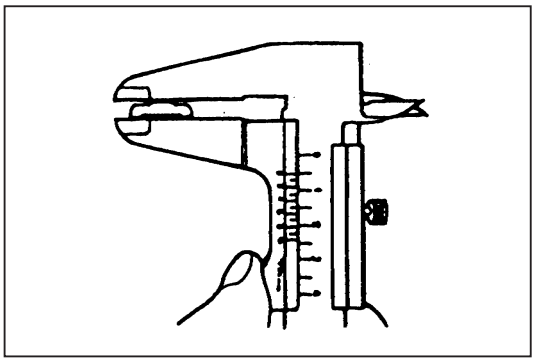
JMT00082-00067

9. Remove the radial ball bearing at the rear side of the counter gear, using the SST given below.
   SST: 09306-87602-000


JMT00083-00068

INSPECTION

1. Measure the height of the synchromesh shifting spring keys.
   Specified Value: 5.1 ± 0.1 mm

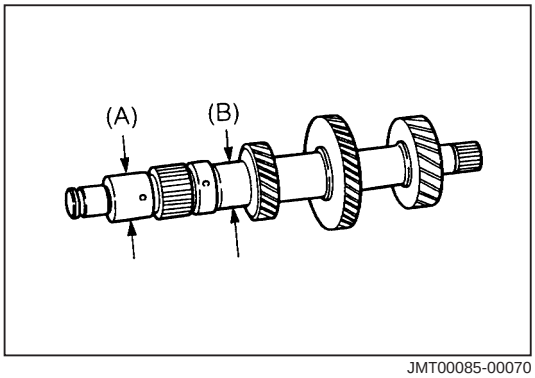

JMT00084-00069

2. Visually inspect the spring for synchromesh shifting key spring for damage or distortion.

3. Measure the outer diameter of the counter gear at the sections (A) and (B).

Unit: mm

	(A)	(B)
Specified Value	32 $^{-0.009}_{-0.029}$	



JMT00085-00070

4. Visually inspect the sections (A) and (B) for discoloration and scratches.

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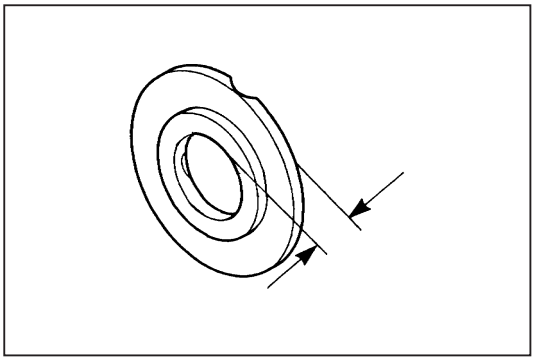
5. Measure the thickness of the 1st gear thrust washer.
   Specified Value: 4 ± 0.03 mm



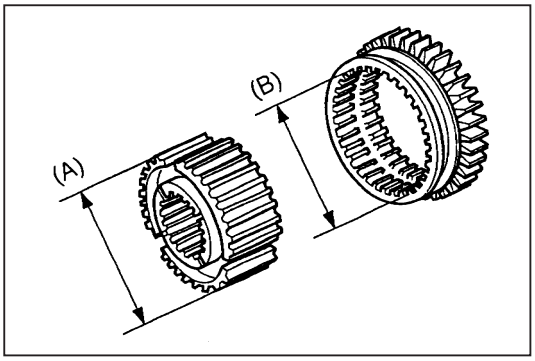
JMT00086-00071

6. Measure the dimensions between the outer diameter of the synchronizer No. 1 hub (A) and the bore diameter of synchronizer hub sleeve (B).
   [Reference information]
   The parts (A) and (B) are available only as a set. An identification mark is applied to the end surface of the synchronizer hub.

Unit: mm

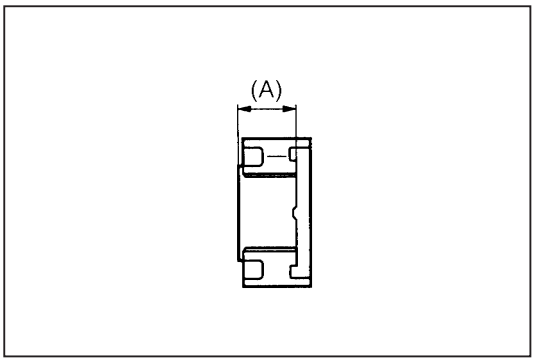
Classification	(A)	(B)	Identification
No. 2	69.78 - 69.84	69.871 - 69.97	Yellow
No. 1	69.68 - 69.74	69.771 - 69.87	None
No. 3	69.58 - 69.64	69.67 - 69.77	White

CAUTION:
- When replacing those parts (A) and (B), be sure to replace them as a set.



JMT00087-00072

7. Measure the thickness (A) of the synchronizer No. 1 hub.
   Specified Value: 27 ± 0.03 mm



JMT00088-00073

8. Measure the inner diameter of 1st and 2nd gear.

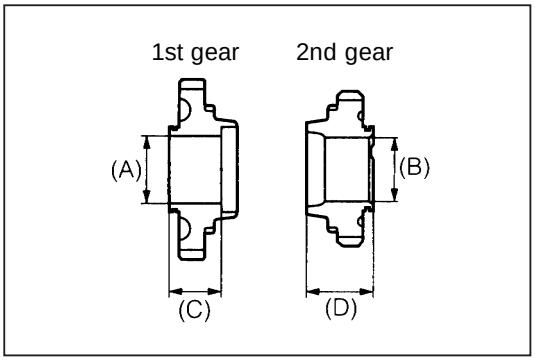
Unit: mm

	1st gear (A)	2nd gear (B)
Specified Value	$37.0\ ^{+0.025}_{+0}$	

9. Measure the thickness of 1st and 2nd gear.

Unit: mm

	1st gear (C)	2nd gear (D)
Specified Value	27.34 ± 0.03	36.30 ± 0.03



JMT00089-00074

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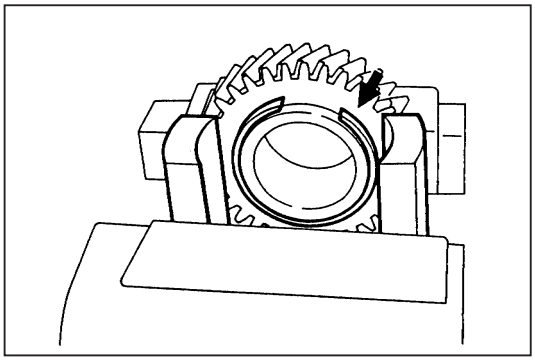
REPLACEMENT OF CONICAL SPRING WASHER

1. Clamp the 1st gear together with the following SST in a vice as shown in the right figure.
   SST: 09350-32014-000

2. Remove the conical spring washer and sub-gear by removing the shaft snap ring.

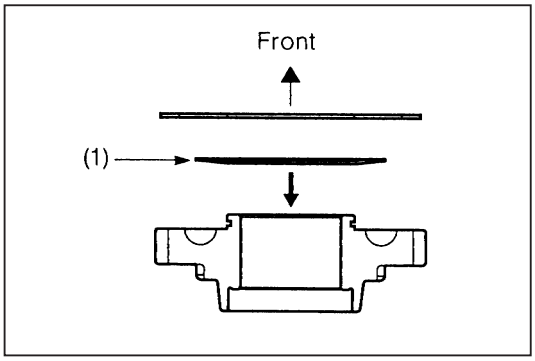


JMT00090-00075

INSPECTION

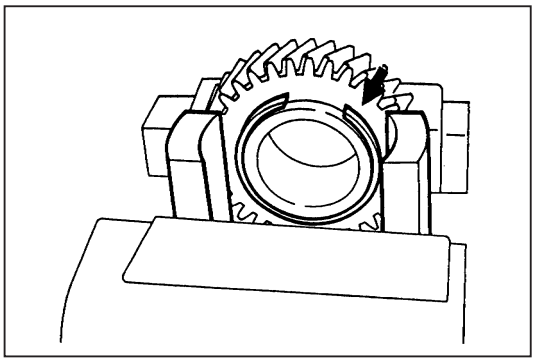
1. Measure the height of the conical spring washer.
   Specified Value: 2.01 mm
   Allowable Limit: 1.04 mm

2. Place a new conical spring washer (1) and sub-gear on the 1st gear.
3. Ensure that the expanded side of the conical spring washer faces toward the sub-gear side as shown in the right figure.



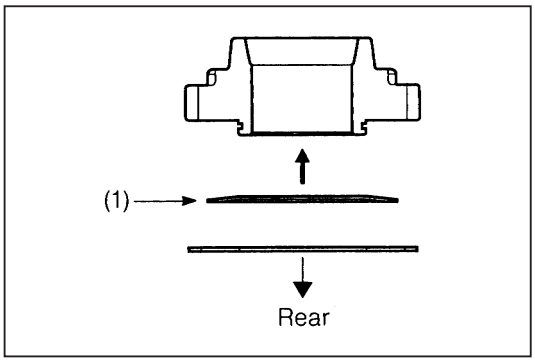
JMT00091-00076

4. Install a new shaft snap ring by pressing the conical spring washer, using the following SST.
   SST: 09350-32014-000



JMT00092-00077

5. In the same manner of the operation stated above, replace the conical spring washer for the 2nd sub-gear.
6. Ensure that the expanded side of the conical spring washer (1) for 2nd sub-gear faces toward the sub-gear side as shown in the right figure.

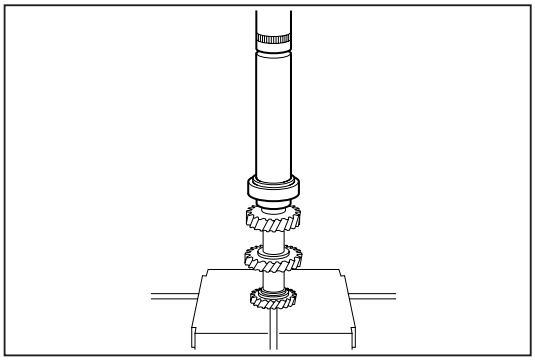


JMT00093-00078

ASSEMBLY

- When assembling the counter gear, apply gear oil at each step and assemble each part.
- As for those parts which bear the "★" marks at pages MT–28 and MT–29, never reuse them.

1. Install the radial ball bearing at the rear side of the counter gear, using a press in combination with the following SST given below.
   SST: 09310-87301-000



JMT00094-00079

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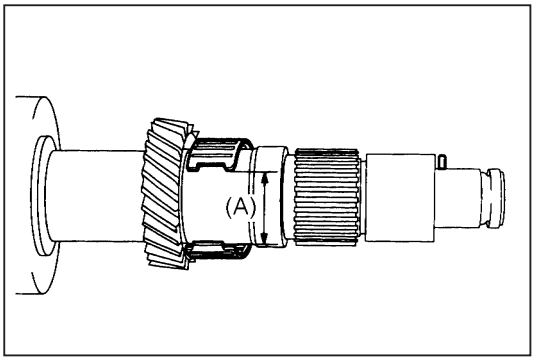
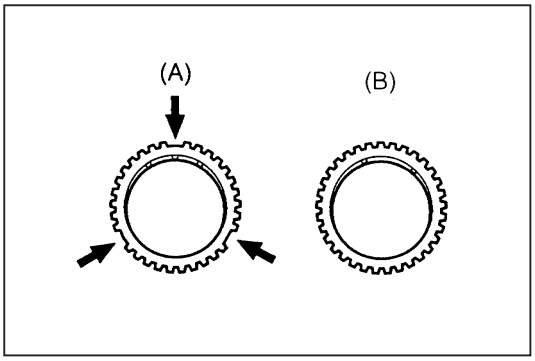
2. Install the split type needle roller bearing.
   CAUTION:
   - When the split type needle roller bearing is installed, make sure that the gap (A) at the opening of the needle roller bearing will not exceed the outer diameter of the counter gear by more than 5 mm.



JMT00095-00080

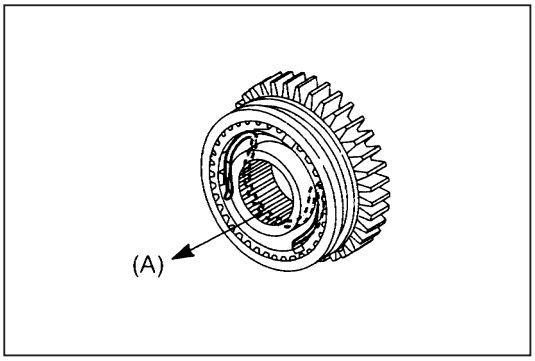
3. Apply gear oil to the outer periphery of the split type needle roller bearing and install the 2nd gear to the counter gear.

4. Place the synchronizer ring No. 3 into the synchronizer No. 1 hub.
   NOTE:
   - The external appearance of the synchronizer ring No. 3 {for 2nd gear (B)} differs from that of the synchronizer ring No. 2 {for 1st gear (A)}, as evident from the right illustration.



JMT00096-00081

5. Install the synchronizer ring No. 3 to the synchronizer No. 1.
6. Assemble the synchromesh shifting key and synchromesh shifting key spring to the synchronizer No. 1 hub assembly.
   NOTE:
   - During assembling, make sure that the mating ends of the shifting key springs come at different positions.
   - When installing the hub and hub sleeve, be sure to align three teeth-missing sections.

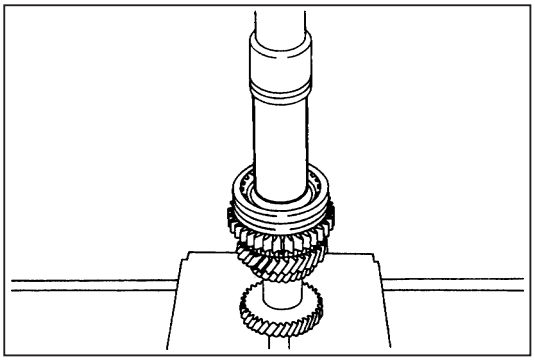


JMT00097-00082

7. Prior to pressing the synchronizer No. 1 hub assembly, make sure that the protrusion section (A) of the hub faces toward the front side. (The hub sleeve has a shift fork groove.)

8. Apply gear oil to the tapered section of the 2nd gear.
9. Apply gear oil to the spline section.
10. Align the spline section. Press the synchronizer No. 2 hub assembly by using the following SST.
    SST: 09310-87302-000

    NOTE:
    - While the synchronizer No. 2 hub assembly is being pressed into the counter gear, make sure that the shifting key assembled to the hub is aligned with the shift key groove of the synchronizer ring.


JMT00098-00083

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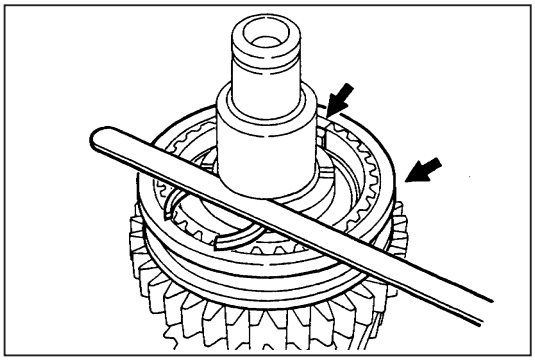
11. Selection sequence of new shaft snap ring.
    (1) Using the table below, select a new shaft snap ring having the same thickness as that measured at the time of removal, or the thinnest shaft snap ring.
    Then, install the thus-selected shaft snap ring on the shaft snap ring installation groove of the counter gear.
    (2) Measure the end play, using a feeler gauge as shown in the right figure.
    (3) Select a shaft snap ring whose end play is zero or almost zero and that can be set readily, using the table below. Then, proceed to install it.



JMT00099-00084

    (4) Again, ensure that the end play conforms to the specified value.
    End Play:
    Specified Value: 0
    Allowable Limit: Less than 0.16 mm

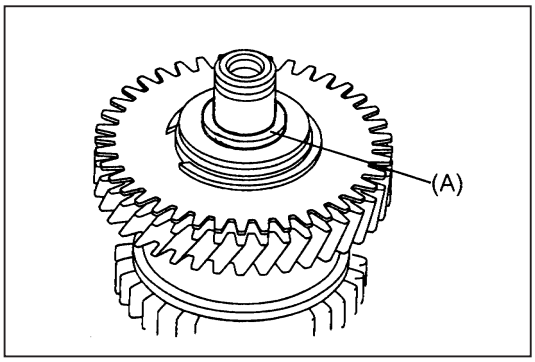
Unit: mm

Part No.	Thickness	Identification	Part No.	Thickness	Identification
90045-20263	2.06	None	90045-20267	1.90	Brown
90045-20264	2.02	Brown	90045-20268	1.86	Blue
90045-20265	1.98	Blue	90045-20269	1.82	None
90045-20266	1.94	None	90045-20270	2.10	Brown

NOTE:
- The shaft snap rings in the table above are the same as those used when the hub of the input shaft is set.

JMT00100-00000

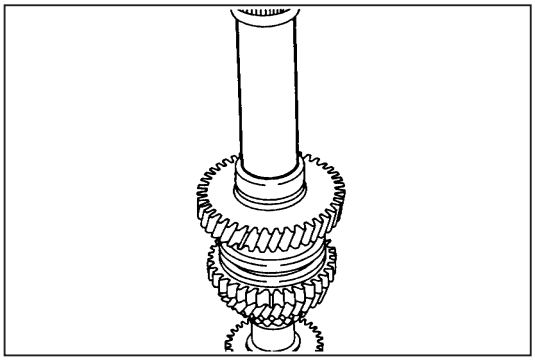
12. Install the needle roller bearing. Apply gear oil to the outer periphery of the needle roller bearing.
13. Place the synchronizer ring No. 2 (the ring having missing teeth).
14. Install the 1st gear with the sub-gear assembled.
15. Install the 1st gear thrust washer.
    NOTE:
    - Ensure that the protrusion section (A) of the 1st gear thrust washer faces toward the front side.



JMT00101-00085

16. Press the radial ball bearing, using the following SST.
    SST: 09310-87301-000

    NOTE:
    - Make sure that the radial ball bearing having a seal faces toward the front.



JMT00102-00086

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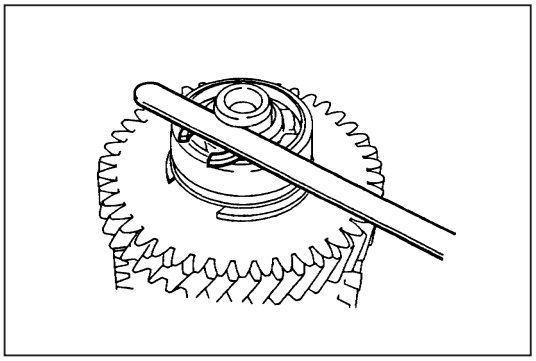
17. Selection sequence of new shaft snap ring
    (1) For the selection procedure of the shaft snap ring, refer to the step 11 at page MT–35.



JMT00103-00087

    (2) Ensure that the end play conforms to the specified value.
    End Play:
    Specified Value: 0
    Allowable Limit: Less than 0.16 mm

Unit: mm

Part No.	Thickness	Identification	Part No.	Thickness	Identification
90045-20279	2.06	None	90045-20283	1.90	Brown
90045-20280	2.02	Brown	90045-20284	1.86	Blue
90045-20281	1.98	Blue	90045-20285	1.82	None
90045-20282	1.94	None	90045-20286	1.78	Brown

JMT00104-00000

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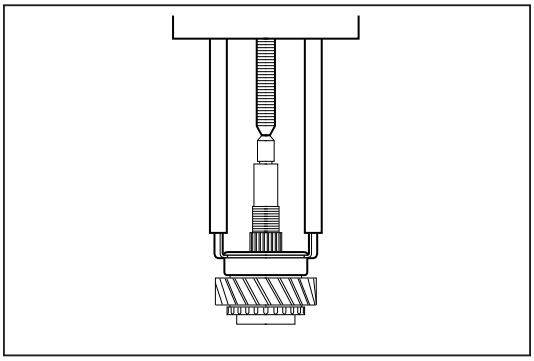
OUTPUT SHAFT

DISASSEMBLY

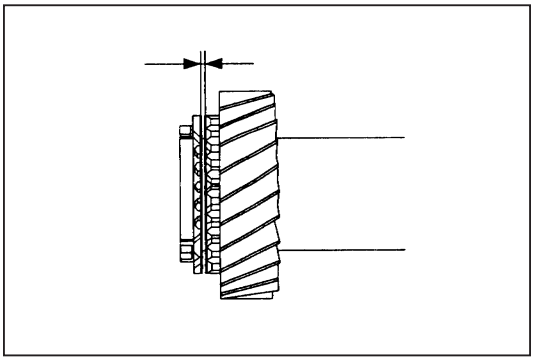
1. Remove the radial ball bearing (for rear), using the following SST.
   SST: 09306-87602-000


JMT00105-00088

INSPECTION

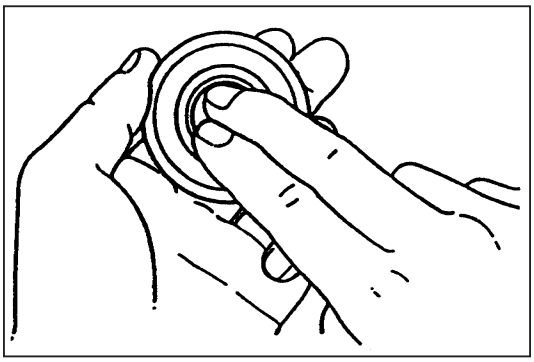
1. Check the clearance between the synchronizer ring and gear tapered section.

Specified Value	0.95 - 1.35 mm


JMT00106-00089

2. Visually inspect the gear and spline section of the output shaft for wear and damage.

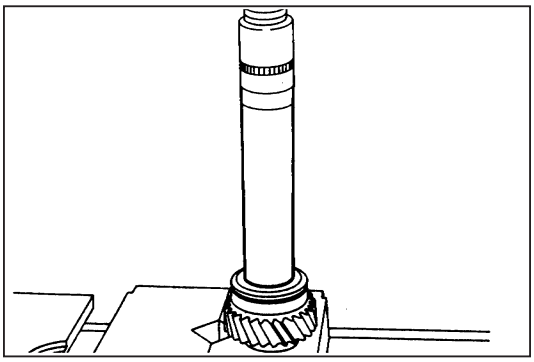
3. When you rotate the rear and center of the radial ball bearing inner race with your fingers, as shown in the right figure, they should be rotated smoothly without any bindings.


JMT00107-00090

ASSEMBLY

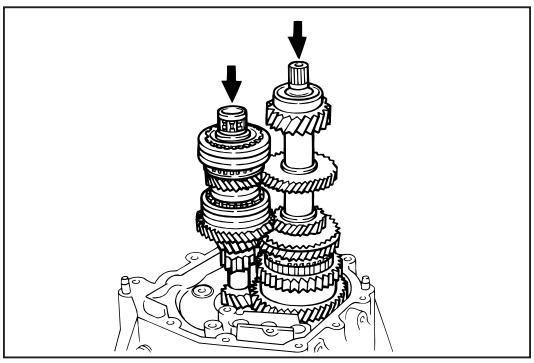
1. Press the inner race of the radial ball bearing.
   - Ensure that the retaining section of the radial ball bearing faces toward the rear side.

   NOTE:
   - The radial ball bearing can be pressed by using either the SST (09310-87302-000) or a pipe with which the inner race can be pressed.


JMT00108-00091

INSTALLATION

1. While holding both the input shaft and counter gear assemblies by your hands, install them to the clutch housing.
   NOTE:
   - Be careful not to damage the Type S oil seal during the installation of the shafts.


JMT00109-00092

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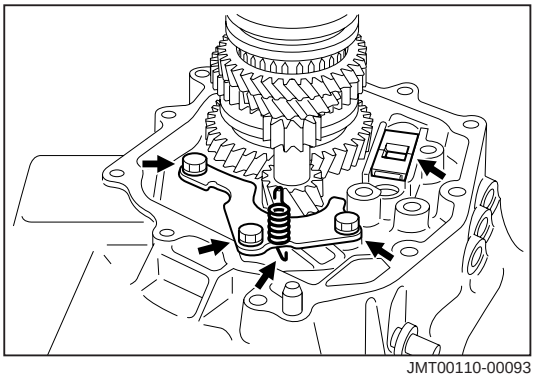
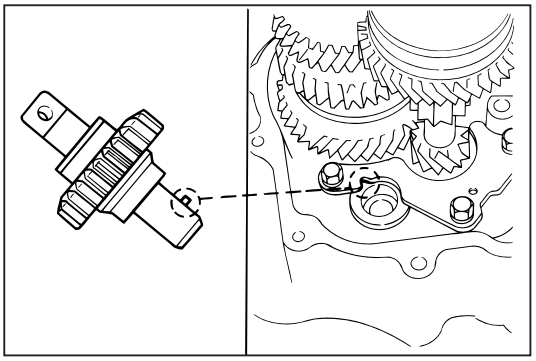
2. Attach the tension spring to the input shaft bearing lock plate.
3. Tighten the input shaft bearing lock plate with the three bolts.
   Tightening Torque: 14.7 - 21.6 N·m (1.5 - 2.2 kgf-m)

4. Place the two pieces of the shift lock plates on the clutch housing side.



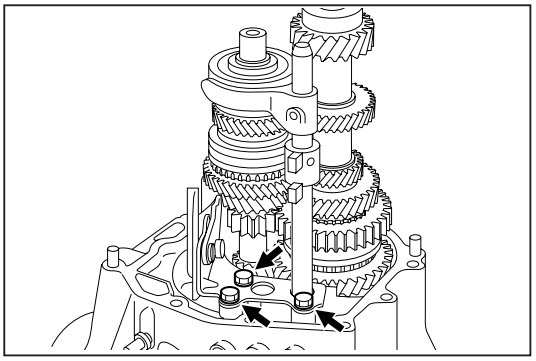
JMT00110-00093

5. Assemble the reverse idler gear, shaft and thrust washer to the clutch housing.
   NOTE:
   - When installing, install the knock pin for use in preventing rotation of the idler gear shaft to the groove section at the clutch housing side.
   - Make sure that the gear chamfer and thrust washer (nylon) face upward (i.e. rear side).



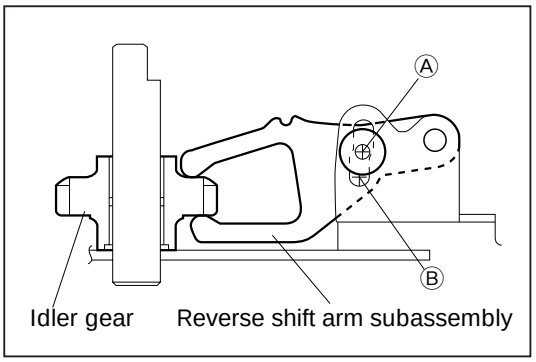
JMT00111-00094

6. Tighten the reverse shift arm with the three bolts.
   Tightening Torque: 14.7 - 21.6 N·m (1.5 - 2.2 kgf-m)



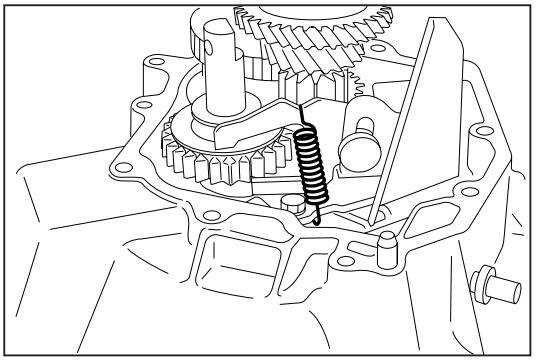
JMT00112-00095

7. Check of reverse shift arm for movement
   With the idler gear pushed against the lower edge surface, check that the pin moves freely (drops by its own weight) between the position Ⓐ (neutral position) to the position Ⓑ (5th gear position).



JMT00113-00096

8. Assemble the tension spring.
   NOTE:
   - Attach the spring to the recessed section of the arm subassembly.



JMT00114-00097

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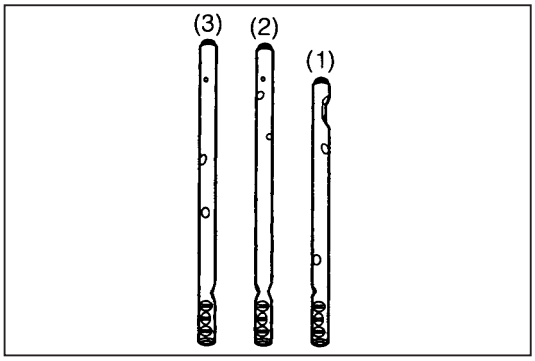
CONFIRMATION OF LENGTH/SHAPE OF SHIFT FORK AND SHIFT FORK SHAFT

9. The following three shift fork shafts differ in the overall length, as shown in the right figure.
   NOTE:
   - Be very careful not to make any wrong installation of these shift fork shafts.

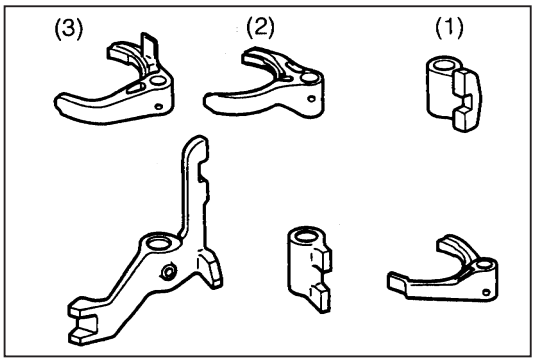


JMT00115-00098

Unit: mm

	Shift fork shafts	Overall Length
(1)	1st & 2nd	224.00
(2)	3rd & 4th	259.00
(3)	5th & Reverse	265.00

10. The shift forks and shift heads differ in the external view, as shown in the right figure. Hence, be very careful not to make any wrong installation of these shift forks and shift heads.
    (1) 1st & 2nd
    (2) 3rd & 4th
    (3) 5th & Reverse
    NOTE:
    - It is advisable to install the shift fork shaft and fork temporarily and confirm that the combination and direction are right. Then, proceed to the operation.

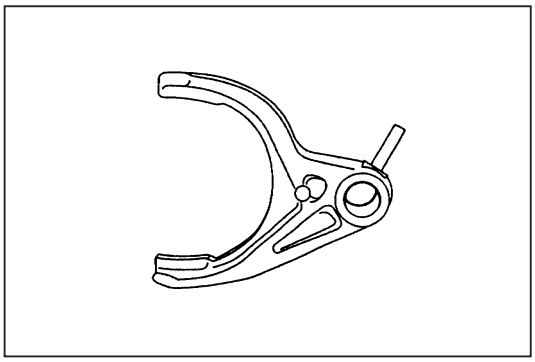


JMT00116-00099

INSTALLATION TO SHIFT FORK AND SHIFT FORK SHAFT

- Apply gear oil to the required points. Perform the operations, following the procedure given below.

11. Temporarily drive a new slotted spring pin into all of the shift forks and heads so that the slotted spring pin may be driven easily during installation.


JMT00117-00100

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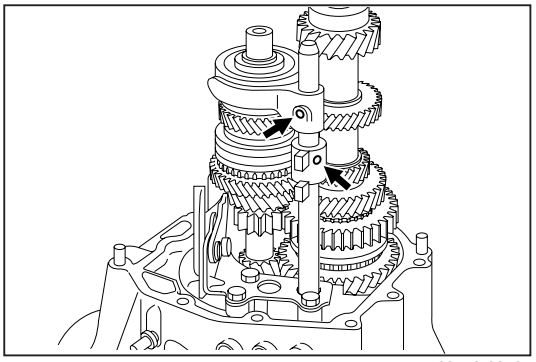
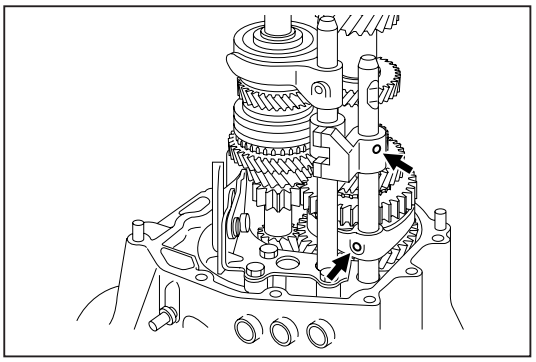
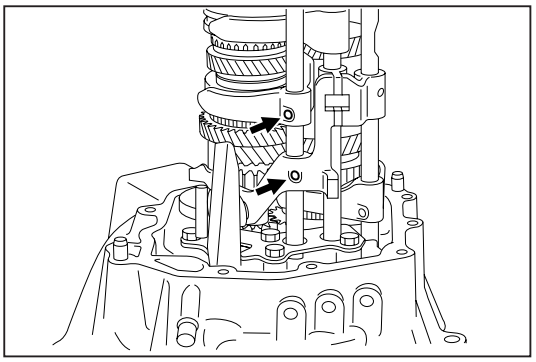
12. Install the 3rd & 4th shift fork into the hub sleeve and insert the 3rd & 4th shift fork shaft.
    NOTE:
    - Make sure that the gear is in the neutral position.
    - In order to drive a new slotted spring pin smoothly, it is advisable to prepare a guide pin whose outer diameter is 4.0 mm and whose length is 50.00 mm.
    - Perform the operations, while confirming the assembling direction of the shift fork and shift head and the positional relationship with the gears.
    - As for the shapes and lengths of the shift fork shaft, shift fork and shift head, refer to the steps 9 and 10 at page MT–39.
    - When driving a new slotted spring pin into position, a measure to sustain the reaction force against the driving force should be taken at the opposite side of the shift fork shaft.


JMT00118-00101

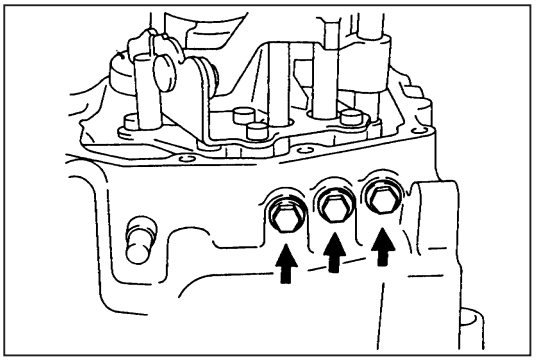
13. Insert a guide pin or the like into the back side groove of the shift fork, as the guide of installation for the slotted spring pin.
14. Install a new slotted spring pin.
15. In the same manner as described in the steps 12 and 13, insert the 3rd & 4th shift head.
16. Install the 1st & 2nd shift fork into the hub sleeve and insert the 1st & 2nd shift fork shaft.
17. As for the installation of 1st & 2nd shift fork and shift head, refer to the steps 12 and 13 described above.


JMT00119-00102

18. Insert the 5th & reverse shift head into the shift fork shaft.
19. As for the installation of the 5th & reverse shift fork and shift head, refer to the steps 12 and 13 described above.


JMT00120-00103

20. Install the three balls and compression springs and tighten the three bolts with a new gasket interposed.
    Tightening Torque: 18.6 - 30.4 N·m (1.9 - 3.1 kgf-m)


JMT00121-00104

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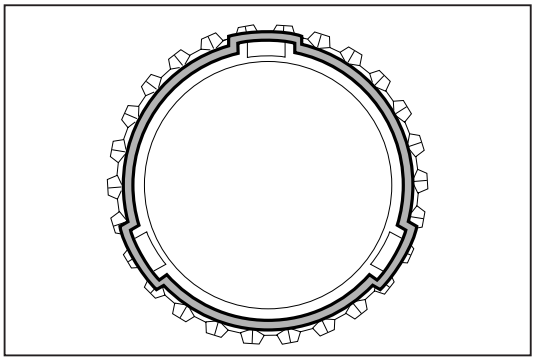
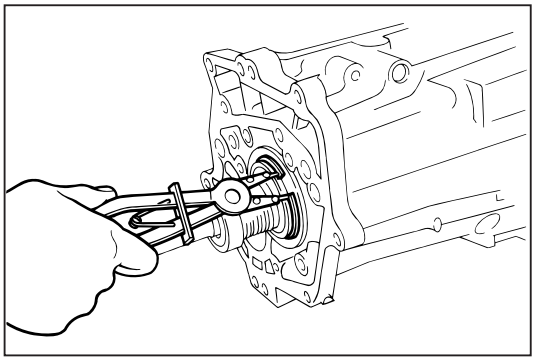
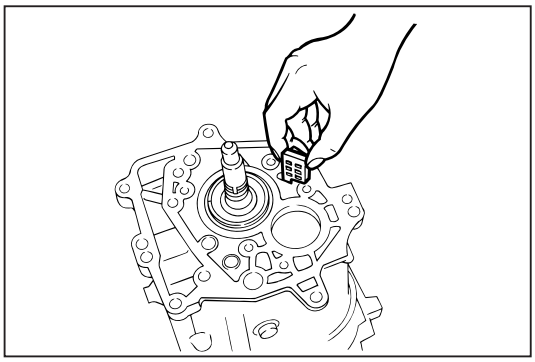
21. Place the output shaft with the needle roller bearing, synchronizer ring and wave spring.
    NOTE:
    - Make sure to assemble the wave spring according to the convex shape of the synchronizer ring. (See the right figure.)


JMT00122-00105

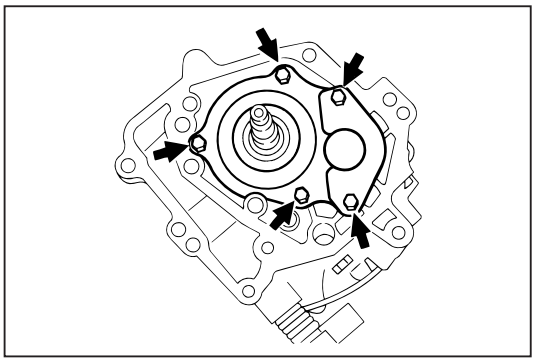
22. Assemble the output shaft in the transmission case. Install the hole snap ring by means of a snap ring expander.


JMT00123-00106

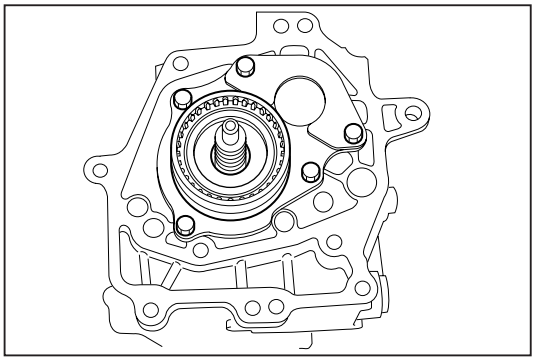
23. Assemble the transmission magnet.


JMT00124-00107

24. Install the rear bearing retainer. Tighten the retainer with the five bolts.
    Tightening Torque: 14.7 - 21.6 N·m (1.5 - 2.2 kgf-m)


JMT00125-00108

25. Assemble the transfer input hub.


JMT00126-00109

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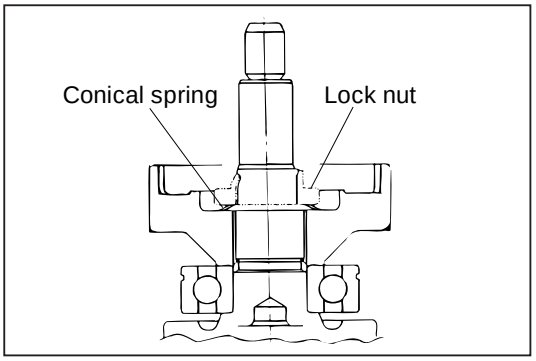
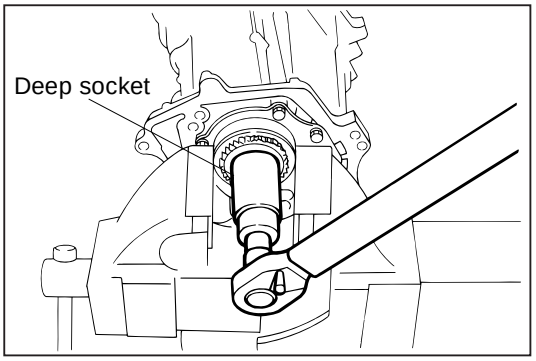
26. With the smaller diameter end placed at the nut side, assemble the conical spring.
    NOTE:
    - Make sure that the conical spring is assembled in the correct direction.



JMT00127-00110

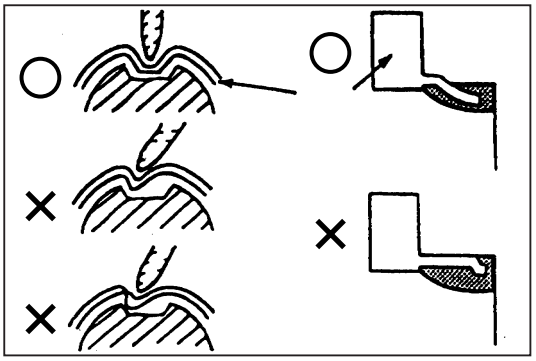
27. Insert a deep socket into the output shaft.
    [Reference]
    - Deep socket dimensions (Tool commercially available)
      Width across flats: 32 mm × Overall length: 100 mm

28. Using soft jaws, clamp the periphery of the transfer input hub in a vice so as to avoid damaging the hub.
    Tighten a new lock nut with a torque wrench.
    Tightening Torque: 176.4 - 215.8 N·m
    (18.0 - 22.0 kgf-m)

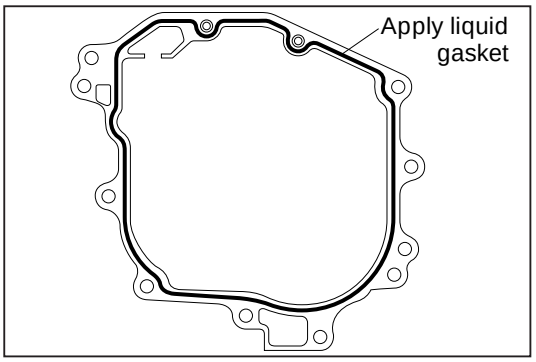


JMT00128-00111

29. Stake the new lock nut.
    NOTE:
    - When staking the new lock nut, point a suitable staking tool toward the output shaft axis center to lock securely, as shown in the right upper figure.
    - Poor staking, such as shown in the right middle and lower figures, may cause loosening of the lock nut.


JMT00129-00112

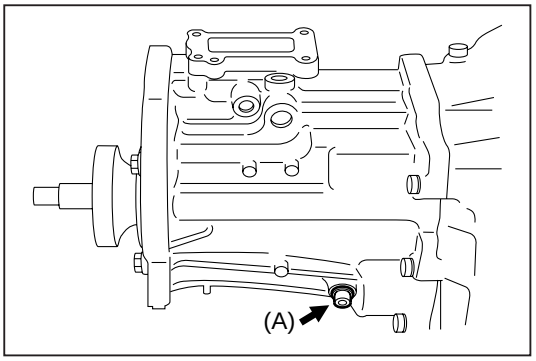
30. Clean the contact surface between the clutch housing and the transmission case side, using solvent or the like.
31. Apply the following bond to the transmission case surface as shown in the right figure.
    Specified Bond: Three bond® 1216 or 1217
    [Reference information]
    Nozzle Inner Diameter: 0.9 mm



JMT00130-00113

32. Quickly install the transmission case.
33. Tighten the ten bolts between the transmission case side and the clutch housing side.
    Tightening Torque: 14.7 - 21.6 N·m (1.5 - 2.2 kgf-m)

34. With a new gasket interposed, tighten the hexagon bolt (A) for reverse idler gear shaft.
    Tightening Torque: 18.6 - 30.4 N·m (1.9 - 3.1 kgf-m)



JMT00131-00114

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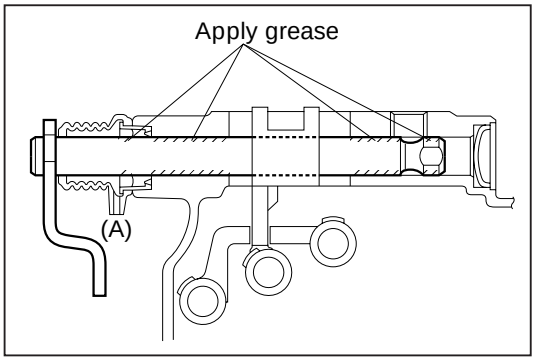
35. Install the clutch related parts.

JMT00132-00000

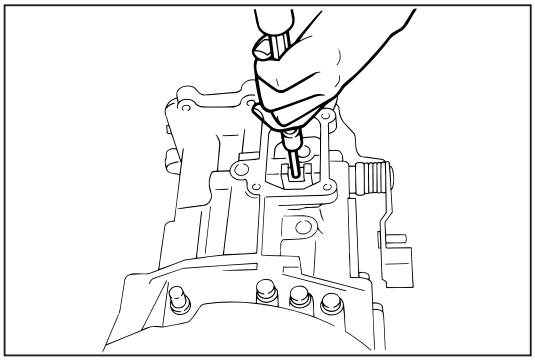
36. Install the shift lever boot and shift lever shaft correctly as shown in the right illustration.
CAUTION:
- Ensure that the air bleeding section (A) of the boot faces toward the lower side.

NOTE:
- Apply MP grease to those points specified in the right figure.



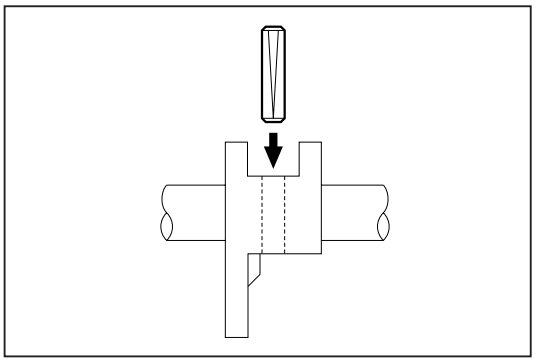
JMT00133-00115

37. Assemble the shift inner lever in the shift lever shaft sub-assembly. Drive a new grooved pin into position with a knock pin punch so that the shift inner lever may be secured.



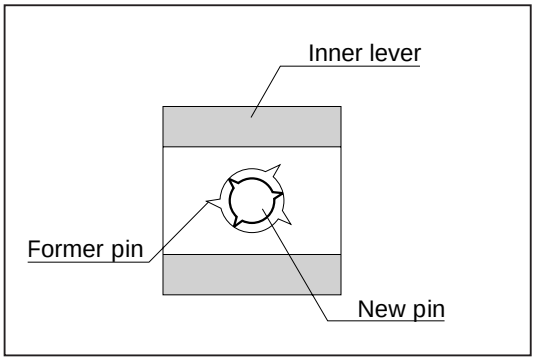
JMT00134-00116

NOTE:
- When driving a new grooved pin into position, the pin should be inserted from the smaller end of the taper.



JMT00135-00117

NOTE:
- When driving the pin into position, be sure that the assembling is made in such a way that the installation angle is displaced from the trace of the former pin.



JMT00136-00118

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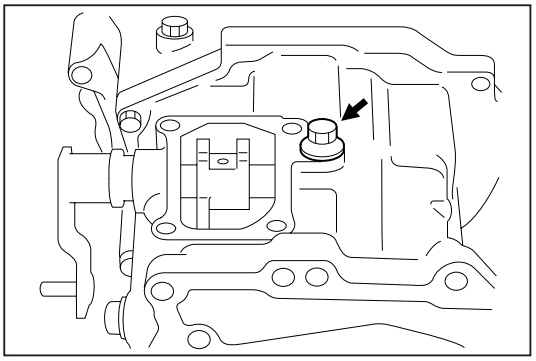
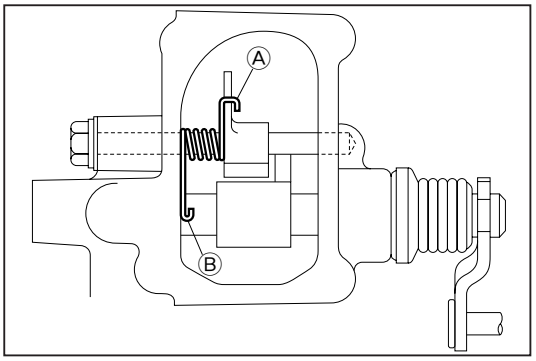
38. Install the ball and compression spring and tighten the reverse restrict pin holder (B) with a new gasket interposed.
    Tightening Torque: 29.4 - 49.0 N·m (3.0 - 5.0 kgf-m)



JMT00137-00119

39. Assemble the torsion spring, reverse restrict cam and reverse restrict shaft in the transmission case in this sequence.
    NOTE:
    - Make sure to attach the torsion spring securely at the two points of the cam (the section Ⓐ and the shift lever shaft (the section Ⓑ).

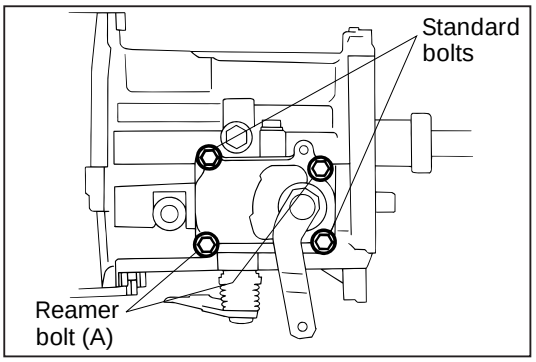


JMT00138-00120

40. Install and tighten the washer based head hexagon bolt with a new gasket used.
    Tightening Torque: 18.6 - 30.4 N·m (1.9 - 3.1 kgf-m)

41. With a new gasket interposed, tighten the select lever shaft subassembly with the four bolts.
    Tightening Torque: 14.7 - 21.6 N·m (1.5 - 2.2 kgf-m)

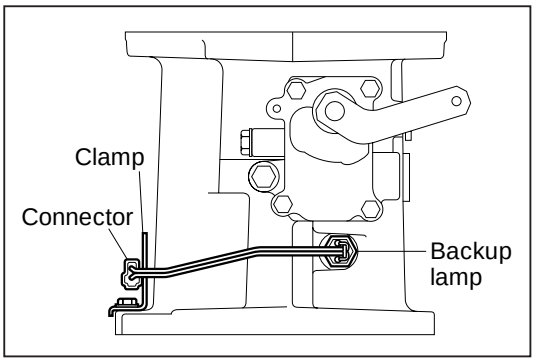
    NOTE:
    - Ensure that the reamer bolts (A) are placed as shown in the right figure.



JMT00139-00121

42. Install and tighten the backup lamp switch assembly with a new gasket used.
    Tightening Torque: 24.5 - 39.2 N·m (2.5 - 4.0 kgf-m)

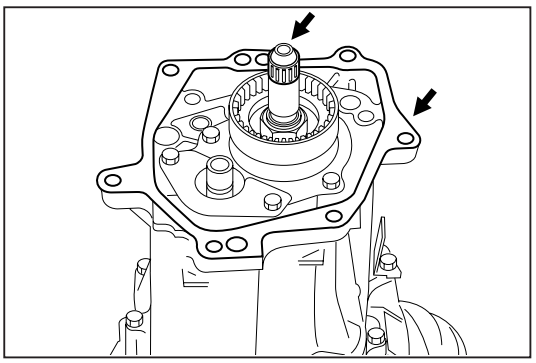
    NOTE:
    - Install the connector, using the drilled hole of the clamp.



JMT00140-00122

INSTALLATION OF TRANSFER ASSEMBLY

1. Install a new extension housing gasket to the rear edge surface of the transmission case.
2. Install the needle roller bearing to the forward end of the transmission output shaft.



JMT00141-00123

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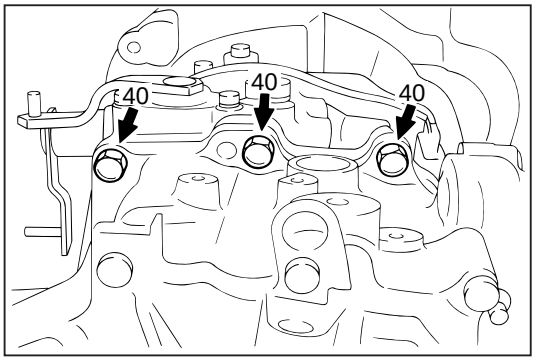
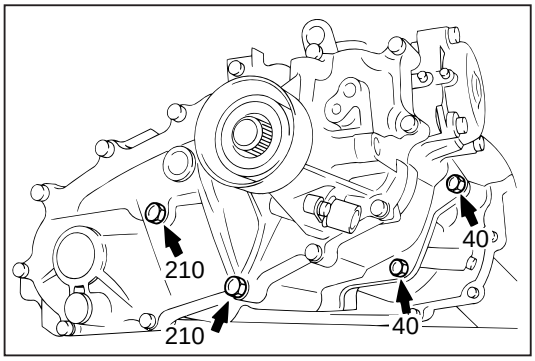
3. Install and tighten the transfer assembly with the seven bolts.
   Tightening Torque: 29.4 - 44.1 N·m (3.0 - 4.5 kgf-m)

   NOTE:
   • The numeral in the right figure denotes the nominal length of each bolt. (Unit: mm)



JMT00142-00124



JMT00000-00125

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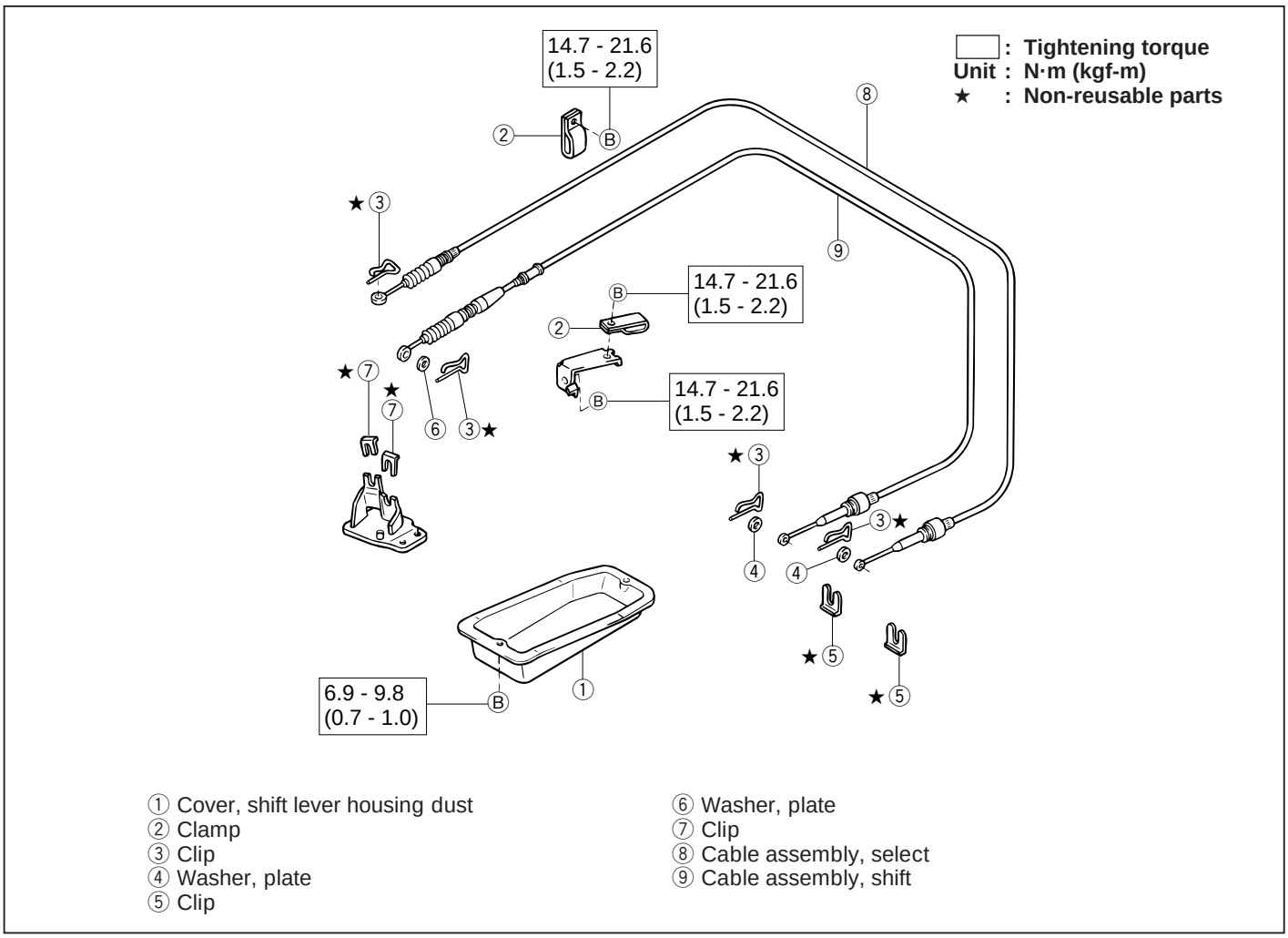
INSTALLATION/REMOVAL OF SHIFT CABLE & SELECT CABLE

COMPONENTS



① Cover, shift lever housing dust
② Clamp
③ Clip
④ Washer, plate
⑤ Clip
⑥ Washer, plate
⑦ Clip
⑧ Cable assembly, select
⑨ Cable assembly, shift

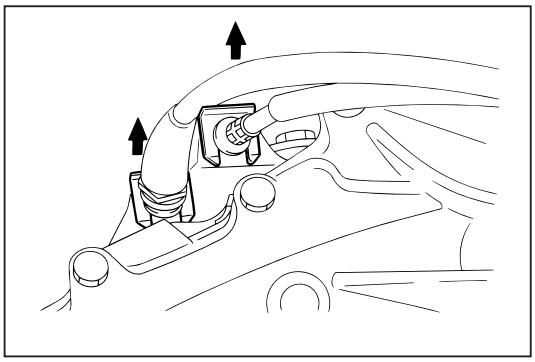
JMT00143-00126

1. MAIN POINTS OF REMOVAL

(1) Detach each clip with pliers or the like.

NOTE:

- Care must be exercised to ensure that the pliers, etc. will not touch with the cable section during the removal.

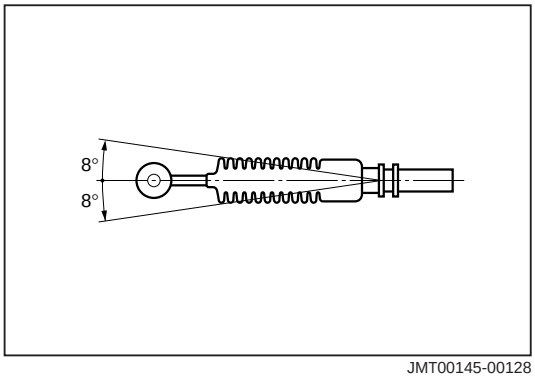


JMT00144-00127

(2) Remove the select cable assembly and shift cable assembly.

NOTE:

- Do not allow the ends of the shift and select cables to be bent beyond 8 degrees.



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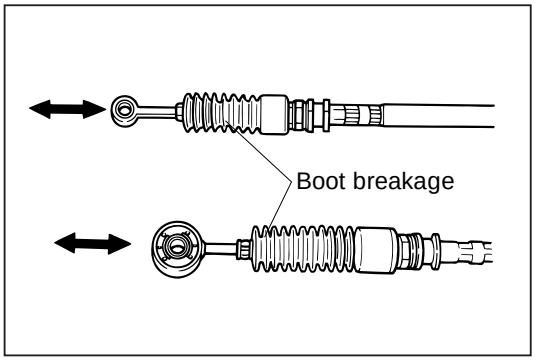
2. CHECK

(1) Check that the inner cables of the shift cable and select cable slide smoothly.

(2) Check for boot breakage, other damage or distortion.



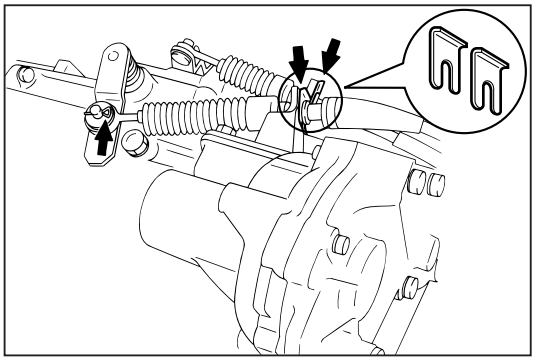
JMT00146-00129

3. MAIN POINTS OF INSTALLATION

(1) Insert the clips ⑤ and ⑦ until their upper edges become flush with the upper edges of the bracket or the retaining surface of the floor shift assembly.

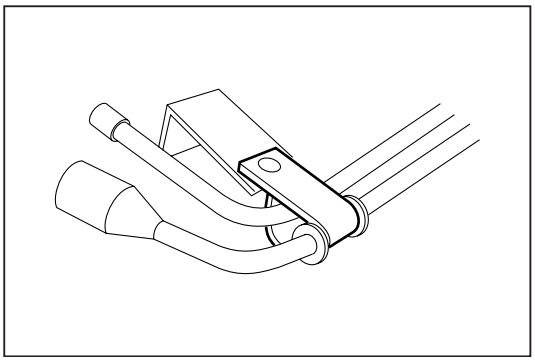
NOTE:

- Install the clips after the eye end has been installed first.
- Make sure that the clips are inserted in the correction direction as indicated in the figure. Never insert them reversely.
- Never allow a hammer, etc. to tap the cable during the clip installation. (If the cable should be tapped inadvertently, be certain to replace the cable with a new one.)



JMT00147-00130

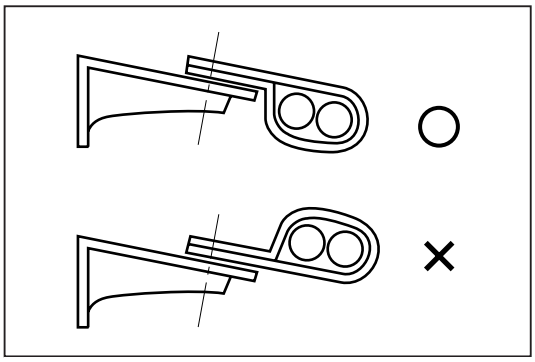
(2) When the shift cable is retained to the clamp ②, retain it to the H-shaped protector section of the shift cable.



JMT00159-00136

NOTE:

- Care should be taken as to the correct direction of the clamp ②. (For the correct direction, see the right figure.)



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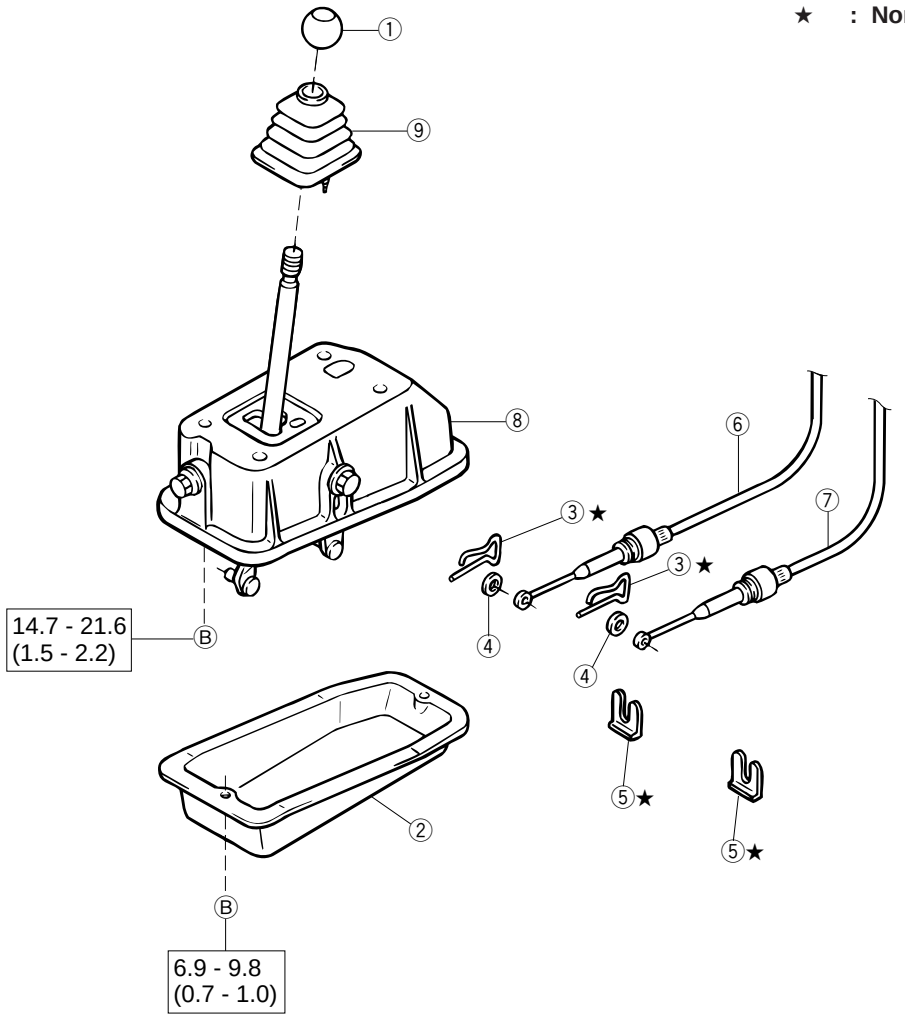
INSTALLATION/REMOVAL OF TRANSMISSION FLOOR SHIFT ASSEMBLY

COMPONENTS



① Knob, shift lever
② Cover, shift lever housing dust
③ Clip
④ Washer, plate
⑤ Clip
⑥ Cable assembly shift
⑦ Cable assembly select
⑧ Floor shift assembly, transmission
⑨ Boot, shift & select lever

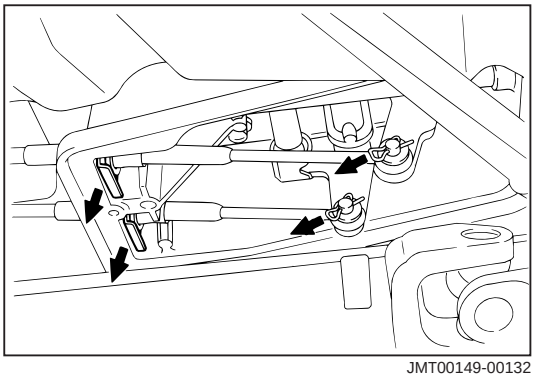
JMT00148-00131

1. MAIN POINTS OF REMOVAL

(1) Detach the clips ③ and ⑤, two each, with pliers or the like.

NOTE:

- Care must be exercised to ensure that the pliers, etc. will not touch with the cable section during the removal.



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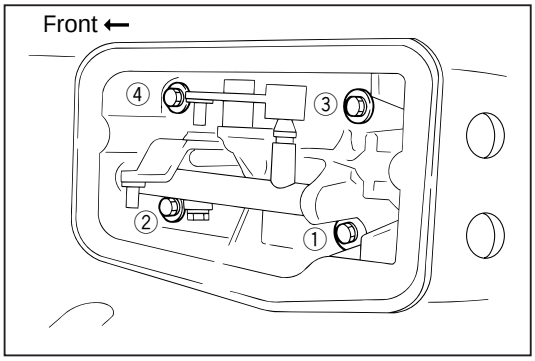
2. MAIN POINTS OF INSTALLATION

(1) Tighten the floor shift assembly with the attaching bolts.
Tightening Torque: 14.7 - 21.6 N·m (1.5 - 2.2 kgf-m)

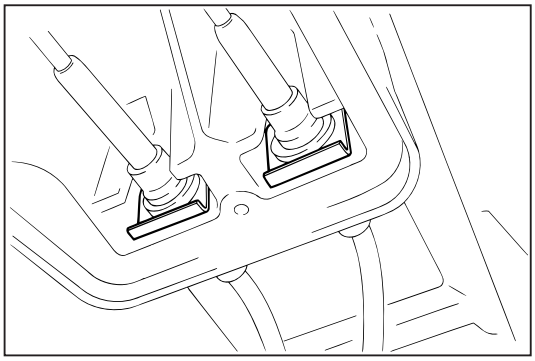
NOTE:
- Be certain to tighten the attaching bolts in the sequence specified in the right figure.



JMT00150-00133

(2) Install the shift cable assembly and select cable assembly in the floor shift assembly. Secure them by means of the clips.

NOTE:
- Make sure that the clips are inserted in the correction direction as indicated in the figure. Never insert them reversely.
- Never allow a hammer, etc. to tap the cable during the clip installation.
- Insert the clips until they become flush with the lower edges of the cable retaining surface.
- Install the clips after the eye end has been installed first.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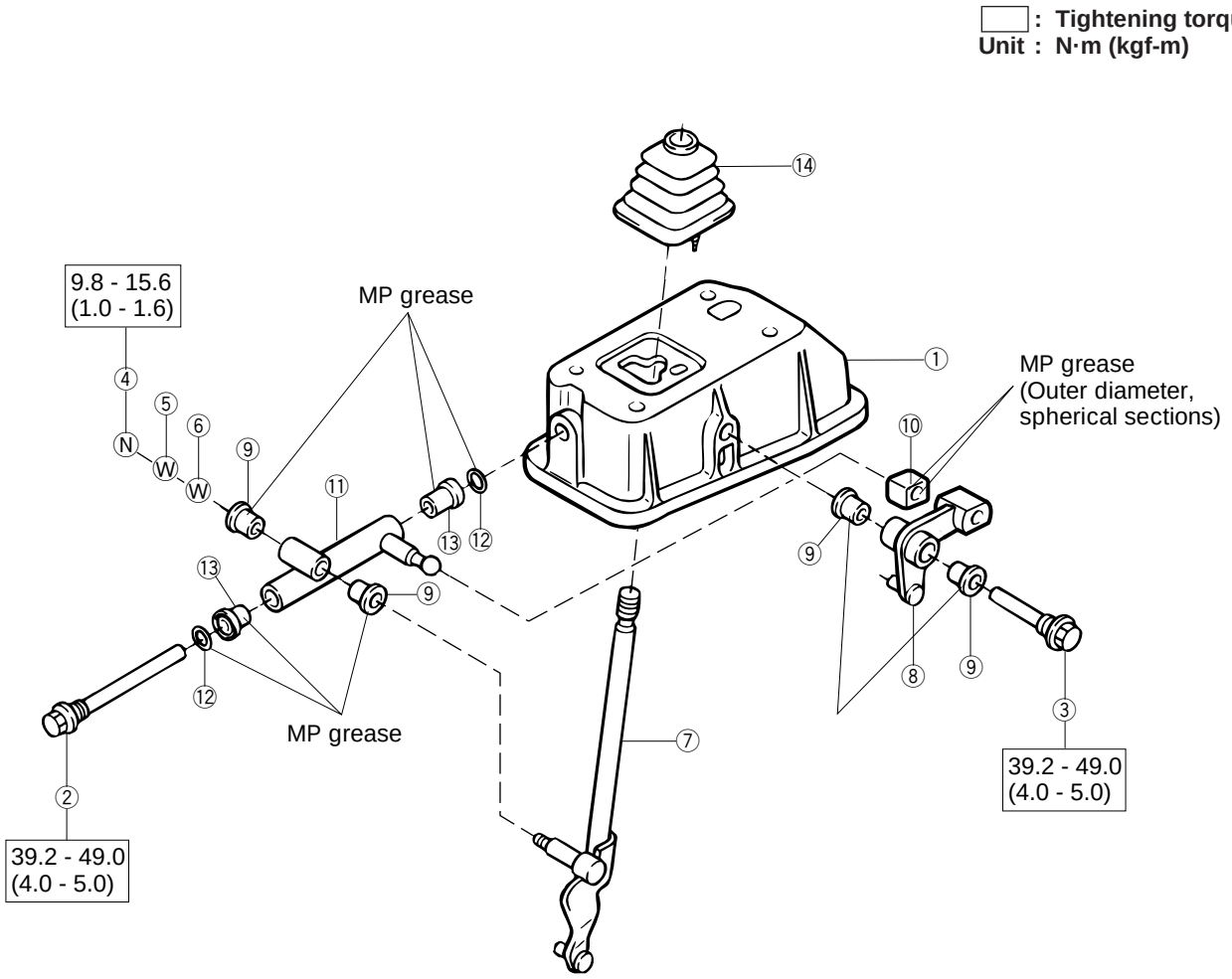
DISASSEMBLY/ASSEMBLY OF TRANSMISSION FLOOR SHIFT ASSEMBLY

COMPONENTS



① Support, control link
② Bolt, washer based head hexagon
③ Bolt, washer based head hexagon
④ Nut
⑤ Washer, spring
⑥ Washer, plate
⑦ Lever subassembly, shift
⑧ Lever subassembly, control select
⑨ Bush
⑩ Guide, control select lever
⑪ Holder subassembly, shift lever
⑫ Ring, O
⑬ Bush
⑭ Boot, shift lever

JMT00152-00135

1. OPERATION PRIOR TO DISASSEMBLY

(1) Remove the transmission floor shift assembly.

2. MAIN POINTS OF ASSEMBLY

(1) Uniformly apply MP grease to the outer diameter and spherical section of the control select lever guide ⑩, the sliding sections of the bushes ⑨ and ⑬, and the O-ring ⑫.

3. OPERATION AFTER ASSEMBLY

(1) Install the transmission floor shift assembly.

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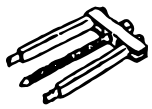
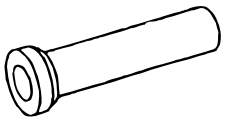
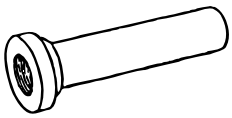
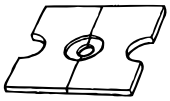
APPENDIX

SSTs (Special Service Tools)

Shape	Part No.	Part name
	09306-87602-000	Counter gear front bearing puller
	09310-87301-000	Counter shaft front bearing replaer
	09310-87302-000	Counter shaft rear bearing replacer
	09334-87301-000	Transmission rear bearing anvil
	09350-32014-000	TOYOTA Automatic transmission tool set
	09606-87201-000	Front hub bearing remover & replacer
	09950-20017-000	Universal puller

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SERVICE SPECIFICATIONS

Unit: mm

			Specified Value	Allowable Limit
Free length of compression spring for reverse restrict pin	Free length		24.00	—
	Load as installed: N (kgf)		28.83 (2.43)	—
	Height as installed:		17.00	—
Free length of compression spring for shift fork shaft	Free length		40.00	—
	Load as installed: N (kgf)		47.33 (4.83)	—
	Height as installed:		30.00	—
Diameter	Outer	Reverse idler gear shaft	$20.0^{+0}_{-0.013}$	—
	Inner	Reverse idler shaft	$20.0^{+0.061}_{+0.032}$	—
Dimensions	Outer	Select inner lever	$15^{-0.02}_{-0.12}$	—
	Inner	Shift inner lever	$15.0^{+0.2}_{+0.1}$	—
	Outer	Shift fork shafts	$13.0^{-0.050}_{-0.077}$	—
	Inner	Case sides	$13.0^{+0.043}_{+0}$	—
	Outer	Shift inner lever	$12^{-0.02}_{-0.12}$	—
	Inner	Shift heads	$12.1^{+0.1}_{+0}$	—
	Outer	Reverse restrict shaft	$8^{-0.065}_{-0.090}$	—
	Inner	Reverse restrict cam	$8^{+0.16}_{+0.07}$	—
Clearance between scynchronizer ring and gear			0.9 - 1.4	0.5

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AT THE INPUT SHAFT SIDE

Unit: mm

				Specified Value	Allowable Limit
Contact width section between shift forks and synchronizer No. 2 & No. 3 hub sleeves		Shift forks	3rd & 5th	$7\ ^{-0.1}_{-0.3}$	6.6
		Hub sleeves	3rd & 5th	$7\ ^{+0.12}_{+0.05}$	7.2
Thrust clearance			3rd	0.10 - 0.52	—
			5th	0.10 - 0.40	—
Clearance between synchronizer rings and gears				0.95 - 1.35	0.90
Outer diameter of input shaft			(A) and (B)	$32\ ^{-0.009}_{-0.029}$	—
			(C)	$20\ ^{-0.016}_{-0.034}$	—
Dimensions	Outer diameter of hubs	Classification	Identification	—	—
		No. 2	Yellow	57.78 - 57.84	—
		No. 1	None	57.68 - 57.74	—
		No. 3	White	57.58 - 57.64	—
	Inner diameter of hub sleeves	No. 2	Yellow	57.871 - 57.97	—
		No. 1	None	57.771 - 57.87	—
		No. 3	White	57.67 - 57.77	—
Thickness of synchronizer hubs			No. 2	18.55 ± 0.03	—
			No. 3	12.40 ± 0.03	—
Thickness of transmission hub sleeve stopper				$7.2\ ^{+0.05}_{-0.01}$	—
Dimensions		Inner diameter	3rd and 5th gears	$37.0\ ^{+0.025}_{+0}$	
		Thickness	3rd gear	37.95 ± 0.03	—
			5th gear	27.85 ± 0.03	—
Height of synchromesh shifting key				$5\ ^{-0.2}_{-0.4}$	—
End play between the snap ring shaft and input shaft				0	Less than 0.16

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AT THE COUNTER SHAFT SIDE

Unit: mm

				Specified Value	Allowable Limit
Contact width section between the synchronizer No. 1 hub sleeve and 1st/2nd shift fork			Hub sleeve	10 $^{+0.12}_{+0.05}$	10.2
			Shift fork	10 $^{-0.1}_{-0.3}$	9.6
Thrust clearance between gear and counter shaft			1st	0.10 - 0.52	—
			2nd	0.10 - 0.40	—
Height of shifting key				5.1 ± 0.1	—
Outer diameter of countershaft (A) and (B)				32 $^{-0.009}_{-0.029}$	—
Thickness of 1st gear thrust washer				4 ± 0.03	—
Dimensions	Outer diameter of synchronizer No. 1 hub	Classification	Identification	—	—
		No. 2	Yellow	69.78 - 69.84	—
		No. 1	None	69.68 - 69.74	—
		No. 3	White	69.58 - 69.64	—
	Inner diameter of synchronizer No. 1 hub sleeve	No. 2	Yellow	69.871 - 69.97	—
		No. 1	None	69.771 - 69.87	—
		No. 3	White	69.67 - 69.77	—
Dimensions		Inner	1st and 2nd gear	37.0 $^{+0.025}_{+0}$	—
		Thickness	1st	27.34 ± 0.03	—
			2nd	36.30 ± 0.03	—
Height of conical spring washer				2.01	1.04
End play between the snap ring shaft and countershaft					Less than 0.16

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TIGHTENING TORQUE

Tightening components	N·m	kgf-m
Engine × Clutch housing	49.0 - 68.6	5.0 - 7.0
Stiffener right × Engine, Clutch housing	29.4 - 44.1	3.0 - 4.5
Stiffener left × Engine, Clutch housing	29.4 - 44.1	3.0 - 4.5
Clutch housing undercover × Clutch housing	14.7 - 21.6	1.5 - 2.2
Stiffener plate bracket × Powertrain stiffener	29.4 - 44.1	3.0 - 4.5
Powertrain stiffener × Transfer case	29.4 - 44.1	3.0 - 4.5
Lock nut × Output shaft	176.4 - 215.8	18.0 - 22.0
Reverse restrict pin holder × Transmission case	29.4 - 49.0	3.0 - 5.0
Transmission case cover × Transmission case	14.7 - 21.6	1.5 - 2.2
Bolt for reverse restrict shaft × Transmission case	18.6 - 30.4	1.9 - 3.1
Clutch housing × Transmission case	14.7 - 21.6	1.5 - 2.2
Input shaft bearing lock plate × Clutch housing	14.7 - 21.6	1.5 - 2.2
Reverse shift arm × Clutch housing	14.7 - 21.6	1.5 - 2.2
Bolt for shift fork shaft × Clutch housing	18.6 - 30.4	1.9 - 3.1
Rear bearing retainer × Transmission case	14.7 - 21.6	1.5 - 2.2
Washer based head hexagon × Transmission case	18.6 - 30.4	1.9 - 3.1
Backup lamp switch assembly × Transmission case	24.5 - 39.2	2.5 - 4.0
Breather plug × Clutch housing	14.7 - 21.6	1.5 - 2.2
W/head straight screw plug × Transmission case	24.5 - 39.2	2.5 - 4.0
Transfer assembly × Transmission case	29.4 - 44.1	3.0 - 4.5
Transmission control cable bracket × Transfer case	29.4 - 44.1	3.0 - 4.5
Control cable bracket × Transfer case	14.7 - 21.6	1.5 - 2.2
Control cable bracket × Clamp	14.7 - 21.6	1.5 - 2.2
Shift lever housing dust cover × Control link support	6.9 - 9.8	0.7 - 1.0
Control link support × Floor	14.7 - 21.6	1.5 - 2.2
Floor shift washer based head hexagon bolt	39.2 - 49.0	4.0 - 5.0
Floor shift nut	9.8 - 15.6	1.0 - 1.6

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TERIOS

J100

AUTOMATIC TRANSMISSION

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AT

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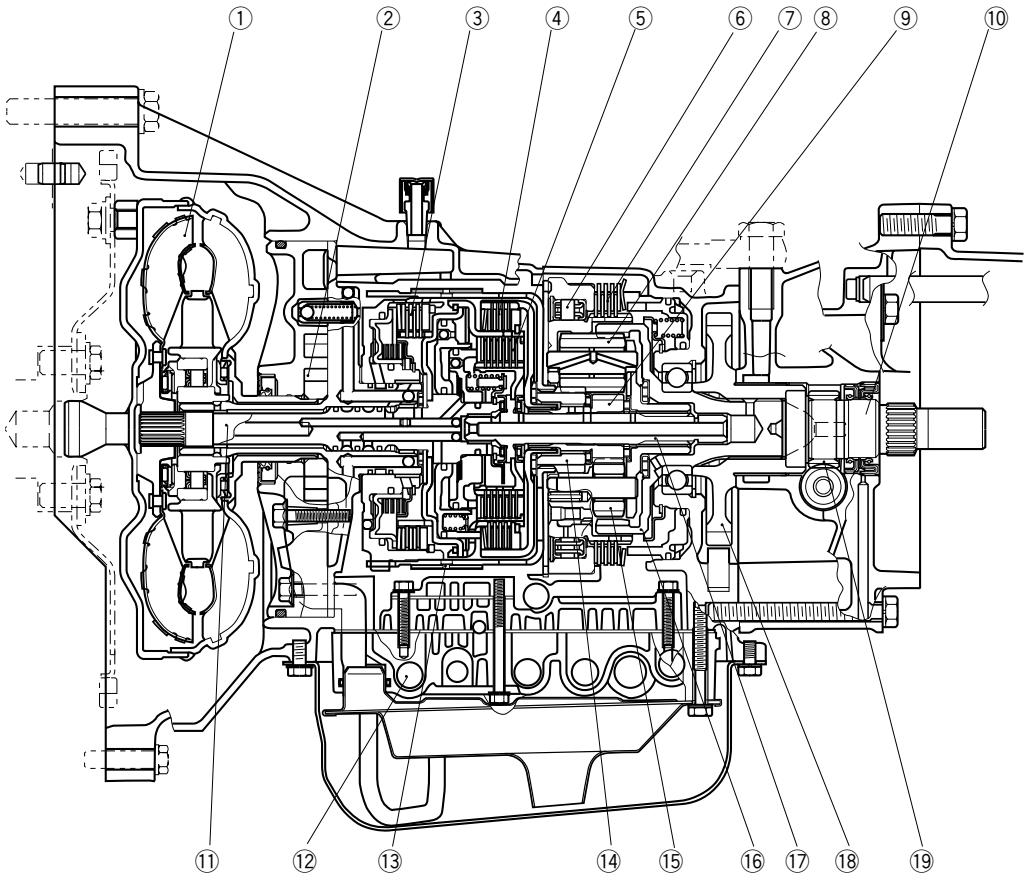
OUTLINE

1. A hydraulic pressure control planetary gear type, four-speed automatic transmission with overdrive is employed, which has been newly developed for FR vehicles with an engine mounted longitudinally.
2. The automatic transmission fluid has employed a DEXRON®III which features excellent heat and oxidation stability.

SECTIONAL VIEW OF AUTOMATIC TRANSMISSION



① Torque converter
② Oil pump
③ Direct clutch
④ Forward clutch
⑤ Rear clutch
⑥ One-way clutch
⑦ 1st & reverse brake
⑧ Planetary long pinion
⑨ Rear planetary sun gear
⑩ Output shaft
⑪ Input shaft
⑫ Valve body
⑬ 2nd brake band
⑭ Front planetary sun gear
⑮ Planetary short pinion
⑯ Planetary output shaft
⑰ Intermediate shaft
⑱ Parking lock gear
⑲ Governor drive gear

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SPECIFICATIONS

Item		Specifications	
Torque converter	Type	Three-element, one-stage, two-phase type	
	Stall torque ratio/Stall revolution speed	2.0/1990 - 2540 rpm	
	One-way clutch type	Sprag type	
Transmission type	Type	Four forward speeds, one reverse gear, planetary gear type	
	Control element	Wet type multiple clutch	3 set
		Band type brake	1 set
		Wet type multiple brake	1 set
		One-way clutch	1 piece
	Gear ratio	1st gear: 2.800 2nd gear: 1.540 3rd gear: 1.000 4th gear: 0.700 Reverse gear: 2.333	
	Speedometer gear ratio	24/5	
	Oil pump	Internal gear type	
	Fluid to be used	ATF DEXRON® III	
	Fluid capacity liter	Except for EU: 4.2 liters , For EU: 4.29 liters	
	Cooling method	Except for EU: Water-cooled (radiator built-in type), For EU: Water-cooled (radiator built-in type) plus air-cooled oil cooler separately mounted	
Control system	Gear shift control method	Governor and throttle pressure shift control method	
	Automatic gear shift	Four forward speeds, full automatic shift	
	Manual control pattern	P—R—N—D—2—L (with overdrive switch)	

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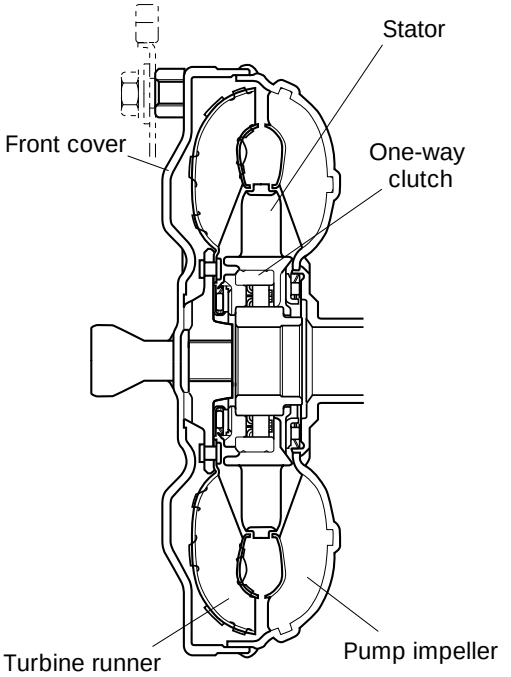
TORQUE CONVERTER

The torque converter employs a three-element, one-stage, two- phase type converter, as has been hitherto employed.

CONSTRUCTION

The torque converter consists of a front cover to which a drive plate is attached, a pump impeller integral with the torque converter cover, a turbine runner which is spline-fitted with the input shaft at the transmission side, a stator, a one-way clutch which supports the stator and so forth.



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OPERATION

When the ratio of the turbine runner speed to the pump impeller speed is small, the fluid returning from the turbine runner to the pump impeller flows in such a direction that prevents the rotation of the pump impeller. Therefore, the installation of the stator helps converting the fluid flow in such a direction that the pump impeller rotation is assisted.

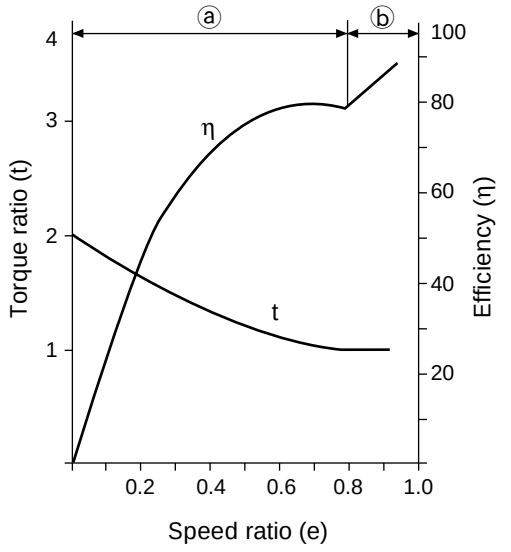
The torque ratio becomes a maximum of about 2.0 when the speed ratio is zero (at the time when the turbine runner is stopped). The torque ratio at this time is called the stall torque, whereas this stage is called the stall point.

Until the speed ratio reaches about 0.8, fluid transmission takes place, while increasing the torque. As the speed ratio becomes greater, the torque ratio decreases. This stage is called the torque converter range.

When the speed ratio becomes above about 0.8, the torque ratio is maintained at about one, transmitting the same torque without altering it. This stage is called the fluid coupling range.

The efficiency rises in proportion to the speed ratio. After passing a certain point, however, the increase rate of the efficiency starts to decline. This is because the fluid from the turbine runner begins to strike the back side of the stator, thus preventing the fluid flow.

Then, the one-way clutch of the stator operates, making the stator rotate. As a result, the increase rate of the efficiency starts to increase again.



ⓐ: Torque converter range

ⓑ: Fluid coupling range

$$e: \text{Speed ratio} = \frac{\text{Turbine shaft revolution speed}}{\text{Pump shaft revolution speed}}$$

$$t: \text{Torque ratio} = \frac{\text{Turbine shaft torque}}{\text{Pump shaft torque}}$$

$$\eta: \text{Efficiency} = \frac{\text{Output horse power}}{\text{Input horse power}} \times 100\ (\%)$$

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POWER TRAIN MECHANISM

DESCRIPTION

In the power train mechanism, the power that has been transmitted from the engine to the input shaft of the transmission through the torque converter is transmitted from various clutches to the planetary gear, using reduction ratios optimum for the running condition.

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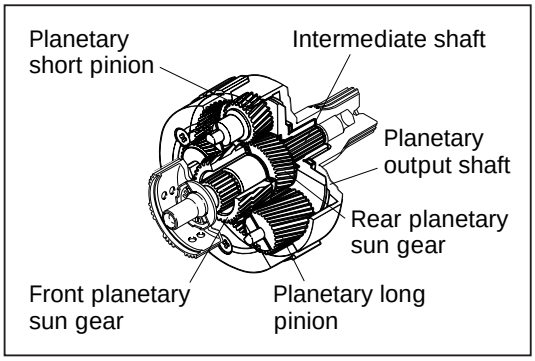
CONSTRUCTION

(1) Planetary gear

A Ravingeau type planetary gear is employed.
The following are the main components: Intermediate shaft, front planetary sun gear, planetary short pinion, planetary long pinion, rear planetary sun gear and planetary output shaft.
The input section of the driving force at the planetary gear unit section is composed of three systems: One is the intermediate shaft; another is the front planetary sun gear; and the third is the rear planetary sun gear.
This input section is switched by making gear shifts.
Furthermore, the output section is the planetary output shaft.



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(2) Shift control element

The shift control element consists of three kinds of wet type multiple-disc clutches, namely, the direct clutch (C1), forward clutch (C2) and rear clutch (C3), as well as the 1st & reverse brake (B2) of the wet type multiple-disc brake, the 2nd brake (B1) of the band type brake, and the one-way clutch (F). Moreover, the following table shows functions of each control element.

Functions of Each Shift Control Element

Shift control element	Operations
Direct clutch (C1)	Connects input shaft with front planetary sun gear.
Forward clutch (C2)	Connects input shaft with rear planetary sun gear.
Rear clutch (C3)	Connects input shaft with intermediate shaft.
2nd brake band (B1)	Locks front planetary sun gear.
1st & reverse brake (B2)	Prevents planetary carrier from rotating.
One-way clutch (F)	Prevents planetary carrier from rotating counterclockwise.

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OPERATION

(1) Power Train Route

The input route of the power train has three routes: One is a route in which the power is transmitted from the input shaft to the front planetary sun gear via the C1 clutch. Another is a route in which the power is transmitted to the rear planetary sun gear via the C2 clutch. The other is a route in which the power is transmitted to the intermediate shaft via the C3 clutch. Conversely, there is only one output route of the planetary output shaft.

Moreover, the following table shows functions of each shift control element according to the transmission gear.

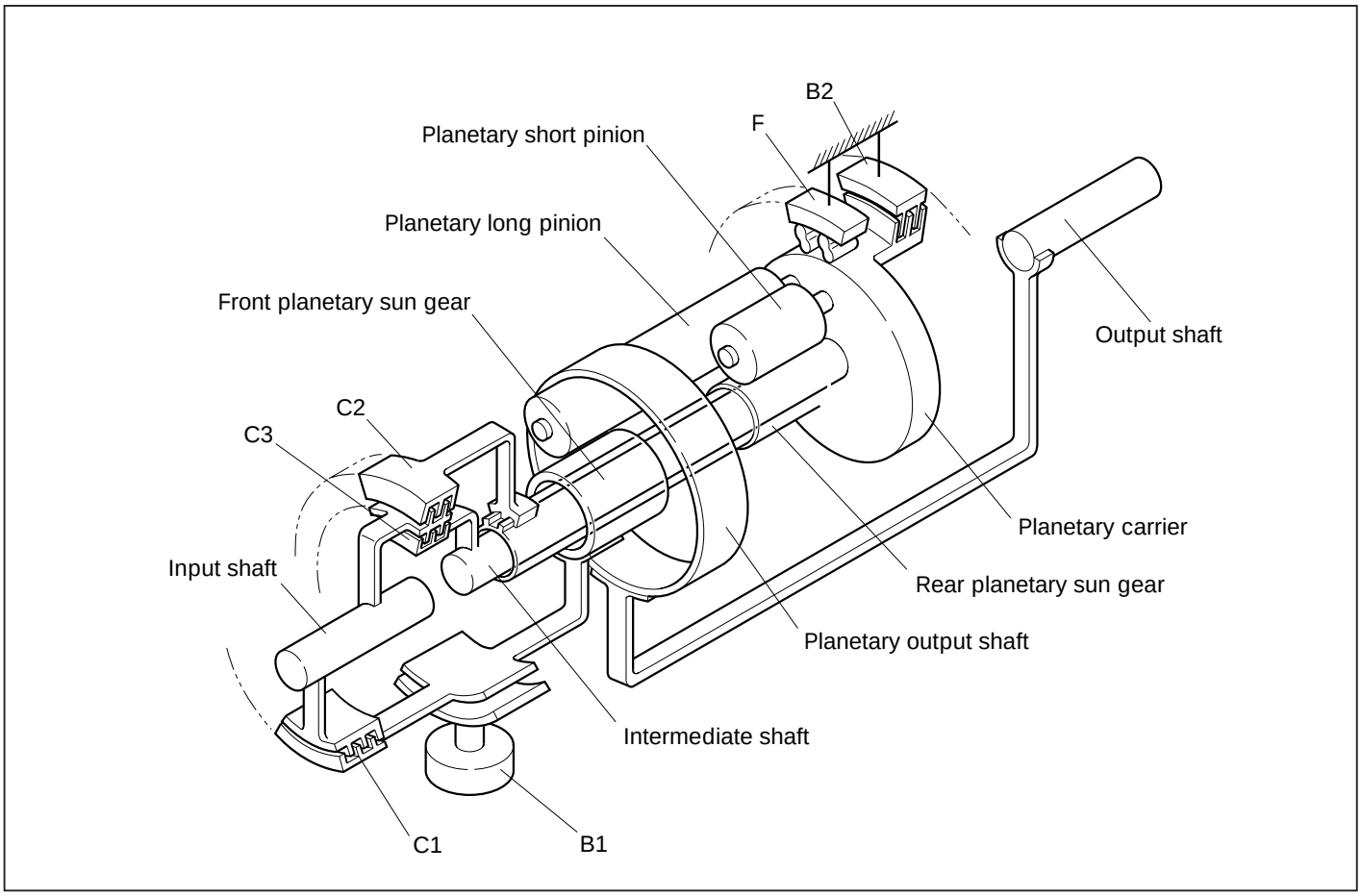

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Table Showing Functions of Shift Control Elements

Shift position		C1	C2	C3	B1	B2	F
P	Parking						
R	Reverse	○				○	
N	Neutral						
D	1st		○				○
	2nd		○		○		
	3rd	○	○	○			
	4th (O/D)			○	○		
2	1st		○				○
	2nd		○		○		
	3rd	○	○	○			
L	1st		○			○	○

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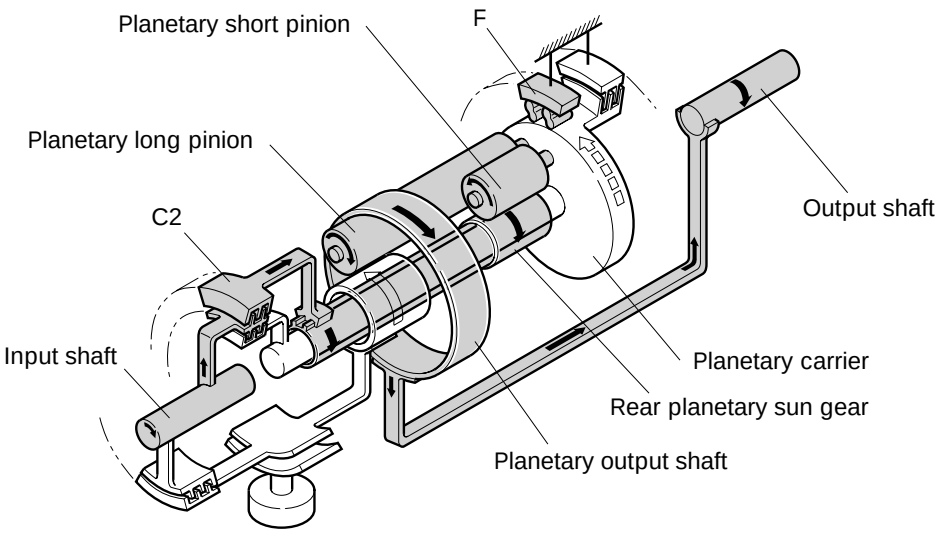
(2) [D] and [2] ranges <1st gear> (without engine brake)

When the transmission is in the 1st gear with the shift lever set to the [D] or [2] range, the forward clutch (C2) is activated. Therefore, the rotating force of the input shaft is directly transmitted to the rear planetary sun gear, thus transmitting a counterclockwise rotating force to the planetary short pinion.

Conversely, the planetary long pinion which is in mesh with the planetary short pinion receives a clockwise rotating force and tries to rotate the planetary carrier counterclockwise. However, the rotation is prevented by the function of the one-way clutch (F). Consequently, the planetary output shaft receives a clockwise rotating force.



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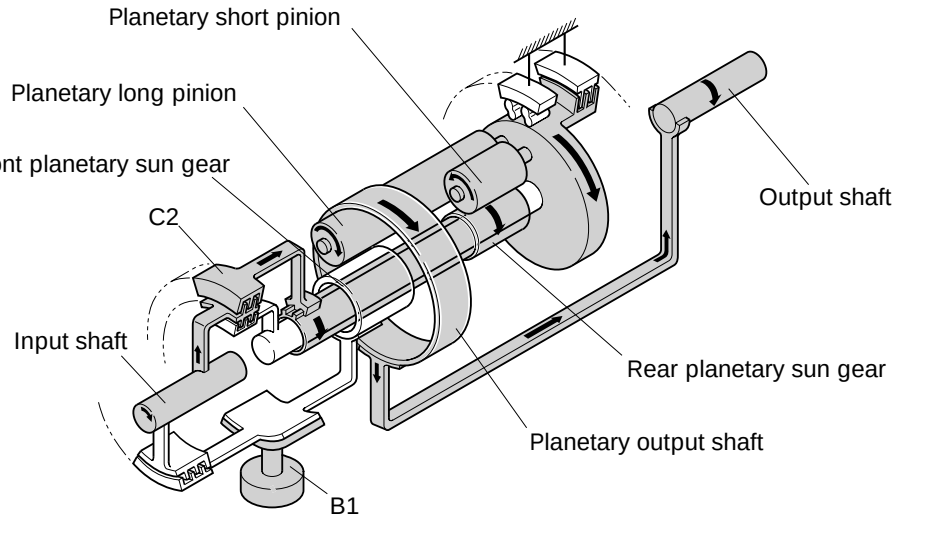
(3) [D] and [2] ranges <2nd gear>

When the transmission is in the 2nd gear, the forward clutch (C2) is activated. Therefore, the rotating force of the input shaft is directly transmitted to the rear planetary sun gear, thus transmitting a counterclockwise rotating force to the planetary short pinion.

Conversely, the front planetary sun gear is locked by the 2nd brake band (B1). As a result, the planetary long pinion which is in mesh with the planetary short pinion receives a clockwise rotating force and revolves around the front planetary sun gear while rotating on its axis. Consequently, a clockwise rotating force is transmitted to the planetary output shaft.



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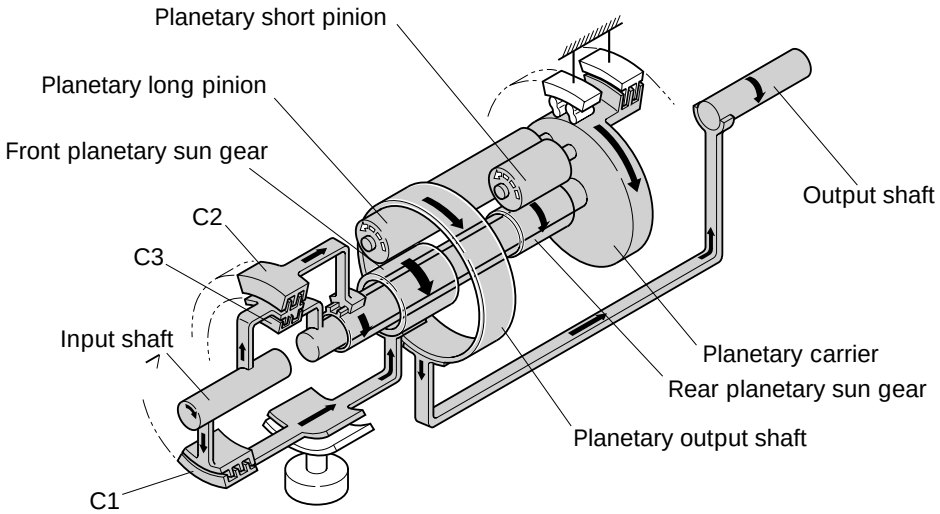
(4) D range <3rd gear>

When the transmission is in the 3rd gear, the direct clutch (C1) and forward clutch (C2) are activated. Therefore, the input shaft, front planetary sun gear and rear planetary sun gear rotate in the same direction. As a result, the planetary short pinion and planetary long pinion come in a locked state. Consequently, the planetary output shaft receives a clockwise rotating force.



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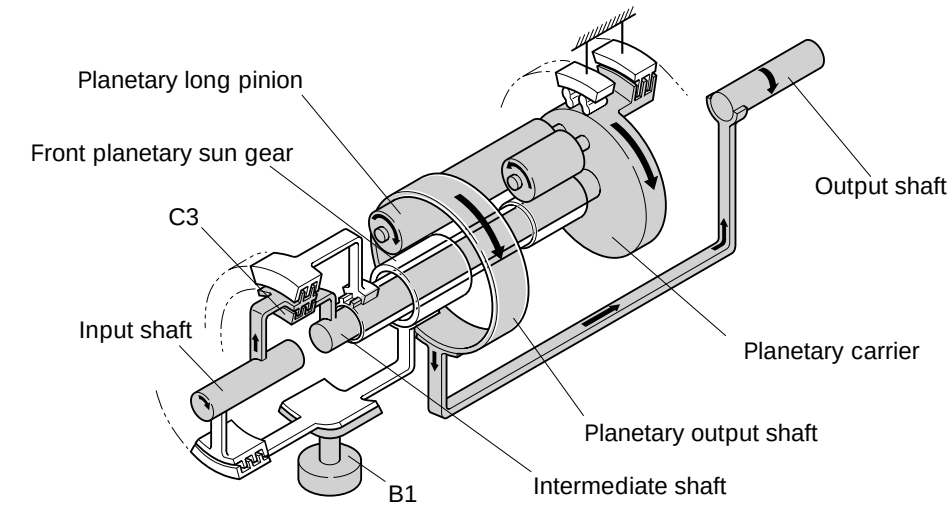
(5) D range <4th gear>

When the transmission is in the 4th gear, the rear clutch (C3) is activated. The rotating force of the input shaft is directly transmitted to the intermediate shaft, thus transmitting a clockwise rotating force to the planetary carrier.

Conversely, the front planetary sun gear is locked by the 2nd brake band (B1). Therefore, the planetary long pinion supported by the planetary carrier receives a clockwise rotating force and revolves around the front planetary sun gear while rotating on its axis. Consequently, a clockwise rotating force is transmitted to the planetary output shaft.



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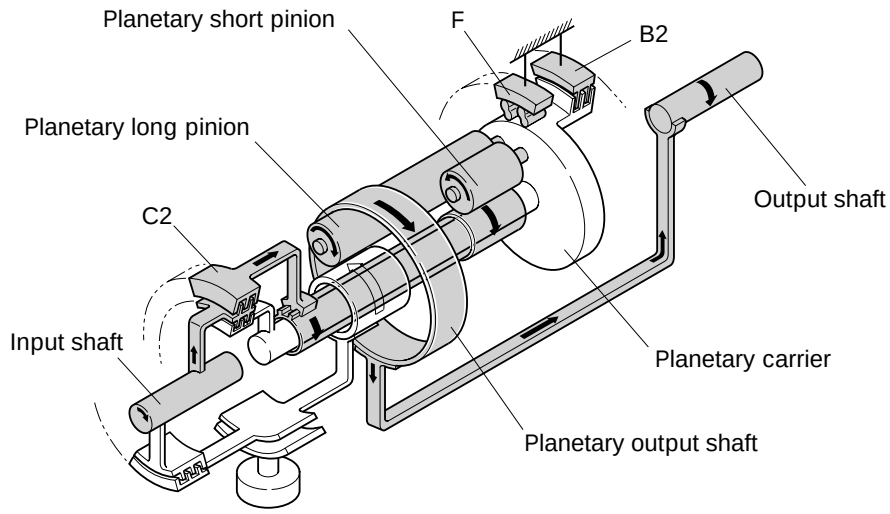
(6) [L] range <1st gear>

The rotating force is transmitted in the same way as the 1st gear of the [D] range, as previously explained. However, the 1st & reverse brake (B2) operates to prevent the planetary carrier from rotating clockwise at the time of engine braking.

In other words, at the time of driving with the [D] range, the counterclockwise rotation of the planetary carrier is locked by the function of the one-way clutch (F). Thus, the rotating force is transmitted to the planetary output shaft.

However, at the time of engine braking, a reverse force is applied. As a result, the one-way clutch (F) will not operate and the planetary carrier rotates idly. Therefore, in order to make the function of engine brake possible, the planetary carrier is secured by operating the 1st & reverse brake (B2).



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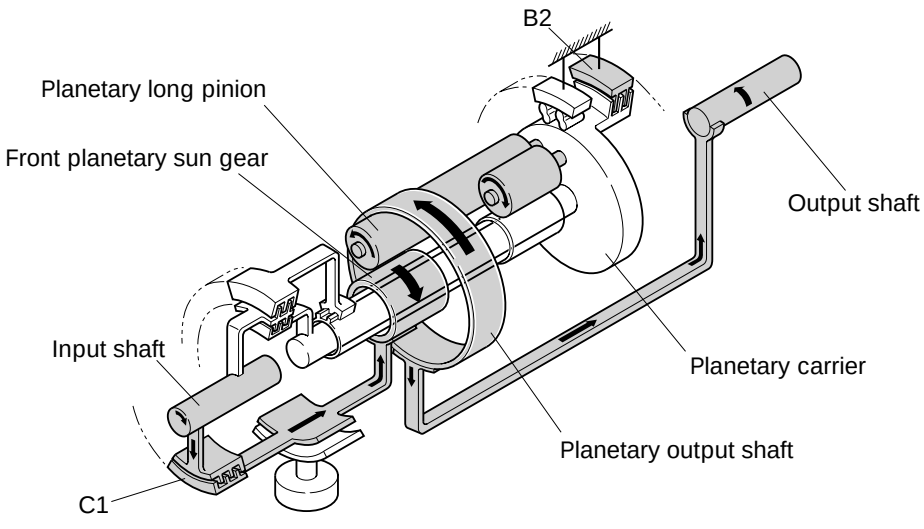
(7) [R] range <Reverse gear>

When the transmission is in the reverse gear, the direct clutch (C1) is activated, as shown in the figure below. Therefore, the rotating force of the input shaft is directly transmitted to the front planetary sun gear.

Conversely, the planetary carrier is locked by the function of the 1st & reverse brake (B2). Therefore, the rotating force transmitted to the front planetary sun gear makes the planetary long pinion rotate counterclockwise on its axis. Consequently, the counterclockwise rotating force is transmitted to the planetary output shaft.



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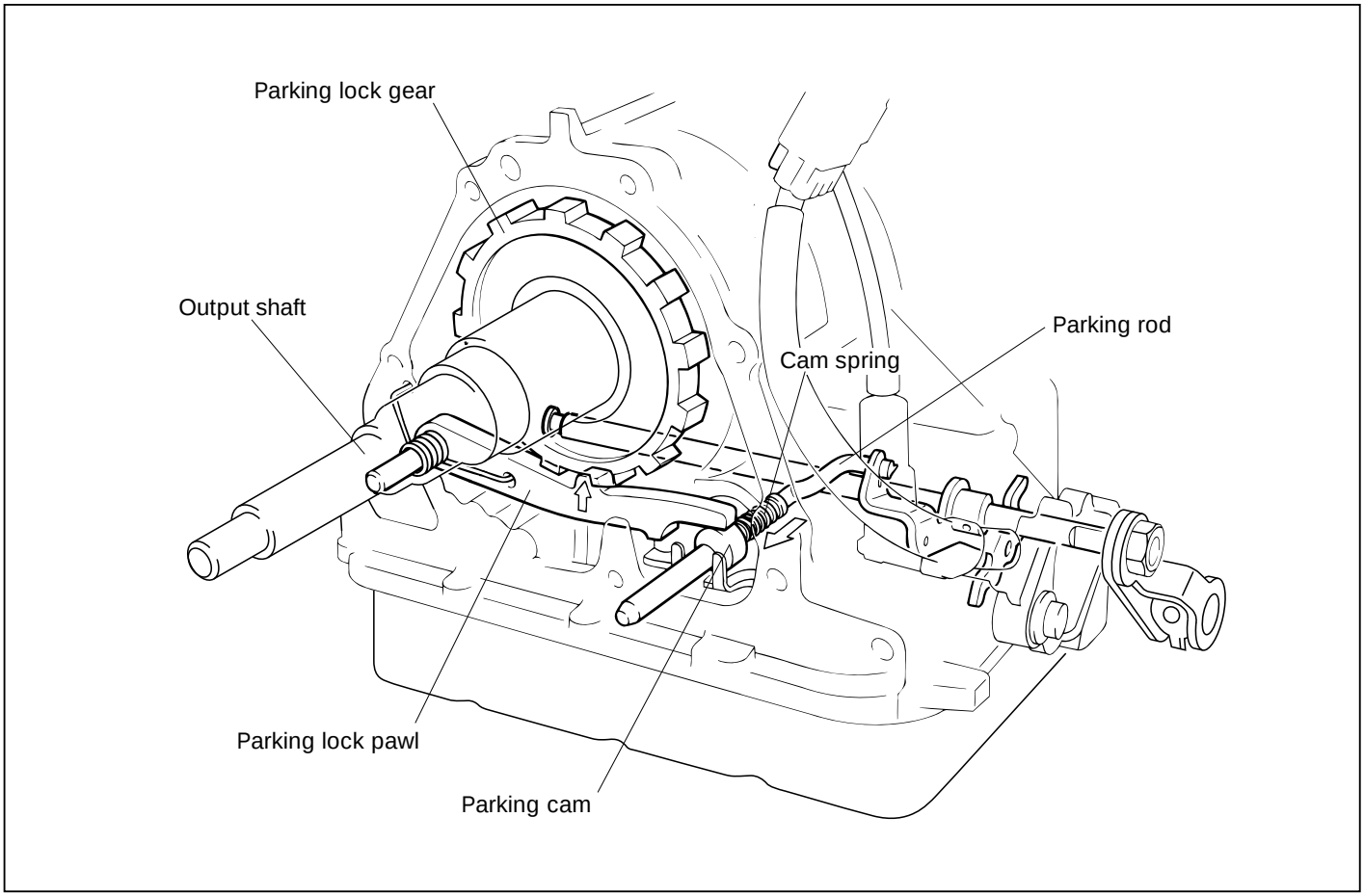
(8) [P] range

When shifted to the [P] range, the parking cam is pushed out through the parking rod. Thus, the parking cam pushes up the parking pawl. As a result, the parking lock pawl becomes engaged with the parking lock gear. Consequently, locking is made.



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HYDRAULIC PRESSURE CONTROL SYSTEM

DESCRIPTION

Utilizing the hydraulic pressure generated at the oil pump, the hydraulic pressure control system switches fluid passages leading to each shift control element of the power train mechanism according to running conditions, regulates the line pressure as well as lubricates each section of the transmission.
The following table shows operating conditions of the hydraulic pressure applied to each shift control element in each shift position.

Table Showing Operating Conditions of Hydraulic Pressure

Shift position		C1	C2	C3	B1		B2
					B1 (Applied side)	B1' (Released side)	
P	Parking						
R	Reverse	○					○
N	Neutral						
D	1st		○				
	2nd		○		○		
	3rd	○	○	○	*○	*○	
	4th (O/D)			○	○		
2	1st		○				
	2nd		○		○		
L	1st		○				○

*: In cases where hydraulic pressure is applied both to the applied side and to the released side, B1 is released by the difference in the pressure-receiving area.

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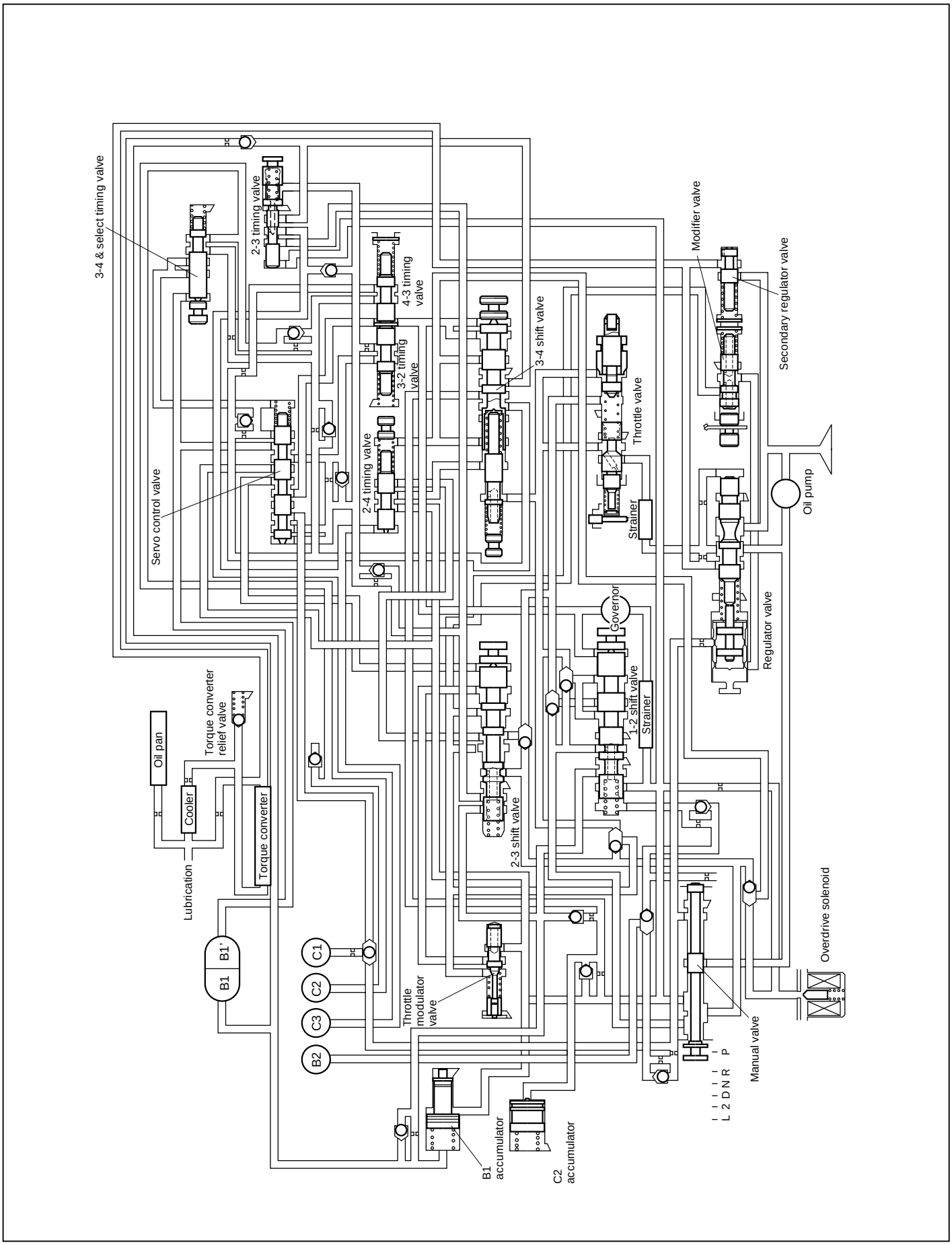
HYDRAULIC PRESSURE CIRCUIT DIAGRAM



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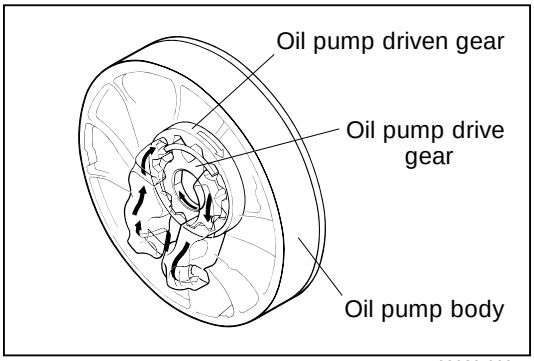
COMPONENTS

(1) OIL PUMP

A trochoid type gear oil pump has been adopted.
The oil pump consists of an oil pump body, an oil pump drive gear, and an oil pump driven gear. The oil pump drive gear, which is driven by the torque converter, drives the oil pump driven gear to send the automatic transmission fluid to the hydraulic pressure control system under a pressurized state.



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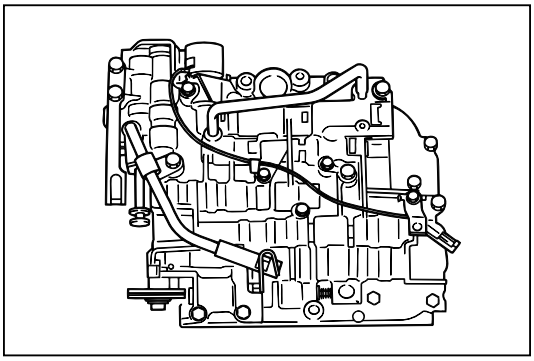
(2) VALVE BODY

The valve body is mounted at the lower surface of the transmission. It incorporates hydraulic pressure-regulating valves, such as a throttle valve, a regulator valve, a modifier valve, a secondary regulator valve, and a throttle modulator valve. It also incorporates a manual valve, and valves that will switch fluid passages of each shift valve, thus reducing gear shift impacts of each timing valve, etc.



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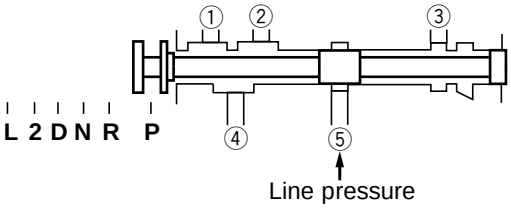
1) Manual valve

The manual valve is interlocked with the shift lever by the control cable. According to the shift lever movement, the manual valve switches the line pressure of each range.



Range \ Circuit	①	②	③	④	⑤
P					○
R			○		○
N					○
D		○			○
2		○		○	○
L	○	○		○	○

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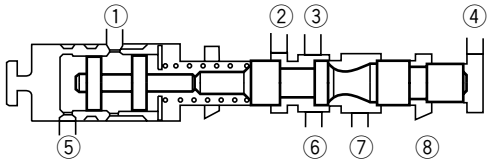
2) Regulator valve

The regulator valve regulates the pressurized fluid sent from the oil pump to a hydraulic pressure (line pressure) suited for the running condition.

The forces applied to the valve are the spring force (force F_S pushing to the right side), line pressure ④ (the discharging pressure from the oil pump ⑥ flowing via ③) (force F_L pushing to the left side), modifier pressure ⑤ (force F_{MF} pushing to the right side), and line pressure ② (force F_{RL} pushing to the right side) which will be applied only when the shift lever is moved to the R range.

Therefore, the line pressure ⑥ is regulated under the following conditions, thus becoming an optimum hydraulic pressure suited for the running condition.

1. Except R range: $F_L = F_S + F_{MF}$
2. R range: $F_L = F_S + F_{MF} + F_{RL}$



① Line pressure (R range)
② Lubrication pressure (To secondary regulator valve and torque converter)
③④⑥ Line pressure (From oil pump to manual valve and throttle valve)
⑤ Modifier pressure
⑦ Drain (To oil strainer)
⑧ Drain

JAT00023-00017

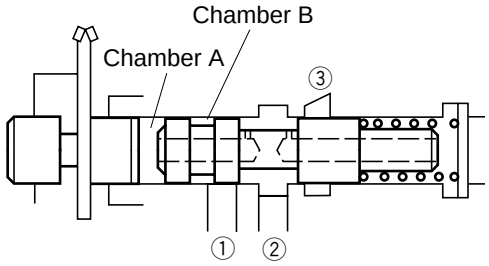
3) Modifier valve

The modifier valve regulates the modifier pressure which will regulate the line pressure to an optimum pressure according to the running condition (throttle opening angle).

The forces applied to the valve are the spring force (force F_S pushing to the left side), force applied to the valve by the modifier pressure ② when it enters the chamber A through the fluid passages inside the valve (force F_{MF} pushing to the right side), and throttle pressure ① (force F_{TH} pushing to the left side).

In cases where the throttle opening angle is less than approximately 25% with the shift lever set to a place other than the 2 and L ranges, the throttle pressure ① flows into ② without being regulated. Therefore, the modifier pressure becomes equal to the throttle pressure. Conversely, in cases where the throttle opening angle is more than approximately 25%, the modifier pressure will be regulated under a condition of $F_{MF} = F_S + F_{TH}$.

When the shift lever is moved to the 2 or L range, the line pressure will be applied to ①. As a result, the modifier pressure becomes a constant value, regardless of the throttle opening angle.



① Throttle pressure
(Except for 2 and L ranges)
Line pressure
(2 and L ranges)

② Modifier pressure

③ Drain

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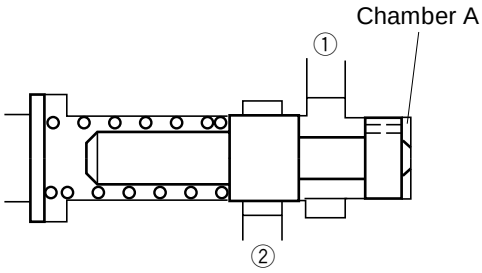
4) Secondary regulator valve

The secondary regulator valve regulates the lubrication pressure to an optimum hydraulic pressure.
The forces applied to the valve are the spring force (force F_S pushing to the right side), and force pushing the valve by the lubrication pressure ① when it enters the chamber A through the fluid passages inside the valve (force F_{LUB} pushing to the left side). Hence, the lubrication pressure will be regulated under a condition of $F_{LUB} = F_S$.



① Lubrication pressure
(From regulator valve to torque converter)

② Drain (To oil strainer)

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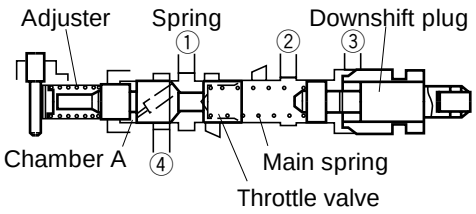
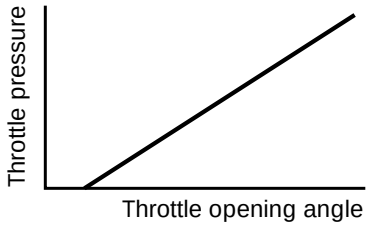
5) Throttle valve & downshift plug

The throttle pressure is generated in proportion to the throttle opening angle.
The forces applied to the throttle valve are the adjuster spring force (force F_{SA} pushing to the right side), main spring force (force F_{SM} pushing to the left), and force generated by the difference in the pressure-receiving area after the throttle pressure ① enters the chamber A through the fluid passages inside the valve (force F_{TH} pushing to the right side). As a result, the throttle pressure is regulated under a condition of $F_{TH} + F_{SA} = F_{SM}$. Since the F_{SM} becomes greater in proportion to the throttle opening angle, the throttle pressure is in proportion to the throttle opening angle.
The downshift plug outputs the throttle pressure from ② to the shift valve when the throttle opening angle becomes 85%. Then, this outputted pressure acts as a force counteracting the governor pressure, thus raising the shifting point.
The throttle pressure ③ acts as a force pushing the downshift plug to the left side, thus reducing the accelerator pedal application force.



① Throttle pressure
② Throttle pressure (Throttle opening angle is 85% or more.)
③ Throttle pressure
④ Line pressure



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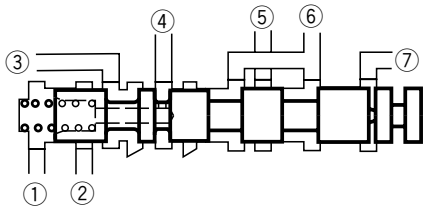
6) 1-2 shift valve

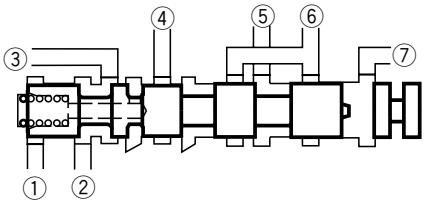
The 1-2 shift valve allows or does not allow the hydraulic pressure be applied to the B1 (the applied side), depending on conditions of the vehicle speed and throttle opening angle.

1. When shifted from 1st gear to 2nd gear:
   When the shift lever is set to the [D] or [2] range, the forces applied to the valve are the spring force (force F_S pushing to the right side), throttle pressure ⑥ (force F_{TH} pushing to the right side), and governor pressure ⑦ (force F_G pushing to the left side). When a condition of $F_G > F_S + F_{TH}$ is obtained, the valve is moved to the left side. Thus, the line pressure ② is applied to the B1 ③ (the applied side).
   When the shift lever is moved to the [L] range, the line pressure (force F_L pushing to the right side) is applied to ④ and ⑥ from the manual valve. In this case, since a condition of $F_G < F_S + F_L$ is always obtained, the valve will not move to the left side (The transmission will not be shifted to the 2nd gear). Furthermore, at this time the line pressure ④ is applied through the fluid passages inside the valve and ①, thereby causing B2 to operate.
2. When shifted from 2nd gear to 1st gear:
   In cases where the throttle opening angle is less than 85% with the shift lever set to the range other than the [L] range, the throttle pressure ⑥ will not be applied to the valve. Therefore, when a condition of $F_G < F_S$ is obtained, the valve moves to the right side. As a result, the hydraulic pressure will not be applied to the B1 ③ (the applied side). (The shifting point comes to a speed lower than the shifting point for 1st-to-2nd gear shifting.)
   In cases where the throttle opening angle is more than 85% with the shift lever set to the range other than the [L] range (at the time of kick down), the throttle pressure (force pushing to the right side) is applied to ⑤. Therefore, the valve moves to the right side under a condition of $F_G < F_S + F_{TH}$ (when the vehicle speed is lower than a certain value).
   When the shift lever is shifted to the [L] range while running with the 2nd gear, the line pressure (F_L) will be applied to ⑤. Therefore, the valve will not move to the right side, until a condition of $F_G < F_S + F_L$ is satisfied. (The 2nd gear is held, until the vehicle speed decreases below a certain vehicle speed, so as to prevent the engine from overrunning.)

<Except 2nd, 3rd and 4th gears>



<2nd, 3rd and 4th gears>



① To B2

② Line pressure ([D], [2] and [L] ranges)

③ To B1

④ Line pressure ([L] range)

⑤ Line pressure ([L] range), Throttle pressure ([D] and [2] ranges, throttle opening angle of 85% or more)

⑥ Line pressure ([L] range), throttle pressure (Except for [D] and [2] ranges)

⑦ Governor pressure

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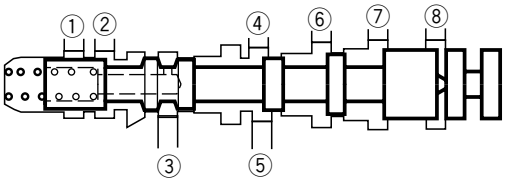
7) 2-3 shift valve

The 2-3 shift valve allows or does not allow the hydraulic pressure be applied to the C1, C3, and B1' (at the released side), depending on conditions of the vehicle speed and throttle opening angle.

1. When shifted from 2nd gear to 3rd gear:
   When the shift lever is set to the D range, the forces applied to the valve are the spring force (force F_S pushing to the right side), throttle pressure ⑥ (force F_{TH} pushing to the right side), throttle modulator pressure ⑦ (force F_{TM} pushing to the right side), and governor pressure ⑧ (force pushing to the left side). When a condition of $F_G > F_S + F_{TH} + F_{TM}$ is satisfied, the valve moves to the left side. Thus, the line pressure from the 1-2 shift valve ① is applied to the C1 and B1' via the servo control valve from ②; and to the C3 via the 2-3 timing valve.
   When the shift lever is moved to the 2 or L range, the line pressure (force F_L pushing to the right side) is applied to ③, ⑤ and ⑥ from the manual valve. In this case, since a condition of $F_G < F_S + F_L$ is always satisfied, the valve will not move to the left side (The transmission will not be shifted to the 3rd gear).
2. When shifted from 3rd gear to 2nd gear:
   In cases where the throttle opening angle is less than 85% with the shift lever set to the D range, the throttle modulator pressure ⑦ will not be applied to the valve. Therefore, when a condition of $F_G < F_S + F_{TH}$ is satisfied, the valve moves to the right side. As a result, the hydraulic pressure will not be applied to the C1 ②, B1' and C3. (The shift point comes to a speed lower than the 2nd-to-3rd gear shift point.)
   In cases where the throttle opening angle is 85% or more with the shift lever set to the D range, the throttle pressure (force F_{KD} pushing to the right side) is applied to ⑤. Therefore, the valve is moved to the right side when a condition of $F_G < F_S + F_{KD} + F_{KD}$ is satisfied (when the vehicle speed is lower than a certain value).
   When the shift lever is shifted to the 2 or L range while running with the 3rd gear, the line pressure (F_L) of the manual valve will be applied to ③ and ⑤. Therefore, the valve will not move to the right side, until a condition of $F_G < F_S + F_L$ is satisfied. (The 3rd gear is held, until the vehicle speed decreases below a certain vehicle speed, so as to prevent the engine from overrunning.)

<Except for 3rd and 4th gears>



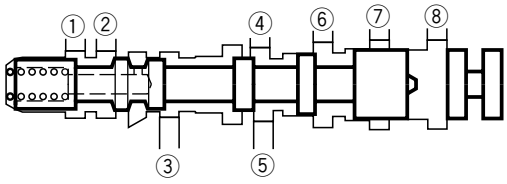
① Line pressure ← From 1-2 shift valve (2nd, 3rd and 4th gears)

② Servo control valve → To C1 and B1'
2-3 timing valve → To C3

③ Line pressure ← From manual valve (2 and L ranges)

④ To 2-4 timing valve

<3rd and 4th gears>



⑤ Line pressure ← From manual valve (2 and L ranges),
Throttle pressure ← From throttle valve (throttle opening angle of 85% or more)

⑥ Throttle pressure ← From throttle valve (Except for 2 and L ranges)
Line pressure → From manual valve (2 and L ranges)

⑦ Throttle modulator pressure ← From throttle modulator valve

⑧ Governor pressure ← From servo control

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8) 3-4 shift valve & 3-4 relay valve

- **3-4 relay valve**

The relay valve changes the force applied to the shift valve, depending on the throttle opening angle.
The forces applied to the valve are the large spring force (force F_S pushing to the left side), small spring force (force $F_{S'}$ pushing to the right side) and throttle pressure ① (force F_{TH} pushing to the right side).
In cases where the throttle opening angle is less than approximately 20%, a condition of $F_S \geq F_{S'} + F_{TH}$ is satisfied. Consequently, the force applied to the shift valve becomes F_S.
In cases where the throttle opening angle is between approximately 20% and 85%, a condition of $F_S \leq F_{S'} + F_{TH}$ is satisfied. Then, the relay valve moves to the right side, coming into contact with the shift valve. Consequently, the force applied to the shift valve becomes $F_{S'} + F_{TH}$.
In cases where the throttle opening angle is more than 85%, the throttle pressure ② (force F_{KD} pushing to the left side) is applied, thus satisfying a condition of $F_S + F_{KD} > F_{S'} + F_{TH}$ (F_{KD}). As a result, the relay valve returns to the left again. Consequently, the force applied to the shift valve becomes $F_S + F_{KD}$.

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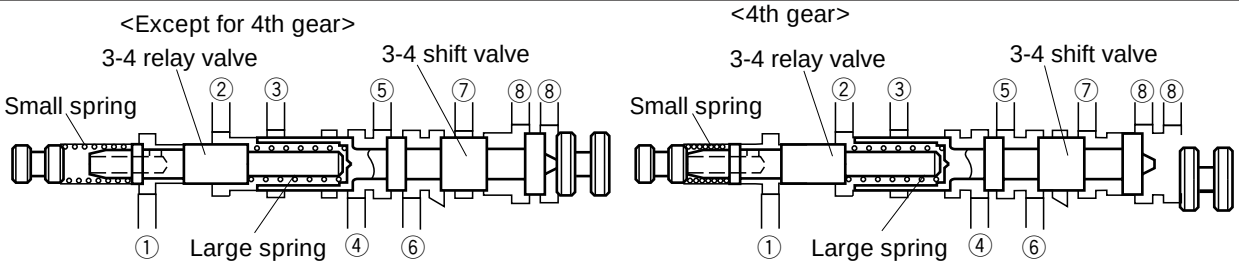
- **3-4 shift valve**

The 3-4 shift valve allows or does not allow the line pressure be applied to the servo control valve and C2, depending on conditions of the vehicle speed, throttle opening angle and overdrive switch, so as to perform gear shifting between the 3rd gear and the 4th gear.

1. When shifting from 3rd gear to 4th gear:
   The forces applied to the 3-4 shift valve are the force generated by the relay valve (force F_R pushing to the right side (= F_S, or $F_{S'} + F_{TH}$, or $F_S + F_{KD}$)), and governor pressure ⑧ (force F_G pushing to the left side).
   When running at a low speed ($F_G < F_R$), the valve is located at the right side. Therefore, the line pressure ⑤ will be applied to the servo control valve and C2 via ④. However, when running at a high speed ($F_G > F_R$), the valve moves to the left side. Consequently, the line pressure which was applied via ④ will be drained. Thus, gear shifting to the 4th gear takes place.
   Furthermore, when the overdrive is turned OFF, the line pressure (force F_L pushing to the right side) is applied to ③. Therefore, a condition of $F_G < F_S + F_L$ is always satisfied. Consequently, the valve will not move to the left side. (No gear shifting to the 4th gear will take place.)
2. When shifting from 4th gear to 3rd gear:
   When the valve is located at the left side, the pressure-receiving diameter of the governor pressure ⑧ becomes greater. As a result, the force ($F_{G'}$) pushing the valve to the left side also becomes greater. Consequently, the 4th-to-3rd gear shift point comes at a speed lower than the 3rd-to-4th gear shift point.
   Furthermore, when the overdrive is turned OFF, the line pressure (force $F_{L'}$ pushing to the right side) is applied to ③ and ⑦. However, since a condition of $F_{G'} < F_S + F_{L'}$ is always satisfied, the valve moves to the right side (gear shifting to the 3rd gear takes place), regardless of the vehicle speed and throttle opening angle.



① Throttle pressure ← Throttle valve

② Line pressure ← From 2-4 timing valve (1st and 2nd gears)
Throttle pressure ← From 2-4 timing valve (Throttle opening angle of 85% or more)

③ Line pressure ← From overdrive solenoid (When overdrive is turned OFF with shift lever set to D, 2 or L range)

④ 3-4 & select timing valve → To C2
Servo control valve → To C1, B1'

⑤ Line pressure ← From manual valve (D, 2 and L ranges)

⑥ To B1

⑦ Line pressure ← From overdrive solenoid (When overdrive is turned OFF with shift lever set to D, 2 or L range)

⑧ Governor pressure ← From governor valve

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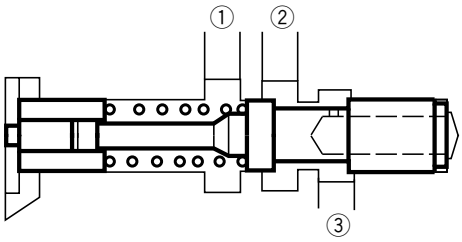
9) Throttle modulator valve

The throttle modulator valve regulates the throttle modulator pressure which is applied to the 2-3 shift valve as a force counteracting the governor pressure. This throttle modulator valve causes shifting to take place at a low vehicle speed when the throttle is opened slightly; and at a high vehicle speed when the throttle is opened widely. Furthermore, when the throttle opening angle is less than approximately 10% and no throttle pressure is being generated, this valve assures the difference in speed between the 2nd-to-3rd gear shift point and the 3rd-to-2nd gear shift point (hysteresis).

In the [D], [2] and [L] ranges, the line pressure is applied to ③ from the manual valve. This pressure flows into ②, thus generating the throttle modulator pressure.

The forces applied to the valve are the spring force (force F_S pushing to the right side), throttle pressure ① (force F_{TH} pushing to the right side), and throttle modulator pressure ② (force F_{TM} pushing to the left side). Thus, the throttle modulator pressure is regulated under a condition of $F_{TM} = F_S + F_{TH}$.



① Throttle pressure ← From throttle valve (Except for [2] and [L] ranges)
Line pressure ← From manual valve ([2] and [L] ranges)

② Throttle modulator pressure → To 2-3 shift valve

③ Line pressure → From manual valve ([D], [2] and [L] ranges)

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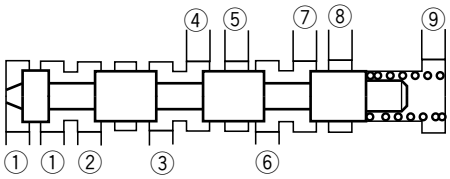
10) Servo control valve

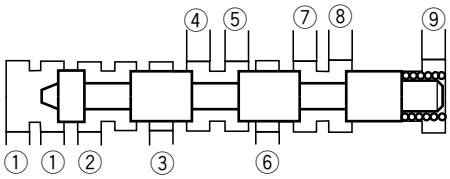
When gear shift takes place between the 3rd gear and the 4th gear, the servo control valve turns ON and OFF the C1 pressure and B1' pressure (at released side) simultaneously.
Moreover, in order to prevent downshift from the 4th gear to the 2nd gear from taking place all at once (because it will apply a great torque to the forward clutch suddenly), the servo control valve causes downshift to the 3rd gear to take place first. Then, the transmission is shifted to the 2nd gear.
When the transmission is in the 3rd gear, the forces applied to the valve are the spring force (force pushing to the left side), line pressure ⑨ (force pushing to the left side) from the 3-4 shift valve, and the line pressure ① (force pushing to the right side) from the 2-3 shift valve.
When conditions for upshifting to the 4th gear are satisfied and the 3-4 shift valve is switched, the line pressure ⑨ will be drained. Therefore, the valve moves to the right side. At this time, ⑦ and ⑧ are connected to each other. Consequently, the pressure B1' ⑦ will be drained from the 3-4 shift valve via ⑧. At the same time, the pressure C1 ② will be drained, too.
Moreover, although the vehicle speed decreases and conditions for switching the 2-3 shift valve (downshift to the 2nd gear) are satisfied, the servo control valve allows the 2-3 shift valve be switched only after the 3-4 shift valve has been switched (downshift to the 3rd gear has taken place). The servo control valve does this by making the line pressure, instead of governor pressure, applied to the 2-3 shift valve from ④.

<Except for 4th gear>



① Line pressure ← From 2-3 shift valve (3rd and 4th gears)
② To C1
③ Governor pressure (From governor valve)
④ To 2-3 shift valve
⑤ Line pressure ← From manual valve (D, 2 and L ranges)

<4th gear>



⑥ Line pressure ← From 2-3 shift valve (3rd and 4th gears)
⑦ To B1'
To 3-4 & select timing valve
⑧, ⑨ Line pressure ← From 3-4 shift valve (1st, 2nd and 3rd gears)

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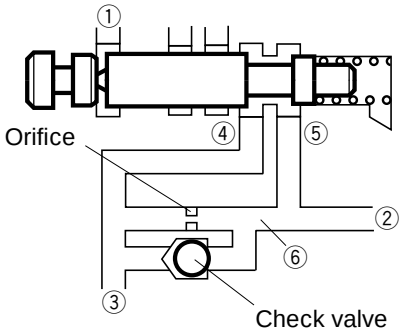
11) 3-4 & select timing valve

When upshift from the 3rd gear to the 4th gear takes place, the 3-4 & select timing valve makes the turning OFF of the pressure C2 synchronized with the turning OFF of the pressure B1', thus preventing the engine from racing and making smooth shifting possible.

When the transmission is in the 3rd gear, the forces applied to the valve are the spring force (force F_S pushing to the left side), and line pressure ① (pressure B1') (force pushing to the right side). Since a condition of $F_S < F_L$ is satisfied, the valve is located at the right side. If the line pressure ① (pressure B1') is turned OFF when upshifting to the 4th gear, the valve moves to the left side. Also, ④ and ⑤ are connected to each other simultaneously. In this way, the pressure C2 ② will be quickly drained.



① Line pressure (pressure B1')

② From C2

③ 3-4 shift valve → Drain

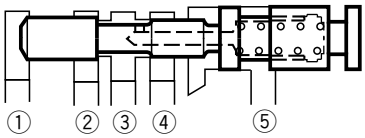
JAT00033-00026

12) 2-3 timing valve

When gear shift takes place between the 2nd gear and the 3rd gear, the 2-3 timing valve raises the pressure C3 after the pressure C1 reaches a certain pressure.

When the transmission is in the 2nd gear with the shift lever set to the D range, the forces applied to the valve are the spring force (force F_S pushing to the left side), and line pressure ① (force F_L pushing to the right side) from the manual valve. Furthermore, since a condition of $F_S < F_L$ is satisfied, the valve is located at the right side. When upshifting from the 2nd gear to the 3rd gear takes place, the line pressure ⑤ (force $F_{L'}$ pushing to the left side) from the 2-3 shift valve is applied gradually via the orifice. As a result, at the point when a condition of $F_S + F_{L'} > F_L$ is satisfied, the valve moves to the left. At the same time, ② and ③ are connected to each other. Consequently, the line pressure ② is applied to the C3 via ③.

<D range, 1st and 2nd gears>

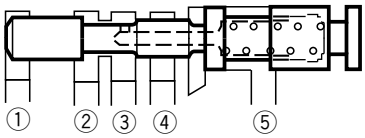


① Line pressure ← From manual valve (D, 2 and L ranges)

② Line pressure ← From 2-3 shift valve (3rd and 4th gears)

③ To C3

<D range, except for 1st and 2nd gears>



④ Line pressure ← From 3-4 shift valve (4th gear)

⑤ Line pressure ← From 2-3 shift valve (3rd and 4th gears)

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13) 2-4 timing valve

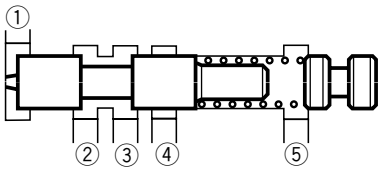
If upshift from the 2nd gear to the 4th gear takes place all at once (when making the C2 inoperative and the C3 operative), the engine starts racing, for no load is applied temporarily. In order to avoid this, the 2-4 timing valve prevents the pressure C2 from being turned OFF (through shifting to the 3rd gear temporarily), until the pressure C3 reaches a certain pressure.

When the transmission is in the 2nd gear with the shift lever set to the D range, only the spring force (force F_S pushing to the left side) is applied to the valve. Therefore, the valve is located at the left side. In this case, the line pressure from the manual valve is applied to the 3-4 shift valve via ③ as a force counteracting the governor pressure.

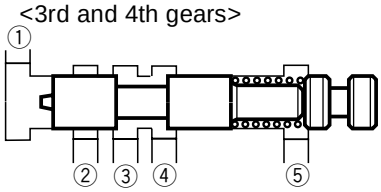
If conditions for upshift to the 4th gear are satisfied and the 2-3 shift valve is switched (moved to the left side), the line pressure ① (pressure C3) (force F_{C3} pushing to the right side) starts to be applied. However, the valve remains located at the left side, until a condition of $F_S < F_{C3}$ is satisfied. Therefore, since the line pressure is applied to the 3-4 shift valve, the 3-4 shift valve cannot move to the left side. In other words, the pressure C2 cannot be turned OFF and the transmission remains in the 3rd gear. When a condition of $C_S < F_{C3}$ is satisfied and the valve moves to the right side, ③ and ④ are connected to each other and the line pressure which was applied to the 3-4 shift valve will be drained. Consequently, the 3-4 shift valve moves and upshifting to the 4th gear takes place.

When the overdrive is turned OFF (the overdrive solenoid is energized), the line pressure (force F_L pushing to the left side) is applied to ⑤. Since a condition of $F_{C3} < F_S + F_L$ is always satisfied, the valve will not move to the right side (upshifting to the 4th gear will not take place).

<Except for 3rd and 4th gears>



<3rd and 4th gears>



① Line pressure (Pressure C3)

② Line pressure ← From manual valve (D, 2 and L ranges)

③ To 3-4 shift valve

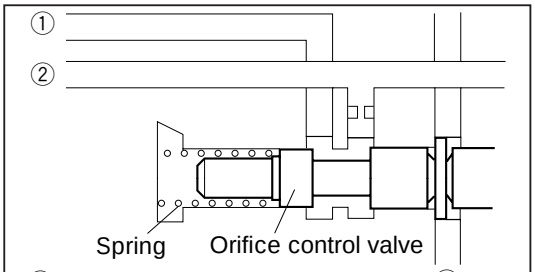
④ Line pressure (2 and L ranges) ← From 2-3 shift valve
Throttle pressure (opening angle of 85% or more) ←

⑤ Line pressure ← From overdrive solenoid (When overdrive is turned OFF with D, 2 or L range)

JAT00035-00028

14) 3-2 timing valve

When a downshift is made from the 3rd gear to the 2nd gear, the change in the engine speed is relatively small during low-speed operation. However, the change in the engine speed is great during high-speed operation, resulting in a strong shift shock. The 3-2 timing valve is provided to reduce this shift shock.



① From BI'
② To 2-3 shift valve
③ Governor pressure

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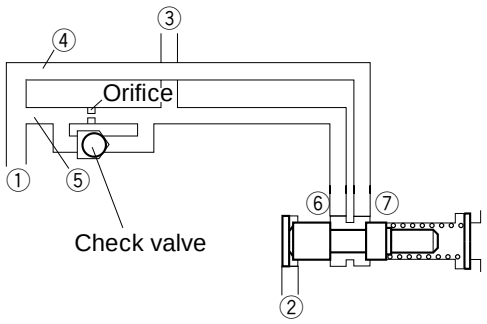
15) 4-3 timing valve

When downshift from the 4th gear to the 3rd gear takes place at a high speed, the 4-3 timing valve retards the rising speed of the line pressure (pressure C2), thus reducing shift impacts.

The forces applied to the valve are the spring force (force F_S pushing to the left side) and governor pressure ② (force F_G pushing to the right side).

When running at a low speed ($F_G < F_S$), the valve moves to the left side, and ⑥ and ⑦ are connected to each other. Therefore, the line pressure ① from the 3-4 shift valve is quickly raised through the route of ④ → ⑦ → ⑥ → ③.

When running at a high speed ($F_G > F_S$), the valve moves to the right side, and ⑥ and ⑦ are cut off. Therefore, the line pressure ① will be raised slowly through the route of ⑤ → orifice → ③.



① Line pressure ← From 3-4 shift valve (Except for 4th gear)

② Governor pressure

③ 3-4 & select timing valve → To C2

JAT00036-00029

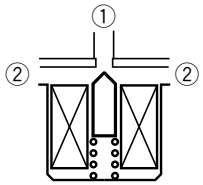
16) Overdrive solenoid

The overdrive solenoid makes the line pressure applied to the 3-4 shift valve and 2-4 timing valve, thus preventing upshift to the 4th gear from taking place.

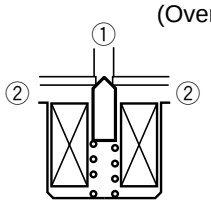
When the overdrive switch is turned ON (overdrive possible), the solenoid is not energized, thus draining the line pressure ①.

When the overdrive switch is turned OFF (overdrive impossible), the solenoid is energized. As a result, the plunger is pulled to close the fluid passage. Consequently, the line pressure ① is retained.

<When electric current is not energized (Overdrive "ON")>



<When electric current is energized (Overdrive "OFF")>



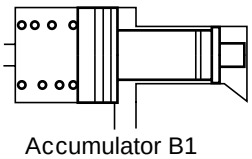
① Line pressure (D, 2 and L ranges)

② Drain

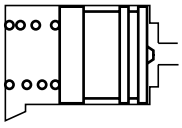
JAT00037-00030

17) Accumulators

The accumulator has functions to relax the connecting of the shift control elements and to reduce gear shift impacts. There are two kinds of accumulators: One is for the forward clutch (C2); and the other is for the 2nd brake band (B1). These are provided in the transmission case.



Accumulator B1



Accumulator C2

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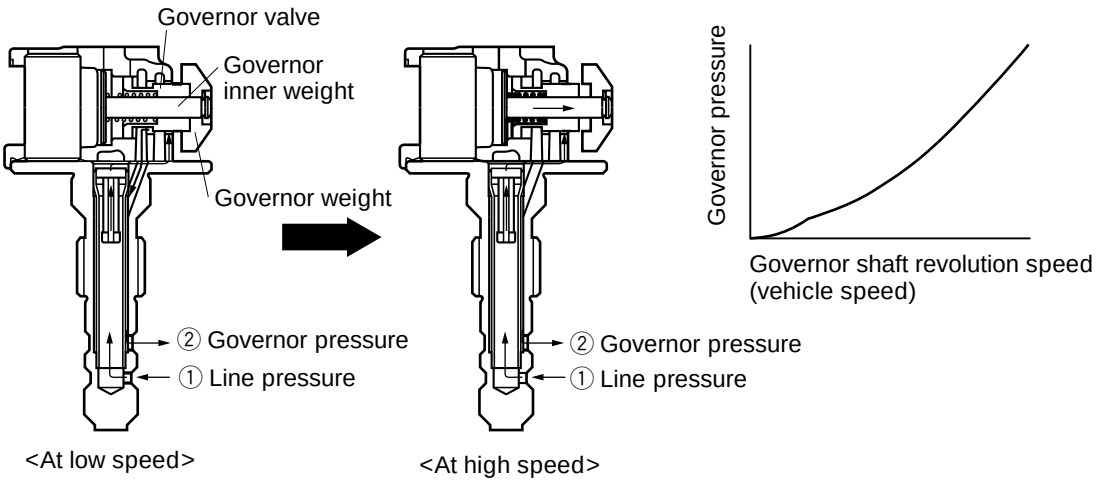
(3) GOVERNOR VALVE

The governor valve is driven by the governor drive gear mounted on the output shaft. The governor valve generates a governor pressure which is corresponding to the vehicle speed (output shaft revolution speed).

The forces applied to the valve are the governor weight, centrifugal force of the governor inner weight (force F_1 pushing to the right side), centrifugal force of the governor valve (force F_2 pushing to the right side), and governor pressure ② (force pushing to the left side).

When running at a low speed (spring force $F_S > F_1$), the governor pressure is regulated under a condition of $F_G = F_1 + F_2$. As the vehicle speed becomes high ($F_S < F_1$), the governor inner weight comes in contact with the stopper. Consequently, the governor pressure is regulated under a condition of $F_G = F_S + F_2$.



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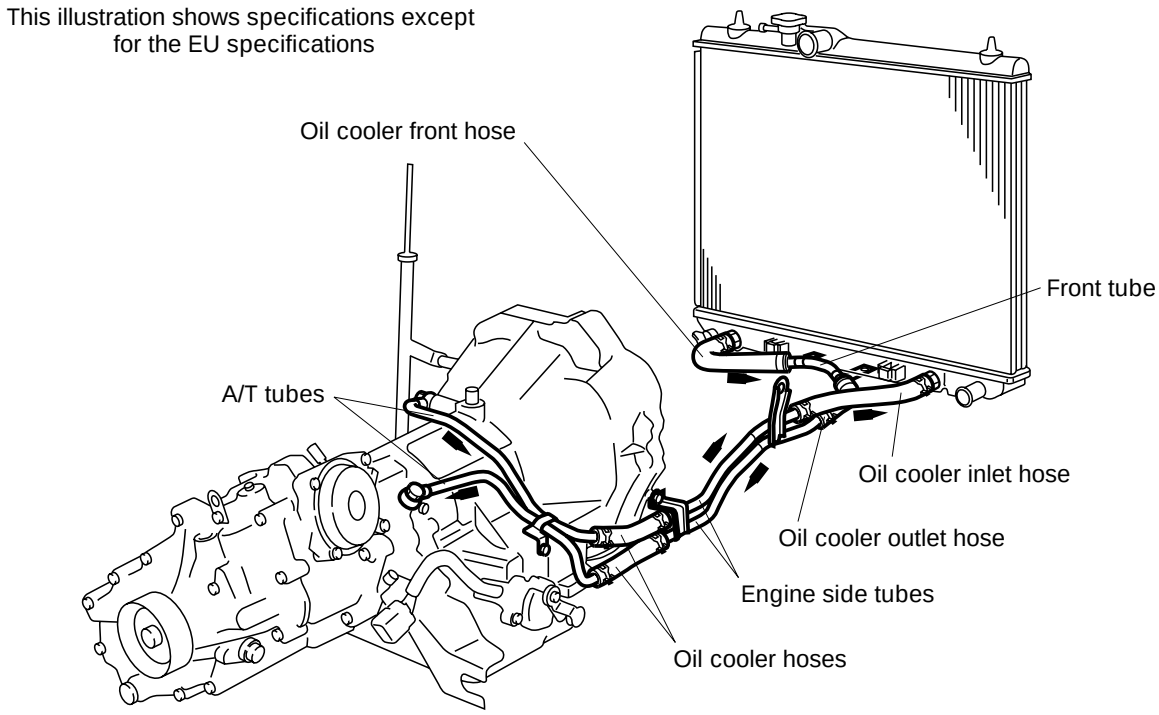
(4) COOLING DEVICE

The automatic transmission fluid is cooled down by the oil cooler incorporated in the radiator.

On vehicles with the EU specifications, the fluid is once cooled down by the air-cooled oil cooler separately mounted. Then, the fluid is sent to the oil cooler inside the radiator to be cooled down further.



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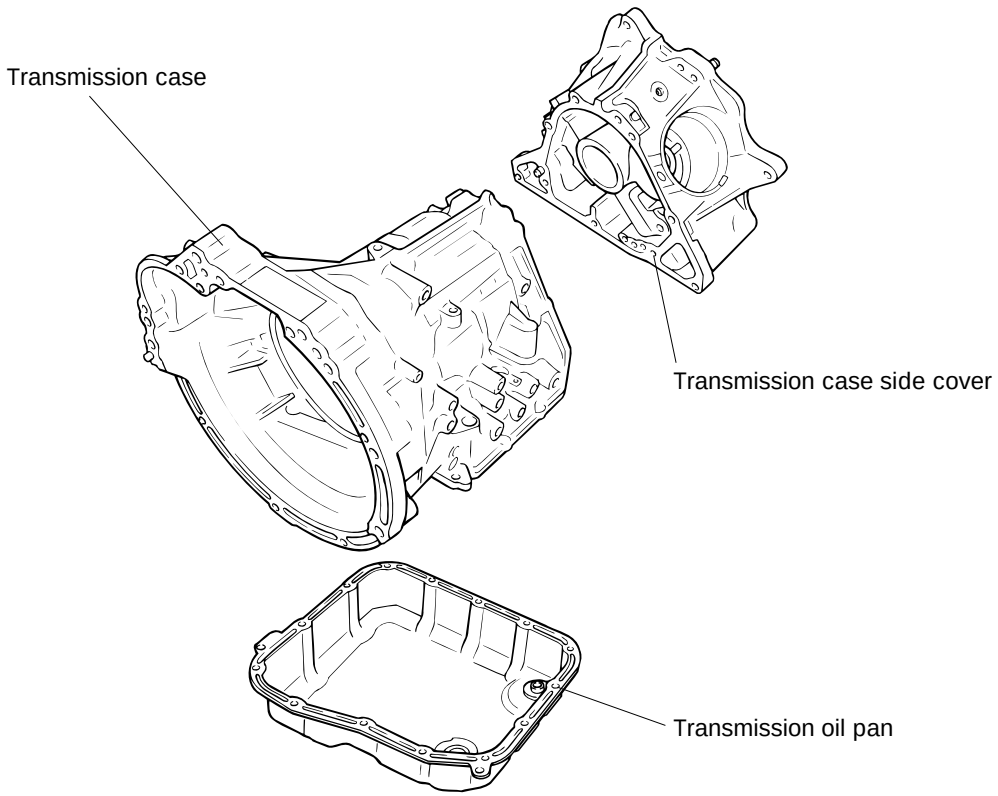
CASE & COVER

DESCRIPTION

The case and cover consist of the transmission case, transmission case side cover, and transmission oil pan.
For improved rigidity of the case, the transmission case is integrated with the converter housing.
Furthermore, liquid gasket featuring excellent sealing ability has been applied at the mating surfaces of each case.



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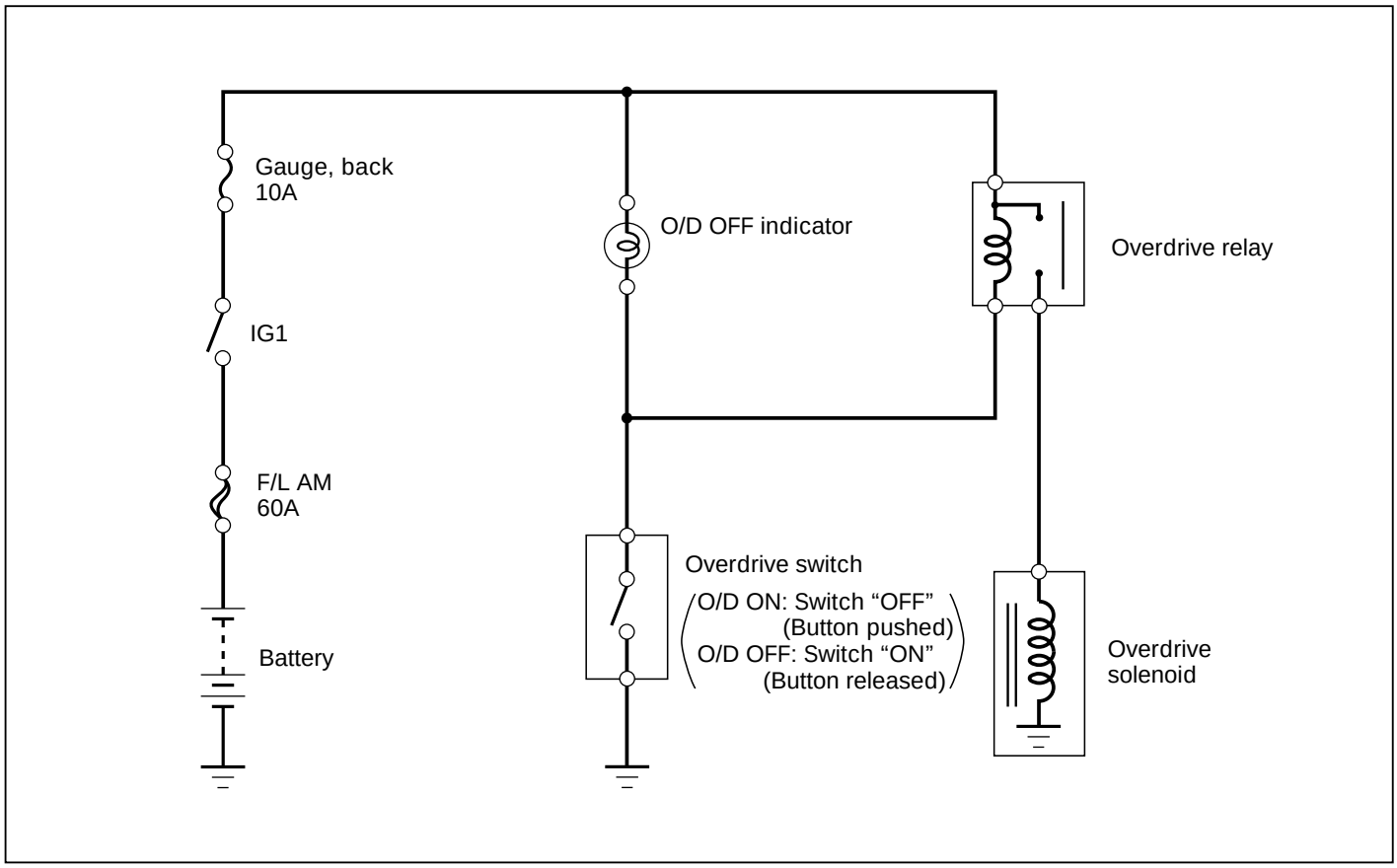
ELECTRIC CONTROL SYSTEM

OVERDRIVE SWITCH

DESCRIPTION

The overdrive solenoid provided in the transmission valve body is energized (overdrive possible) by turning ON (pushing) the overdrive switch incorporated in the shift lever. Also, the overdrive solenoid is non-energized (overdrive impossible) by turning OFF (releasing) the overdrive switch.



JAT00042-00035

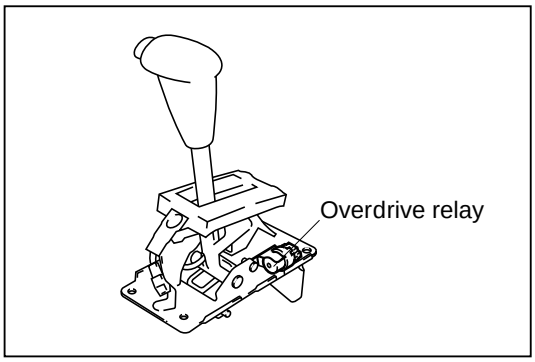
COMPONENTS

① **Overdrive switch**

② **Overdrive relay**

The overdrive relay is mounted on the floor shift assembly with a bracket interposed.

③ **Overdrive solenoid**



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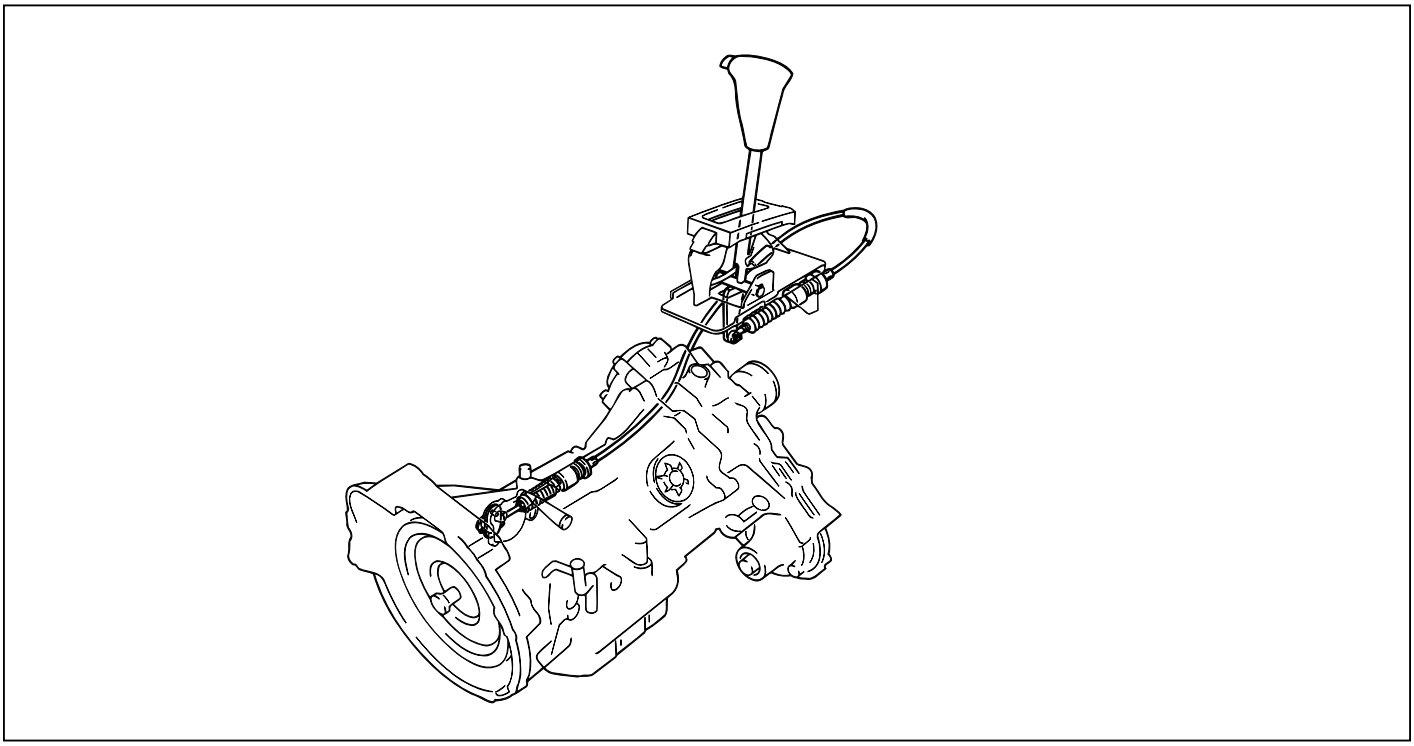
SHIFT CONTROL MECHANISM

DESCRIPTION

1. The shift control mechanism has employed a remote control type, using a push-pull cable.

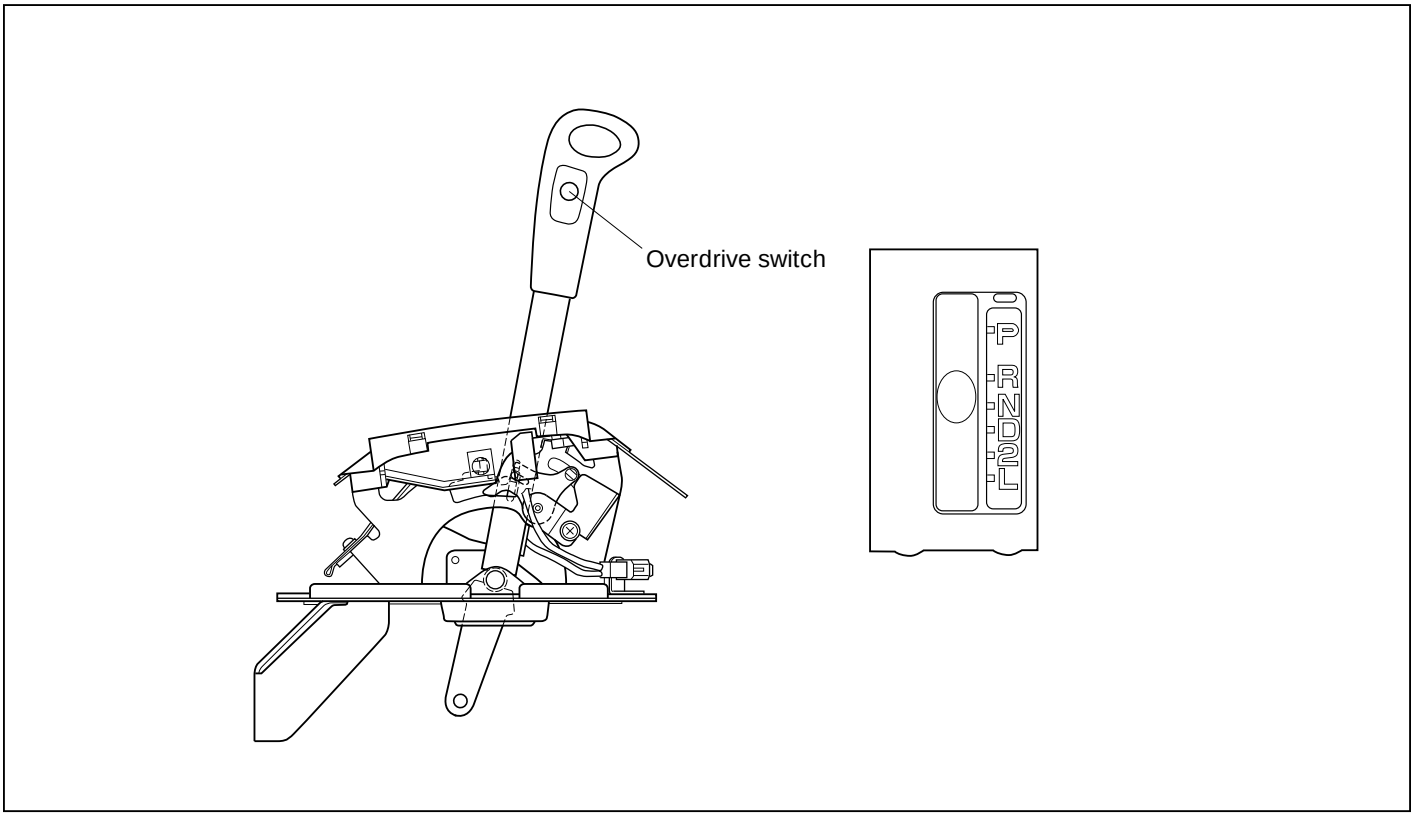


JAT00044-00037

COMPONENTS

(1) Shift lever assembly

The floor shift assembly has employed a six-position type having the P, R, N, D, 2 and L positions. Also, the overdrive switch is incorporated.



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PRELIMINARY CHECK

1. Check of transmission fluid level
   NOTE:
   - Prior to the fluid level check, be sure to run the vehicle until the engine and transmission have reached their normal operating temperature.
     (Fluid temperature: 70 - 90°C)

2. Check of engine idling speed.
   Specified Value: 850 ± 50 rpm
   (Refer to the EM section.)

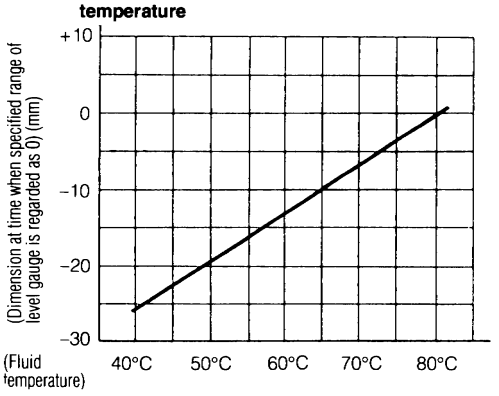
   (a) Park the vehicle on a level surface. Apply the parking brake.
   (b) With the engine idling, smoothly move the shift lever all through the ranges from P to L. Finally, return the shift lever to the P range.
   (c) Pull out the transmission fluid level gauge and wipe it clean.
   (d) Push it back fully into the tube.
   (e) Pull it out and check that the fluid level is in the HOT range.
   If the fluid level is too low, add the fluid.
   Fluid To Be Used: DEXRON®III
   Full Capacity: Approx. 4.2 ℓ (For EU: 4.29 ℓ)
   Drain and Refill: Approx. 1.7 ℓ (For EU: 1.74 ℓ)

   CAUTION:
   - Do not overfill the fluid.

• Transmission warming-up method
1. Warm up the engine.
2. If the vehicle runs for about 15 minutes at a speed of 60 km/h or for about 30 minutes at a speed of 40 km/h, the temperature of the fluid inside the transmission becomes about 80 ± 10°C.

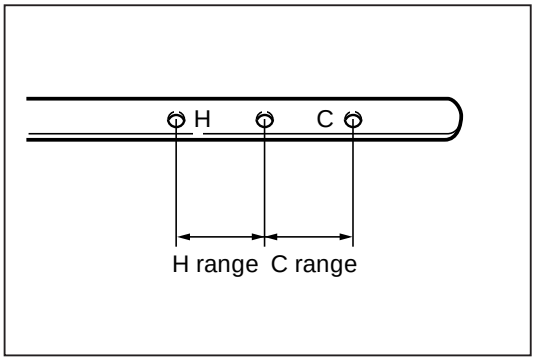
Reference
When the engine is cold, if the engine is operated for about 35 minutes at the idling speed after the engine has started, the temperature of the fluid inside the transmission will rise to about 60 ± 10°C.

Reference
• Change of fluid level as a result of rise in fluid temperature



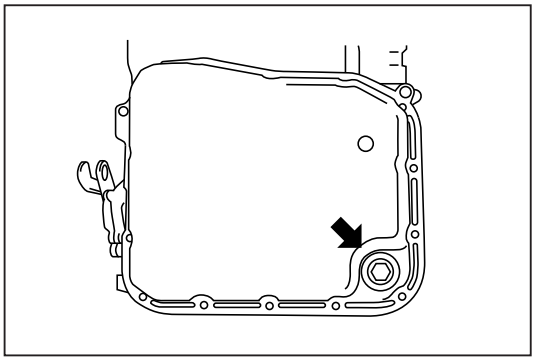
JAT00046-00039

NOTE:
- If it is necessary to check the fluid level at a low temperature (20 - 30°C), e.g. at the time of fluid change, first adjust the fluid level so that it may become within the COLD level. Then, recheck the fluid level under the hot conditions.
- If the fluid level fails to reach the cold level on the fluid level gauge, be sure to check the transmission for fluid leakage. Also, pull out the fluid level gauge and check the fluid for contamination or smell of fluid burning.



JAT00047-00040

3. Check of fluid condition
   If the fluid smells burning or it presents a black appearance, change the fluid.
4. Change of transmission fluid
   (1) Remove the drain plug with the gasket. Drain the fluid.
   NOTE:
   - Never reuse the removed gasket.



JAT00048-00041

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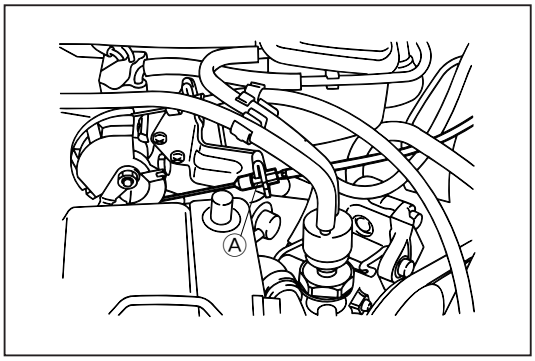
(2) With a new gasket interposed, tighten the drain plug securely.
Tightening Torque: 19.6 - 29.4 N·m (2.0 - 3.0 kgf-m)

(3) Add new fluid through the filler tube.
Fluid To Be Used: DEXRON®III
Full Capacity: Approx. 4.2 ℓ (For EU: 4.29 ℓ)
Drain and Refill: Approx. 1.7 ℓ (For EU: 1.74 ℓ)

(4) Start the engine. Move the shift lever to all positions from P through L. Then, move it to the P position.
(5) With the engine idling, check the fluid level. Add fluid up to the COLD level on the fluid level gauge.
(6) Check the fluid level at the normal fluid operating temperature (70 - 90°C). Add the fluid, as required.

JAT00049-00000

5. Adjustment of throttle cable
The purpose of this adjustment is to make the full open state of the throttle link of the throttle body at the engine side equal to the full-open position of the throttle valve inside the transmission.
NOTE:
- Do not perform the adjustment, using the attaching nut of the throttle link at the engine side. The nut Ⓐ in the right figure is secured with bond.



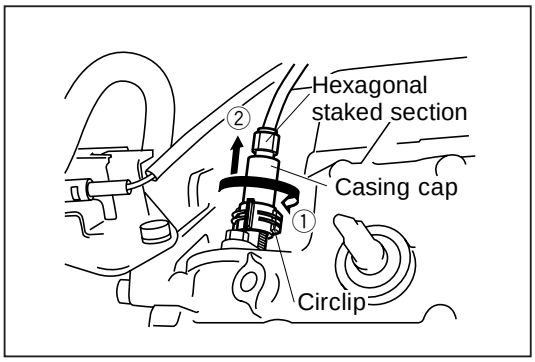
JAT00050-00043

(1) Remove the neutral start switch.
(2) Reset the automatic adjusting mechanism, following the procedure given below.
NOTE:
- When turning the casing cap with pliers or the like, be sure not to apply a lateral force. If a lateral force should be applied, it may damage (break) the casing cap section.

1) Turn the casing cap about 60 to 90 degrees. (The circlip will be expanded.)

NOTE:
- When turning the casing cap with pliers or the like, be sure to clamp the hexagonal staked section of the casing cap.

2) Pull the casing cap, until it is brought into contact with the stopper.



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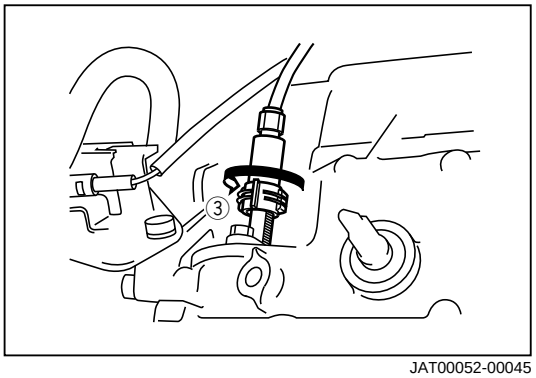
3) Turn the casing cap in the reverse direction of the step 1). (The circlip will be closed so that the casing cap may be secured.)



JAT00052-00045

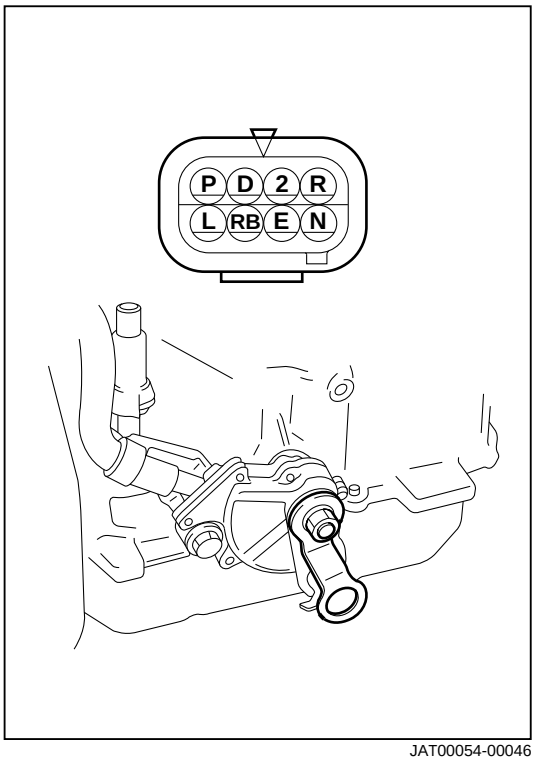
(3) Fully depress the accelerator pedal or turn the throttle link at the engine side, until it comes in contact with the full-open stopper.
At this time, ensure that the free play of the throttle cable has been automatically adjusted by listening to a clicking sound.
(4) Install the neutral start switch assembly.
(See the step 7.)

JAT00053-00000

6. Inspection of neutral start switch
Using an ohmmeter, check the continuity of the terminals for each switch position shown in the table below.

Range \ Terminal	E	R	RB	P	N	D	2	L
P	○			○				
R		○	○					
N	○				○			
D	○					○		
2	○						○	
L	○							○

If the continuity does not conform to the specifications, replace the switch.



JAT00054-00046

7. Adjustment of neutral start switch
(1) Move the shift lever to the N range.
(2) Remove the attaching bolts of the control cable and control shift lever subassembly.
(3) Remove the control shaft lever subassembly.

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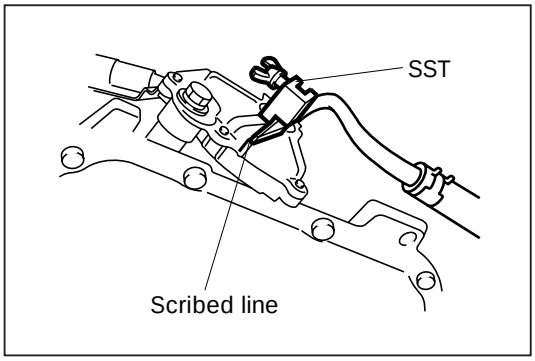
(4) Install the SST. Check that the gauge section of the SST is aligned with the scribed line of the neutral start switch.
SST: 09302-87201-000



JAT00056-00047

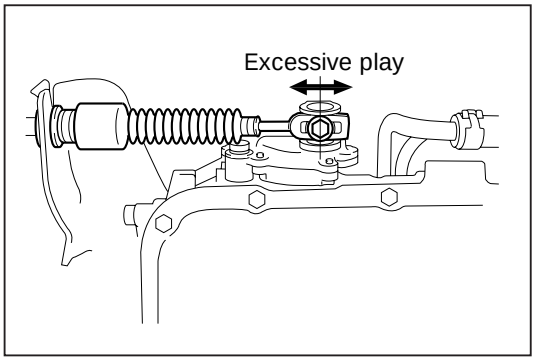
(5) If they are not aligned with each other, loosen the bolt. Then, perform the adjustment by turning the switch section so that they may be aligned. Tighten the bolt to the specified torque.
Tightening Torque: 14.7 - 21.6 N·m (1.5 - 2.2 kgf-m)

NOTE:
- Do not use an impact wrench to tighten the securing bolt of the neutral start switch.

(6) Remove the SST. Install the control shaft lever sub-assembly.
Tightening Torque: 9.8 - 15.7 N·m (1.0 - 1.6 kgf-m)

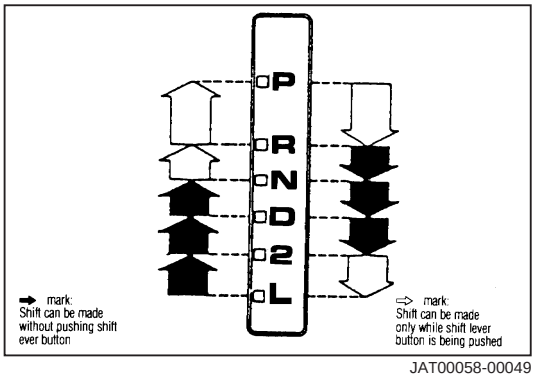
(7) In cases where the operation in (5) has been performed, confirm the operation of the control shaft lever, following the procedure given below:
1) With the control shaft lever set to the [P] range, move it approximately 2 to 3 mm toward the [R] range by your hand. At this time, ensure that the control shaft lever fully returns to the [P] range.
2) If the lever will not return to the [P] range, once loosen the securing bolt of the neutral start switch. After performing the adjustment, retighten the bolt.

(8) Install the control cable, making sure that the backlash will not be deviated to one side.
Tightening Torque: 6.9 - 9.8 N·m (0.7 - 1.0 kgf-m)



JAT00057-00048

8. Check of shift lever position
(1) Move the shift lever from the [N] range to each range. Ensure that the shift lever button and shift lever can be operated smoothly with a positive detent feeling at each range. Check that the position indicator functions properly.
(2) Start the engine. Ensure that the vehicle moves forward when you move the shift lever from the [N] range to the [D], [2] and [L] ranges, respectively. Make sure that the vehicle moves backward when you move the shift lever to the [R] range.
(3) With the ignition switch set to the ON position, move the shift lever from the [P] to [R] range and from the [N] to [R] range while depressing the brake pedal.
⇨ mark: Shift can be made only while shift lever button is being pushed
➡ mark: Shift can be made without pushing shift lever button
(4) With the ignition switch turned ON and the shift lever placed in the [R] range, check that the back-up lamp goes on and the reverse warning buzzer is set off.



JAT00058-00049

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TESTING

CAUTION:

- Perform the stall test at the normal fluid operating temperature (70 - 90°C).
- Do not conduct this test continuously for more than five seconds.
- Wait at least one minute before the switching is made from the [D] range to the [R] range.
- Be sure to turn OFF the air conditioner (if equipped so on).

JAT00059-00000

STALL TEST

1. Place chocks at the wheels of the vehicle.
2. Connect an engine tachometer. Apply the parking brake.
3. Start the engine.
4. While strongly depressing the brake pedal by your left foot, move the shift lever to the [D] and [R] ranges, respectively. Then, depress the accelerator pedal fully by your right foot. At this time, quickly read the engine revolution speed.

   NOTE:

   - Do not conduct this test continuously for more than five seconds.
   - There must be an interval of at least one minute between the [D] range and the [R] range.

   Specified Value: 1990 - 2540 rpm

   REFERENCE:

   - If the stall revolution speed fails to conform to the specified value, most likely the following malfunctions are taking place.

Although the stall revolution speed in the [D] range is the same as that in the [R] range, they are lower than the specified value.	• Insufficient engine output • Faulty torque converter stator one-way clutch
Although the stall revolution speed in the [D] range is the same as that in the [R] range, they are higher than the specified value.	• Insufficient transmission fluid amount • Low line pressure • Slipping of forward clutch, direct clutch and 1st & reverse brake, and malfunction of one-way clutch
The stall revolution speed in the [D] range is higher than the specified value.	• Low line pressure • Slipping of forward clutch, and malfunction of one-way clutch
The stall revolution speed in the [R] range is higher than the specified value.	• Low line pressure • Slipping of direct clutch and 1st & reverse brake

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TIME LAG TEST

1. Apply the parking brake and place chocks at the wheels of the vehicle.
2. Start the engine.
3. While depressing the brake pedal, move the shift lever from the [N] range to the [D] range; and from the [N] range to the [R] range at the idle speed. At this time, measure the time elapsed from shifting until a shock is felt.
   NOTE:
   - If the time lag is to be measured consecutively, be sure to put a one-minute interval between the tests.
   - Conduct the test several times. Obtain the mean value.
     Specified Value:
     [N] → [D]: 1 second or less
     [N] → [R]: 1 second or less

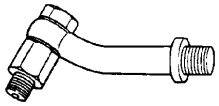
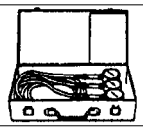
   REFERENCE:
   - If the time lag fails to conform to the specified value, most likely the following malfunctions are taking place.

The time lag when shifted from the [N] range to the [D] range is longer than the specified value.	• Forward clutch slipping • Low line pressure
The time lag when shifted from the [N] range to the [R] range is longer than the specified value.	• Direct clutch slipping • 1st & reverse brake slipping • Low line pressure

JAT00061-00000

HYDRAULIC PRESSURE TEST

1. Articles to be prepared

	Shape	Part number, nomenclature
SST		09325-87201-000 A/T pressure gauge No. 1 adapter
Instrument		Pressure gauge for automatic transmission fluid
		Oil pressure gauge adapter
Grease	DEXRON®III	

JAT00062-00050

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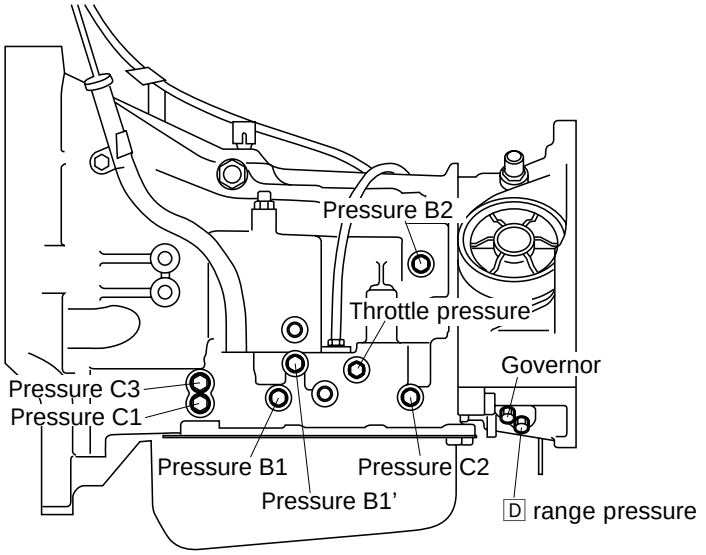
2. Plug position for hydraulic pressure test



Test plug tightening torque
6.9 - 9.8 (0.7 - 1.0)

Unit: N·m (kgf-m)

JAT00063-00051

3. Installation procedure for pressure gauges

NOTE:

- Be sure to use new gaskets for the SST and instrument.
- Never reuse the test plugs.

(1) Remove the test plug and install the pressure gauge.

NOTE:

- Be very careful not to allow the pressure gauge to interfere with the front propeller shaft.

(2) Start the engine and warm up the transmission (fluid temperature 70 - 90 °C). Check the fluid level. Also, check each section for fluid leakage.

4. Measurement procedure for each hydraulic pressure

① **Throttle pressure, D range pressure, pressure C1, pressure C2 and pressure B2**

(1) Apply the parking brake and place chocks at the wheels of the vehicle.
(2) Start the engine.
(3) Strongly depress the brake pedal by your left foot. With the shift lever moved to the D range, R range, and L range, respectively, operate the accelerator pedal by your right foot. At this time, measure each hydraulic pressure.

② **Pressure B1**

(1) Jack up the four wheels. Then, support the vehicle by rigid racks.
(2) Start the engine.
(3) With the shift lever moved to the D range and 2 range, gradually depress the accelerator pedal. Measure the hydraulic pressure after upshift to the 2nd gear takes place. However, in cases where the shift lever is set to the D range, measure the hydraulic pressure at the time when the accelerator pedal is released.

③ **Pressure C3 and pressure B1'**

(1) Jack up the four wheels. Then, support the vehicle by rigid racks.
(2) Start the engine.
(3) With the shift lever moved to the D range, gradually depress the accelerator pedal so that upshift to the 3rd gear may take place. Then, measure the hydraulic pressure at the time when the accelerator pedal is released.

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④ **Governor pressure**

(1) Drive the vehicle onto a speedometer tester.
(2) Start the engine.
(3) With the shift lever moved to the D range, gradually depress the accelerator pedal. Measure the hydraulic pressure at each vehicle speed.

Specified Value

Item		Measurement condition		Specified value (kPa {kg/cm^2})
Throttle pressure		D	Idling revolution condition	29 {0.3} or less
			Stall revolution condition	598 - 637 {6.1 - 6.5}
D range pressure		D	Idling revolution condition	530 - 628 {5.4 - 6.4}
			Stall revolution condition	843 - 941 {8.6 - 9.6}
Line pressure	C2	D	Idling revolution condition	530 - 628 {5.4 - 6.4}
			Stall revolution condition	843 - 941 {8.6 - 9.6}
	C1, B2	R	Idling revolution condition	1265 - 1363 {12.9 - 13.9}
			Stall revolution condition	1971 - 2069 {20.1 - 21.1}
	B2	L	—	431 - 530 {4.4 - 5.4}
		R	Idling revolution condition	1265 - 1363 {12.9 - 13.9}
			Stall revolution condition	1971 - 2069 {20.1 - 21.1}
	B1', C3	D	3rd gear with accelerator pedal "OFF"	530 - 628 {5.4 - 6.4}
	B1	D	2nd gear with accelerator pedal "OFF"	530 - 628 {5.4 - 6.4}
		2	2nd gear	902 - 1000 {9.2 - 10.2}
Governor pressure		30 km/h		49 - 147 {0.5 - 1.5}
		60 km/h		167 - 265 {1.7 - 2.7}

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REFERENCE:

- If each hydraulic pressure fails to conform to the specified value, most likely the following malfunctions are taking place.

All line pressures fail to conform to the specified value.	1. Oil pump faulty 2. Oil strainer clogged 3. Faulty O-ring of oil strainer 4. Improper adjustment of throttle cable 5. Faulty valve body assembly • Loose connecting bolt of valve body • Faulty modulator valve 6. Improper throttle pressure
Only a certain clutch or brake pressure fails to conform to the specified value.	1. Faulty valve body assembly • Leakage or clogging at circuit of the clutch or brake pressure concerned • Faulty piston accumulator of the clutch or brake pressure concerned • Shift valve faulty 2. Manual valve faulty, or improper adjustment of position
D range pressure fails to conform to the specified value.	1. Faulty valve body assembly • Faulty manual valve, or improper adjustment of position • Leakage or clogging of D range pressure circuit 2. Improper line pressure
Throttle pressure fails to conform to the specified value.	1. Improper adjustment of throttle cable 2. Throttle cable detached or broken 3. Faulty valve body assembly • Faulty throttle valve • Leakage or clogging of throttle pressure circuit 4. Improper line pressure
Governor pressure fails to conform to the specified value.	1. Faulty governor valve assembly 2. Faulty valve body assembly • Leakage or clogging of governor pressure circuit 3. Improper line pressure

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RUNNING TEST

NOTE:

- Be sure to confirm safety on the road when conducting the running test.
- Make sure that the fluid temperature is in a normal running condition (70 - 80 °C).

1. D range test

(1) Move off the vehicle with the shift lever set to the D range. Check to see if upshift and downshift take place between the 1st gear and the 2nd gear; between the 2nd gear and the 3rd gear; and between the 3rd gear and the 4th gear (overdrive). Also, check to see if each shift point conforms to the specified value. Furthermore, check that there is no abnormal shock and slipping, etc.

(2) While driving the vehicle with the shift lever set to the D range and the transmission in the 4th gear (overdrive), 3rd gear, and 2nd gear, respectively, perform the kick-down operation. At this time, check to see if kick-down takes place from the 4th gear (overdrive) to the 3rd gear, from the 3rd gear to the 2nd gear; and from the 2nd gear to the 1st gear. Also, check to see if the vehicle speed range during which kick-down is possible conforms to the specified value. Furthermore, check that there is no abnormal shock or slipping, etc.

(3) When the overdrive switch is turned OFF while driving the vehicle in the 4th gear (overdrive), ensure that the downshift from the 4th gear (overdrive) to the 3rd gear takes place.

2. 2 range test

(1) Move off the vehicle with the shift lever set to the 2 range. Check to see if upshift and downshift take place between the 1st gear and the 2nd gear. Also, check to see if each shift point conforms to the specified value. Furthermore, check that there is no abnormal shock and slipping, etc.

(2) Move off the vehicle with the shift lever set to the 2 range. At this time, ensure that upshift from the 1st gear to the 2nd gear takes place and that no upshift to the 3rd gear will take place.

(3) While driving the vehicle with the shift lever set to the 2 range and the transmission in the 2nd gear, perform the kick-down operation. Check to see if kick-down takes place from the 2nd gear to the 1st gear. Also, check to see if the vehicle speed range during which kick-down is possible conforms to the specified value. Furthermore, check that there is no abnormal shock and slipping, etc.

(4) When the shift lever is shifted to the 2 range while driving the vehicle with the shift lever set to the D range and the transmission in the 3rd gear, check that downshift from the 3rd gear to the 2nd gear takes place and engine brake is applied. Also, check to see if the shift point conforms to the specified value.

3. L range test

(1) Move off the vehicle with the shift lever set to the L range. At this time, ensure that no upshift to the 2nd gear will take place.

(2) When the shift lever is shifted to the L range while driving the vehicle with the shift lever set to the D range and the transmission in the 3rd gear, check that downshifts from the 3rd gear → the 2nd gear → the 1st gear take place and engine brake is applied. Also, check to see if the shift point conforms to the specified value.

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4. [P] range test

(1) Park the vehicle on a grade (approximately 5 degrees or more) in a climbing state and move the shift lever to the [P] range. Then, release the parking brake. At this time, check that the parking lock mechanism functions and the vehicle will not move.
(2) Park the vehicle in a descending state, and perform the same check as stated above.
(3) Under conditions above, move the shift lever from the [P] range to other ranges. At this time, check to see if the vehicle moves.

Specified Value

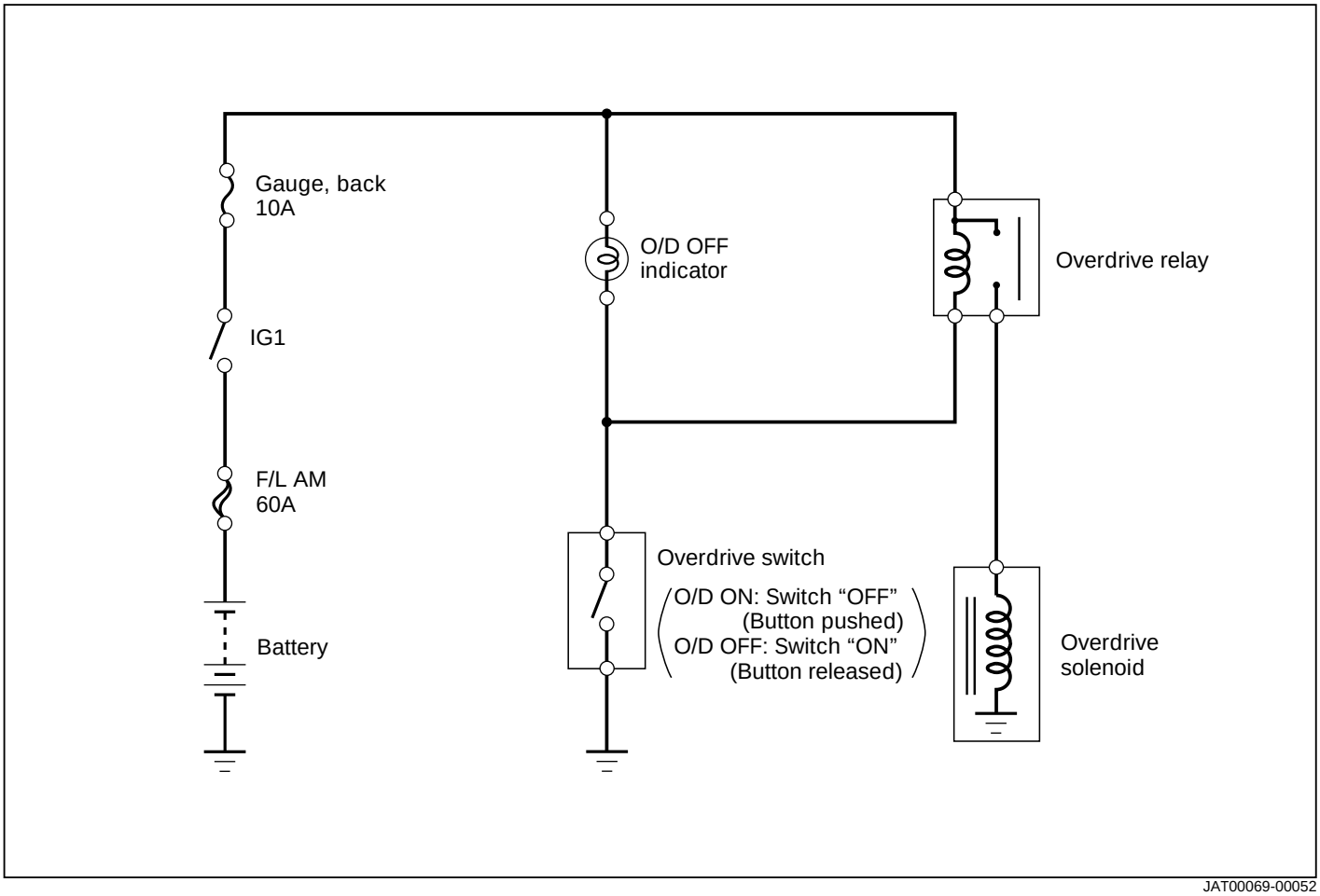
Throttle opening angle	Range	Gear shifting	Vehicle speed (km/h)
100 %	[D]	1st → 2nd	31.6 - 47.6
		2nd → 3rd	67.6 - 83.6
		3rd → 4th	107.8 - 123.8
		4th → 3rd	89.4 - 105.4
		3rd → 2nd	60.7 - 76.7
		2nd → 1st	24.5 - 40.5
0 %	[D]	4th → 3rd	12.0 - 28.0
		3rd → 1st	6.3 - 22.3
0 - 100%	[2], [L]	3rd → 2nd	85.6 - 101.6
	[L]	2nd → 1st	33.7 - 49.7

JAT00068-00000

ELECTRIC-RELATED TESTS

OVERDRIVE SYSTEM

① Wiring diagram



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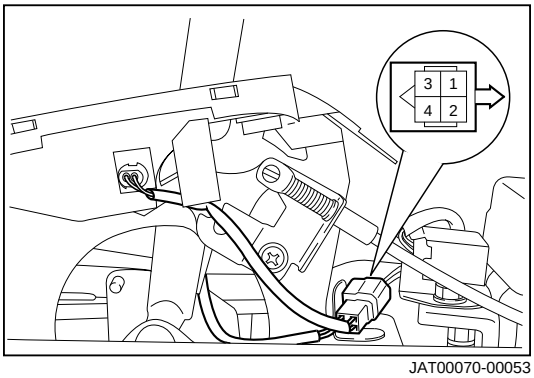
② **Unit inspection**

- **Overdrive switch**

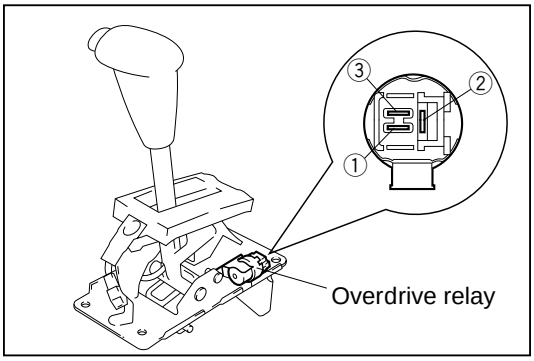
1. When the overdrive switch is turned ON (overdrive possible), check that no continuity exists between the terminals ① and ② of the connector in the right figure. Also, when the overdrive switch is turned OFF (overdrive impossible), check that continuity exists between the same terminals.



JAT00070-00053

- **Overdrive relay**

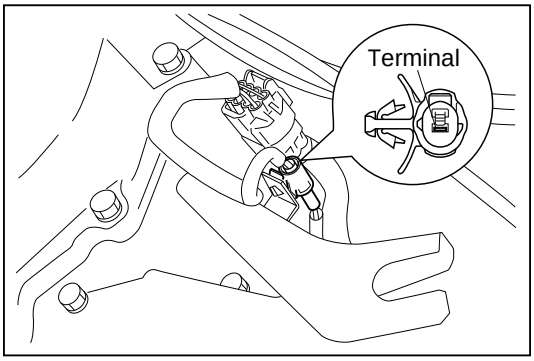
1. Measure the resistance between the terminals ① and ②.
   Specified Value: Approx. 70 Ω
2. Ensure that no continuity exists between the terminals ① and ③.
3. When the battery voltage is applied across the terminals ① and ③, ensure that continuity exists between the terminals ① and ②.



JAT00071-00054

- **Overdrive solenoid**

1. Measure the resistance between the terminal of the overdrive solenoid connector and the ground (transmission case).
   Specified Value: 24 - 27.2 Ω



JAT00072-00055

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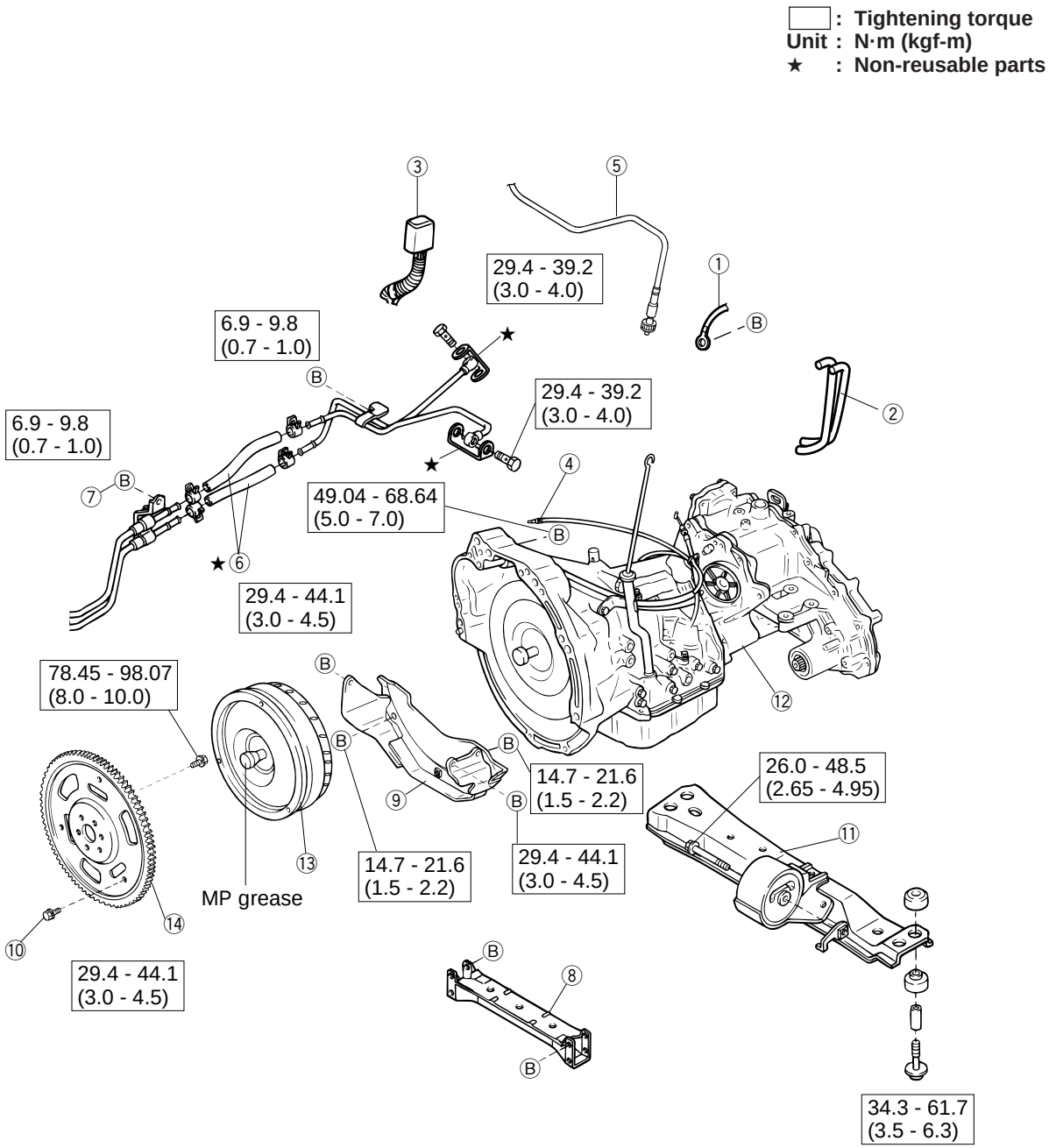
REMOVAL AND INSTALLATION OF AUTOMATIC TRANSMISSION

COMPONENTS



① Ground wire
② Vacuum hose
③ Neutral start switch connector
④ Overdrive solenoid connector
⑤ Speedometer drive cable assembly
⑥ Oil cooler hose
⑦ Bolt (tube bracket × transmission)
⑧ Front lower frame crossmember subassembly
⑨ Power train stiffener
⑩ Bolt (torque converter × drive plate)
⑪ Engine rear support member subassembly with engine mounting rear insulator
⑫ Transmission assembly with transfer assembly
⑬ Torque converter assembly
⑭ Drive plate & ring gear subassembly

JAT00073-00056

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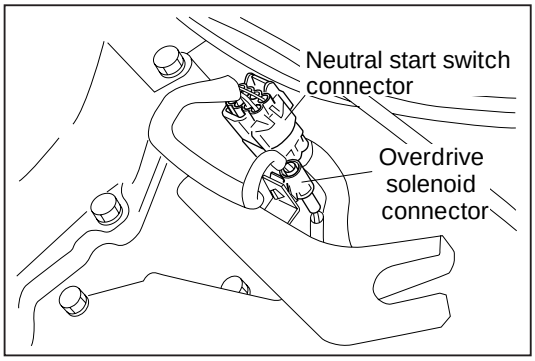
1. Operations prior to removal
   (1) Disconnect the negative (–) terminal of the battery.
   (2) Disconnect the throttle cable at the engine side.
   (3) Drain the automatic transmission fluid.
   (4) Remove the propeller front shaft.
   (5) Remove the propeller shaft.
   (6) Remove the front exhaust pipe.
   (7) Remove the starter assembly.
   (8) Disconnect the control cable at the transmission side.

JAT00074-00000

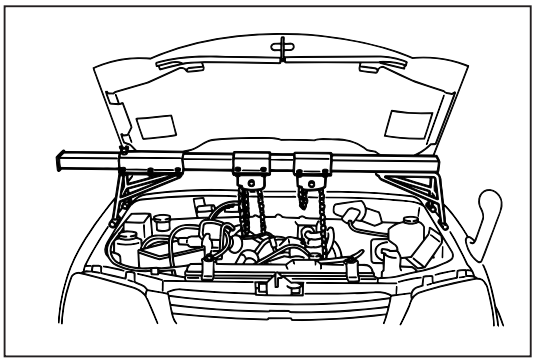
2. Main points of removal
   (1) Disconnect the neutral start switch connector and overdrive solenoid connector.



JAT00075-00057

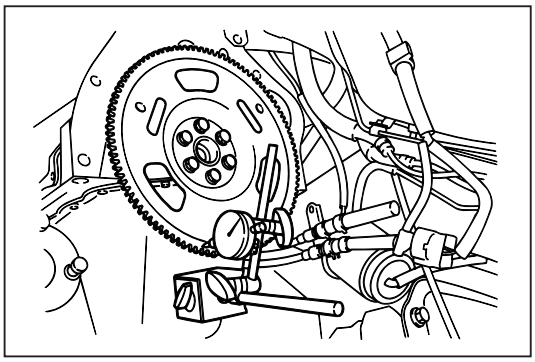
   (2) Support the engine, using an engine supporting bridge. Remove the engine rear support member sub-assembly with the rear engine mounting rear insulator.
   (3) Support the transmission assembly with the transfer, using a transmission jack, etc. Remove the transmission assembly with the transfer.

   NOTE:
   - Be very careful not to deform the oil pan during the removal.



JAT00076-00058

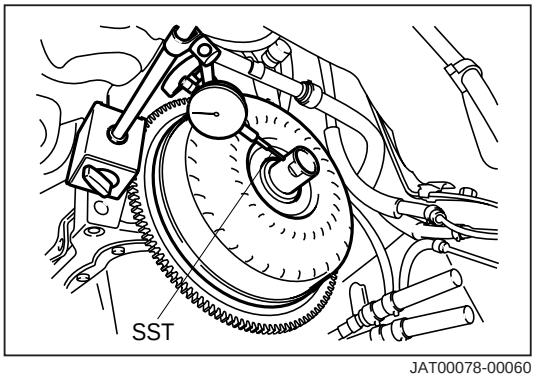
3. Check
   (1) Check the drive plate for runout.
      Limit: 0.25 mm



JAT00077-00059

   (2) Install the torque converter to the drive plate. Check the shaft for runout, using the following SST.
      SST: 09351-87203-000
      Limit: 0.30 mm

   NOTE:
   - Be very careful not to drop the torque converter during the operation.



JAT00078-00060

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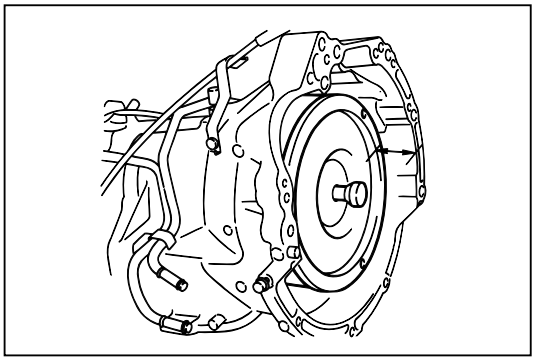
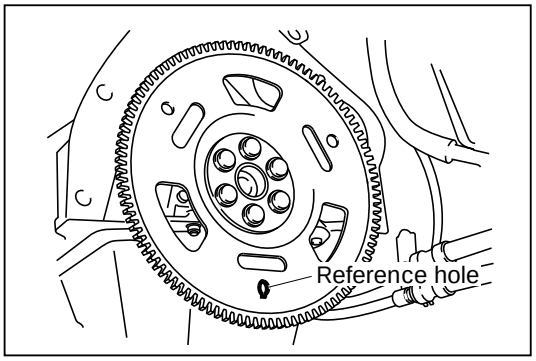
4. Main points of installation
   (1) Insert the torque converter assembly into the transmission assembly. Ensure that the torque converter has been inserted securely.
   Specified Value: Dimension A is 28 mm or more. (Dimension A: Dimension between edge surface of housing and drive plate installation seat of torque converter)


JAT00079-00061

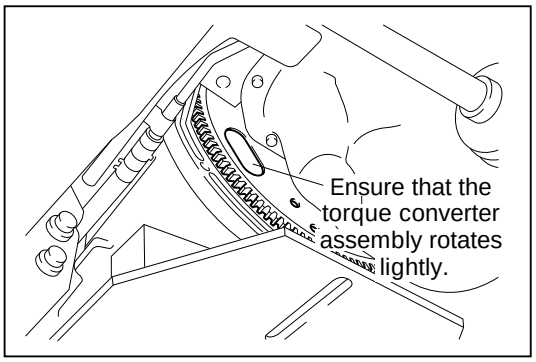
   (2) Install the transmission assembly with the transfer.
      1) Face the reference hole (elongated hole) of the drive plate downward.
      2) Support the transmission assembly with a transmission jack, etc. Then, connect the transmission assembly to the engine.

NOTE:
- Be very careful not to dent the oil pan during the operation.



JAT00080-00062

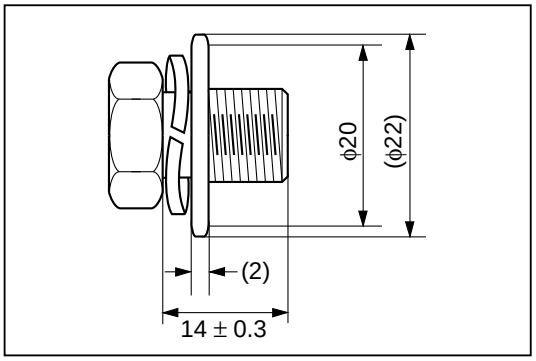
NOTE:
- Before securely tightening the bolts and nuts (engine × transmission), make sure that the torque converter turns lightly. If the torque converter will not turn lightly, it means that the torque converter is deviated from the specified position. Therefore, remove the transmission and securely insert the torque converter into the specified position. (If the bolts and nuts are tightened securely with the torque converter deviated from the specified position, there will be the possibility that the oil pump be damaged.)
  Tightening Torque: 49.04 - 68.64 N·m (5.0 - 7.0 kgf-m)



JAT00081-00063

   (3) Install the bolts (drive plate × torque converter).
      1) First, tighten the bolt in the reference hole (elongated hole) of the drive plate.

NOTE:
- Never use bolts other than the bolt indicated in the right figure. (If those bolts longer than the specified bolt should be used, it would lead to improper tightening or deformation of the inner shape of the converter, thus resulting in hampering the functions.)
  Tightening Torque: 29.4 - 44.1 N·m (3.0 - 4.5 kgf-m)



JAT00082-00064

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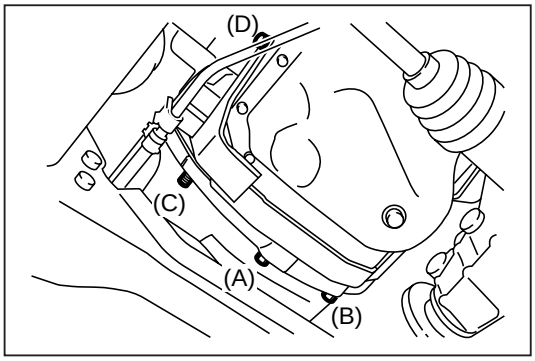
(4) Install the power train stiffener. Tighten the bolts in the following sequence.
   1) Temporarily tighten the bolt (A).
   2) Securely tighten the bolts in the sequence of the bolt (B), bolt (A), bolt (E), bolt (F), bolt (C), and bolt (D).

REFERENCE:

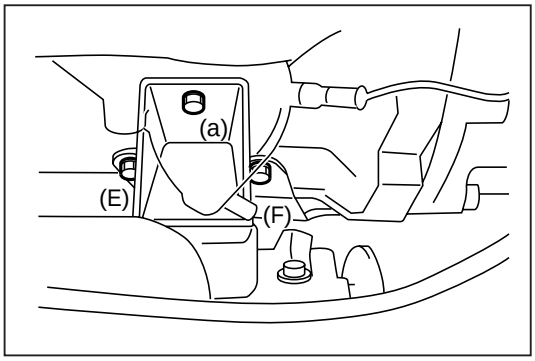
- If any difficulty is encountered in inserting the bolts (E) and (F), loosen the bolt (a) before the operation.



JAT00083-00065

Tightening Torque:

M10 29.4 - 44.1 N·m (3.0 - 4.5 kgf-m)
M8 14.7 - 21.6 N·m (1.5 - 2.2 Kgf-m)



JAT00084-00066

5. Operations after installation
   (1) Install the starter assembly.
   (2) Install the control cable assembly at the transmission side.
   (3) Install the front exhaust pipe.
   (4) Install the propeller shaft.
   (5) Install the propeller front shaft.
   (6) Connect the throttle cable at the engine side.
   (7) Fill automatic transmission fluid.
   (8) Perform the basic check and adjustment.

JAT00085-00000

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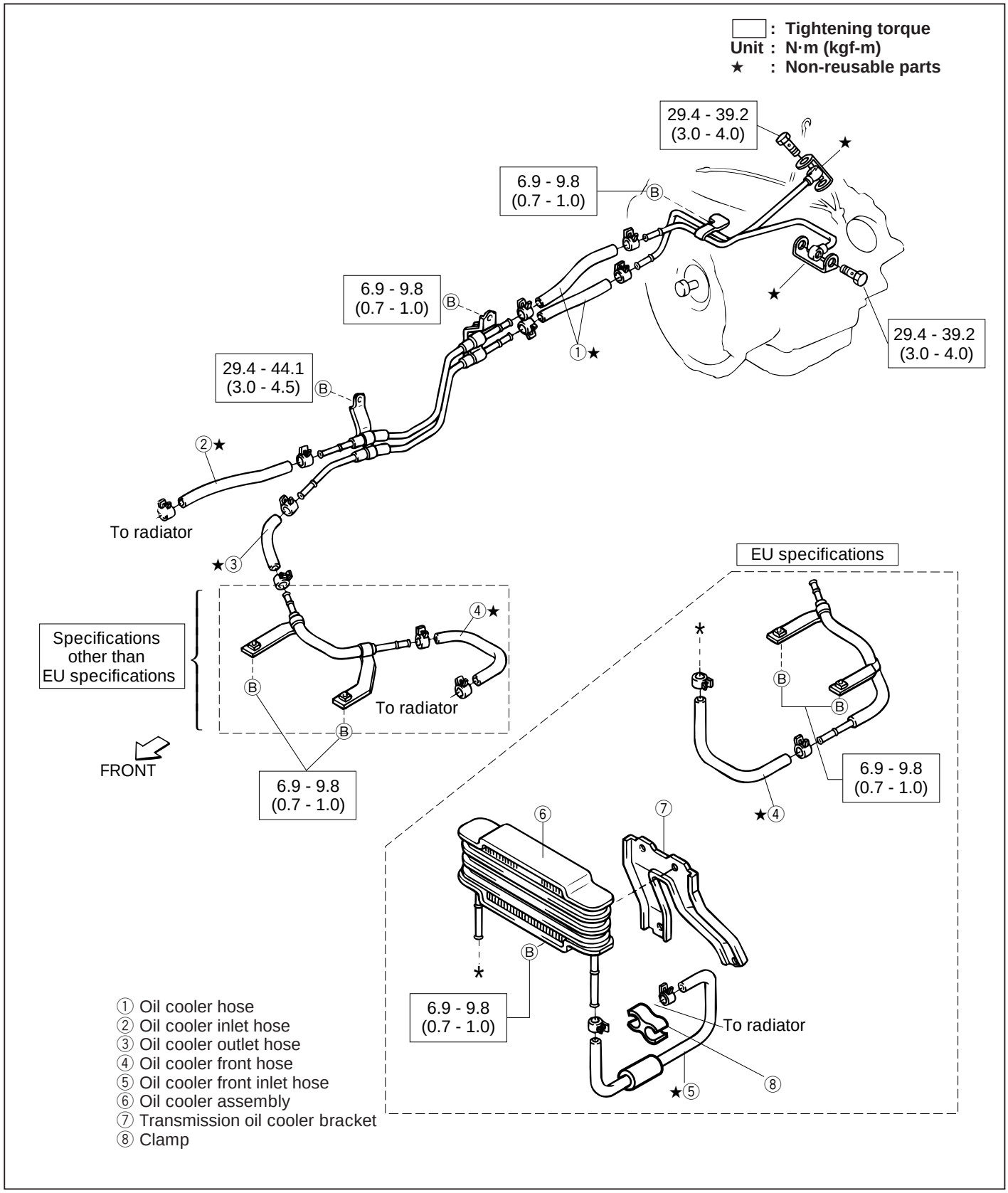
CONNECTION AND DISCONNECTION OF OIL COOLER HOSES

COMPONENTS

1. Operations prior to removal

(1) • Remove the center engine undercover. (Except EU specifications)
• Remove the center engine undercover, radiator grill and front bumper cover. (EU only)



JAT00086-00067

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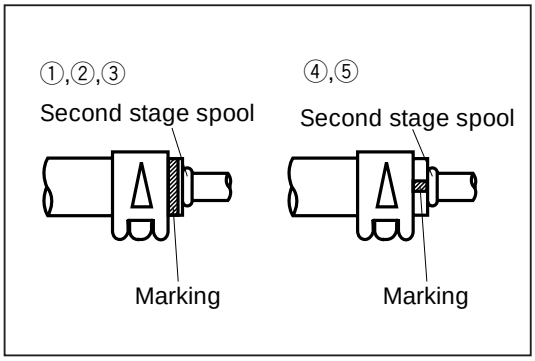
2. Main points of removal

Table showing identification of oil cooler hose

	Length (mm)	Remarks
① Oil cooler hose	125	—
② Oil cooler inlet hose	246	—
③ Oil cooler outlet hose	189	—
④ Oil cooler front hose	—	Moulded hose
⑤ Oil cooler front inlet hose		Moulded hose

JAT00087-00000

(1) Completely degrease the hose connecting section. Insert new oil cooler hoses ①, ②, ③, ④ and ⑤ up to the second stage spools of the oil cooler tube and the union at the oil cooler side, while making sure that those hoses may not be twisted. Then, attach the clip, while aligning it with the edge of the marking. However, the oil cooler front hoses (moulded hoses) ④ and ⑤ should be connected in such a way that the marking faces just downward of the vehicle.



JAT00088-00068

3. Operations after installation

(1) Check the automatic transmission fluid level. Replenish the fluid, as required.

(2)
- Install the center engine undercover. (Except EU specifications)
- Install the center engine undercover, front bumper cover and radiator grill. (EU only)

JAT00089-00000

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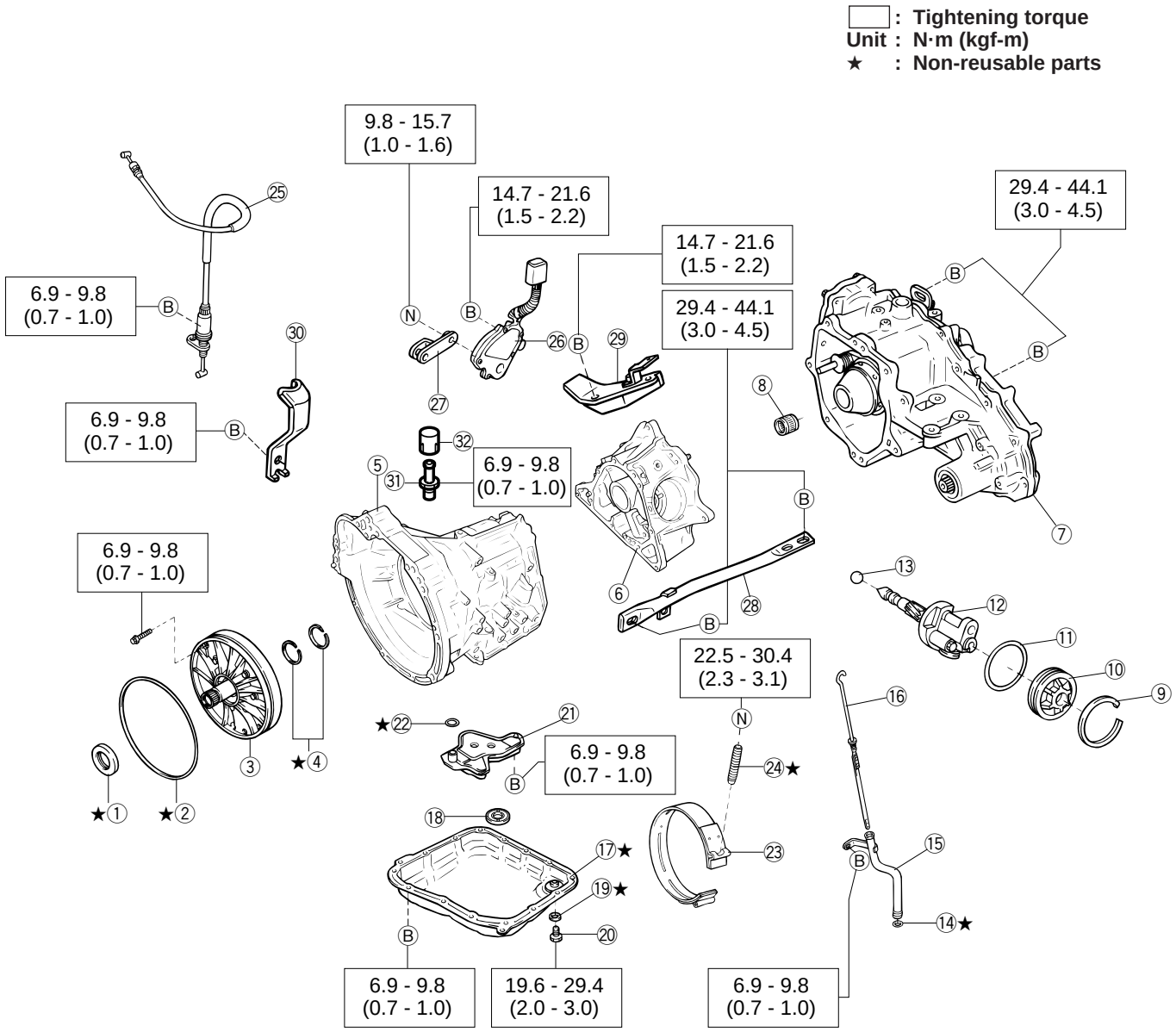
DISASSEMBLY AND ASSEMBLY OF AUTOMATIC TRANSMISSION

COMPONENTS



① T-type oil seal
② O-ring
③ Stator shaft & oil pump assembly
④ Clutch drum oil seal ring
⑤ Transmission case subassembly
⑥ Transmission case side cover subassembly
⑦ Transfer assembly
⑧ Needle roller bearing
⑨ Hole snap ring
⑩ Governor cover
⑪ O-ring
⑫ Governor body assembly
⑬ Ball
⑭ O-ring
⑮ Transmission oil filler tube subassembly
⑯ Transmission oil level gauge subassembly
⑰ Transmission oil pan assembly
⑱ Transmission magnet
⑲ gasket
⑳ W/head straight screw plug
㉑ Oil strainer subassembly
㉒ O-ring
㉓ Transmission brake band assembly
㉔ Transmission brake band adjusting anchor bolt
㉕ Throttle cable assembly
㉖ Neutral start switch assembly
㉗ Transmission control shaft lever subassembly
㉘ Power train stiffener
㉙ Control cable bracket
㉚ Throttle cable clamp
㉛ Breather plug No. 1
㉜ Breather plug No. 2

JAT00090-00069

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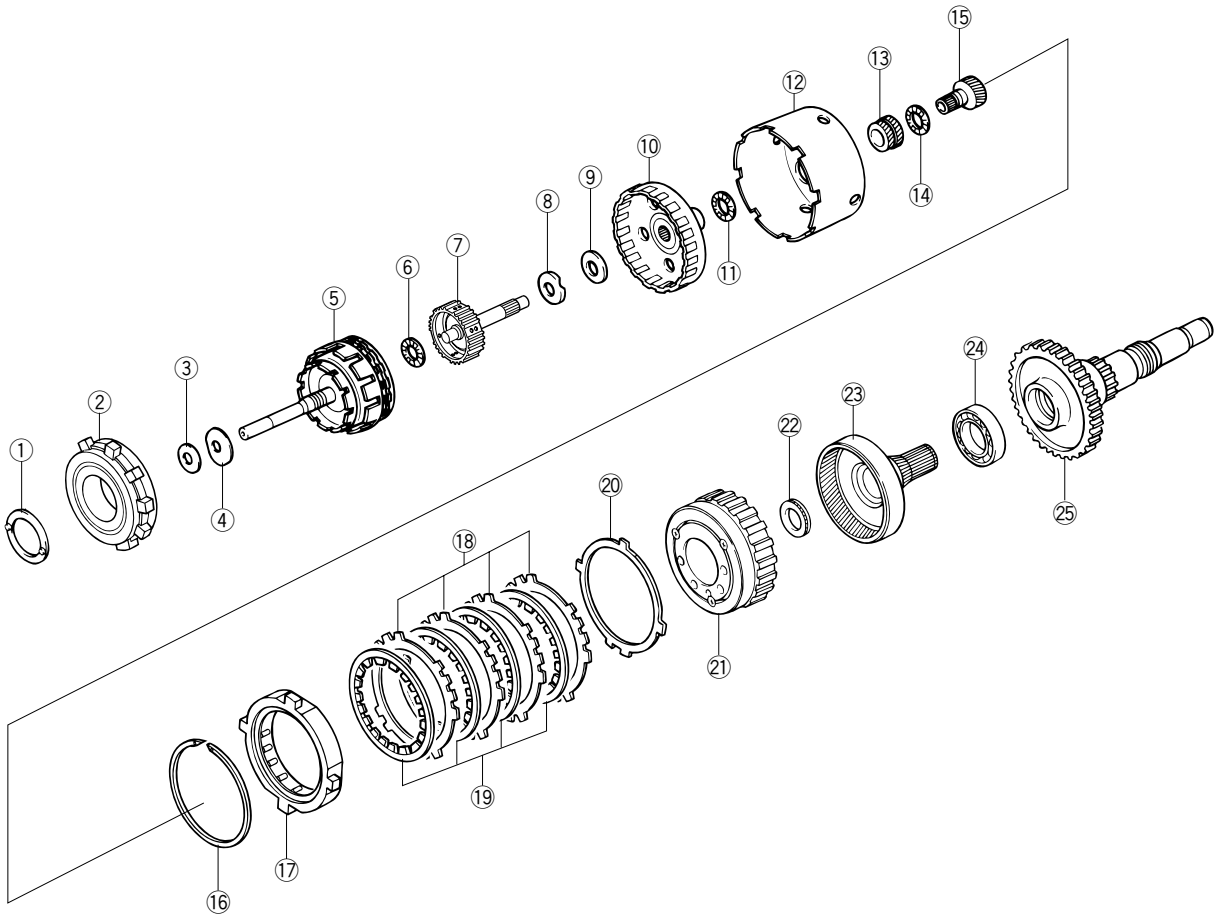
COMPONENTS (INNER PARTS)



① Clutch drum thrust washer
② Direct clutch assembly
③ Thrust needle roller bearing
④ Thrust bearing race
⑤ Forward clutch assembly
⑥ Thrust needle roller bearing
⑦ Intermediate shaft subassembly
⑧ Thrust needle roller bearing
⑨ Thrust bearing race
⑩ Forward clutch hub
⑪ Thrust needle roller bearing
⑫ 2nd brake drum
⑬ Planetary sun gear subassembly
⑭ Thrust needle roller bearing
⑮ Rear planetary sun gear subassembly
⑯ Hole snap ring
⑰ One-way clutch
⑱ Brake plate
⑲ Brake disc
⑳ Brake cushion plate
㉑ Planetary gear assembly
㉒ Thrust needle roller bearing
㉓ Planetary output shaft subassembly
㉔ Radial ball bearing
㉕ Output shaft assembly

JAT00091-00070

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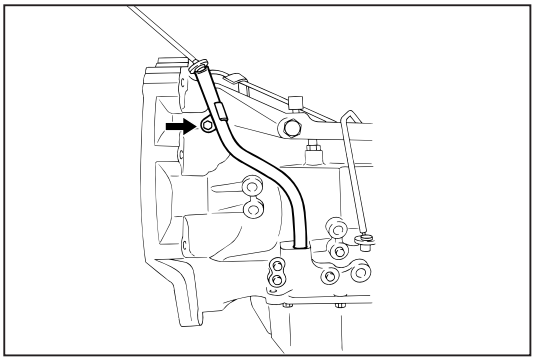
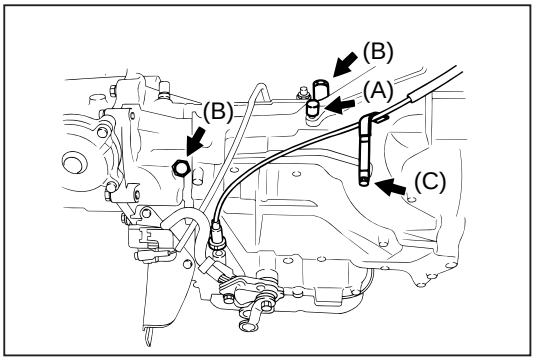
REMOVAL

1. Remove the bolt of the transmission oil filler tube subassembly.
2. Pull out the transmission oil filler tube subassembly toward upside.
3. Remove the O-ring from the transmission oil filler tube subassembly.
   NOTE:
   - Never reuse the removed O-ring.



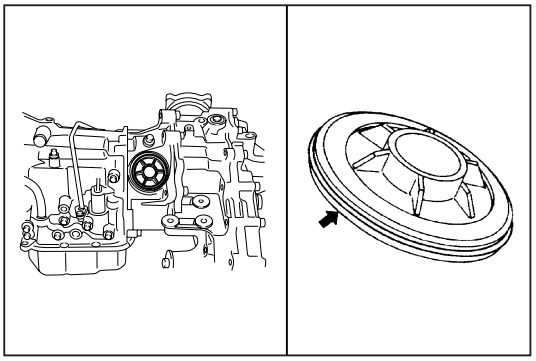
JAT00092-00071

4. Remove the breather plug (A) and union bolts (B) (for oil cooler).
   NOTE:
   - Never reuse the removed gaskets.
5. Remove the clamp (C) for the throttle cable.



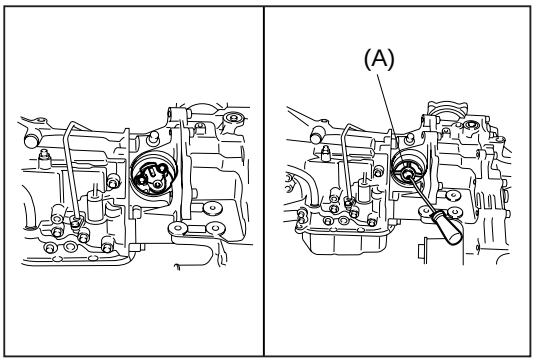
JAT00093-00072

6. Removal of governor valve
   (1) Remove the hole snap ring, using standard snap ring pliers.
   (2) Remove the governor cover with the O-ring installed, using standard pliers.
   (3) Remove the O-ring from the governor cover.
   NOTE:
   - Never reuse the removed O-ring.



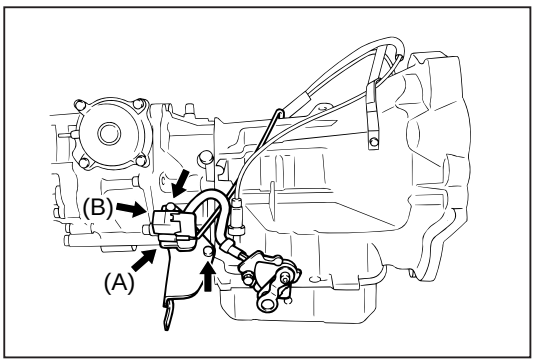
JAT00094-00073

   (4) Remove the governor body assembly from the transmission case.
   (5) Remove the ball (A), using a standard magnet hand.



JAT00095-00074

7. Detach the connector (A) of the solenoid wire assembly from the clamp of the control cable bracket.
8. Removal of neutral start switch assembly
   (1) Remove the control cable bracket by removing the two bolts.
   (2) Detach the connector (B) (of the neutral start switch) from the clamp of the control cable bracket.



JAT00096-00075

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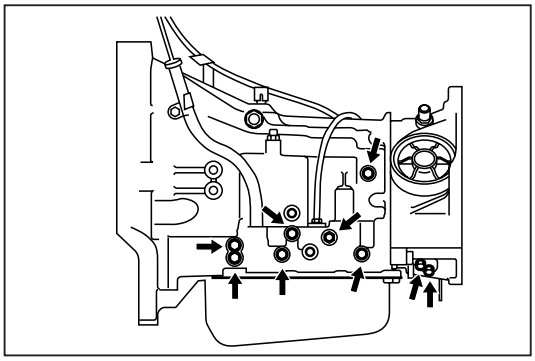
(3) Remove the transmission control shaft lever sub-assembly by removing the nut.
(4) Remove the neutral start switch assembly by removing the bolt.

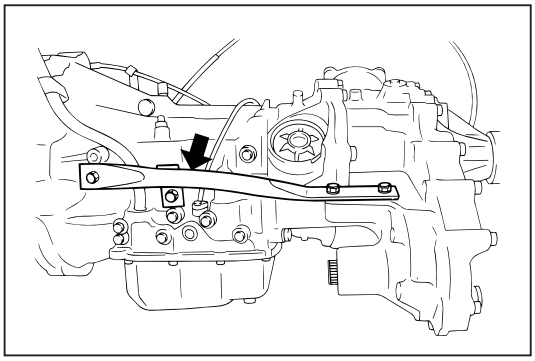
JAT00097-00000

9. Remove the nine inspection plugs from the transmission.
NOTE:
- Never reuse the removed plugs.



JAT00098-00076

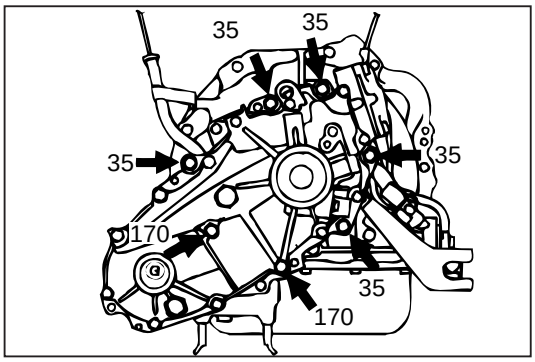
10. Remove the power train stiffener.



JAT00099-00077

11. Removal of transfer assembly
NOTE:
- For the disassembling procedure of the transfer, refer to the TR section.

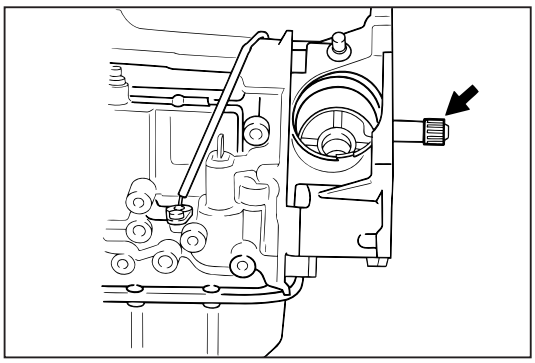
(1) Remove the seven bolts indicated in the right figure.
NOTE:
- The numerals in the right figure denote the nominal length of each bolt. (Unit: mm)



JAT00100-00078

(2) Tap the rib section of the transfer case. Then, pull it out toward you.

12. Remove the needle roller bearing at the forward end of the output shaft assembly.



JAT00101-00079

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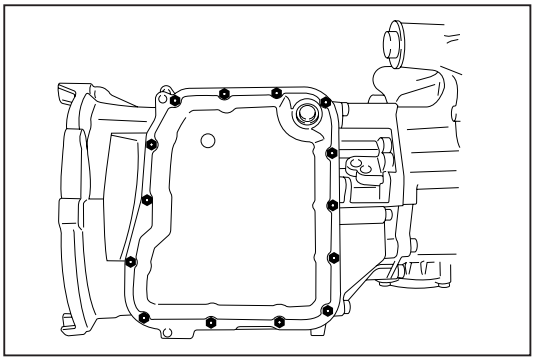
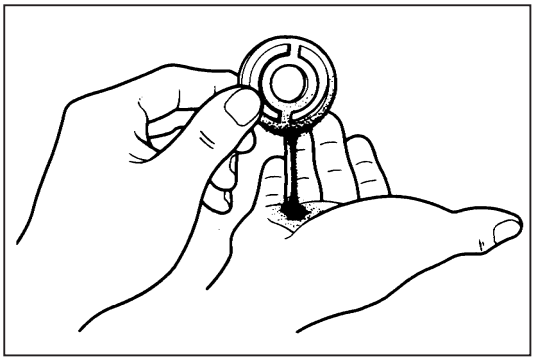
13. Remove the transmission oil pan assembly by removing the fourteen bolts.
    CAUTION:
    - Do not turn over the transmission, for this will contaminate the valve body with foreign materials deposited at the bottom of the oil pan.

    NOTE:
    - Never reuse the removed oil pan assembly.



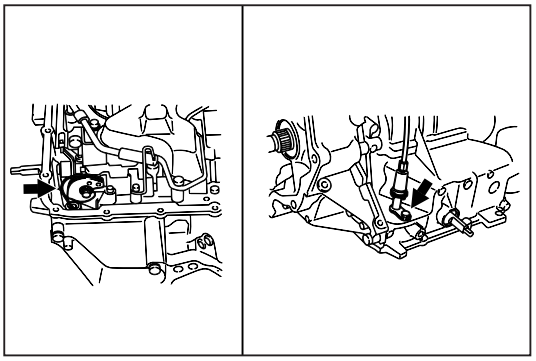
JAT00102-00080

14. Check of pan for particles
    Remove the transmission magnet and use them to collect any steel chips. Inspect the oil pan for any chips and particles collected on the magnet. Inspect them carefully to find out the type of wear of the transmission.
    Steel (magnetic) ... Wear of bearing, gear and plate
    Brass (nonmagnetic) ... Wear of bush



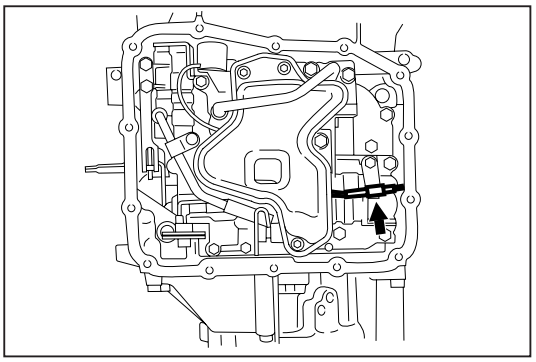
JAT00103-00081

15. Disconnect the throttle cable from the throttle valve cam.
16. Remove the throttle cable attaching bolt.
17. Pull out the throttle cable from the transmission case.
18. Remove the O-ring of the throttle cable.
    NOTE:
    - Never reuse the removed O-ring.



JAT00104-00082

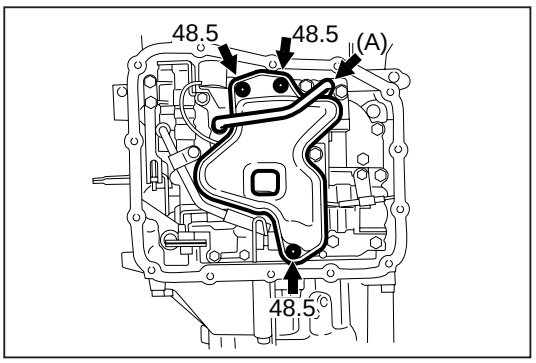
19. Disconnect the connector of the solenoid wire assembly indicated by the arrow mark in the right figure.



JAT00105-00083

20. Remove the oil strainer subassembly by removing the three bolts.
    NOTE:
    - Be sure to remove the bolts evenly and uniformity.
    - The numerals in the right illustration indicate the nominal length of the bolt.

21. Disconnect the valve body tube (A).



JAT00106-00084

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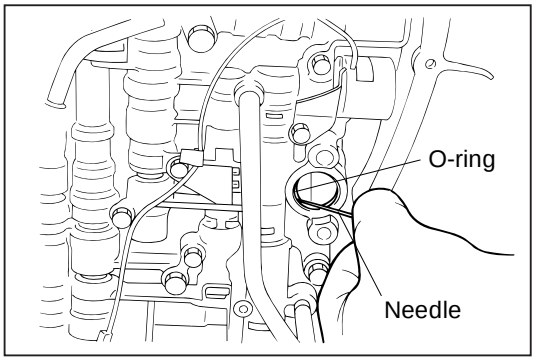
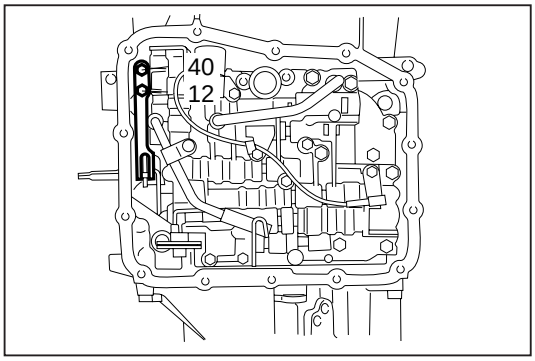
22. Remove the O-ring by sticking a needle into the O-ring for the oil strainer which has been installed at the valve body side.
    NOTE:
    - Be very careful not to scratch the valve body when sticking the needle into the O-ring.
    - Never reuse the removed O-ring.



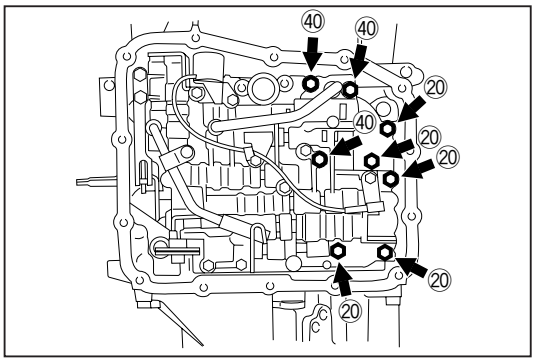
JAT00107-00085

23. Remove the manual detent spring by removing the two bolts.
    NOTE:
    - Be sure to remove the bolts evenly and uniformity.
    - The numerals in the right illustration indicate the nominal length of the bolt.



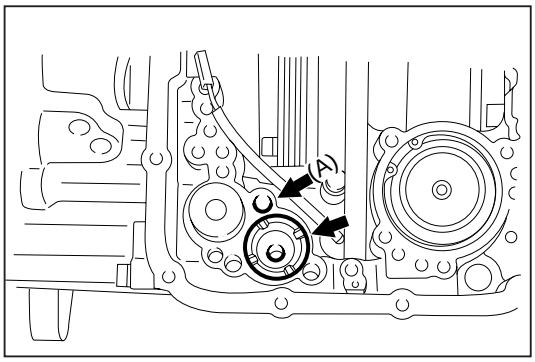
JAT00108-00086

24. Remove the valve body assembly.
    NOTE:
    - Be sure to remove the bolts evenly and diagonally.
    - The numerals in the right illustration indicate the nominal length of the bolt.



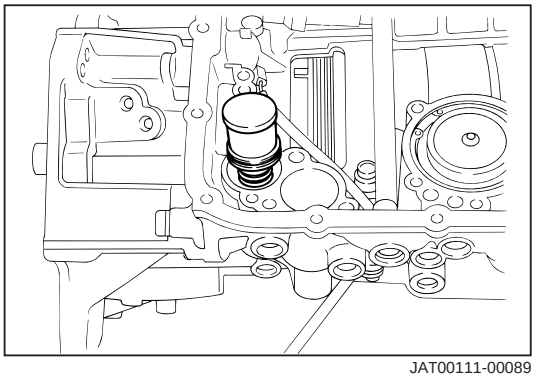
JAT00109-00087

25. Remove the compression spring of the B_1 accumulator piston.
26. Lightly hold the arrow-headed section of the accumulator No. 1 piston.
27. Remove the piston with the accumulator seal No. 1 and No. 2 rings installed by applying compressed air into the oil hole (A).
    NOTE:
    - Be sure to put on protection goggles since oil may splash when using compressed air.



JAT00110-00088

28. Remove the accumulator No. 2 piston with the seal No. 1 ring installed and compression spring.


JAT00111-00089

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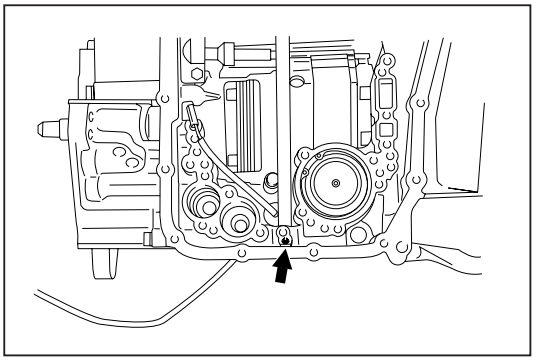
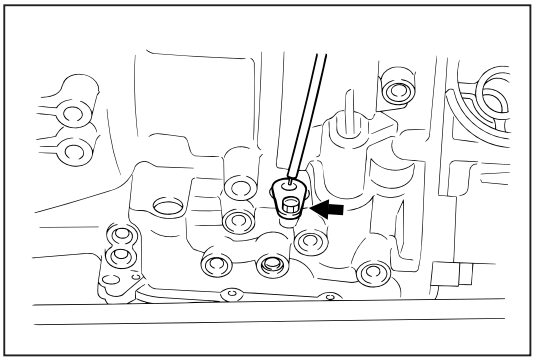
29. Remove the roller for manual valve lever shaft subassembly, using a standard magnet hand.



JAT00112-00090

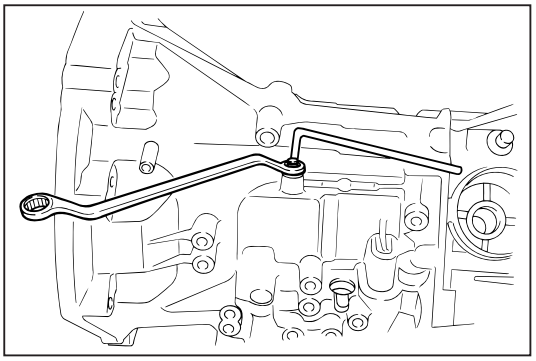
30. Remove the solenoid wire assembly attaching bolt.
31. Pull out the the solenoid wire assembly from the transmission case.



JAT00113-00091

32. Removal of 2nd brake piston assembly
    (1) Remove the lock nut of the transmission brake band adjusting anchor bolt.
    (2) Remove the transmission brake band adjusting anchor bolt, using a standard screwdriver or the like.

    NOTE:
    - Never reuse the removed anchor bolt.



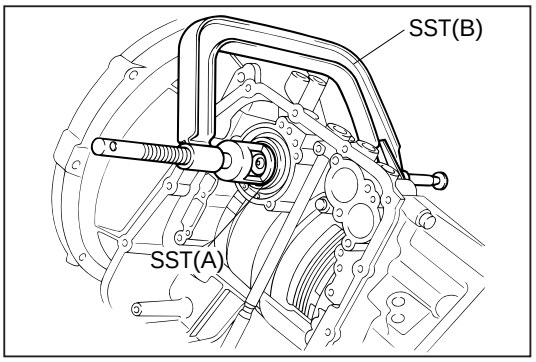
JAT00114-00092

    (3) Remove the hole snap ring, using snap ring pliers in combination with the following SSTs.
        SST: 09202-87002-000 ..... (A)
             09202-87002-0A0 ..... (B)

    (4) Gradually loosen the SSTs (A) and (B) above, until the compression spring for the 2nd coast brake piston is released fully. Then, remove the SSTs.

    NOTE:
    - In cases where the 2nd coast brake piston will not come out, slightly loosen the SSTs above. Then, apply a light impact by means of a plastic hammer to remove the 2nd coast brake piston.

    (5) Remove the 2nd brake piston assembly and compression spring.



JAT00115-00093

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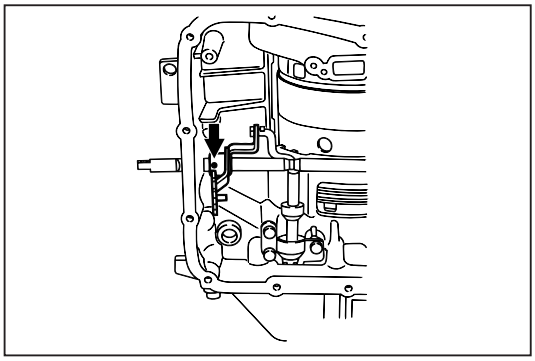
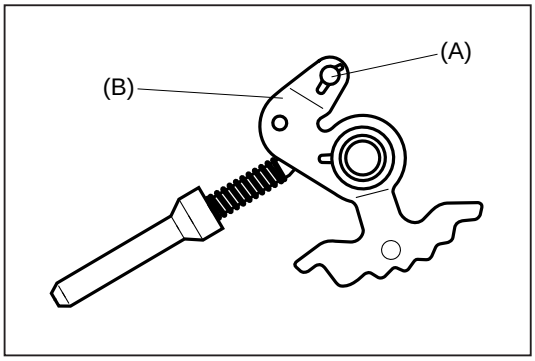
33. Remove the slotted spring pin, using a pin punch and a hammer.
    NOTE:
    - When removing the slotted spring pin, be very careful not to drop it into the transmission case.
    - Never reuse the removed slotted spring pin.



JAT00116-00094

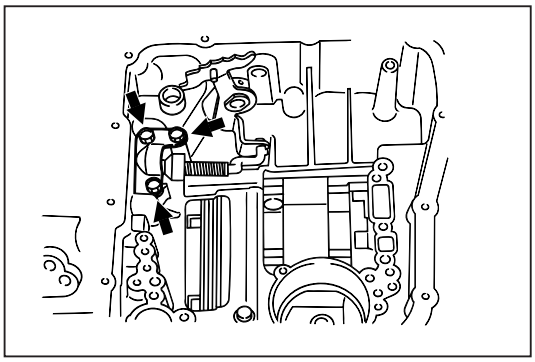
34. Pull out the manual valve lever shaft subassembly.

35. Remove the manual valve lever by aligning the cut-out groove of the manual valve lever (B) with the protruding section of the parking lock rod (A).



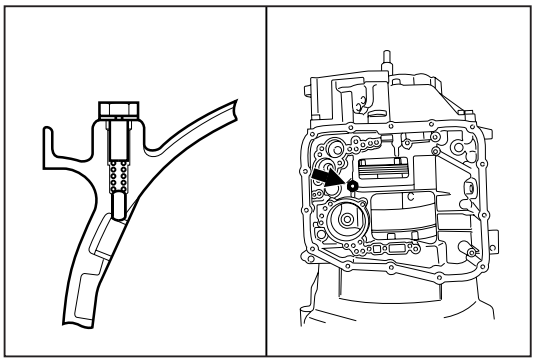
JAT00117-00095

36. Remove the parking lock cam support and parking lock rod subassembly by removing the three bolts.



JAT00118-00096

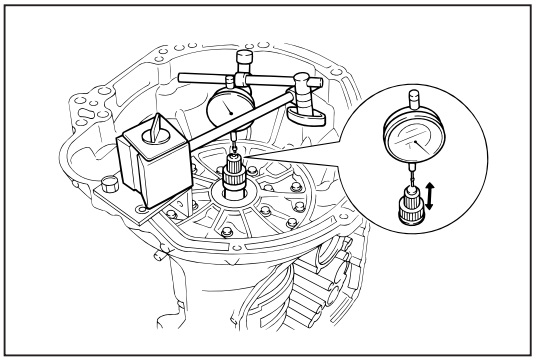
37. Remove the roller for the one-way clutch outer race, and compression spring by removing the bolt.



JAT00119-00097

38. Measure the input shaft end play, using a dial gauge in conjunction with the following SST.
    SST: 09351-87210-000
    Specified Value: 0.28 - 0.92 mm

    NOTE:
    - Be sure to record the measured value for a guide during the assembly.



JAT00120-00098

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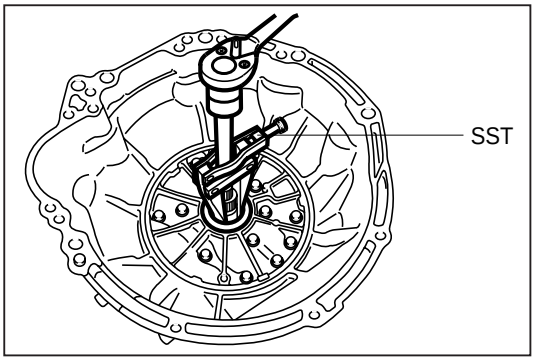
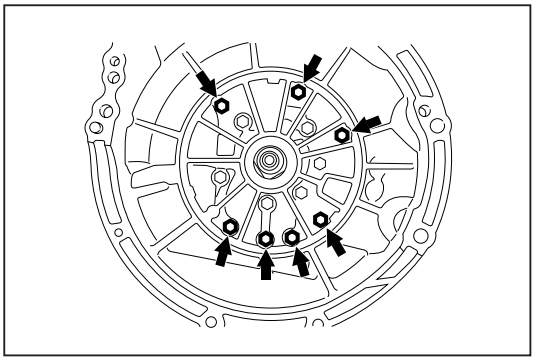
39. Remove the T type oil seal, using the following SST.
    SST: 09308-10010-000

    NOTE:
    - Never reuse the removed oil seal.



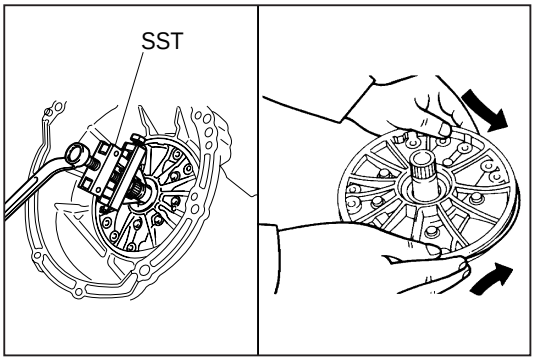
JAT00121-00099

40. Remove the seven bolts of the stator shaft & oil pump assembly.
    NOTE:
    - Be sure to remove the bolts evenly and diagonally.
    - Never loosen any bolt other than the specified ones in the right figure.


JAT00122-00100

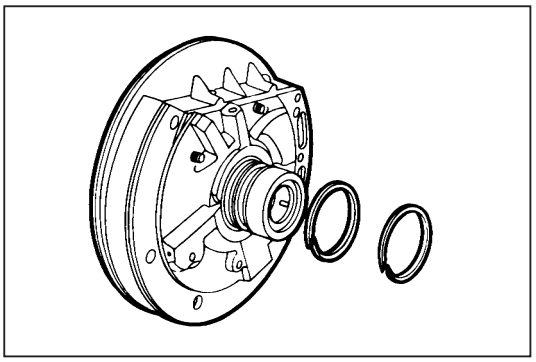
41. Remove the stator shaft & oil pump assembly with the O-ring installed, using the following SST.
    SST: 09820-00021-000

42. Remove the O-ring from the stator shaft & oil pump assembly.
    NOTE:
    - Never reuse the removed O-ring.

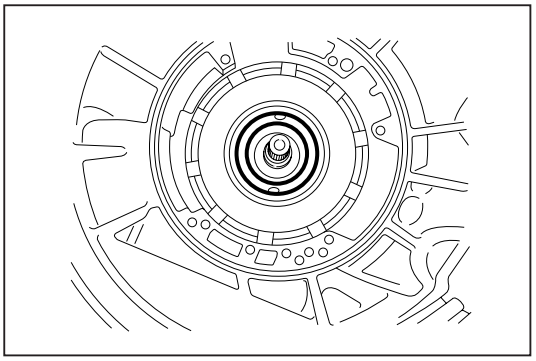


JAT00123-00101

43. Remove the two clutch drum oil seal rings.
    NOTE:
    - Never reuse the removed oil seal rings.


JAT00124-00102

44. Remove the clutch drum thrust washer (resin made) from the direct clutch.
    NOTE:
    - If no thrust washer (resin made) is provided on the direct clutch, make sure that the thrust washer is installed at the stator shaft & oil pump assembly side.


JAT00125-00103

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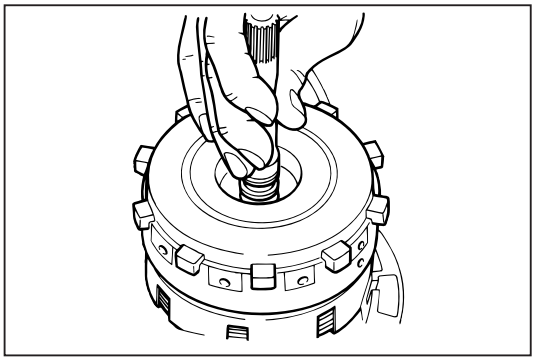
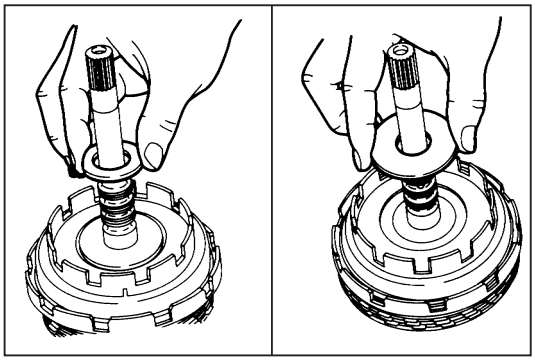
45. Remove the direct clutch together with the forward clutch at the same time.
46. Remove the direct clutch from the forward clutch.



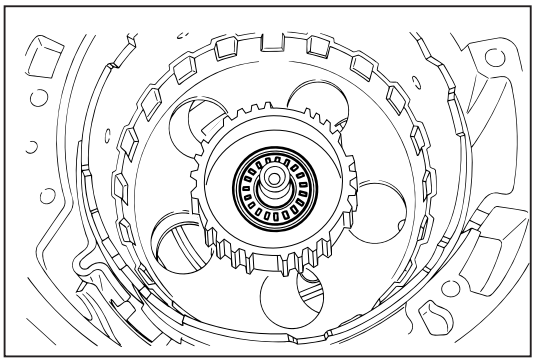
JAT00126-00104

47. Remove the thrust needle roller bearing from the forward clutch.
48. Remove the thrust bearing race from the forward clutch.



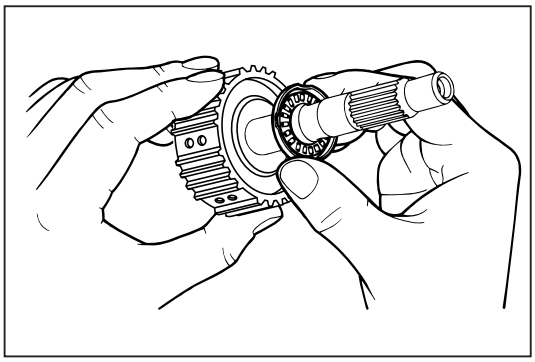
JAT00127-00105

49. Removal of intermediate shaft subassembly
    (1) Remove the thrust needle bearing from the intermediate shaft subassembly.
    (2) Remove the intermediate shaft subassembly.



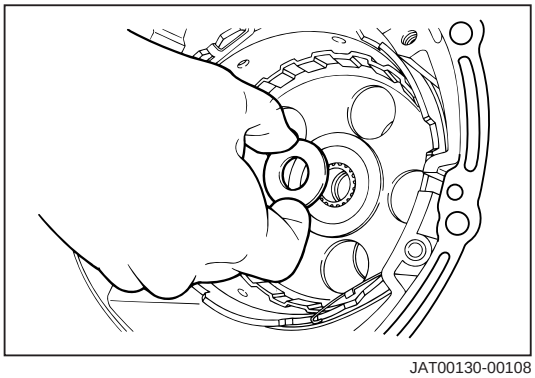
JAT00128-00106

    (3) Remove the thrust needle bearing from the intermediate shaft subassembly.



JAT00129-00107

50. Removal of forward clutch hub and 2nd brake drum
    (1) Remove the thrust bearing race from the forward clutch hub.



JAT00130-00108

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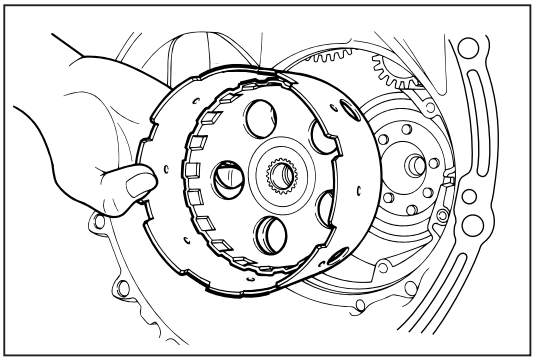
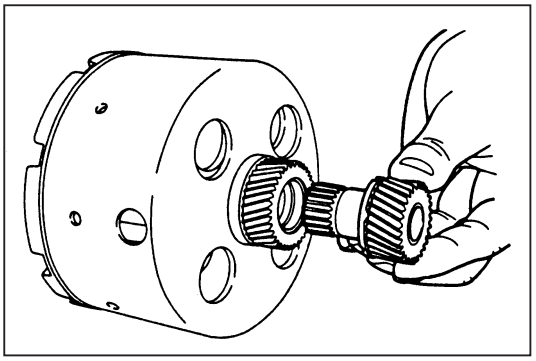
(2) Remove the 2nd brake drum (together with the forward clutch hub).



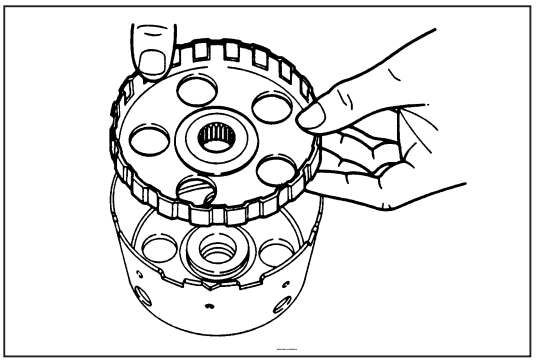
JAT00131-00109

(3) Remove the rear planetary sun gear subassembly from the 2nd brake drum.
(4) Remove the thrust needle bearing from the rear planetary sun gear subassembly.



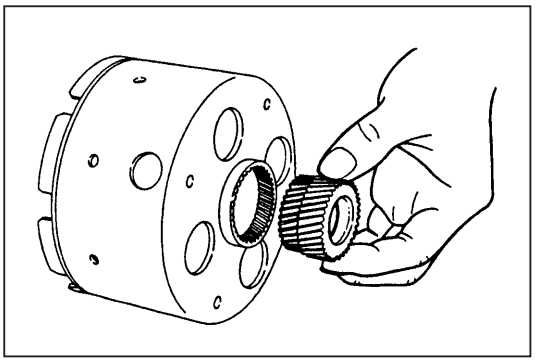
JAT00132-00110

(5) Remove the forward clutch hub from the 2nd brake drum.
(6) Remove the thrust needle bearing from the 2nd brake drum.



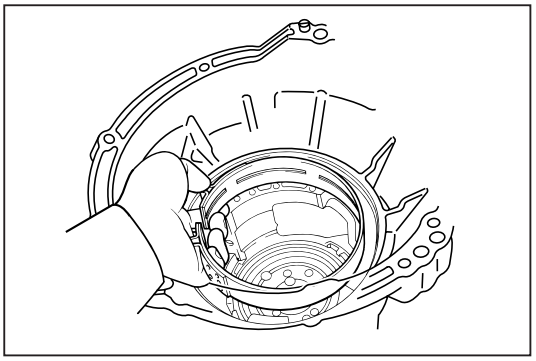
JAT00133-00111

(7) Remove the planetary sun gear assembly from the 2nd brake drum.



JAT00134-00112

51. Remove the transmission brake band assembly.



JAT00135-00113

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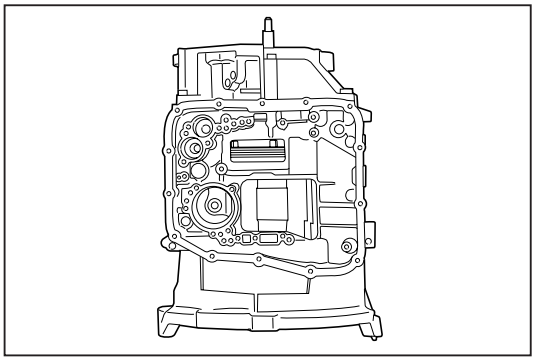
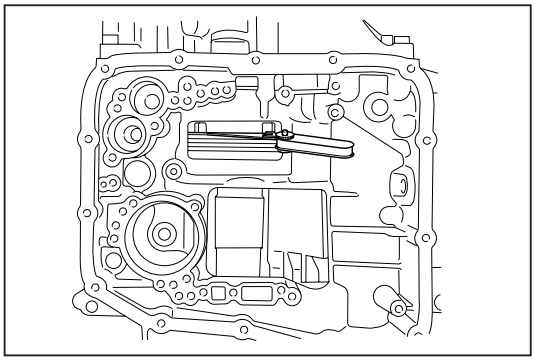
52. Measurement of 1st & reverse brake end play
    (1) Turn over the transmission case.



JAT00136-00114

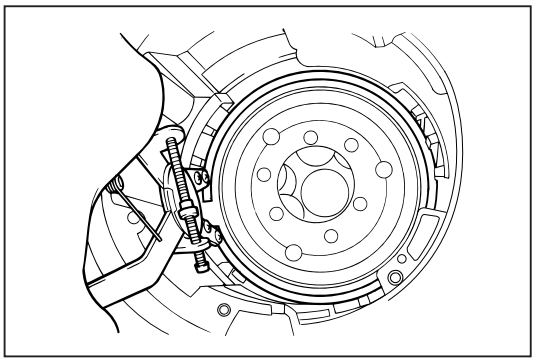
    (2) Measure the 1st & reverse brake end play, using a standard feeler gauge.
        Specified Value: 1.04 - 1.41 mm



JAT00137-00115

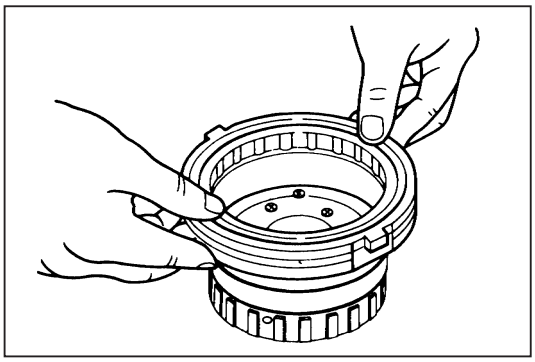
    NOTE:
    - Be sure to record the measured value for a guide during the assembly.
    - The tightness which you encounter during this insertion/withdrawal of the feeler gauge should be virtually the same as the tightness which you would encounter during the thickness adjustment of the valve rocker arm.

53. Removal of planetary gear and one-way clutch
    (1) Remove the hole snap ring, using snap ring pliers.
    (2) Remove the planetary gear assembly with the one-way clutch installed.



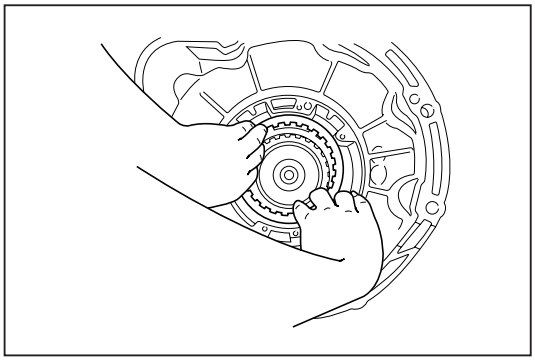
JAT00138-00116

    (3) Remove the one-way clutch from the planetary gear assembly.



JAT00139-00117

54. Removal of 1st & reverse brake
    (1) Move the brake discs, brake plates and brake cushion plate as a set in such a way that they face toward the front side.
    (2) Remove the discs, plates and cushion plate in the following order.
        D = Brake disc, P = Brake plate
        B = Brake cushion plate
        D → P → D → P → D → P → D → P → B



JAT00140-00118

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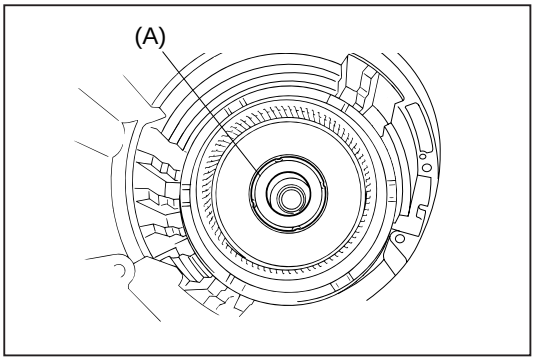
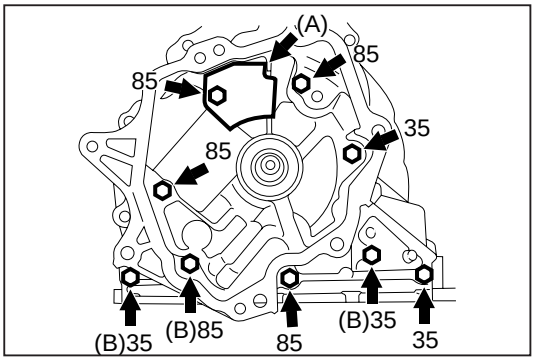
(3) Remove the thrust needle roller bearing (A) from the planetary output shaft subassembly.



JAT00141-00119

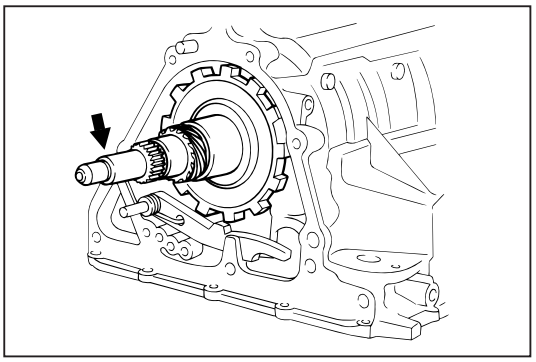
55. Removal of transmission case side cover
(1) Remove the nine bolts and oil guide plate (A).
NOTE:
- The numerals in the right figure denote the nominal length of each bolt.
- Never reuse the removed three bolts (B).

(2) Remove the transmission case side cover, using a plastic hammer.
NOTE:
- Lightly apply an impact to the right and left sides of the transmission case side cover, using a plastic hammer, when removing the cover.
- Be very careful not to scratch the oil seal lip by the spline of the output shaft when removing the transmission case side cover.



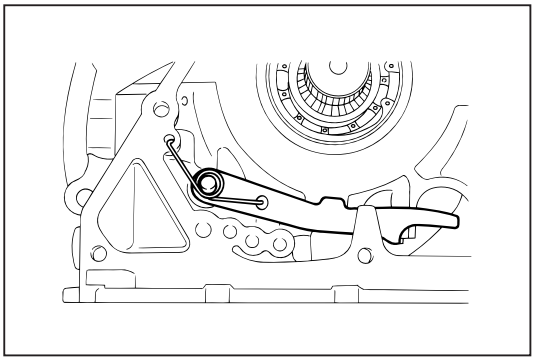
JAT00142-00120

56. Remove the output shaft assembly.



JAT00143-00121

57. Remove the torsion spring.
58. Remove the parking lock pawl.
59. Remove the parking lock pawl shaft.



JAT00144-00122

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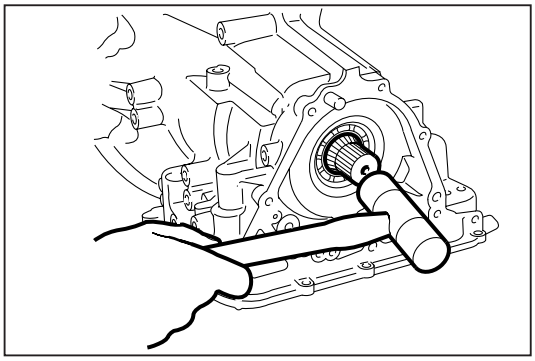
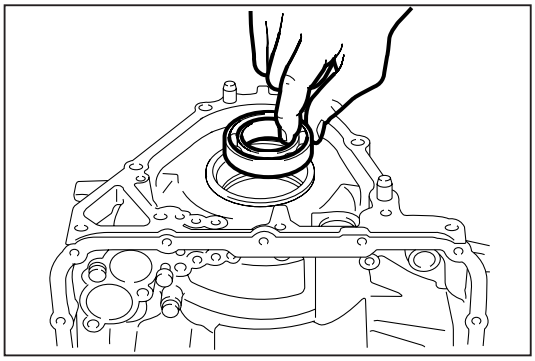
60. Removal of planetary output shaft subassembly
    (1) Tap the planetary output shaft subassembly lightly, using a plastic hammer, until the planetary output shaft subassembly becomes free.
    (2) Remove the planetary output shaft subassembly from the transmission case side.



JAT00145-00123

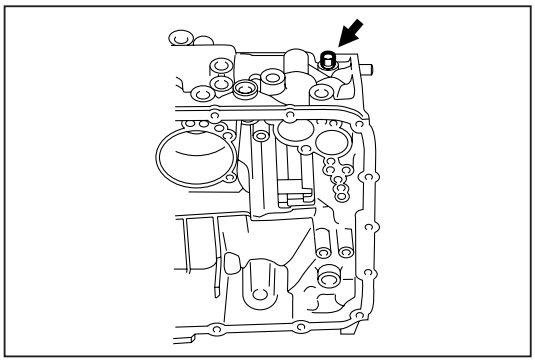
    (3) Remove the hole snap ring, using snap ring pliers.
    (4) Remove the radial ball bearing.

    NOTE:
    - If any difficulty is encountered in removing the radial ball bearing, remove it by applying a light impact from the inside of the transmission case, using a suitable brass bar in combination with a plastic hammer.



JAT00146-00124

61. Disassembling of first & reverse brake piston
    (1) Temporarily install the removed B2 inspection plug to the transmission case.

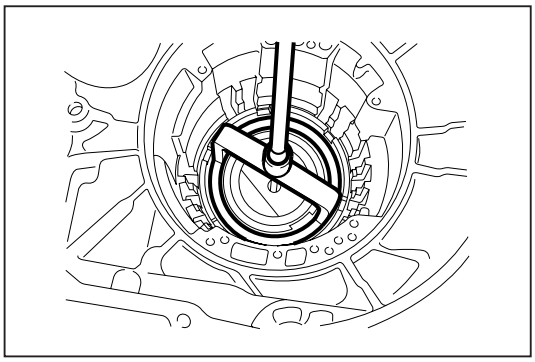


JAT00147-00125

    (2) Assemble the following SSTs and set them to the transmission case to remove the first & reverse brake return spring.

        SSTs: 09351-87201-000
              09351-87707-000
              09351-87709-000
              09351-87710-000

    NOTE:
    - To prevent the first & reverse brake return spring seat from being deformed, be sure to stop pressing when the first & reverse brake return spring seat has been lowered 1 to 2 mm from the shaft snap ring installation position.

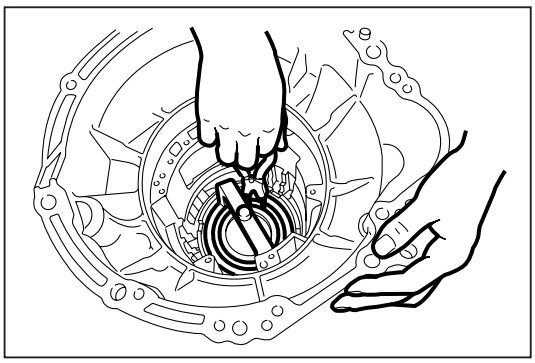


JAT00148-00126

    (3) Remove the shaft snap ring, using snap ring pliers.

    NOTE:
    - Be very careful not to deform the shaft snap ring by spreading it excessively.

    (4) Remove the first & reverse brake return spring.



JAT00149-00127

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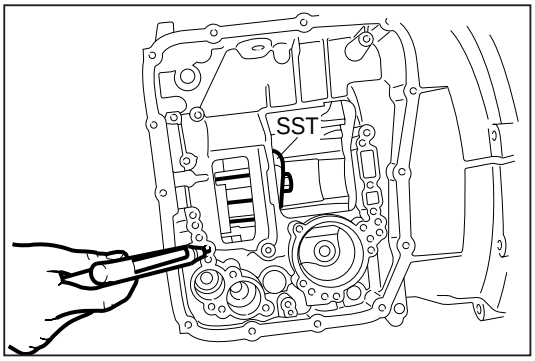
(5) Hold the first & reverse brake piston, using the following SSTs (to prevent the piston from being tilted when removing the piston).

SSTs: 09351-87201-000
09351-87707-000
09351-87709-000
09351-87710-000



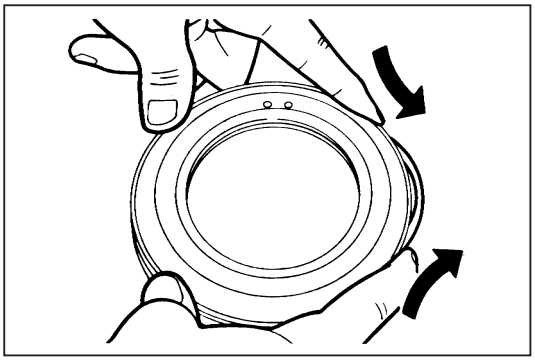
JAT00150-00128

(6) While applying compressed air of 392 - 784 kPa (4 - 8 kgf/cm^2) from the oil hole indicated in the right figure, gradually loosen the bolt of the SST and remove the first & reverse brake piston.

(7) Remove the outer O-ring of the first & reverse brake piston.

NOTE:

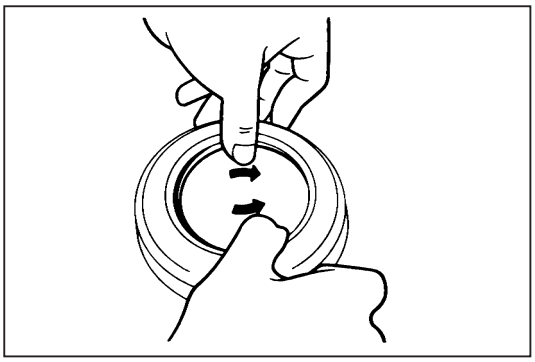
- Never reuse the removed O-ring.


JAT00151-00129

(8) Remove the inner O-ring of the first & reverse brake piston.

NOTE:

- Never reuse the removed O-ring.


JAT00152-00130

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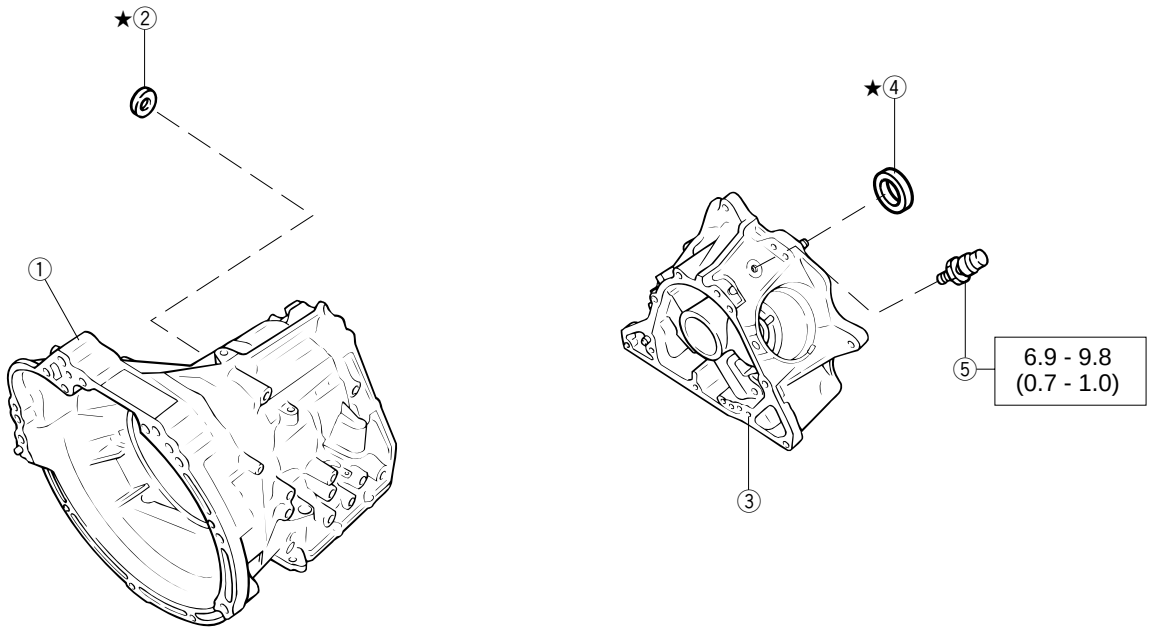
DISASSEMBLY AND ASSEMBLY OF COMPONENTS

COMPONENTS

□ : Tightening torque
Unit : N·m (kgf-m)
★ : Non-reusable parts

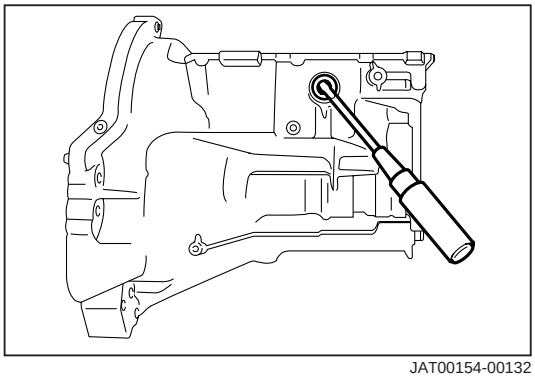


① Transmission case
② T type oil seal
③ Transmission case side cover subassembly
④ D type oil seal
⑤ Breather plug

JAT00153-00131

1. Disassembly and assembly of transmission case
   (1) Remove the type T oil seal, using a standard screwdriver.

   NOTE:
   - Never reuse the removed oil seal.



JAT00154-00132

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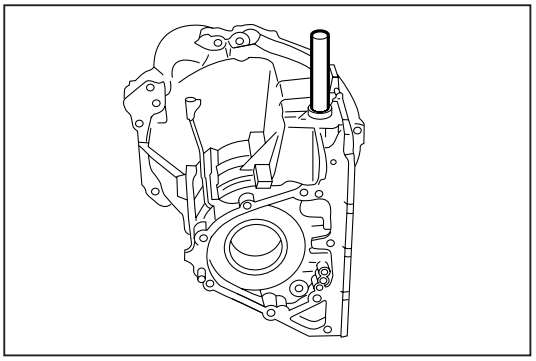
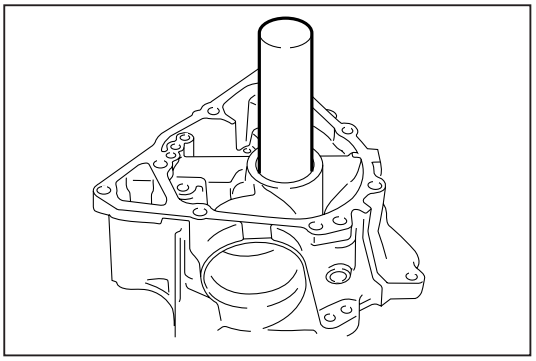
(2) Assemble a new type T oil seal, using the following SST.
SST: 09301-87702-000


JAT00155-00133

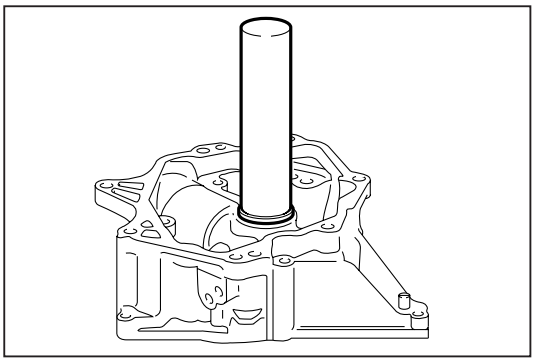
2. Disassembly and assembly of transmission case side cover subassembly
(1) Remove the type D oil seal, using the following SST.
SST: 09309-87502-000

NOTE:
- Never reuse the removed oil seal.


JAT00156-00134

(2) Assemble a new type D oil seal, using the following SST.
SST: 09309-87203-000

(3) Tighten the breather plug to the specified torque.
Tightening Torque: 6.9 - 9.8 N·m (0.7 - 1.0 kgf-m)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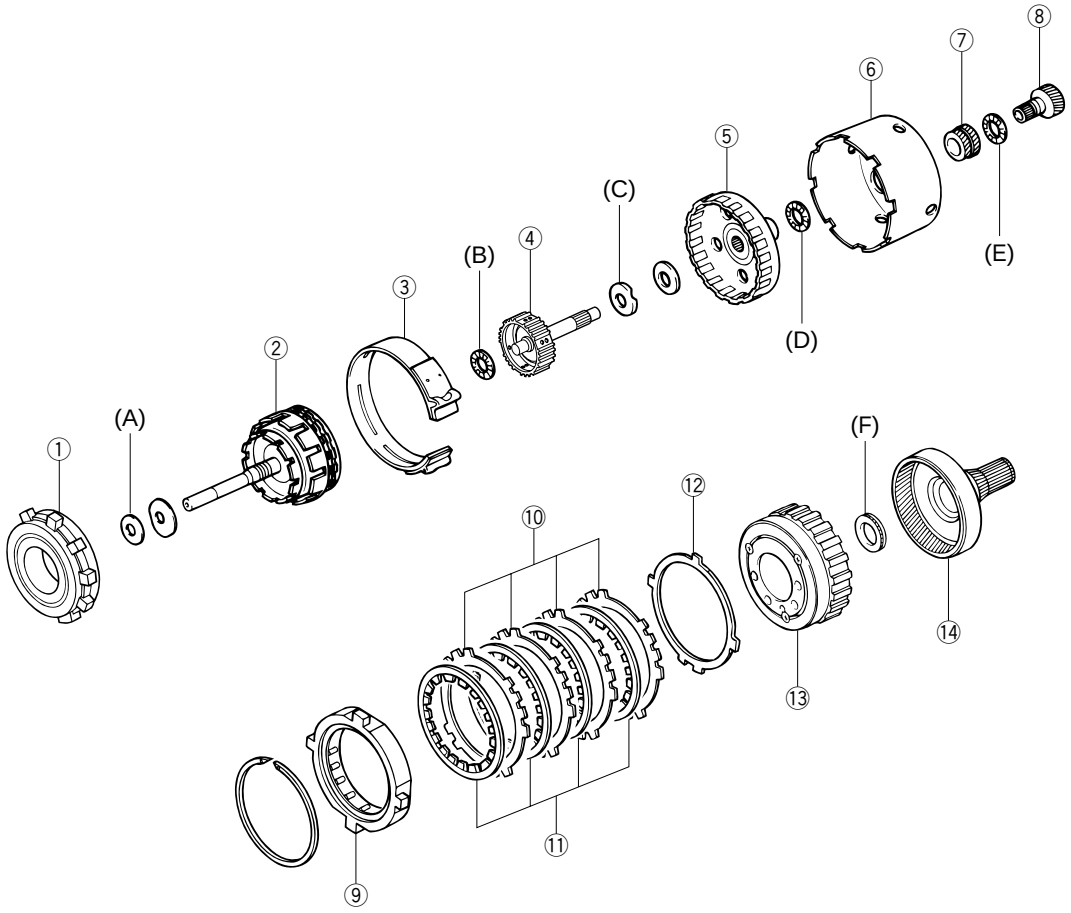
INSPECTION

COMPONENTS



① Direct clutch assembly
② Forward clutch assembly
③ Brake band assembly
④ Intermediate shaft subassembly
⑤ Forward clutch hub
⑥ 2nd brake drum
⑦ Planetary sun gear subassembly
⑧ Rear planetary sun gear subassembly
⑨ One-way clutch
⑩ Brake plate
⑪ Brake disc
⑫ Brake cushion plate
⑬ Planetary gear assembly
⑭ Planetary output shaft subassembly
(A) - (F) Thrust needle roller bearing
Visually inspect each part for wear and damage.

JAT00158-00136

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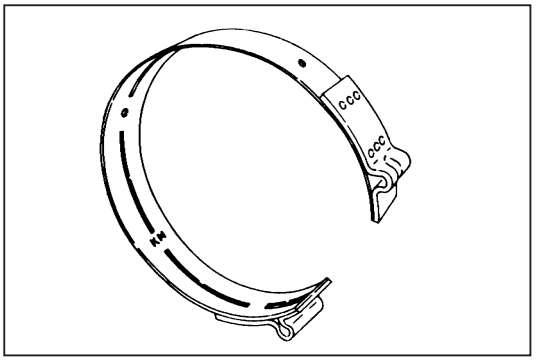
1. Brake band assembly

If the lining of the brake band is exfoliated or discolored, or even a part of the printed number is defaced, replace the brake band.

NOTE:

- When the brake band assembly is replaced, be sure to check the band contacting surface at the 2nd brake drum side.
- If the contacting surface is damaged or discolored, be sure to replace the 2nd brake drum together with the band.
- Before assembling a new brake band, soak it in the ATF for at least two hours.



JAT00159-00137

2. Direct clutch assembly

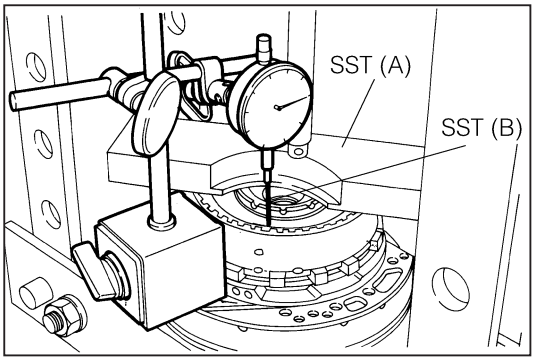
Check of piston stroke of direct clutch

(1) Install the clutch drum thrust washer (resin made) to the oil pump.

(2) Install the direct clutch on the oil pump.

NOTE:

- Be very careful not to scratch the clutch drum oil seal ring of the oil pump.

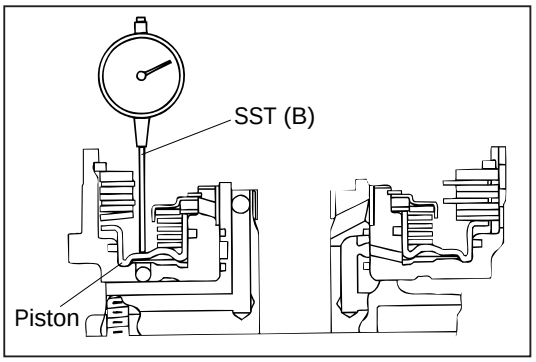


JAT00160-00138

(3) Secure the direct clutch, using the following SST in combination with a press, to such an extent that the direct clutch will not move in an up-&-down direction.

(4) Install the following SSTs to the dial gauge.

SST: 09351-87203-000 ... (B)
09527-87301-000 ... (A)



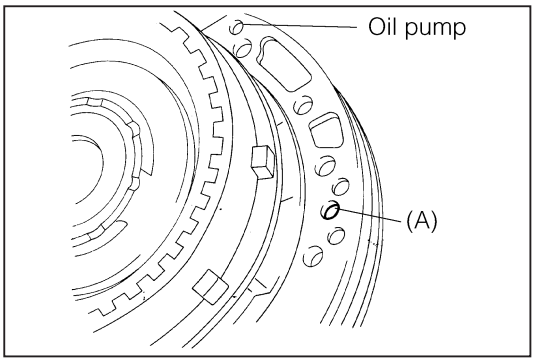
JAT00161-00139

NOTE:

- Make sure that the SST (09351-87203-000) installed to the dial gauge is in contact at right angles with the direct clutch outer piston. Make sure that the SST is not in contact with any part other than the piston.)

(5) Measure the direct clutch piston stroke while applying and releasing compressed air 392 - 784 kPa (4 - 8 kgf/cm^2) through the section (A) as shown in the right figure.

SST: 09527-87301-000, 09351-87203-000
Piston Stroke: 1.22 - 1.53 mm



JAT00162-00140

- If the piston stroke is greater than the maximum, replace the direct clutch with a new one.
- Perform the measurement at several points.
- Before assembling a new direct clutch, soak it in the ATF for at least two hours.

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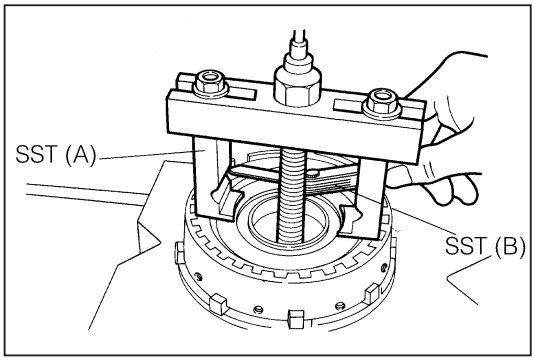
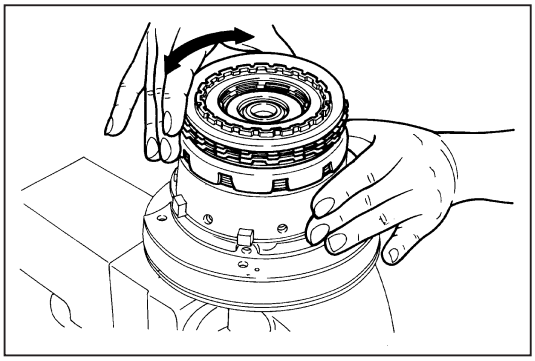
(6) While pressing the direct clutch flange with a force of 9.8 - 29.4 N (1.0 - 3.0 kgf), using the following SST (A) in combination with a suitable pushable gauge, measure the end play between the direct clutch flange and the snap ring, using a flat thickness gauge (B).
Specified Value: 0.93 $^{+0.15mm}_{-0.16mm}$
SST: 09306-87302-000 ... (A)



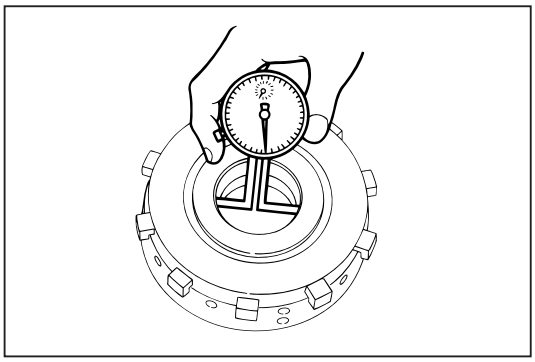
JAT00163-00141

(7) Confirmation of turning effort of clutch disc
Insert the input shaft (forward clutch) and rotate it. At this time, ensure that the clutch disc rotates lightly.


JAT00164-00142

(8) Measure the bush inner diameter of the direct clutch piston subassembly, using an inner caliper gauge.
Specified Value: 44.000 - 44.025 mm
Allowable Limit: 44.075 mm

NOTE:
- Ensure that the measurement should be performed at several points.
- If the measured value exceeds the allowable limit, replace the direct clutch drum subassembly with a new one.
- If the measured value exceeds the allowable limit of the bush inner diameter, check the bush contacting surface of the stator shaft of the oil pump assembly. If the contacting surface is scratched or discolored, replace the stator shaft & oil pump assembly with a new one, too.


JAT00165-00143

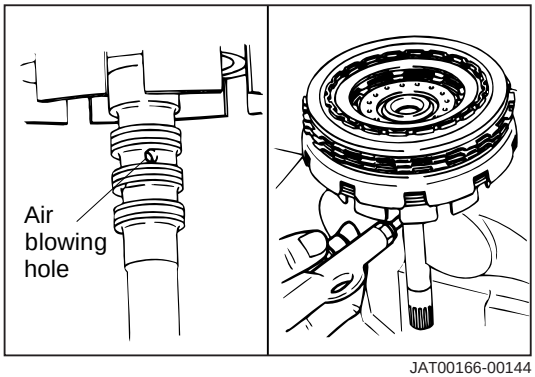
3. Forward clutch assembly

- Operation check of forward clutch piston

(1) Secure the input shaft on a vice with aluminum sheets interposed.

NOTE:
- Be very careful not to score the bush contacting surface of the input shaft.

(2) Blow compressed air of 392 - 784 kPa (4 - 8 kgf/cm^2) into the fluid hole of the input shaft indicated in the right figure. At this time, check that the piston slides smoothly.



JAT00166-00144

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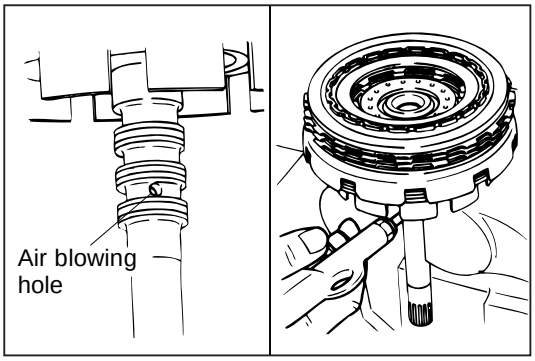
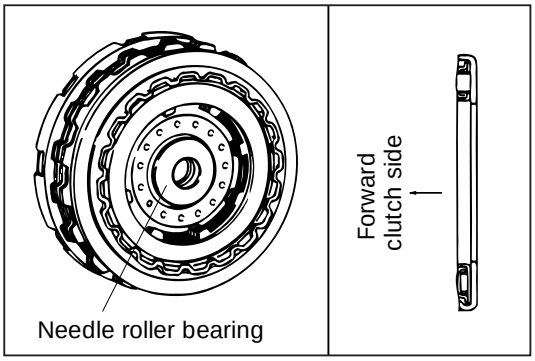
- Operation check of rear clutch piston
  (1) Blow compressed air of 392 - 784 kPa (4 - 8 kgf/cm^2) into the fluid hole of the input shaft indicated in the right figure. At this time, check that the piston slides smoothly.



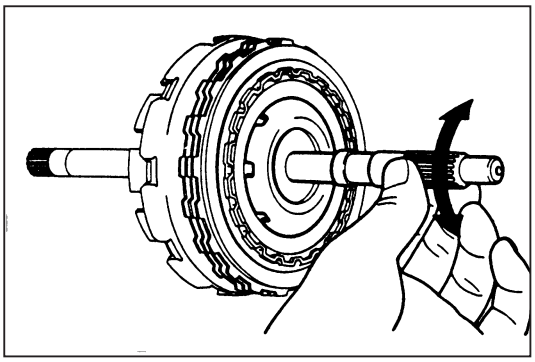
JAT00167-00145

- Confirmation of rotating weight of clutch disc
  (1) Install the thrust needle bearing to the forward clutch.
  REFERENCE:
  Dimensions of thrust needle roller bearing:
  Outer diameter: 32 mm
  Inner diameter: 16.5 mm
  Thickness: 4.1 mm

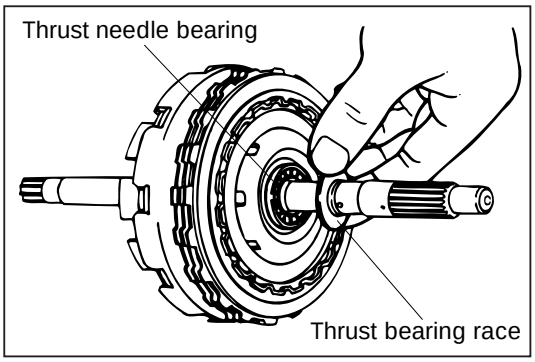


JAT00168-00146

  (2) Assemble the intermediate shaft subassembly and rotate it. Ensure that the clutch No. 3 disc rotates lightly.

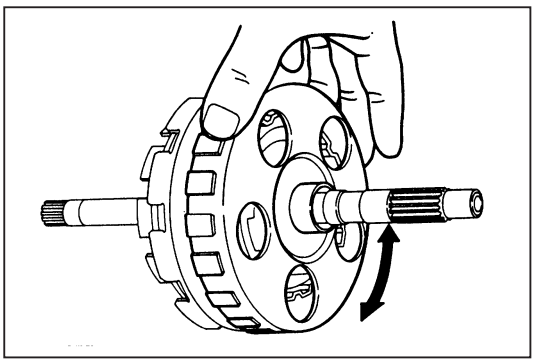

JAT00169-00147

  (3) Assemble the thrust needle bearing and thrust bearing race to the intermediate shaft subassembly.
  REFERENCE:
  Dimensions of thrust needle bearing:
  Outer diameter: 32 mm
  Inner diameter: 16.5 mm
  Thickness: 4.1 mm



JAT00170-00148

  (4) Assemble the forward clutch hub and rotate it. Ensure that the clutch No. 2 disc rotates lightly.


JAT00171-00149

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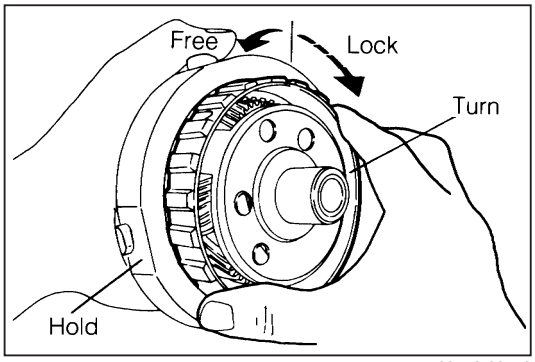
4. One-way clutch

Hold the one-way clutch and turn the planetary gear assembly.

NOTE:

- Ensure that the one-way clutch turns freely when turned counterclockwise. Also, ensure that it is locked when turned clockwise.



JAT00172-00150

5. Thrust bearing specifications

Be sure to install the thrust bearings in the correct direction and position.

NOTE:

- Since the following six bearings have been staked at the race side, these bearings can not be removed from the race.

Approx

Unit: mm

	A	B	C	D	E	F
Outer diameter	35.7	32	32	46.5	35.7	46.5
Inner diameter	22.7	16.5	16.5	25.0	22.7	25.0
Thickness	2.8	4.1	4.1	5.0	2.8	5.0

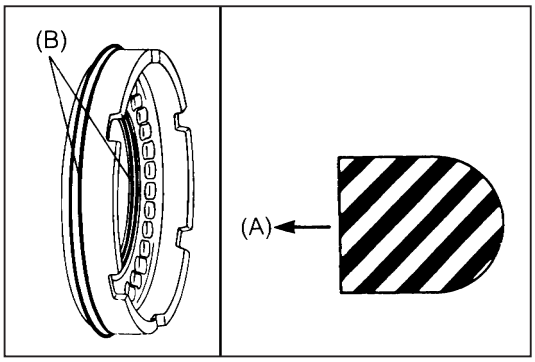
JAT00173-00000

ASSEMBLY

1. Assembly of 1st & reverse brake piston
   (1) Coat new O-rings with ATF.
   (2) Install the new O-rings (B) to the first & reverse brake piston

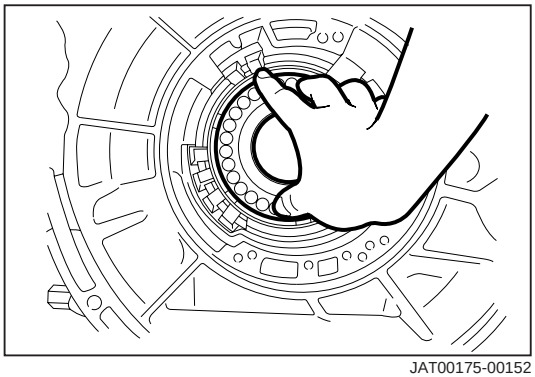
   NOTE:

   - Be sure to install the (A) section of the new O-rings faces toward the first & reverse brake piston side, for the O-ring has a D-type shape.



JAT00174-00151

   (3) Apply ATF to the outer periphery of the first & reverse brake piston.
   (4) Apply ATF to the inserted section of the first & reverse brake piston of the transmission case.
   (5) Insert the first & reverse brake piston into the transmission case.



JAT00175-00152

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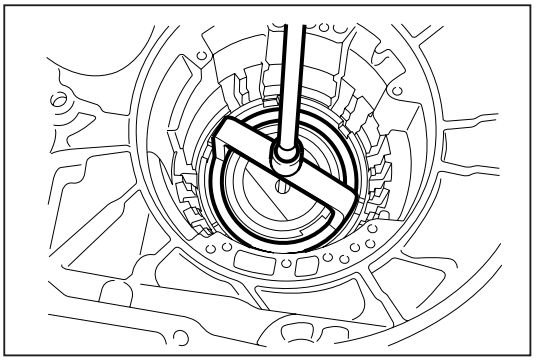
(6) Install the first & reverse brake piston, using the following SSTs.

SSTs: 09351-87201-000
09351-87707-000
09351-87709-000
09351-87710-000



JAT00176 -00153

NOTE:

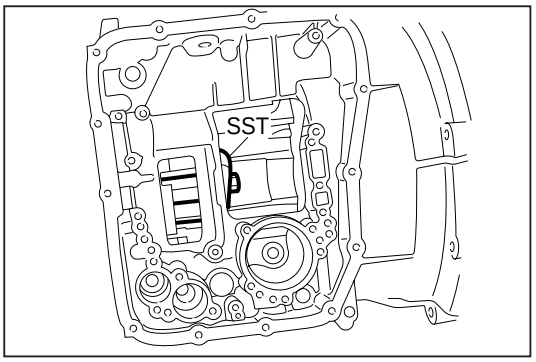
- When installing the first & reverse brake piston, care must be exercised to ensure that the O-ring may not be deviated from the specified position and may not be scratched.

(7) Remove the aforesaid SST from the transmission case.
(8) Place the first & reverse brake return spring.

JAT00177-00000

(9) Compress the first & reverse brake return spring (seat section), using the following SSTs.

SSTs: 09351-87201-000
09351-87707-000
09351-87709-000
09351-87710-000



JAT00178-00154

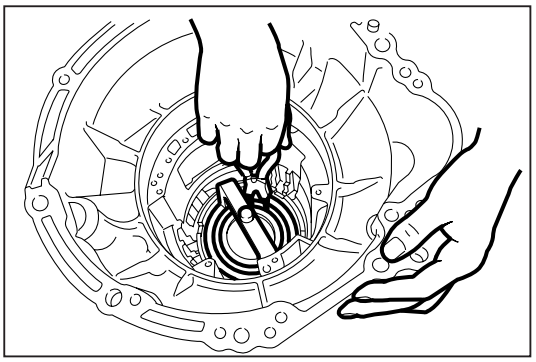
NOTE:

- To prevent deformation, be sure to stop tightening the SST when the first & reverse brake return spring has been lowered 1 to 2 mm from the snap ring installation groove.

(10) Install the shaft snap ring, using snap ring pliers.

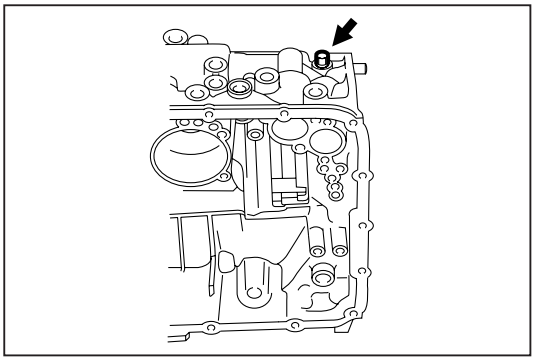
NOTE:

- Do not expand the ring excessively.
- Make sure that the end gap of the shaft snap ring is not aligned with the stopper section of the spring retainer claw.



JAT00179-00155

(11) Remove the B2 inspection plug.



JAT00180-00156

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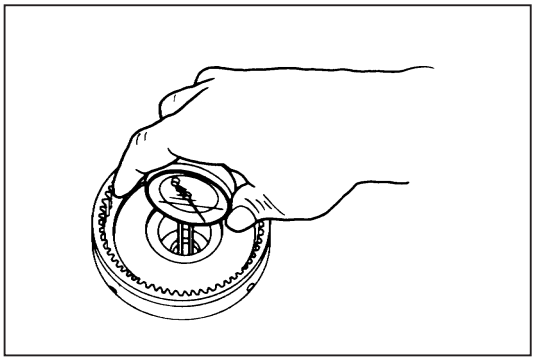
2. Measure the inner diameter of the planetary output shaft subassembly, using an inner caliper gauge.
   Specified Value: 12.000 - 12.018 mm
   Allowable Limit: 12.068 mm

   NOTE:
   - Perform the measurement at several points. Calculate the mean value.
   - If the measured value exceeds the allowable limit, replace the planetary output shaft subassembly with a new one. Moreover, when replacing the planetary output shaft subassembly, be sure to check the bush contacting surface of the intermediate shaft for scratch or discoloration. If the contacting surface is scratched or discolored, replace the intermediate shaft with a new part.



JAT00181-00157

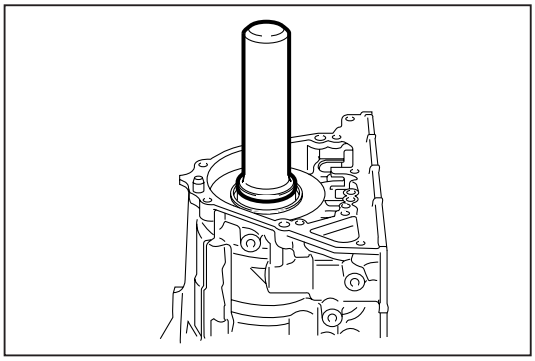
3. Assembly of planetary output shaft subassembly
   (1) Install the radial ball bearing to the transmission case, using the following SST.
      SST: 09310-87301-0000

   (2) Assemble the hole snap ring into the groove of the transmission case, using snap ring pliers.

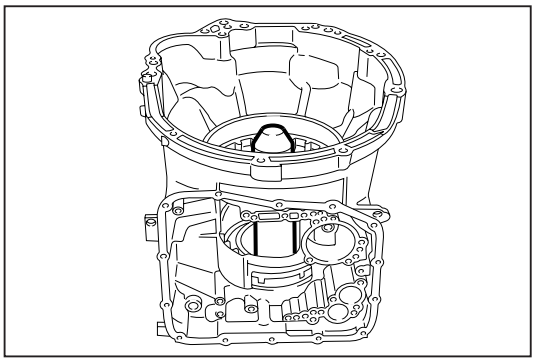
   NOTE:
   - Replace any scored or deformed hole snap ring with a new one.

   (3) Insert the planetary output shaft subassembly into the transmission case as far as it will go.

   (4) Install the planetary output shaft subassembly, using the following SST in combination with a hammer.
      SST: 09506-87303-000

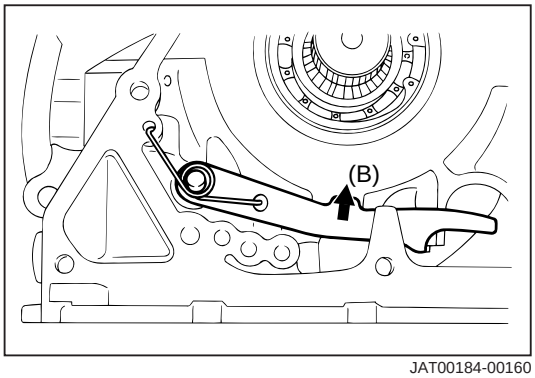


JAT00182-00158



JAT00183-00159

4. Install the parking lock pawl shaft to the transmission case.
5. Install the parking lock pawl.
6. Install the torsion spring, as indicated in the right figure.
   NOTE:
   - Push the parking lock pawl toward the direction (B) and release it. At this time, make sure that the parking lock pawl returns to the original position by the reaction force of the torsion spring.



JAT00184-00160

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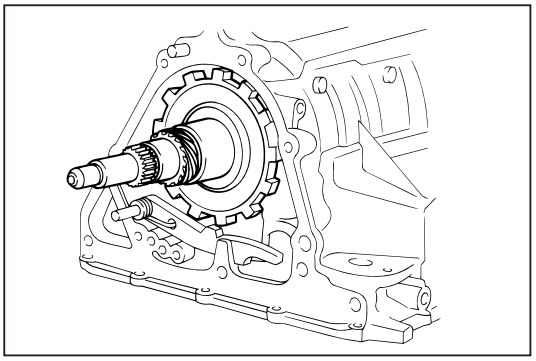
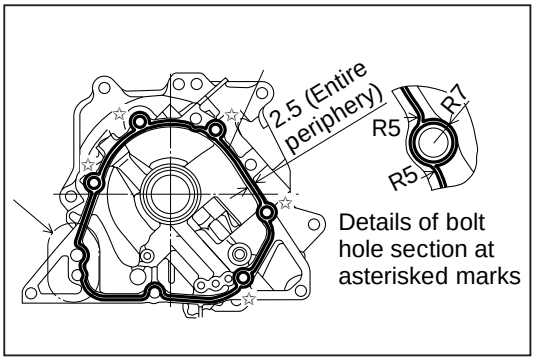
7. Install the output shaft assembly.
   NOTE:
   - Securely insert the output shaft assembly into the spline of the planetary output shaft assembly.



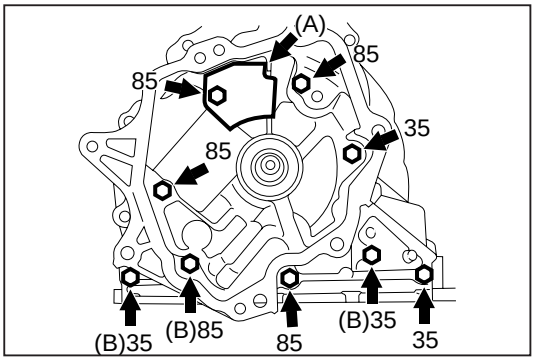
JAT00185-00161

8. Installation of transmission case side cover
   (1) Apply the Three Bond 1281B to the entire periphery of the transmission case without any discontinuation, as indicated in the right figure.



JAT00186-00162

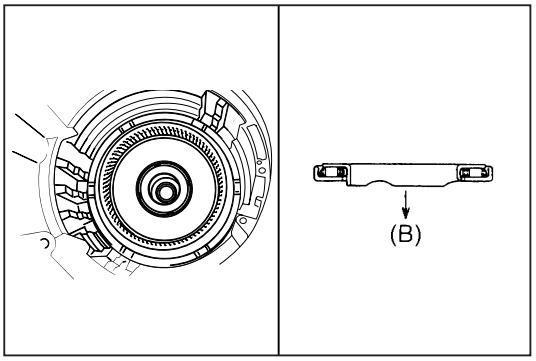
   (2) Assemble the transmission case side cover to the transmission case. Tighten the nine bolts.
   Among the nine bolts, one bolt should be tightened together with the oil guide plate (A).
   Tightening Torque: 14.7 - 21.6 N·m (1.5 - 2.2 kgf-m)



JAT00187-00163

   NOTE:
   - The numerals in the right figure denote the nominal length of each bolt.
   - Make sure that new bolts are used at the three sections (B).
   - Be very careful not to scratch the oil seal lip by the spline of the output shaft when installing the transmission case side cover.

9. Install the thrust needle roller bearing to the planetary output shaft subassembly.
   Reference Value:
   Thrust needle roller bearing dimensions
   Outer Diameter: 46.5 mm
   Inner Diameter: 25 mm
   Thickness: 5 mm



JAT00188-00164

   NOTE:
   - Be sure to install the (B) section of the thrust needle roller bearing in such a way that it faces toward the output shaft assembly side.

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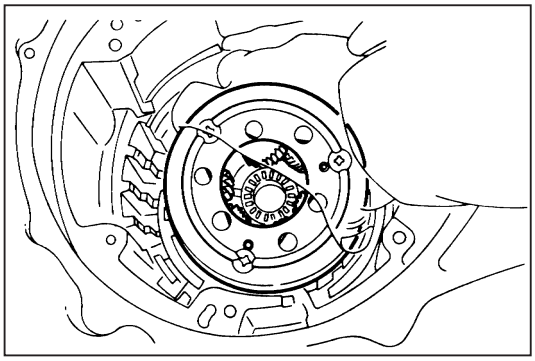
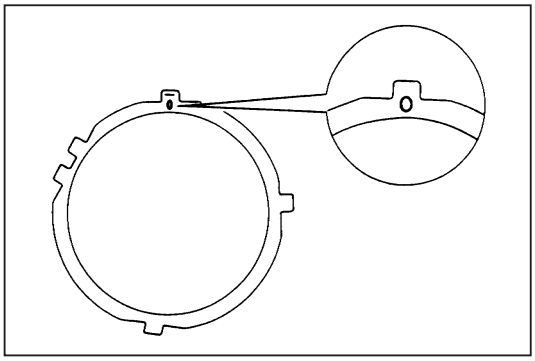
10. Install the planetary gear assembly.
NOTE:
- Ensure that the planetary gear assembly rotates smoothly.

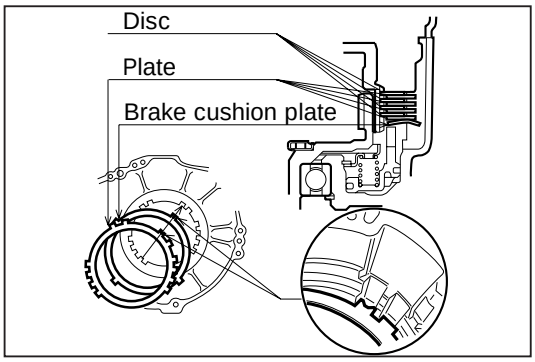

JAT00189-00165

11. Installation of first & reverse brake
(1) Install the brake cushion plate.
NOTE:
- Ensure that the stamped mark “O” of the brake cushion plate faces toward the upper side.


JAT00190-00166

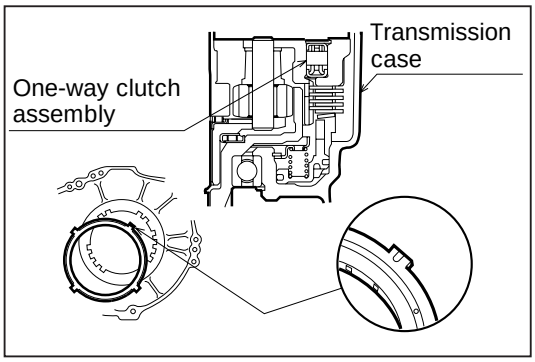
(2) Install the plates and discs in the following order.
P = Brake plate, D = Brake disc
P → D → P → D → P → D → P → D

NOTE:
- Before assembling new discs, soak them in the ATF for at least two hours.
- Be sure to align the cut-out section of the brake plate with the protruding section of the transmission when installing the brake plate.



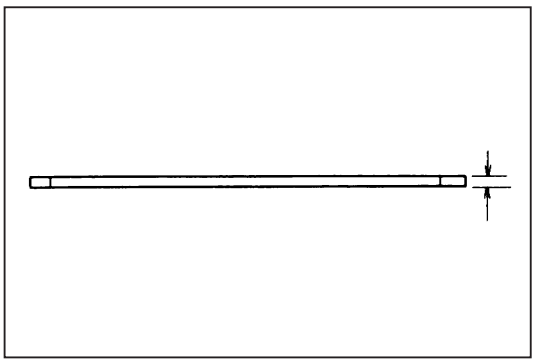
JAT00191-00167

(3) Coat the sliding section of the one-way clutch and planetary gear assembly with the ATF.
(4) Install the one-way clutch.
NOTE:
- Ensure that the one-way clutch with the snap ring faces toward the upside.
- Align the cut-out section at the inside of the transmission case with the protruding section provided with the groove (O mark) of the one-way clutch.



JAT00192-00168

(5) Measure and record the thickness of the hole snap ring.
NOTE:
- Replace any scratched or deformed hole snap ring with a new part.


JAT00193-00169

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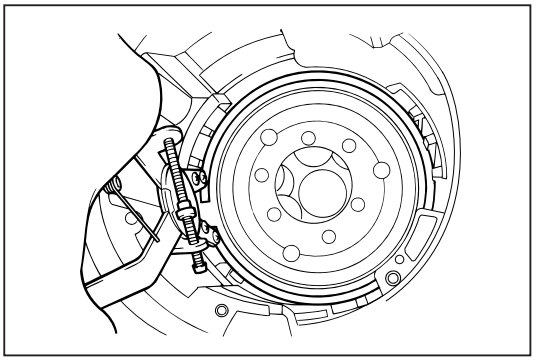
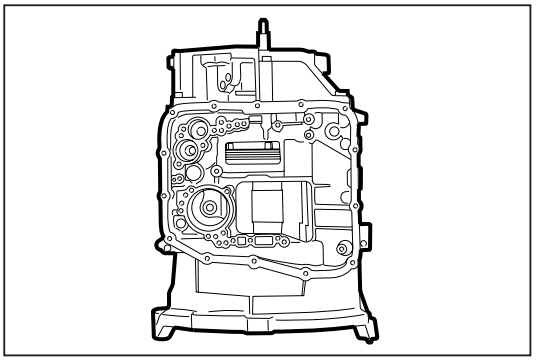
(6) Install the hole snap ring to the grooved section of the transmission case.



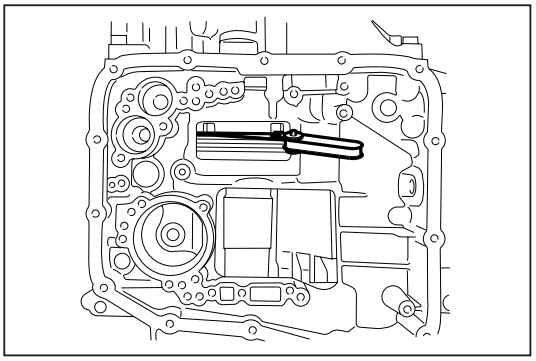
JAT00194-00170

12. Measurement of first & reverse brake end play
(1) Turn over the transmission case.



JAT00195-00171

(2) Measure the first & reverse brake end play, using a flat thickness gauge.
Specified Value: 1.04 - 1.41 mm

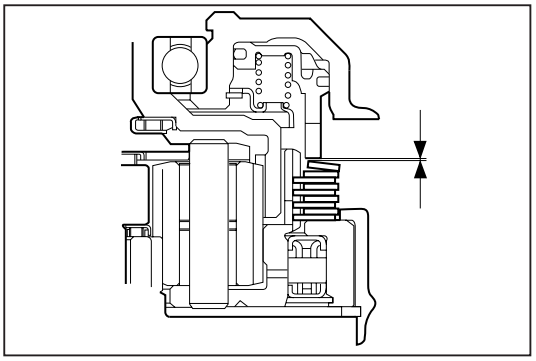


JAT00196-00172

NOTE:

- The tightness which you encounter during this insertion/withdrawal of the flat thickness gauge should be virtually the same as the tightness which you would encounter during the thickness adjustment of the valve rocker arm.

- If the measured end play fails to conform to the specified value above, select a snap ring from the right lower table, using the following calculation formula. Then, install it.



JAT00197-00173

Calculation formula
A = B - C + D
A = Thickness of snap ring to be selected
(Refer to the right table.) Measured value of end play
B = Measured value of end play
C = Specified value of end play
D = Thickness of snap ring that has been already installed

Snap ring thickness Unit: mm	Part No.
1.97 - 2.03	90045-21119-000
2.22 - 2.28	90045-21120-000
2.48 - 2.53	90045-21121-000
2.72 - 2.78	90045-21123-000

JAT00198-00000

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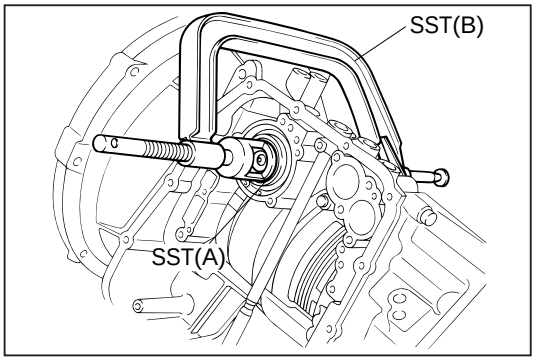
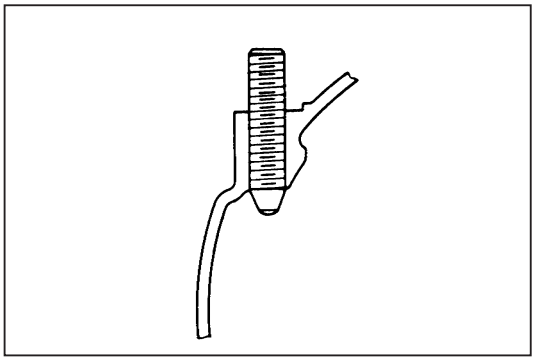
13. Installation of transmission brake band assembly-related parts
    (1) Install the compression spring to the second brake piston assembly.
    (2) Install the 2nd brake piston assembly to the transmission case together with the compression spring.
    (3) While compressing the 2nd brake piston with the following SSTs, install the hole snap ring, using snap ring pliers.
        SSTs: 09202-87002-000 ... (A)
              09202-87202-0A0 ... (B)



JAT00199-00174

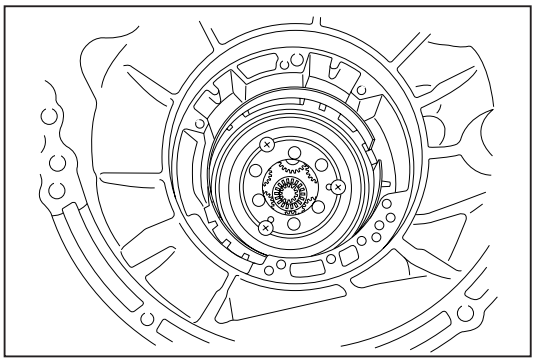
    (4) Install a new brake band adjusting anchor bolt to the transmission.

NOTE:
- Be sure to tighten the anchor bolt, until the head section of the anchor bolt appears at the inside of the transmission case, as indicated in the right figure.


JAT00200-00175

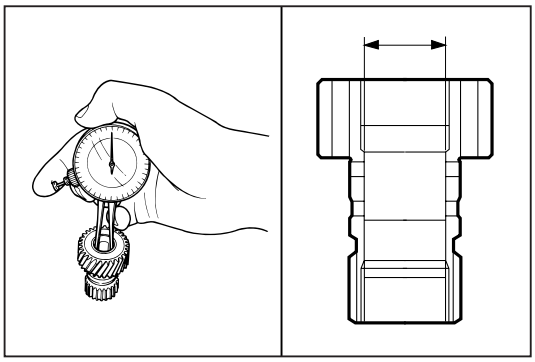
    (5) With the brake band assembly contracted, assemble the band while aligning its recessed section with the head of the brake band anchor bolt and with the head of the 2nd coast brake piston rod.

NOTE:
- Before assembling the brake band assembly, soak it in the ATF for at least two hours.


JAT00201-00176

14. Assembly of forward clutch hub and 2nd brake drum
    (1) Measure the bush bore diameter of the rear planetary sun gear subassembly.
        Specified Value: 15.500 - 15.518 mm
        Allowable limit: 15.568 mm

NOTE:
- The measurement should be performed at several points. Determine the mean value.
- If the bore diameter exceeds the allowable limit, replace the rear planetary sun gear subassembly.
- When replacing the rear planetary sun gear subassembly, be sure to check the bush contacting surface of the intermediate shaft subassembly. If the contacting surface is scored or discolored, replace the intermediate shaft subassembly, too, with a new one at the same time.


JAT00202-00177

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(2) Assemble the thrust needle roller bearing to the rear planetary sun gear subassembly.

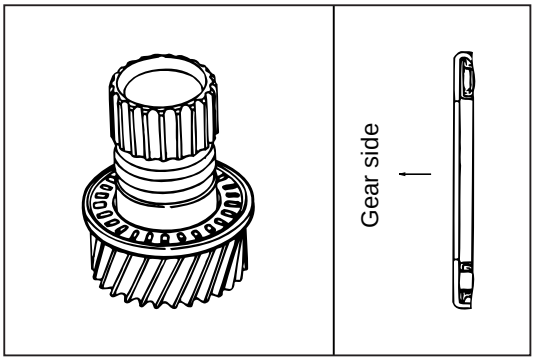
NOTE:

- Make sure that the thrust needle roller bearing is assembled in the correct direction.

REFERENCE:

Dimensions of thrust needle roller bearing

Outer diameter: 35.7 mm
Inner diameter: 22.7 mm
Thickness: 2.8 mm

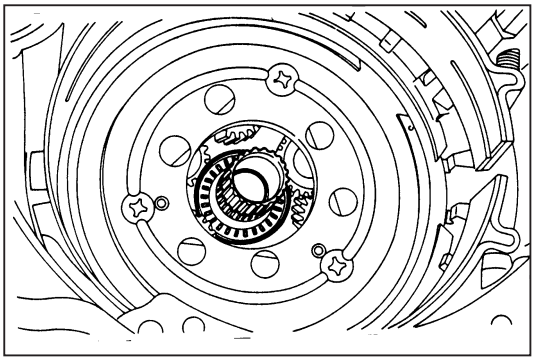


JAT00203-00178

(3) Assemble the rear planetary sun gear subassembly to the planetary gear assembly.

NOTE:

- Apply ATF to the bush section.



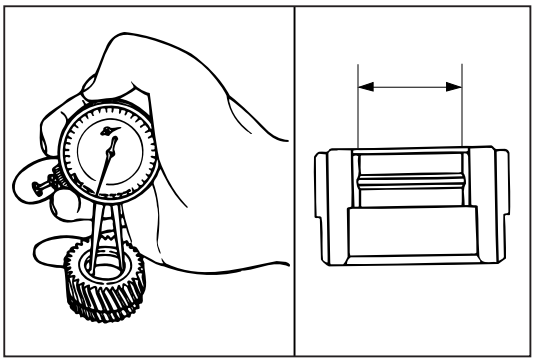
JAT00204-00179

(4) Measure the bush bore diameter of the planetary sun gear subassembly.

Specified Value: 22.020 - 22.038 mm
Allowable Limit: 22.088 mm

NOTE:

- The measurement should be performed at several points. Determine the mean value.
- If the bore diameter exceeds the allowable limit, replace the planetary sun gear subassembly.
- When replacing the planetary sun gear subassembly, be sure to check the bush contacting surface of the rear planetary sun gear subassembly. If the contacting surface is scored or discolored, replace the rear planetary sun gear subassembly with a new one, too, at the same time.

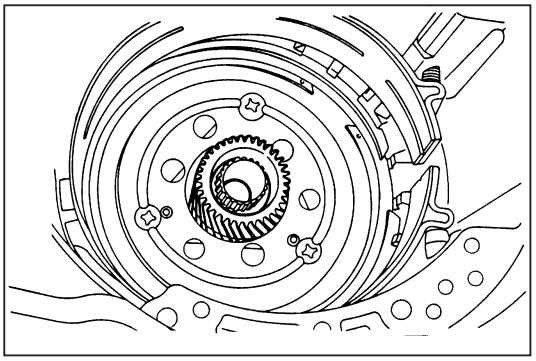


JAT00205-00180

(5) Assemble the planetary sun gear subassembly to the planetary gear assembly.

NOTE:

- Apply ATF to the bush section.



JAT00206-00181

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(6) Assemble the thrust needle roller bearing to the 2nd brake drum.

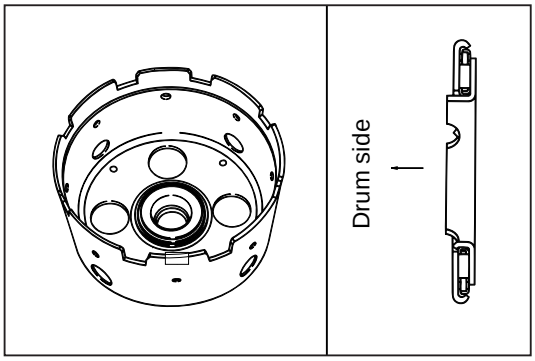
NOTE:

- Make sure that the thrust needle roller bearing is assembled in the correct direction.

REFERENCE:

Dimensions of thrust needle roller bearing

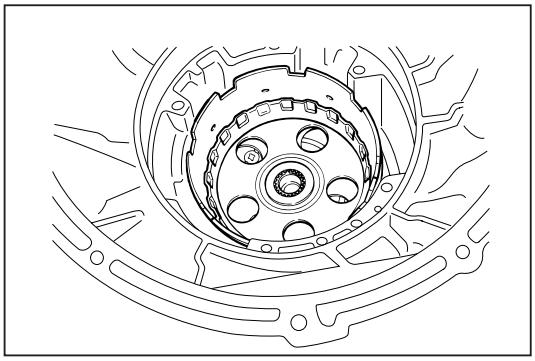
Outer diameter: 46.5 mm
Inner diameter: 25 mm
Thickness: 5 mm



JAT00207-00182

(7) Assemble the forward clutch hub to the 2nd brake drum.

(8) Assemble the 2nd brake drum to the transmission case.



JAT00208-00183

15. Assembly of intermediate shaft subassembly

(1) Assemble the thrust needle roller bearing and thrust bearing race to the intermediate shaft subassembly.

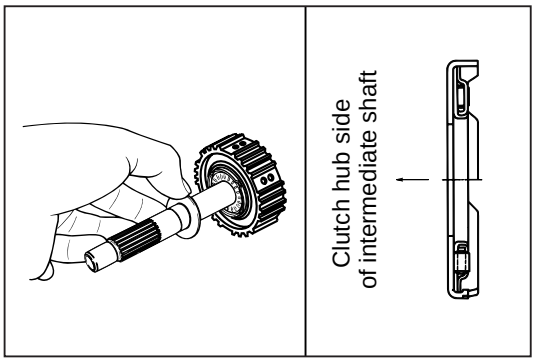
NOTE:

- Make sure that the thrust needle roller bearing is assembled in the correct direction.

REFERENCE:

Dimensions of thrust needle roller bearing

Outer diameter: 32 mm
Inner diameter: 16.5 mm
Thickness: 4.1 mm

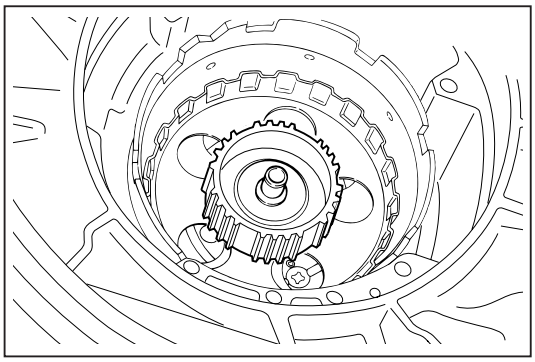


JAT00209-00184

(2) Assemble the intermediate shaft subassembly.

NOTE:

- Be sure to apply ATF to the intermediate shaft subassembly before assembling.



JAT00210-00185

16. Assemble the thrust needle roller bearing to the intermediate shaft subassembly.

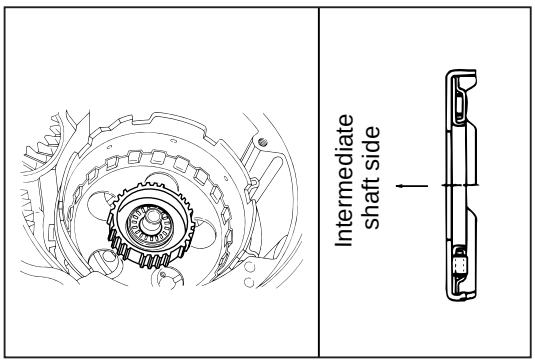
NOTE:

- Make sure that the thrust needle roller bearing is assembled in the correct direction.

REFERENCE:

Dimensions of thrust needle roller bearing:

Outer diameter: 32 mm
Inner diameter: 16.5 mm
Thickness: 4.1 mm



JAT00211-00186

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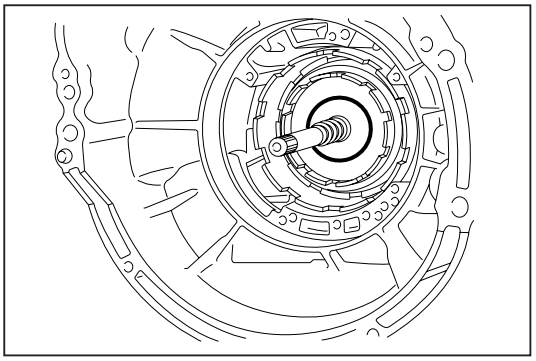
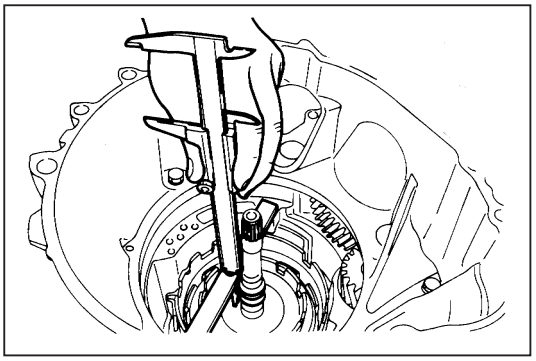
17. Align the pawls of the clutch disc of the forward clutch with each other.
18. While aligning the pawls of the clutch disc of the forward clutch with the groove of the forward clutch hub and with the groove of the intermediate shaft subassembly, assemble these parts.



JAT00212-00187

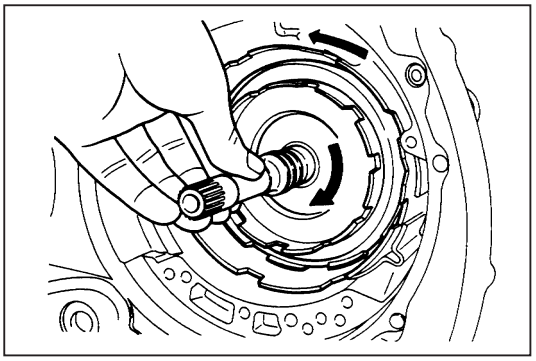
19. Measure the height of the forward clutch between the installation section of the oil pump and the thrust bearing race of the forward clutch, using the following SST.
    SST: 09351-87208-000
    Specified Value: Approx. 54 mm

    NOTE:
    - If the actually measured value is less than the specified value, there is the possibility that the pawl section of the forward clutch disc is not fitted in the groove of the forward clutch hub. Be sure to perform the operation of the step 15-(2) again and recheck the specified dimension.



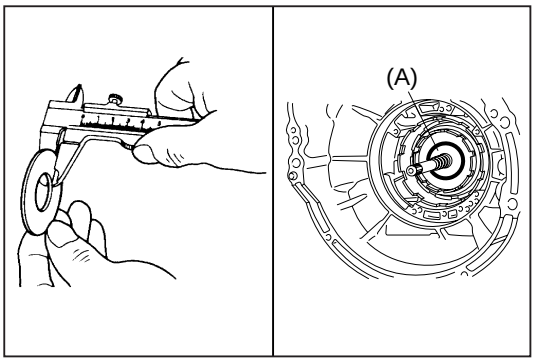
JAT00213-00188

20. Turn the forward clutch clockwise and counterclockwise. At this time, ensure that the forward clutch turns lightly and the 2nd brake drum makes a relative movement with the forward clutch.



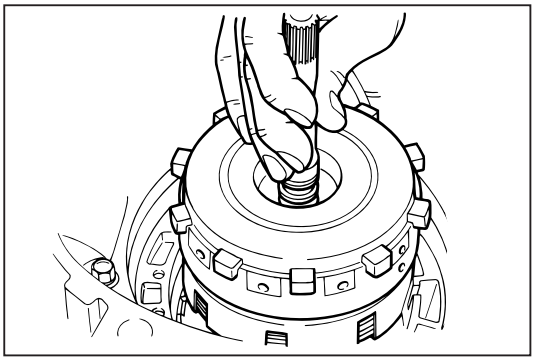
JAT00214-00189

21. Installation of direct clutch
    (1) Measure and record the thickness of the thrust bearing race.
    (2) Install the thrust bearing race (A).



JAT00215-00190

    (3) Install the direct clutch.
    (4) Install the direct clutch to the 2nd brake drum while turning the direct clutch clockwise and counterclockwise.



JAT00216-00191

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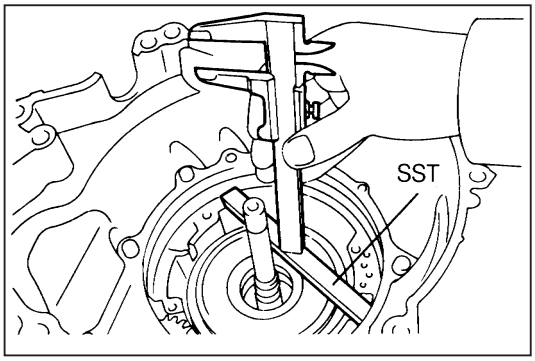
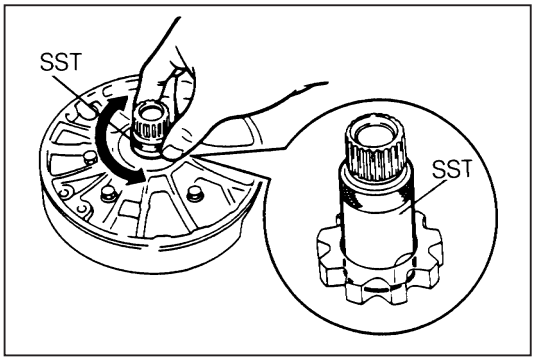
(5) Confirm the height of the oil pump attaching surface from the upper surface of the direct clutch, using the following SST.
SST: 09351-87208-000
Specified Height: Approx. 22 mm



JAT00217-00192

NOTE:
- If the actually measured value is less than the specified height, there is the possibility that the two pawls of the clutch disc are not fitted into the groove of the forward clutch. Be sure to perform the operation of the step (4) above again.

22. Inspection of stator shaft & oil pump assembly
(1) Inspection of oil pump operation
Ensure that the oil pump drive gear rotates smoothly, using the following SST.
SST: 09351-87206-000



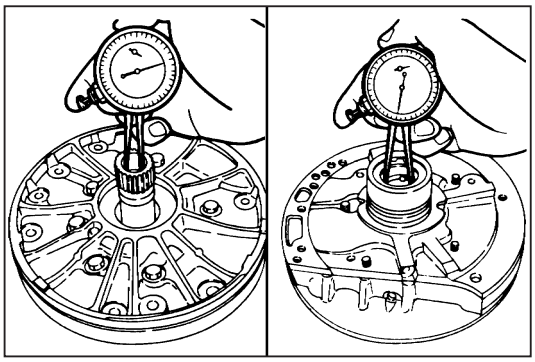
JAT00218-00193

NOTE:
- Be sure to insert the flat sections (2 points) of the SST into the flat sections of the oil pump drive gear.

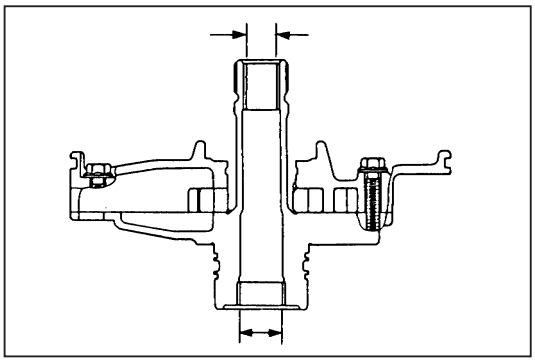
(2) Measure the inner diameter of the oil pump bush section, using an inner caliper gauge.

Unit: mm

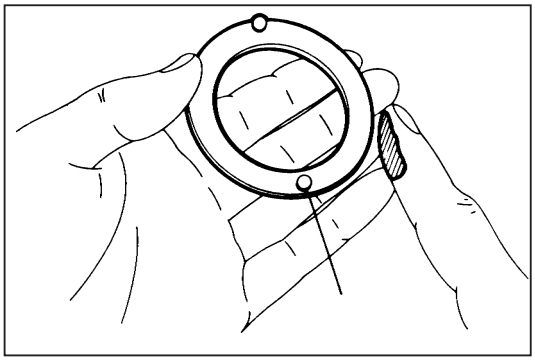
	Specified value	Allowable limit
Front side	15.50 - 15.522	15.572
Rear side	21.100 - 21.121	21.171


JAT00219-00194

NOTE:
- Perform the measurement at several points. Calculate the mean value.
- If the actually measured value exceeds the allowable limit, replace the stator shaft & oil pump assembly with a new one.
- When replacing the stator shaft & oil pump assembly, be sure to check the bush contacting surface of the input shaft subassembly. If the contacting surface is scratched or discolored, replace the input shaft subassembly with a new one, too, at the same time.


JAT00220-00195

23. Check of input shaft end play
(1) Apply a small amount of vaseline to the protruding sections (2 points) of the clutch drum thrust washer.


JAT00221-00196

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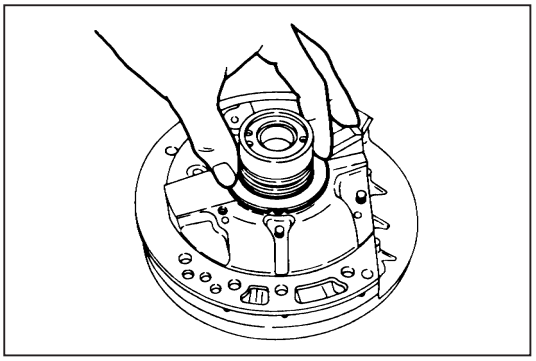
(2) Install the clutch drum thrust washer by aligning its protruding section with the recessed section of the oil pump assembly.

NOTE:

- Be sure to apply vaseline in a small amount enough to prevent the clutch drum thrust washer from dropping.

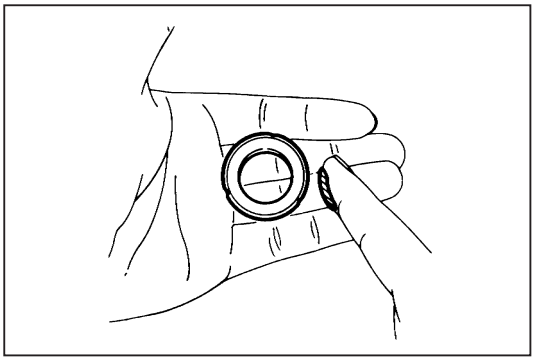


JAT00222-00197

(3) Apply a small amount of vaseline to the race side of the thrust needle roller bearing.

NOTE:

- Be sure to apply vaseline in a small amount enough to prevent the thrust needle roller bearing from dropping.

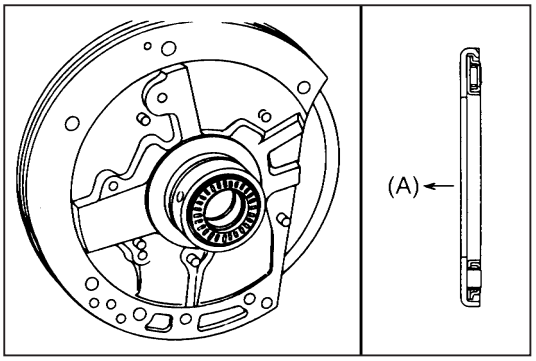


JAT00223-00198

(4) Install the thrust needle roller bearing to the oil pump assembly.

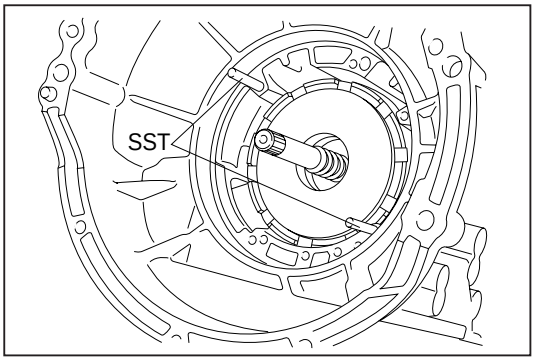
NOTE:

- Ensure that the section (A) of the thrust needle roller bearing race faces toward the oil pump assembly side.
  Reference Value:
  Thrust needle roller bearing dimensions
  Outer Diameter: 35.7 mm
  Inner Diameter: 22. 7 mm
  Thickness: 2.8 mm



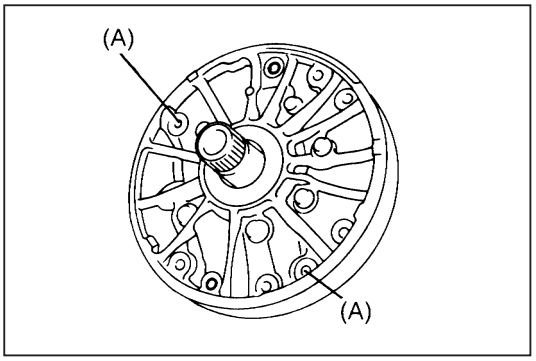
JAT00224-00199

(5) Install the following SST to the transmission case.
SST: 09351-87207-000



JAT00225-00200

(6) Align the attaching holes (sections (A)) of the stator shaft & oil pump assembly with the SST that has been installed at the step (5).



JAT00226-00201

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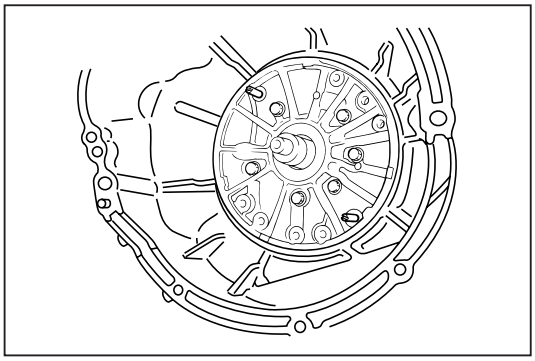
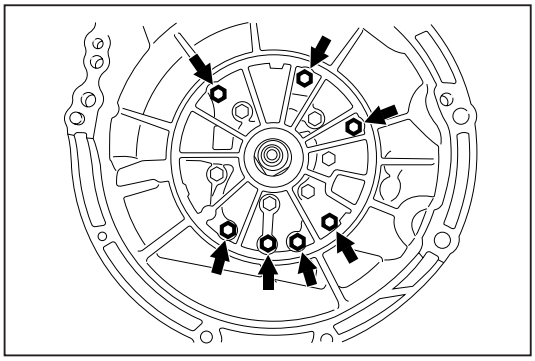
(7) Apply the ATF to the outer periphery of the stator shaft & oil pump assembly.
(8) Install the stator shaft & oil pump assembly to the transmission case.

NOTE:
- Be very careful not to damage or twist the O-ring during the installation of the stator shaft & oil pump assembly.


JAT00227-00202

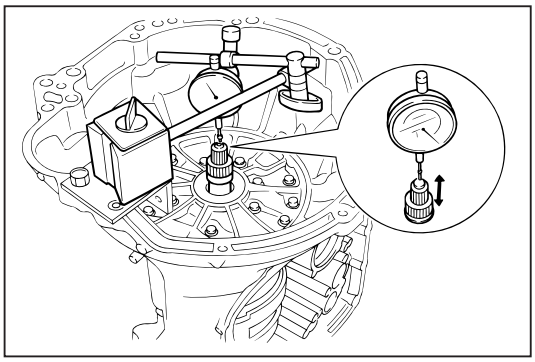
(9) Tighten the seven bolts of the stator shaft & oil pump assembly.
Tightening Torque: 6.9 - 9.8 N·m (0.7 - 1.0 kgf-m)

NOTE:
- Be sure to tighten the bolts alternately and diagonally.


JAT00228-00203

(10) Measure the input shaft end play with a dial gauge and the following SST.
SST: 09351-87210-000
Specified Value: 0.28 - 0.92 mm

NOTE:
- If the measured end play exceeds the specified value, remove the stator shaft & oil pump assembly and the direct clutch from the transmission case. Then, select the thickness of the thrust bearing race from the right lower table. Proceed to perform the operations of the steps from 21-(2) to 23-(10).


JAT00229-00204

Thrust Bearing Race Availability

Thrust bearing race thickness Unit: mm	Part No.
1.55 - 1.65	35789-87208-000
1.95 - 2.05	35789-87209-000
2.35 - 2.45	35789-87210-000

JAT00230-00000

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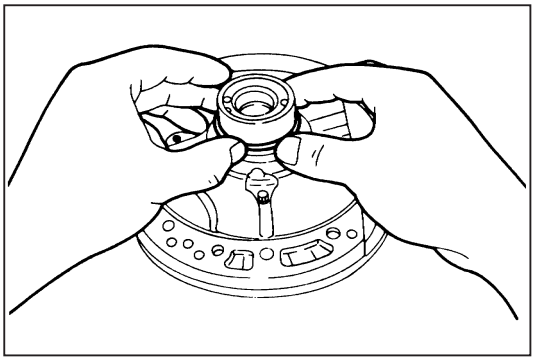
24. Assembly of stator shaft & oil pump assembly
    (1) Coat a new O-ring of the stator shaft & oil pump assembly with the ATF.
    (2) Install the two new clutch drum oil seal rings to the stator shaft & oil pump assembly.

    NOTE:
    - Do not spread the new oil seal rings excessively.

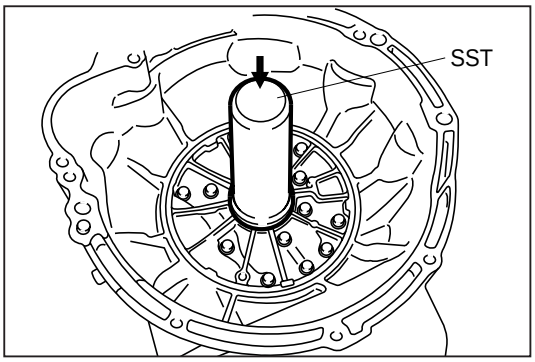
    (3) Coat a new O-ring of the stator shaft & oil pump assembly with the ATF.
    (4) Install the new O-ring to the stator shaft & oil pump assembly.
    (5) Assemble the stator shaft & oil pump assembly, following the procedure given in the steps 23-(1) through 23-(9).



JAT00231-00205

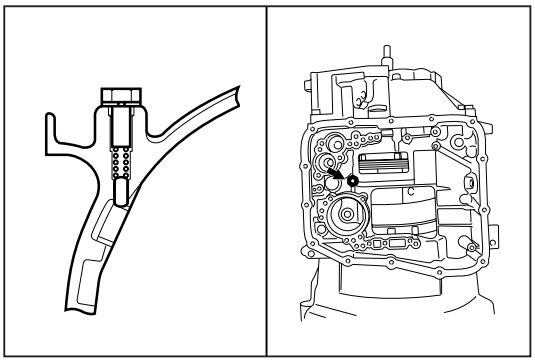
    (6) Install a new T-type oil seal, using the following SST.
        SST: 09310-87301-000

    NOTE:
    - Make sure that the T-type oil seal is in contact at right angles with the stator shaft & oil pump assembly when installing the oil seal.



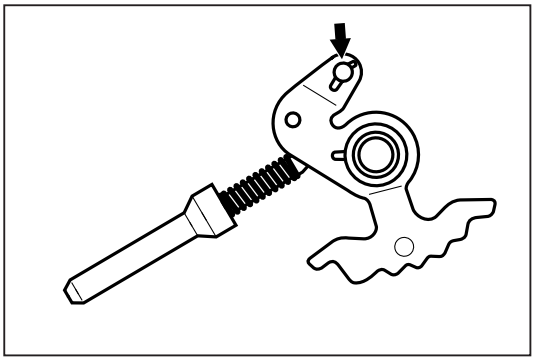
JAT00232-00206

25. Install the roller, compression spring and bolt to the transmission case in this order.
    Tightening Torque: 6.9 - 9.8 N·m (0.7 - 1.0 kgf-m)



JAT00233-00207

26. Assemble the manual valve lever subassembly to the parking lock rod subassembly in advance.
    NOTE:
    - Apply ATF to the arrow-headed section indicated in the right figure.



JAT00234-00208

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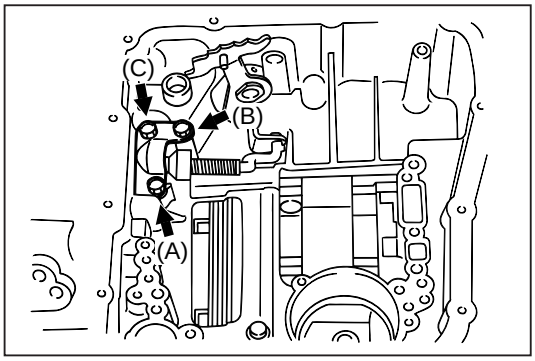
27. Install the parking lock rod subassembly and parking lock pawl cam support, as indicated in the right figure. Tighten the three bolts.
    Tightening Torque: 14.7 - 17.7 N·m (1.5 - 1.8 kgf-m)

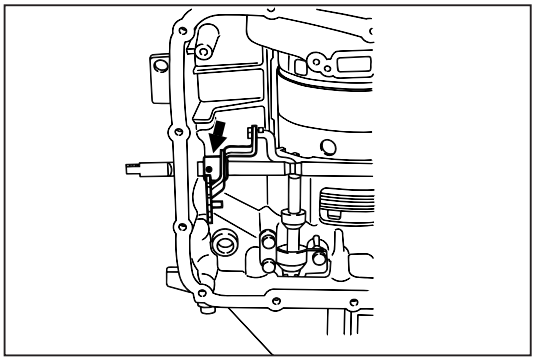
    NOTE:
    - Tightening should be made in the following sequence: (A) (Tighten temporarily.) → (B) (Tighten securely.) → (C) (Tighten securely.) → (A) (Tighten securely.)



JAT00235-00209

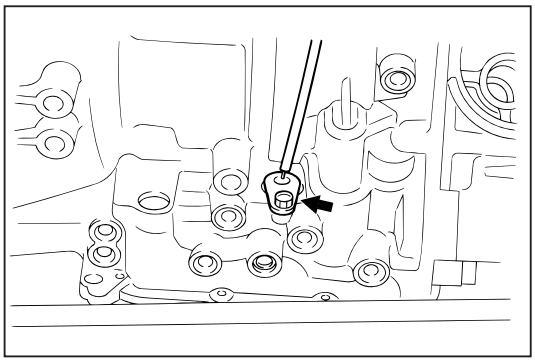
28. Installation of manual valve lever shaft assembly
    (1) Install the manual lever shaft subassembly.
    NOTE:
    - Care must be exercised so that the lip of the oil seal may not be scratched when installing the shaft.

    (2) Install a new slotted spring pin, using a pin punch and a hammer.
    NOTE:
    - Be sure to positively install the new slotted spring pin, until it becomes flush with the edge surface of the manual valve lever.

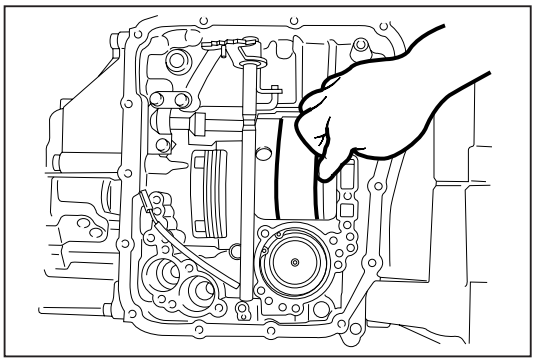

JAT00236-00210

29. Install the solenoid wire assembly to the transmission case.
    Tightening Torque: 6.9 - 9.8 N·m (0.7 - 1.0 kgf-m)

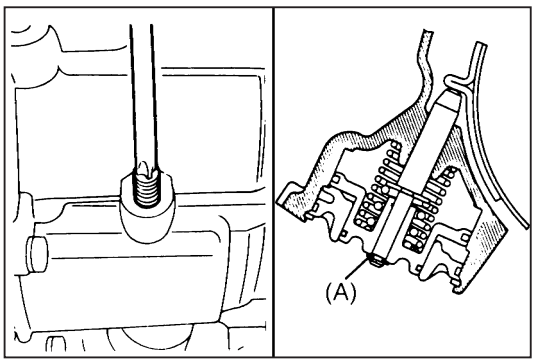
    NOTE:
    - Apply ATF to the outer periphery of the O-ring of the solenoid wire assembly. Care must be exercised so that the O-ring may not be caught in when inserting it.


JAT00237-00211

30. Adjustment of brake band
    (1) Set the brake band parallel to the 2nd brake drum.


JAT00238-00212

    (2) Tighten the brake band adjusting anchor bolt, until the E-ring (A) of the 2nd coast brake piston slightly floats.
    (3) At the time when the E-ring of the 2nd coast brake piston floats, stop tightening the brake band adjusting anchor bolt.



JAT00239-00213

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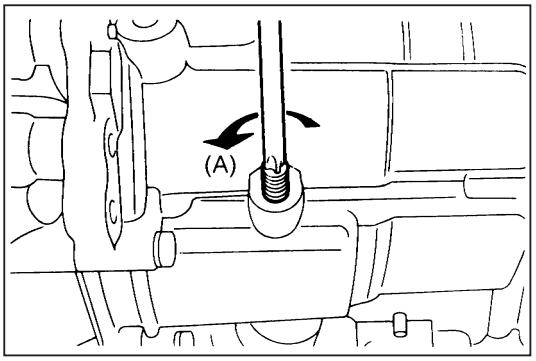
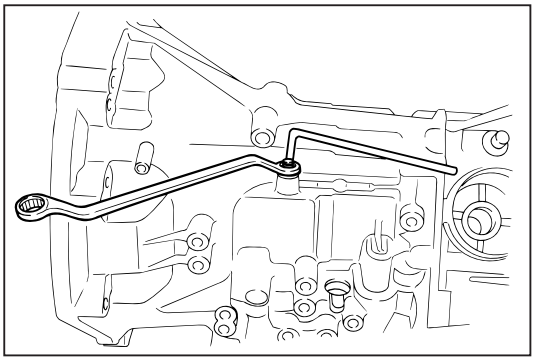
(4) Under the condition of the step (3) above, loosen the brake band anchor bolt 3.2 turns counterclockwise (direction (A)).



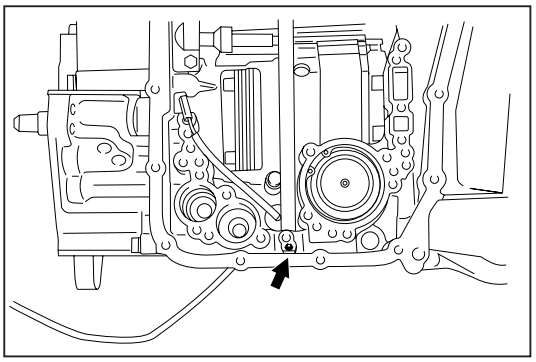
JAT00240-00214

(5) Install the nut to the brake band anchor bolt.
(6) While holding the brake band anchor bolt by means of a screwdriver or the like, tighten the nut.
Tightening Torque: 22.5 - 30.4 N·m (2.3 - 3.1 kgf-m)



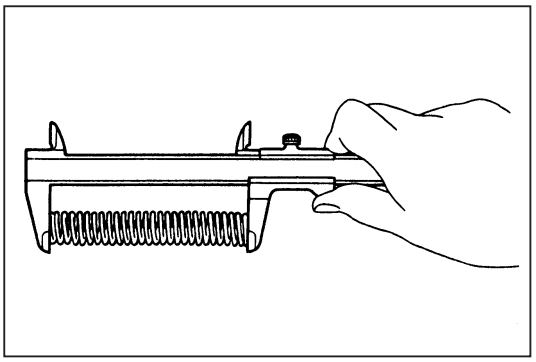
JAT00241-00215

31. Install the roller for the manual valve lever shaft subassembly as illustrated in the right figure.
NOTE:
- Make sure that the roller edge surface is lower than the transmission case edge surface.



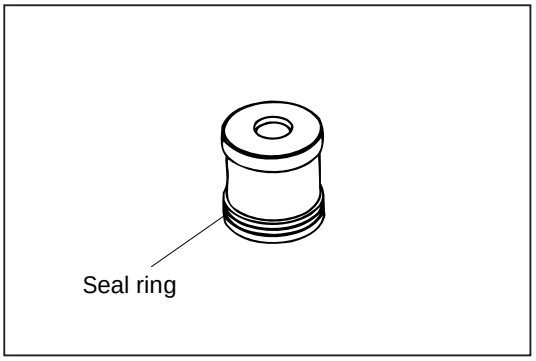
JAT00242-00216

32. Assembly of C2 accumulator piston
(1) Measure the free length and outer diameter of the C2 accumulator compression spring.
Reference Value:
Free Length: 85.8 mm
Outer Diameter: 18.3 mm



JAT00243-00217

(2) Apply ATF to a new C2 accumulator seal No. 1 ring. Then, assemble the ring to the accumulator No. 2 piston.
NOTE:
- Do not expand the oil seal ring beyond the minimum extent needed for assembly.
- Be sure to align the opening ends with each other after assembling.



JAT00244-00218

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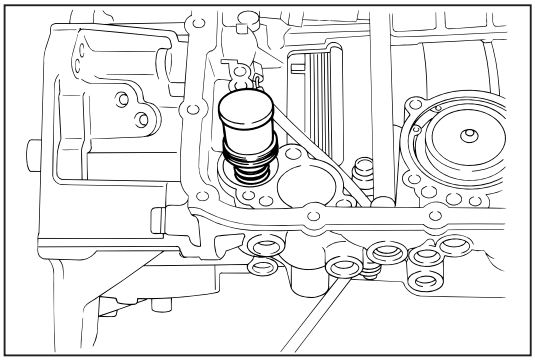
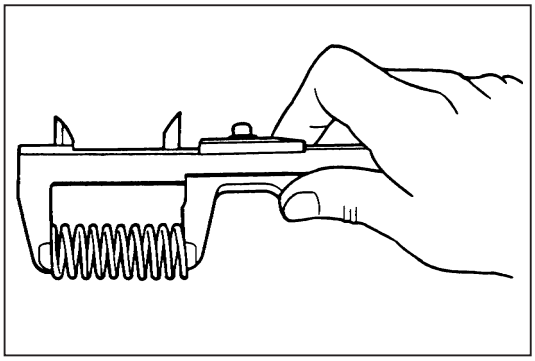
(3) Assemble the compression spring and accumulator No. 2 piston to the transmission case.



JAT00245-00219

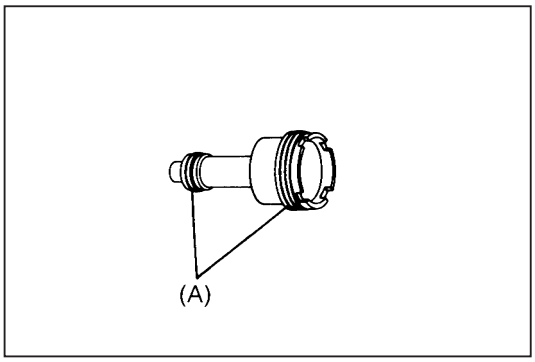
33. Assembly of B1 accumulator piston
(1) Measure the free length and outer diameter of the B1 accumulator compression spring.
Reference Value:
Free Length: 50.5 mm
Outer Diameter: 20 mm



JAT00246-00220

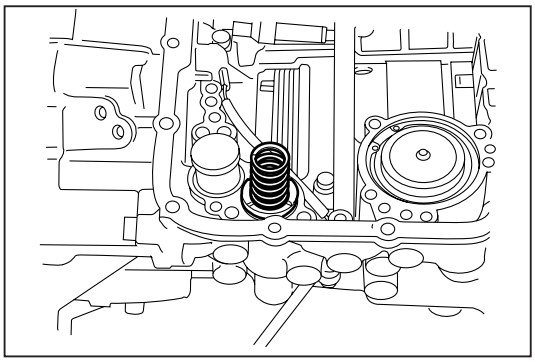
(2) Coat the A section of the new accumulator seal No. 1 and No. 2 ring with ATF.
(3) Install the accumulator seal No. 1 and No. 2 ring to the accumulator No. 1 piston.

NOTE:
- Do not spread the seal ring end excessively.



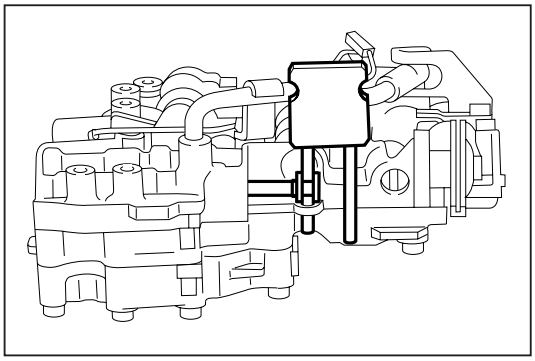
JAT00247-00221

(4) Install the accumulator No. 1 piston to the transmission case.
(5) Install the compression spring.



JAT00248-00222

34. Assembly of valve body
(1) Ensure that the manual valve operates smoothly without any binding.
(2) Set the manual valve to the neutral position, using the following SST.
SST: 09351-87211-000



JAT00249-00223

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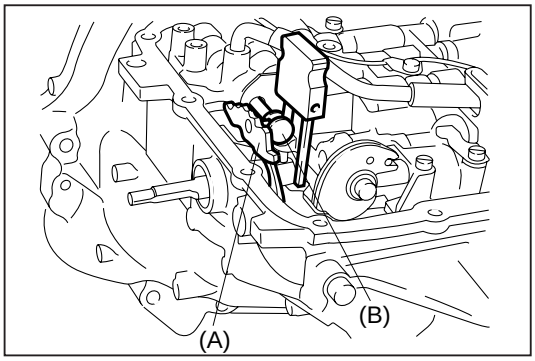
(3) Install the valve body assembly with the aforesaid SST to the transmission case.

NOTE:

- Ensure that the protrusion of the manual valve lever (A) and grooved section of the manual valve (B) are matched securely.

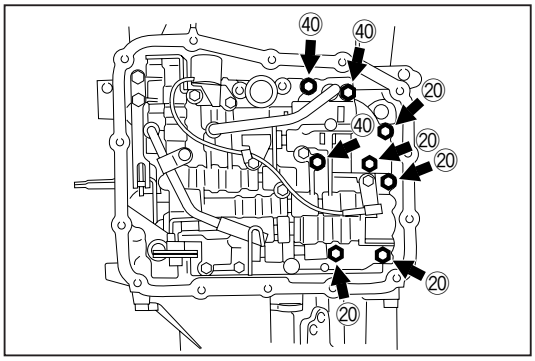


JAT00250-00224

(4) Tighten the bolts of the valve body assembly.
Tightening Torque: 6.9 - 9.8 N·m (0.7 - 1.0 kgf-m)

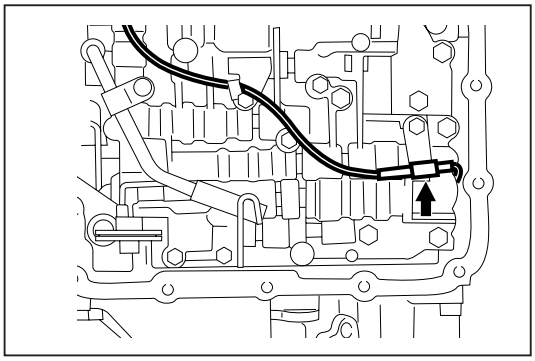
NOTE:

- The numeral in the right illustration indicates the nominal length of the bolt.
- If the bolt is tightened with any oil getting to the bolt's threaded portion, it may cause the bolt looseness. Therefore, be sure to clean the bolt threaded portion by applying compressed air.
- Care must be exercised so that the wire may not be caught in between the transmission case and the valve body assembly.



JAT00251-00225

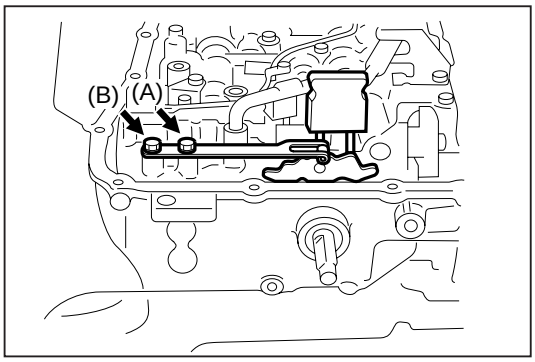
(5) Connect the connector of the solenoid wire assembly.


JAT00252-00226

35. Tighten the (A) bolt firstly with the aforesaid SST. Then, proceed to tighten the (B) bolt of the manual detent spring.
Tightening Torque: 6.9 - 9.8 N·m (0.7 - 1.0 kgf-m)

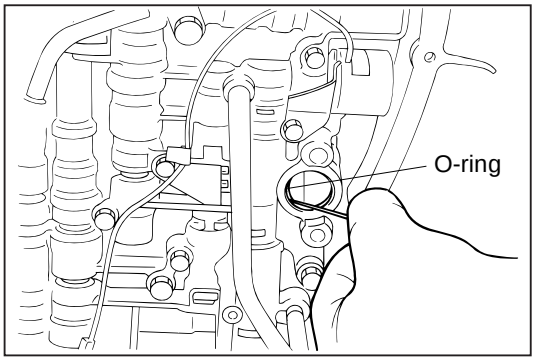
NOTE:

- The numeral in the right figure indicates the nominal length of the bolt.
(A) = 12 mm (B) = 40 mm
- Be sure to tighten the bolts alternately.



JAT00253-00227

36. Assembly of oil strainer
(1) Coat a new O-ring (A) with ATF.
(2) Install the new O-ring to the groove section of the valve body.



JAT00254-00228

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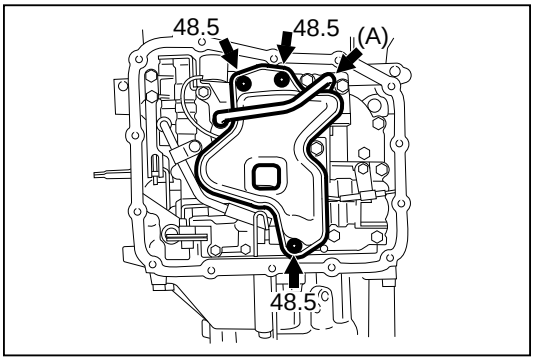
(3) Apply ATF to the O-ring contact section of the oil strainer.
(4) Install the valve body tube (A).
(5) Install the oil strainer with the 3 bolts.
Tightening Torque: 6.9 - 9.8 N·m (0.7 - 1.0 kgf-m)

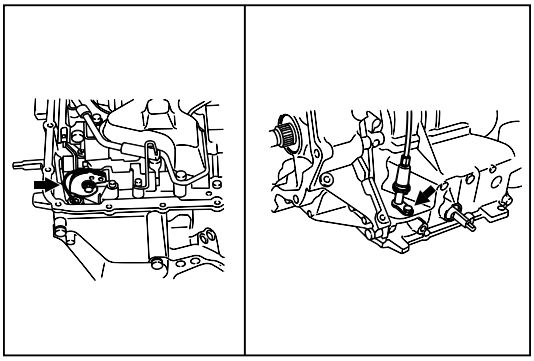
NOTE:
- The numeral in the right illustration indicates the nominal length of the bolt.
- Be sure to tighten the bolts alternately and diagonally.



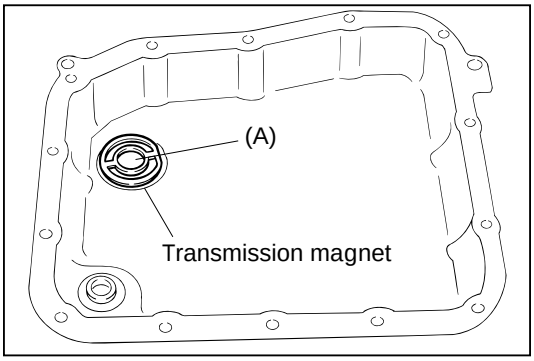
JAT00255-00229

37. Assembly of throttle cable
(1) Coat a new O-ring with the ATF.
(2) Install the new O-ring to the throttle cable.
(3) Insert the throttle cable to the transmission case.
(4) Tighten the throttle cable with a bolt.
Tightening Torque: 6.9 - 9.8 N·m (0.7 - 1.0 kgf-m)

(5) Connect the throttle cable to the throttle valve cam.

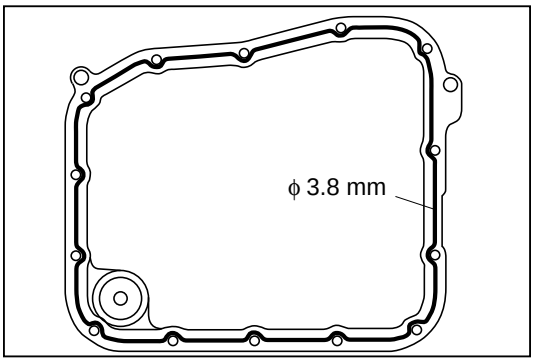

JAT00256-00230

38. Assembly of oil pan
(1) Place the transmission magnet in the protrusion (A) of the transmission oil pan assembly.



JAT00257-00231

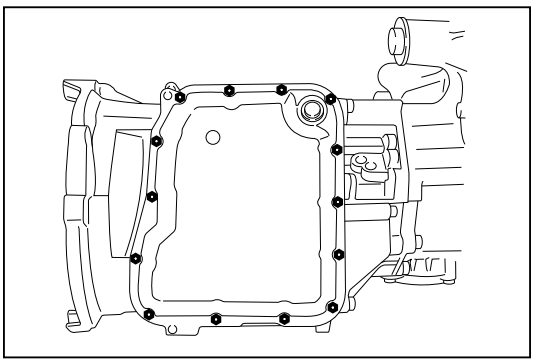
(2) Apply the Three Bond 1281B to the entire periphery of the oil pan without any discontinuation, as indicated in the right figure.
NOTE:
- Be very careful not to get oil to the application surface.



JAT00258-00232

(3) Install the new transmission oil pan assembly with the 14 bolts.
Tightening Torque: 6.9 - 9.8 N·m (0.7 - 1.0 kgf-m)

NOTE:
- Be sure to tighten the bolts alternately and diagonally.
- When installing the transmission oil pan, be very careful not to allow the oil pan to come in contact with any inside part.


JAT00259-00233

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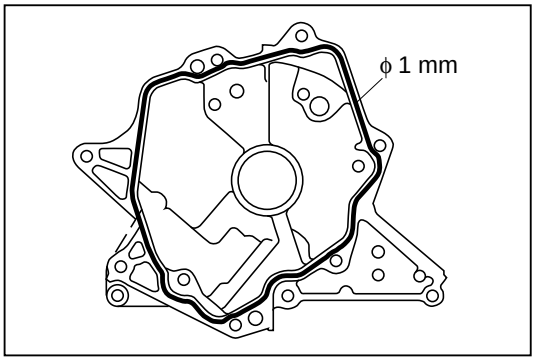
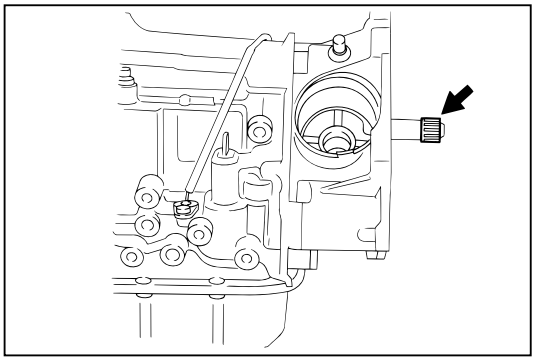
39. Clean the contact surface between the transmission case side cover subassembly and the transfer assembly, using solvent or the like.
40 Apply the following bond to the transmission case side cover subassembly surface as shown in the right figure.
Specified Bond: Three bond 1216 or 1217

NOTE:
- Be sure to apply the bond to the entire periphery without any discontinuation.



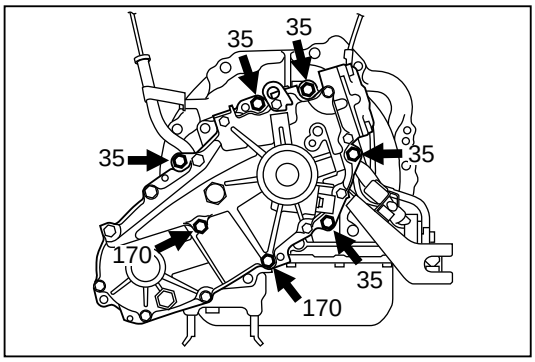
JAT00260-00234

41. Install the needle roller bearing to the forward end of the output shaft assembly.


JAT00261-00235

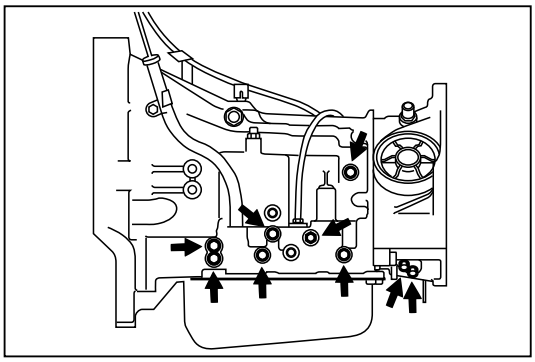
42. Install the transfer assembly. Tighten the seven bolts.
Tightening Torque: 29.4 - 44.1 N·m (3.0 - 4.5 kgf-m)

NOTE:
- The numerals in the right figure denote the nominal length of each bolt. (Unit: mm)

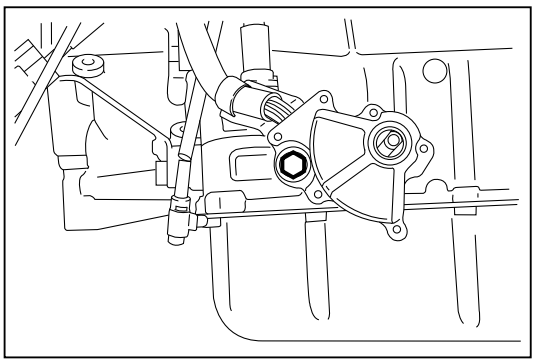


JAT00262-00236

43. Tighten nine new inspection plugs to the transmission case.
Tightening Torque: 6.9 - 9.8 N·m (0.7 - 1.0 kgf-m)


JAT00263-00237

44. Adjustment of neutral start switch
(1) Temporarily tighten the bolt of the neutral start switch assembly.


JAT00264-00238

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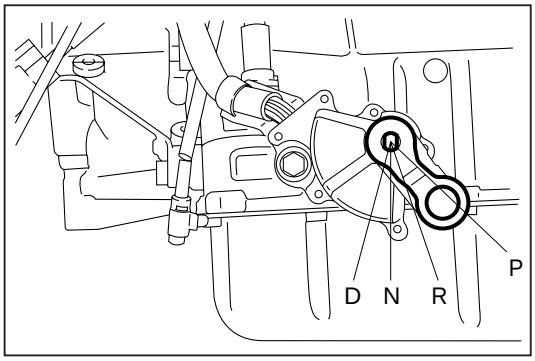
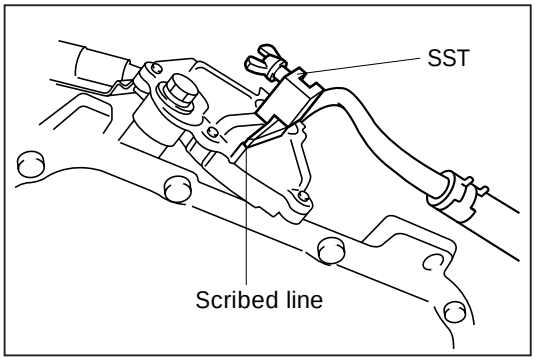
(2) Place the transmission control shaft lever subassembly.
(3) Push the transmission control shaft lever subassembly toward the front side (ie: P range)
(4) Back off the lever two notches to the NEUTRAL position
(5) Remove the transmission control shaft lever subassembly.



JAT00265-00239

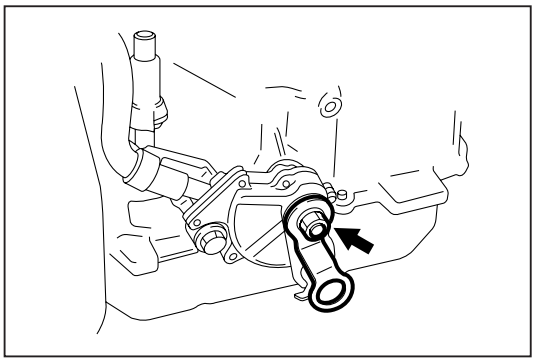
(6) Install the following SST
SST: 09302-87201-000

(7) Adjust the neutral start switch assembly until the neutral basic line should be aligned with the SST above.
(8) Tighten the bolt.
Tightening Torque: 14.7 - 21.6 N·m (1.5 - 2.2 kgf-m)



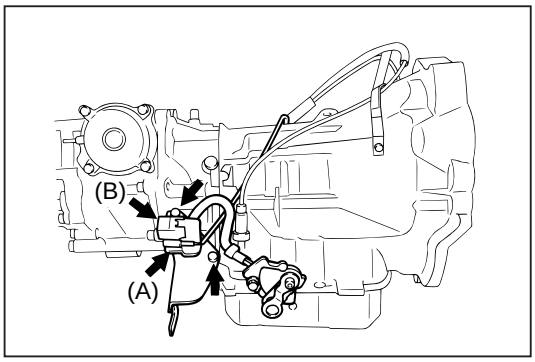
JAT00266-00240

45. Tighten the transmission control shaft lever subassembly with a nut.
Tightening Torque: 9.8 - 15.7 N·m (1.0 - 1.6 kgf-m)


JAT00267-00241

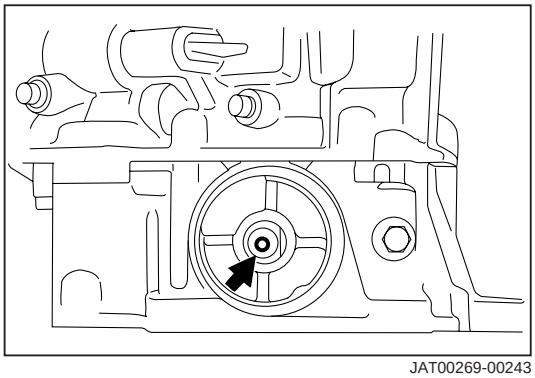
46. Install the control cable bracket. Tighten the two bolts.
Tightening Torque: 14.7 - 21.6 N·m (1.5 - 2.2 kgf-m)

47. Secure the connectors of the neutral start switch assembly (B) and solenoid wire assembly (A), respectively, to the control cable bracket.



JAT00268-00242

48. Installation of governor valve.
(1) Place the ball into the transmission case side cover.


JAT00269-00243

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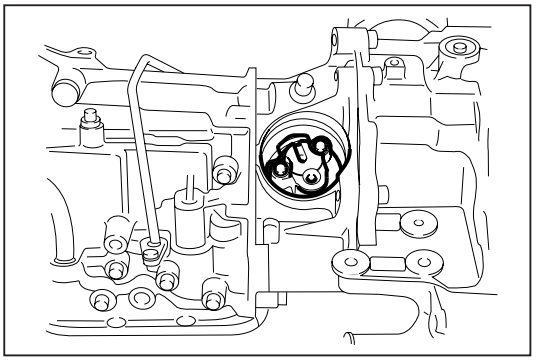
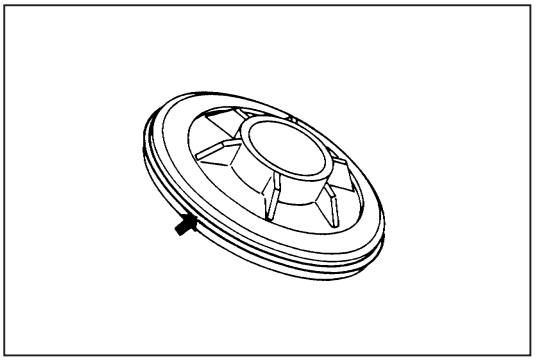
(2) Coat the whole of governor body assembly with ATF.
(3) Install the governor body assembly into the transmission case side cover.


JAT00270-00244

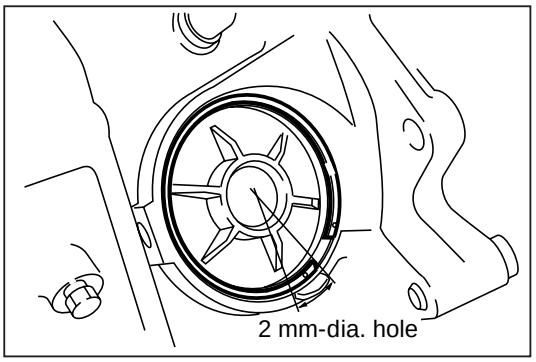
(4) Coat a new O-ring with ATF.
(5) Install the new O-ring to the governor cover.
(6) Install the governor cover to the transmission case side cover.

NOTE:
- Be very careful not to damage the new O-ring during installation.


JAT00271-00245

(7) Install the hole snap ring, using standard pliers.

NOTE:
- Make sure that the hole of the snap ring comes in the slant line section indicated in the right figure when assembling.

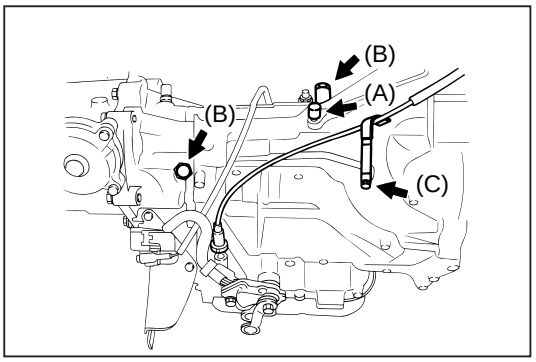


JAT00272-00246

49. Assemble the union bolts (B) with a new gasket interposed. (B)
    Tightening Torque: 29.4 - 39.2 N·m (3.0 - 4.0 kgf-m)

50. Tighten the breather plug (A).
    Tightening Torque: 6.9 - 9.8 N·m (0.7 - 1.0 kgf-m)

51. Assemble the clamp (C) for the throttle cable. Tighten the bolt to the specified torque.
    Tightening Torque: 6.9 - 9.8 N·m (0.7 - 1.0 kgf m)



JAT00273-00247

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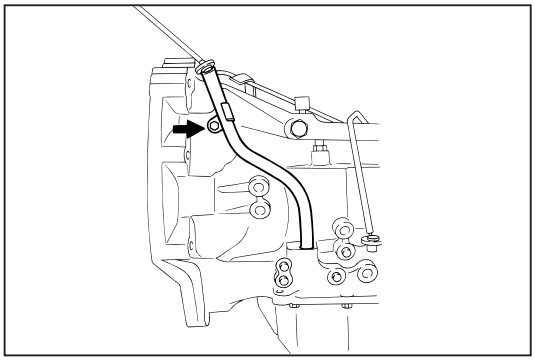
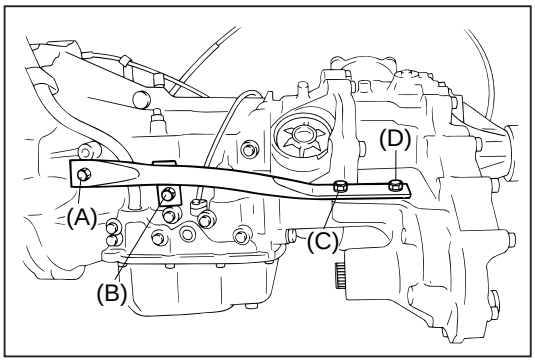
52. Coat a new O-ring with the ATF.
53. Install the new O-ring to the transmission oil filler tube subassembly.
    NOTE:
    - Be very careful not to twist or damage the O-ring during the installation of the transmission oil filler tube subassembly.

54. Insert the transmission oil filler tube subassembly to the transmission case.
55. Tighten the transmission oil filler tube subassembly with the bolt.
    Tightening Torque: 6.9 - 9.8 N·m (0.7 - 1.0 kgf-m)



JAT00274-00248

56. Install the power train stiffener. Tighten the bolts in the following sequence.
    (1) Temporarily tighten the bolt (A) and bolt (D).
    (2) Securely tighten the bolt (B).
    (3) Tighten the bolts in the sequence of the bolt (A), bolt (D) and bolt (C).
    Tightening Torque: 29.4 - 44.1 N·m (3.0 - 4.5 kgf-m)



JAT00275-00249

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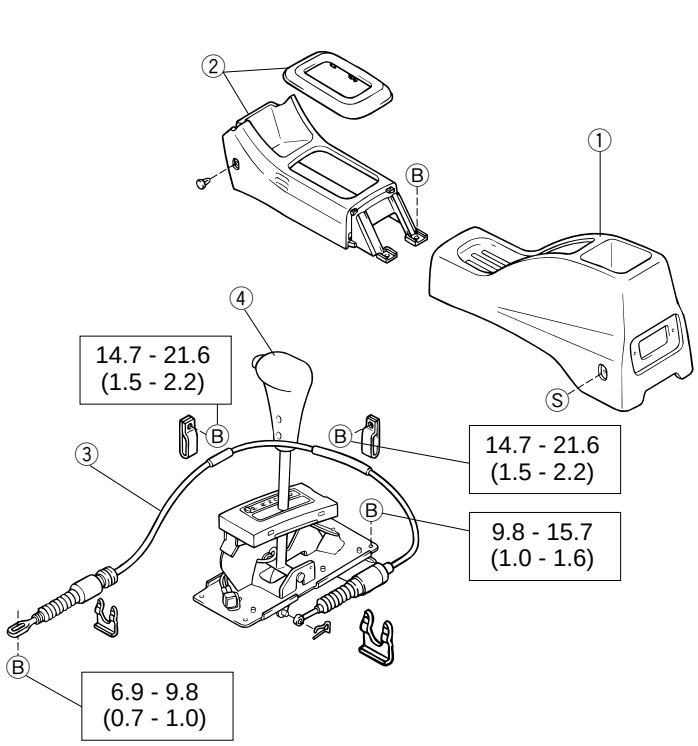
INSTALLATION AND REMOVAL OF CONTROL CABLE AND FLOOR SHIFT

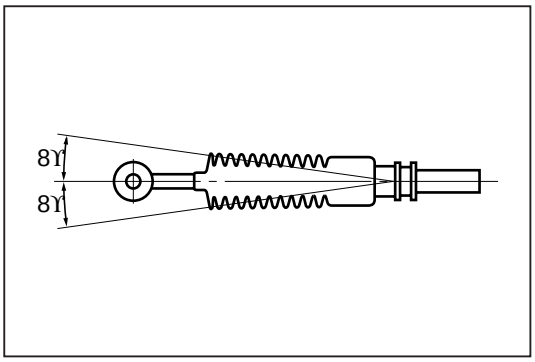
COMPONENTS



① Console rear box assembly
② Console panel with shifting hole vessel
③ Control cable assembly

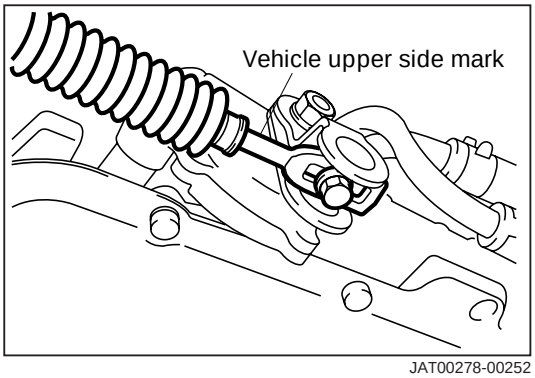
JAT00276-00250

1. Main points of removal
   NOTE:
   - Be very careful not to rock the control cable end (both shift lever side and transmission side) beyond 8 degrees. Also, never apply any load to it.



JAT00277-00251

   (1) Remove the control cable assembly.
      1) First, confirm that a white mark for identifying the upper side and lower side is put on the upper side of the cable end. Then, remove the control cable assembly at the transmission side. If the mark is erased, put a mark.



JAT00278-00252

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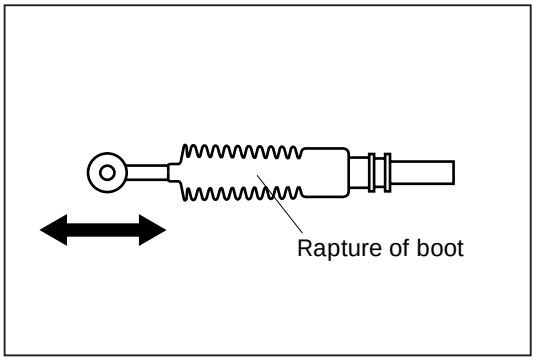
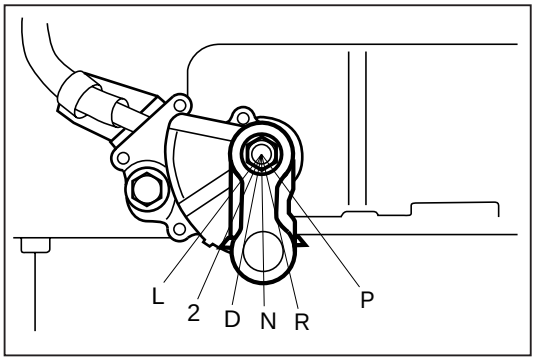
2. Check
   (1) Check that the inner cable of the control cable assembly slides smoothly. Also, check that the control cable assembly exhibits no damage and deformation, such as rapture of the boot.



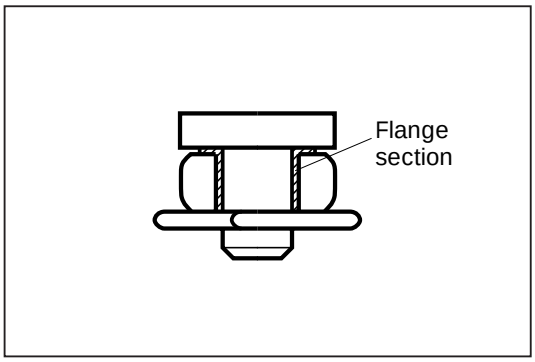
JAT00279-00253

3. Main points of installation
   (1) Install the control cable assembly.
      1) Move the shift lever and transmission control shaft lever to the [N] range.



JAT00280-00254

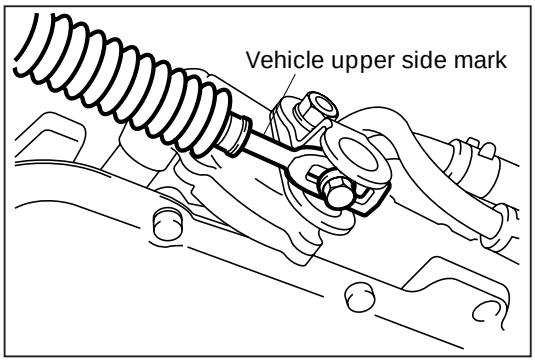
      2) Connect the control cable (at the shift lever side) to the floor shift assembly so that the flange section of the collar may come at the lever side. Then, secure the control cable with the clip.



JAT00281-00255

      3) Install the control cable end at the transmission side to the transmission control shaft lever assembly, while making sure that the white mark for identifying the upper side and lower side comes at the upper side.

   Tightening Torque: 6.9 - 9.8 N·m (0.7 - 1.0 kgf-m)



JAT00282-00256

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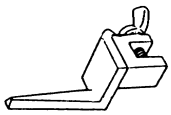
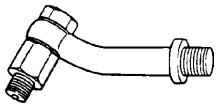
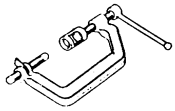
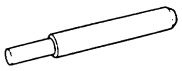
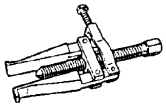
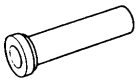
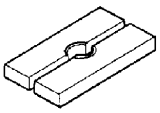
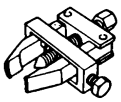
APPENDIX

SSTs (Special Service Tools)

Shape	Part No.	Part name
	09302-87201-000	Neutral start switch adjusting gauge
	09325-87201-000	Automatic transmission pressure gauge No. 1 adapter
	09202-87002-000	Valve cutter remover & replacer
	09301-87702-000	Clutch guide tool
	09308-10010-000	Oil seal puller
	09309-87203-000	4M/T friction dumper No. 2 replacer
	09309-87502-000	4M/T friction dumper No. 2 replacer
	09310-87301-000	Countershaft front bearing replacer
	09527-87301-000	Rear axle shaft bearing remover
	09820-00021-000	Alternator rear bearing puller
	09306-87302-000	Counter gear front bearing puller

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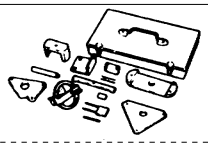
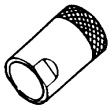
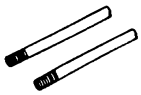
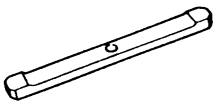
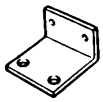
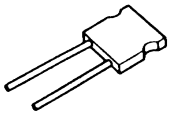
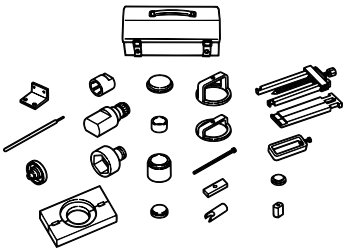
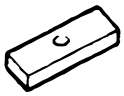
Shape	Part No.	Part name
	09350-87202-000	Automatic transmission tool set
	09351-87201-000	Piston spring No. 1 compressor
	09351-87203-000	Dial gauge attachment
	09351-87206-000	Oil pump driver
	09351-87207-000	Oil pump guide
	09351-87208-000	Direct & forward clutch measure
	09351-87210-000	Dial gauge stand base
	09351-87211-000	Manual valve setting tool
	09350-87704-000	Automatic tool set
	09351-87707-000	Piston spring No. 1 compressor
	09351-87709-000	Brake piston rod
	09351-87710-000	Brake piston plate

JAT00283-00257

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SERVICE SPECIFICATIONS

Unit: mm

Items		Specified value	Allowable limit
Free play of input shaft		0.28 - 0.92	—
Bush bore diameter of direct clutch drum subassembly		44.000 - 44.025	44.075
Stroke of direct clutch piston		1.22 - 1.53	—
End play of direct clutch		0.77 - 1.08	—
End play of 1st & reverse brake		1.04 - 1.41	—
Bush bore diameter of planetary sun gear subassembly		22.020 - 22.038	22.088
Bush bore diameter of rear planetary sun gear subassembly		15.500 - 15.518	15.568
Bush bore diameter of planetary output shaft subassembly		12.000 - 12.018	12.068
Bush bore diameter of stator shaft & oil pump assembly	Front side	15.500 - 15.522	15.572
	Rear side	21.100 - 21.121	21.171
Dimensions of compression spring for accumulator C2 piston	Free length	⟨85.8⟩	—
	Outer diameter	⟨18.3⟩	—
Dimensions of compression spring for accumulator B1 piston	Free length	⟨50.5⟩	—
	Outer diameter	⟨20.0⟩	—

The number in brackets < > denotes the reference value.

JAT00284-00000

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TIGHTENING TORQUE

Tightening components		Tightening torque	
		N·m	kgf-m
Drive plate × Crankshaft		78.45 - 98.07	8.0 - 10.0
Transmission × Engine direct-connecting bolt		49.04 - 68.64	5.0 - 7.0
Torque convertor × Drive plate		29.4 - 44.1	3.0 - 4.5
Power train stiffener × Engine, Transmission	M8	14.7 - 21.6	1.5 - 2.2
	M10	29.4 - 44.1	3.0 - 4.5
Starter shaft & oil pump × Transmission case		6.9 - 9.8	0.7 - 1.0
Nut (for brake band anchor bolt) × Transmission case		22.5 - 30.4	2.3 - 3.1
Roller, bolt for securing spring × Transmission case		6.9 - 9.8	0.7 - 1.0
Parking lock pawl cam support × Transmission case		14.7 - 17.7	1.5 - 1.8
Valve body × Transmission case		6.9 - 9.8	0.7 - 1.0
Manual detent spring × Transmission case		6.9 - 9.8	0.7 - 1.0
Transmission oil pan × Transmission case		6.9 - 9.8	0.7 - 1.0
Inspection plugs × Transmission case		6.9 - 9.8	0.7 - 1.0
Breather plug × Transmission case		6.9 - 9.8	0.7 - 1.0
Throttle cable × Transmission case		6.9 - 9.8	0.7 - 1.0
Clamp for throttle cable × Transmission case		6.9 - 9.8	0.7 - 1.0
Oil strainer × Transmission case		6.9 - 9.8	0.7 - 1.0
Unions (for oil cooler) × Transmission case		29.4 - 39.2	3.0 - 4.0
Neutral start switch × Transmission case		14.7 - 21.6	1.5 - 2.2
Transmission control shaft lever × Manual shaft lever		9.8 - 15.7	1.0 - 1.6
Control cable bracket × Transmission case side cover		14.7 - 21.6	1.5 - 2.2
Transmission oil filter tube × Transmission case		6.9 - 9.8	0.7 - 1.0
Transmission case × Transmission case side cover		14.7 - 21.6	1.5 - 2.2
Breather plug × Transmission case side cover		6.9 - 9.8	0.7 - 1.0
Solenoid wire assembly × Transmission case		6.9 - 9.8	0.7 - 1.0
Transmission × Transfer		29.4 - 44.1	3.0 - 4.5
Control cable × Transmission control shaft lever		6.9 - 9.8	0.7 - 1.0
Drain plug × Oil pan		19.6 - 29.4	2.0 - 3.0
Oil cooler × Oil cooler bracket		6.9 - 9.8	0.7 - 1.0
Power train stiffener × Transmission, Transfer		29.4 - 44.1	3.0 - 4.5

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DAIHATSU

TERIOS

J100

TRANSFER

DESCRIPTION ..... TR– 2
CENTER DIFFERENTIAL SYSTEM ..... **TR– 2**
OPERATION OF CENTER DIFFERENTIAL LOCK SYSTEM ..... **TR– 2**
IN-VEHICLE INSPECTION ..... TR– 4
COMPONENTS ..... TR– 5
REMOVAL ..... TR– 5
DISASSEMBLY ..... TR– 8
INSPECTION TR–10
ASSEMBLY TR–15
INSTALLATION TR–17
SSTs TR–20
TIGHTENING TORQUE TR–20

JTR00001-00000

TR

NO. 9710-JE

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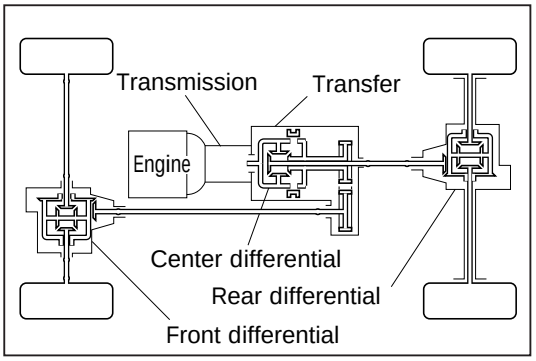
DESCRIPTION

A driving system equipped with a center differential is employed.

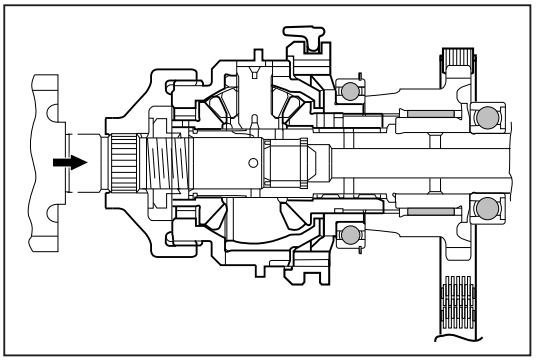


JTR00002-00101

CENTER DIFFERENTIAL SYSTEM

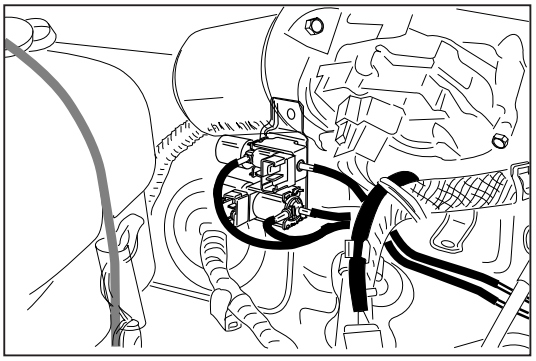
The input power from the transmission of the driving system is always distributed to the front and rear wheels. The transfer system employs a negative pressure-driving actuator type, with a center differential lock mechanism.

The negative pressure which has been taken from the intake manifold is transmitted to a diaphragm type actuator provided inside the transfer case.



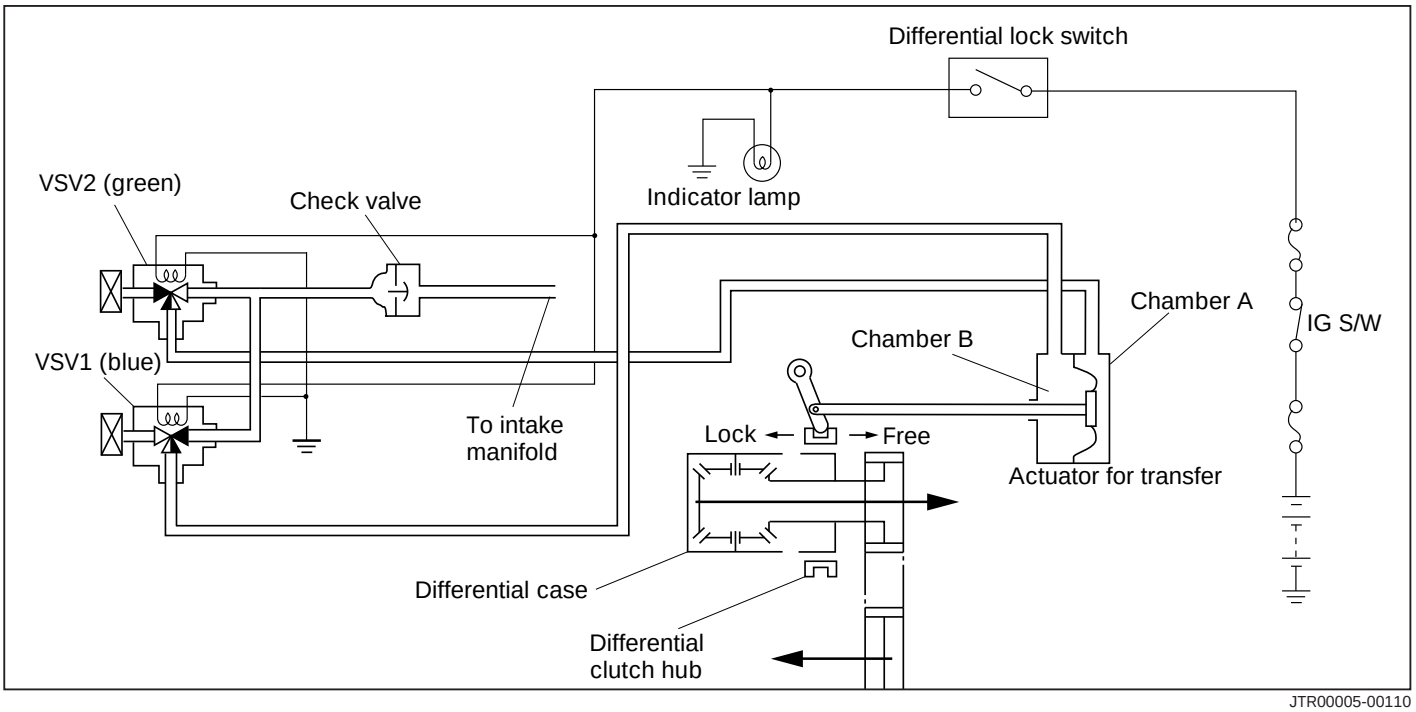
JTR00003-00102

The negative pressure is controlled by two VSV's. For improved response of the actuator, these VSV's have been installed in the engine compartment.



JTR00004-00103

OPERATION OF CENTER DIFFERENTIAL LOCK SYSTEM



JTR00005-00110

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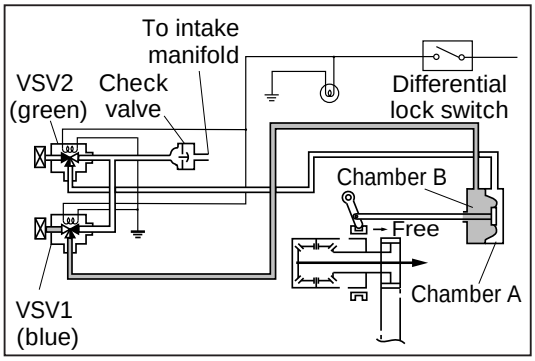
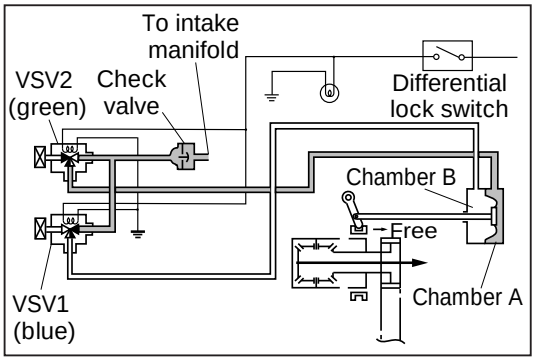
1. When center differential lock switch is turned off.
   (1) The VSV1 and VSV2 become unenergized. Thus, the VSV1 is connected to the air filter side. As a result, the transfer actuator chamber B becomes equal to the atmospheric pressure.



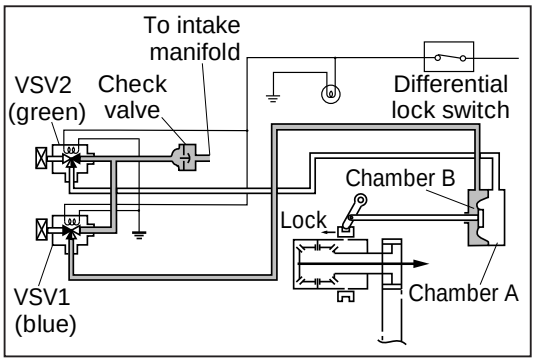
JTR00006-00111

   (2) On the other hand, the intake manifold negative pressure is transmitted to the check valve, VSV2, and then, transfer actuator chamber A. Consequently, the differential clutch hub assembly of the transfer moves backward. In this way, the center differential is switched to a free state.



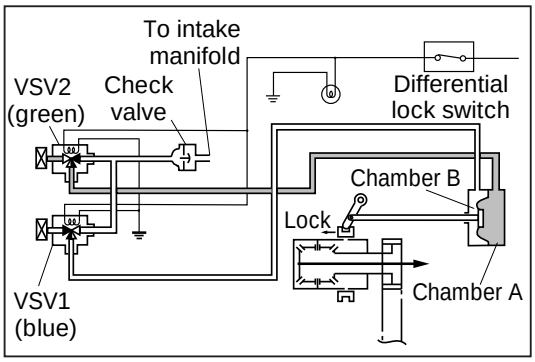
JTR00007-00112

2. When center differential lock switch is turned on.
   (1) A electric current flows into the VSV1 and VSV2. Thus, the intake manifold negative pressure is transmitted to the check valve, VSV1, and then, transfer actuator chamber B.



JTR00008-00113

   (2) On the other hand, the VSV2 is connected to the air filter. As a result, the transfer actuator chamber A becomes equal to the atmospheric pressure. Consequently, the differential clutch hub assembly of the transfer moves forward, thus engaging with the differential case subassembly. In this way, the center differential becomes in a locked state.



JTR00009-00114

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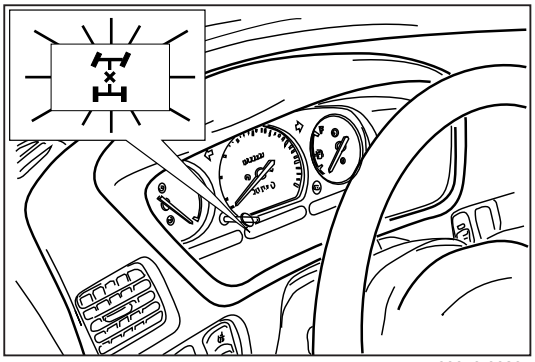
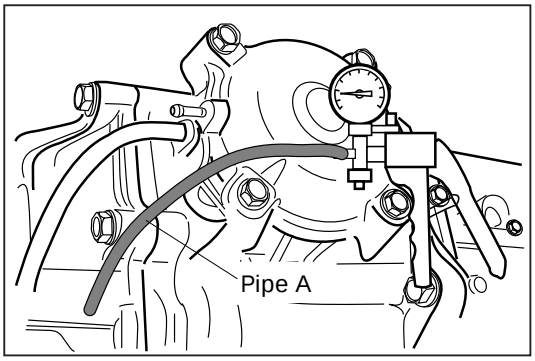
IN-VEHICLE INSPECTION

1. Turn the ignition switch to the “ON” position.
2. Check to see if the indicator will illuminate when the differential lock switch is turned on.
   NOTE:
   - If not, check the indicator valve.
3. Turns off the differential lock switch.



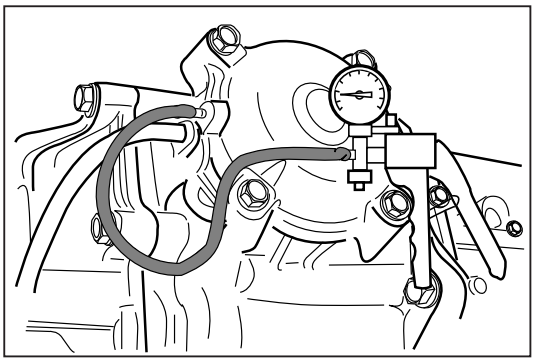
JTR00010-00201

4. Disconnect the pipe A. Then, Connect a MityVac to the pipe A.
5. Start the engine.
6. Check to see if the MityVac indicates a negative pressure while keeping the engine revolution speed at idling.



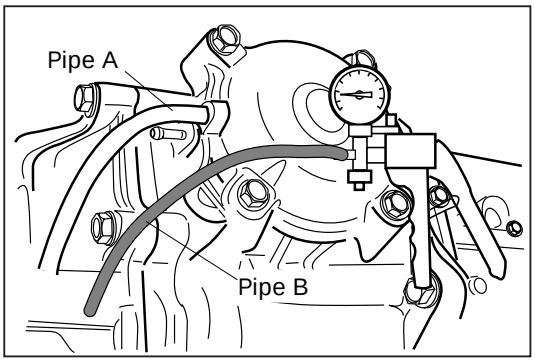
JTR00011-00202

7. Connect the MityVac to the diaphragm with a suitable pipe.
8. Set the MityVac to –200 mmHg manually.
9. Hold the negative pressure of the MityVac at –200 mmHg for about 10 seconds.
   NOTE:
   - If the diaphragm exhibits damage, deterioration and so forth, the negative pressure will rapidly return to positive pressure.



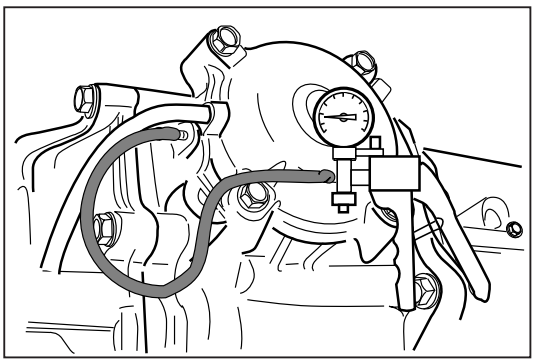
JTR00012-00203

10. Disconnect the pipe B.
11. Connect the MityVac to the pipe B.
12. Start the engine. Turns on the differential lock switch.
13. Check to see if the MityVac indicates a negative pressure while keeping the engine revolution speed at idling.



JTR00013-00204

14. Connect the MityVac to the diaphragm with a suitable pipe.
15. Set the MityVac to –200 mmHg manually.
16. Hold the negative pressure of the MityVac at –200 mmHg for about 10 seconds.
    NOTE:
    - If the diaphragm exhibits damage, deterioration and so forth, the negative pressure will rapidly return to positive pressure.



JTR00014-00205

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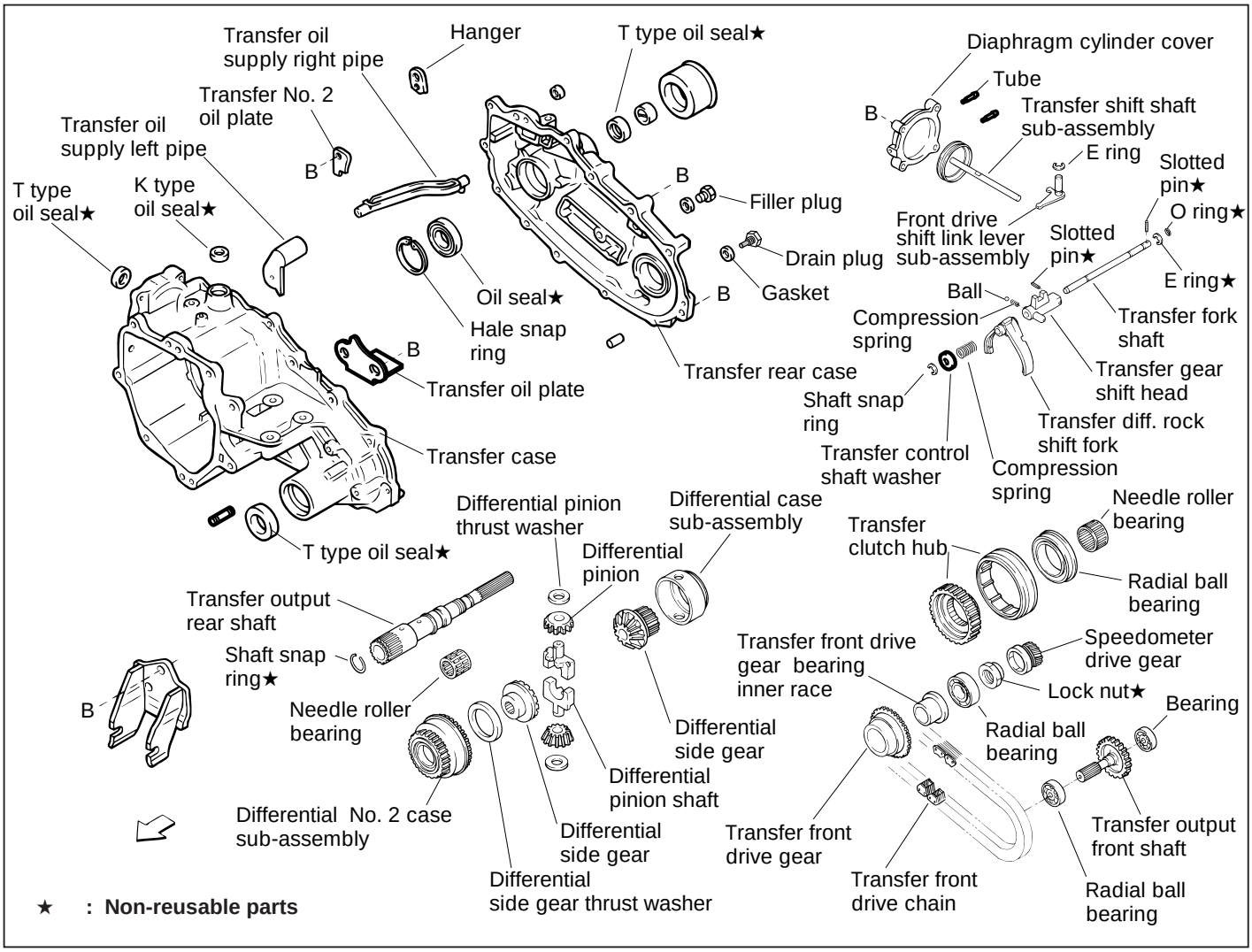
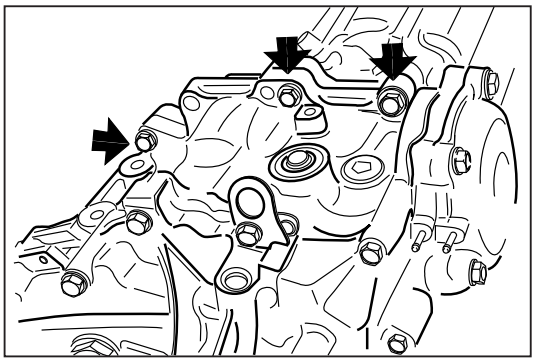
COMPONENTS



JTR00015-00301

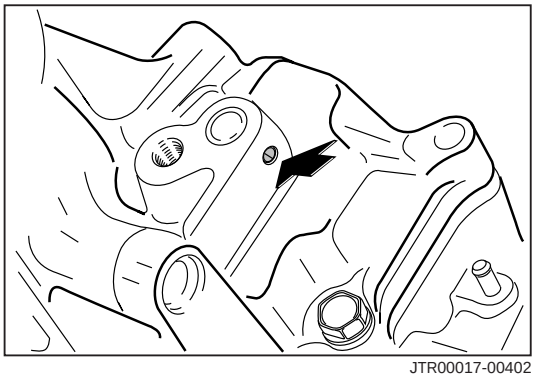
REMOVAL

1. Remove the transmission & transfer assembly from the vehicle. Refer to MT and AT section of the service manual.
2. Remove the transfer from the transmission by removing the attaching bolts.
   NOTE:
   - Never reuse the removed gasket.



JTR00016-00401

3. Drive off the slotted pin of the transfer fork shaft.



JTR00017-00402

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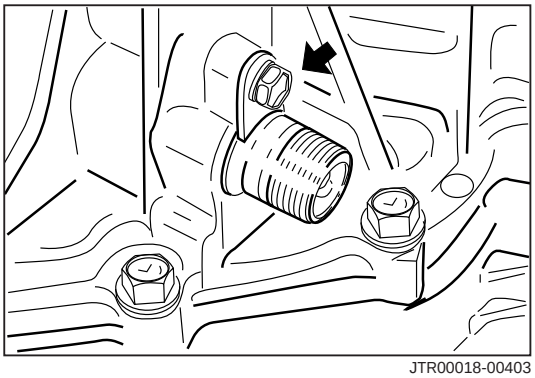
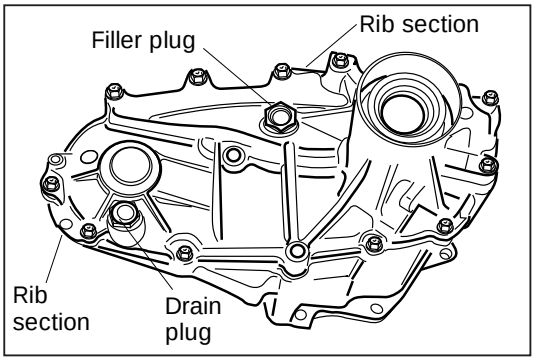
4. Remove the speedometer shaft sleeve by removing the bolt.



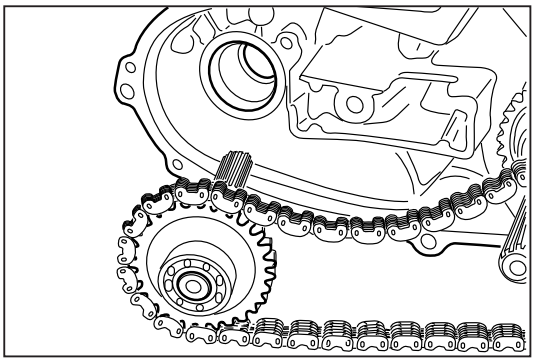
JTR00018-00403

5. Remove the drain plug.
6. Remove the filler plug.
7. Remove the transfer case by removing the attaching bolts.
   NOTE:
   - While lightly tapping the transfer case at the rib sections, using a plastic hammer or the like, remove the transfer case.



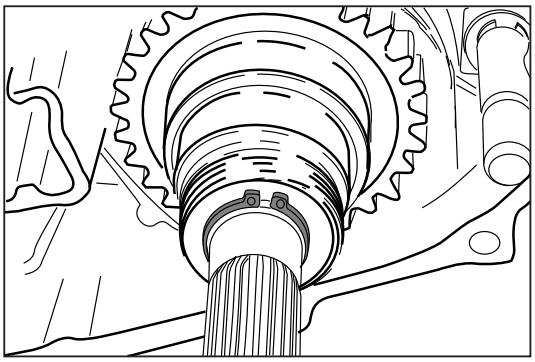
JTR00019-00404

8. Remove the transfer output front shaft with the radial ball bearings.



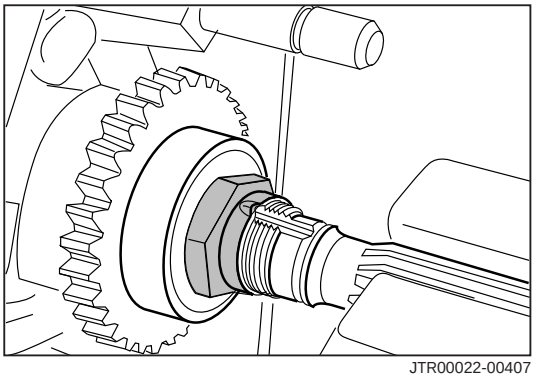
JTR00020-00405

9. Detach the snap ring of the speedometer drive gear.
10. Remove the speedometer drive gear.



JTR00021-00406

11. Remove the lock nut of the radial ball bearing in the transfer output rear shaft.
    NOTE:
    - Release the staking of the lock nut, using a suitable chisel and a hammer.
    - Prior to loosen the nut, grab the shaft by the vise with the soft metal for not rotating.
      (Be careful not to damage the shaft.)
    - Never reuse the removed nut.



JTR00022-00407

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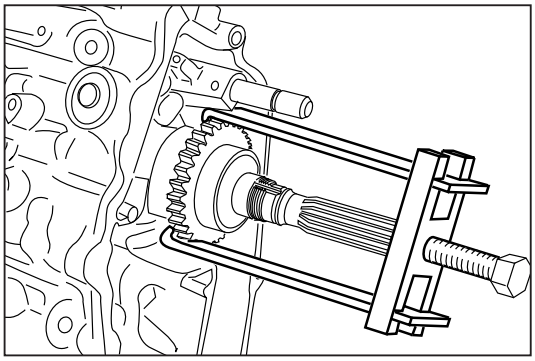
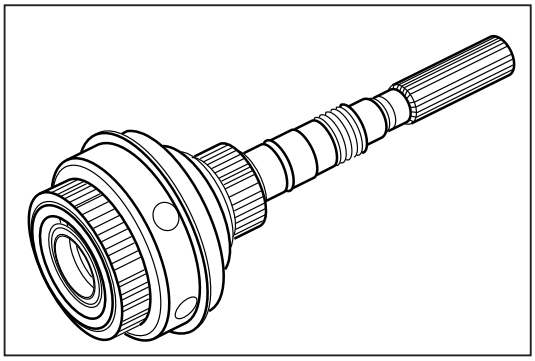
12. Remove the radial ball bearing in combination with the gear, using the following SST.
    SST: 09306-87602-000



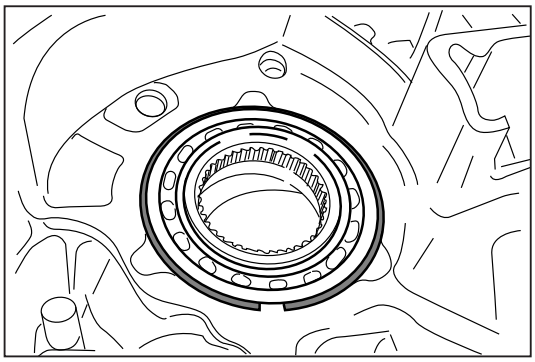
JTR00023-00408

13. Remove the transfer output rear shaft with differential gear.



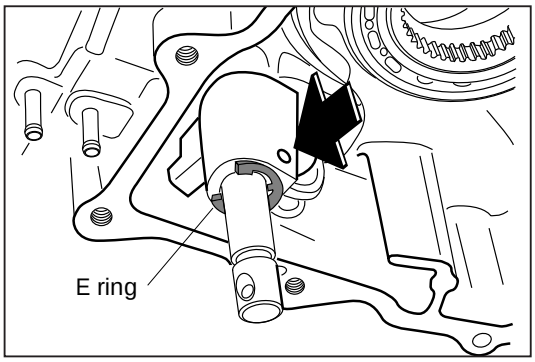
JTR00024-00409

14. Remove the ring retainer of the bearing.
15. Remove the radial ball bearing with the transfer clutch inner hub from the transfer case.



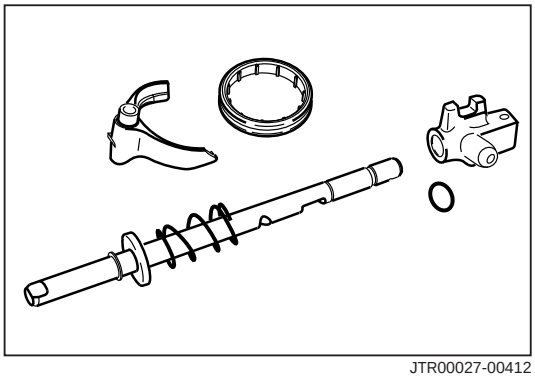
JTR00025-00410

16. Drive off the slotted pin of the transfer gear shift head.
17. Remove the E ring.



JTR00026-00411

18. Remove the following parts.
    (1) Transfer fork shaft
    (2) Compression spring
    (3) Transfer control shaft washer
    (4) Shaft snap ring
    (5) O ring
    (6) Transfer differential lock shift fork
    (7) Transfer clutch outer hub
    (8) Transfer gear shift head



JTR00027-00412

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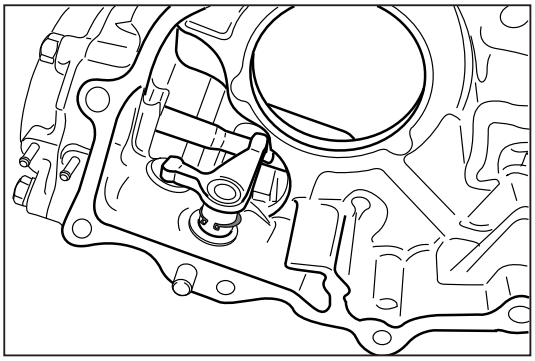
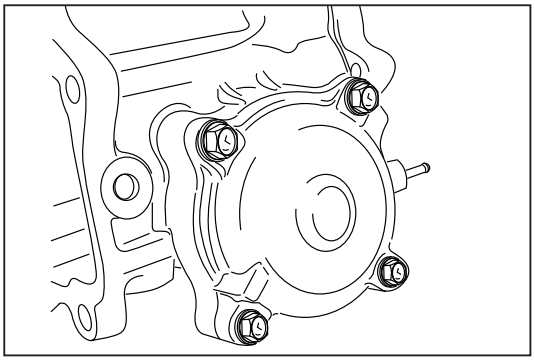
19. Remove front drive shift link lever sub-assembly and E ring.



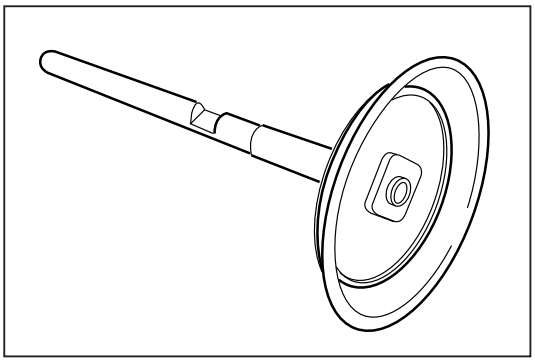
JTR00028-00413

20. Remove the diaphragm cylinder cover.



JTR00029-00414

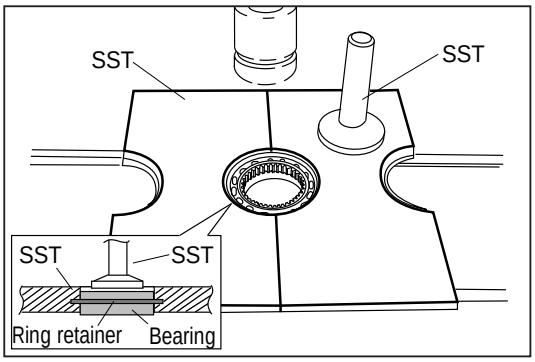
21. Remove the transfer shift shaft sub-assembly from the diaphragm cylinder.



JTR00030-00415

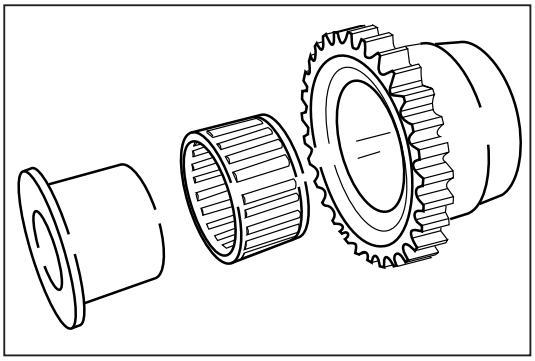
DISASSEMBLY

1. Disassemble the transfer clutch inner hub and the radial ball bearing, using the following SST in conjunction with a press.
   SST: 09310-87102-000
   09253-87202-000



JTR00031-00501

2. Disassemble the following parts.
   (1) Transfer front drive gear
   (2) Needle roller bearing
   (3) Transfer front drive gear bearing inner race



JTR00032-00502

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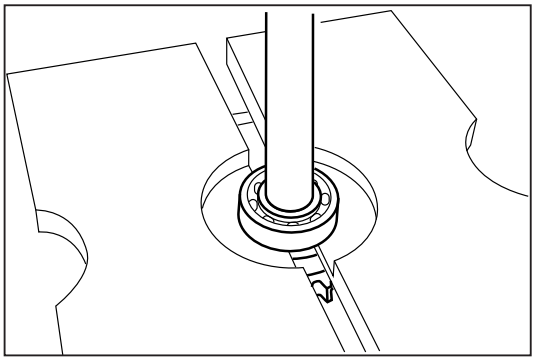
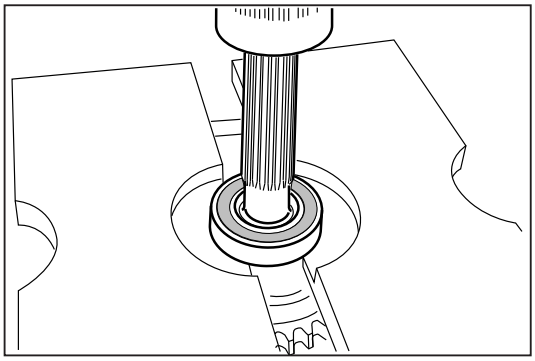
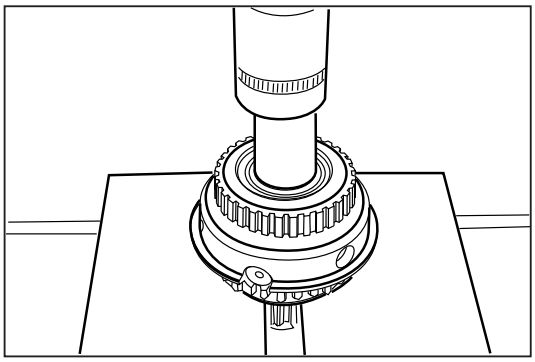
3. Disassemble the rear bearing from the transfer output front drive shaft, using the following SST in conjunction with a press.
   SST: 09253-87101-000
   09301-87601-000


JTR00033-00503

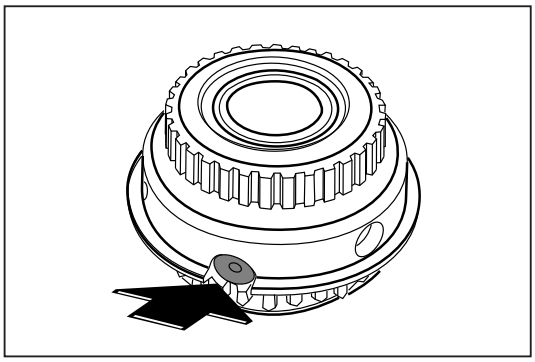
4. Disassemble the front bearing from the transfer output front drive shaft, using the following SST in conjunction with a press.
   SST: 09253-87101-000


JTR00034-00504

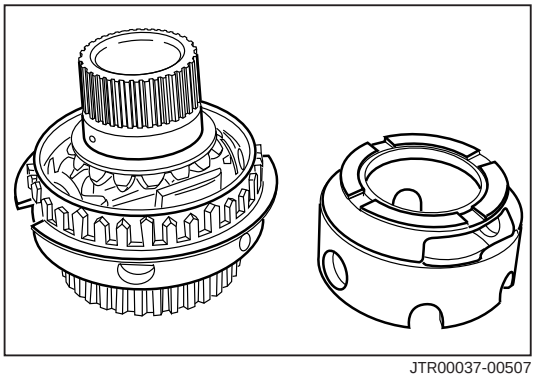
5. Remove the transfer output rear shaft and needle roller bearing from the differential case sub-assembly, using the following SST, in conjunction with a press.
   SST: 09238-87202-000


JTR00035-00505

6. Push the differential pinion shafts by pushing it with your fingers.


JTR00036-00506

7. Remove the differential case No. 2 case sub-assembly.


JTR00037-00507

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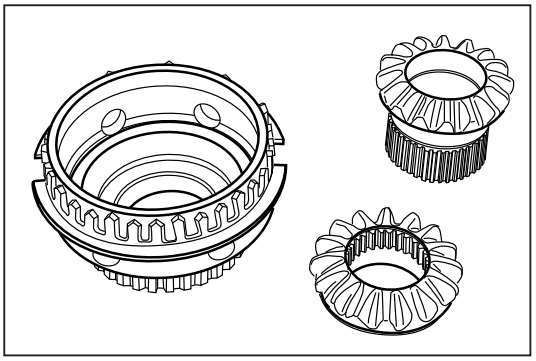
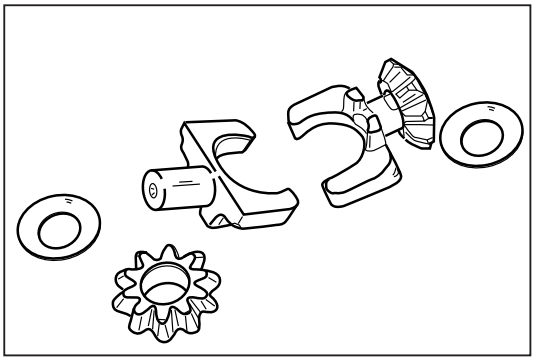
8. Remove the following parts from the differential case.
   (1) Differential side gear No. 2
   (2) Differential side gear



JTR00038-00508

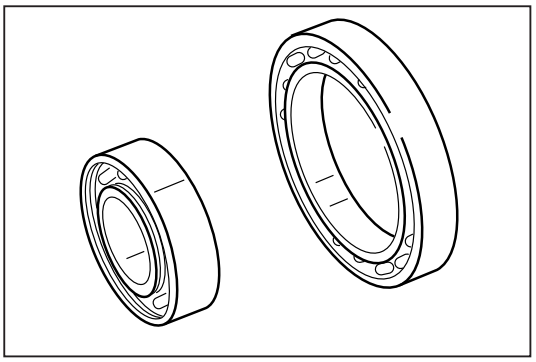
   (3) Differential pinion shafts
   (4) Differential pinions
   (5) Differential pinion thrust washers



JTR00039-00509

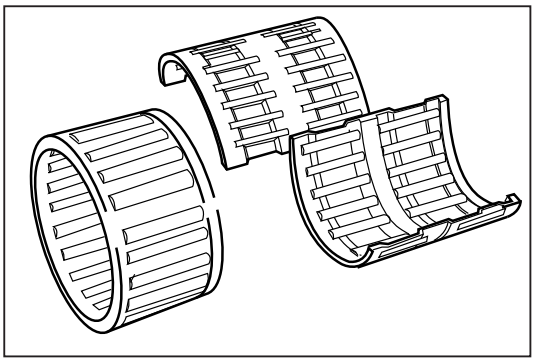
INSPECTION

1. Bearings
   Visually inspect the roller and roller guide surface for seizure due to poor oil lubrication and so forth.



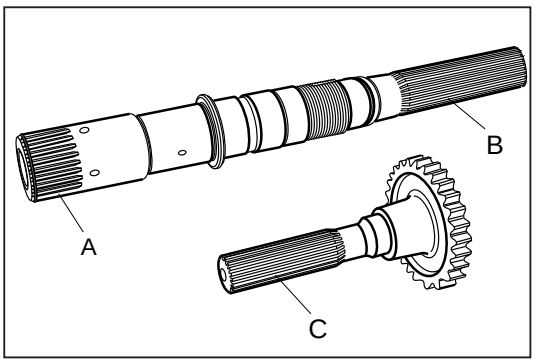
JTR00040-00601

2. Needle roller bearings
   Check the roller outer periphery of the needle roller bearing for damage by scratching it by your fingernails. Also, visually inspect the roller outer periphery for seizure due to poor oil lubrication or use of deteriorated oil.



JTR00041-00602

3. Check the fitting section (A) and spline section (B) of the transfer output rear shaft and the spline section (C) of the transfer output front shaft for damage or abnormal wear.



JTR00042-00603

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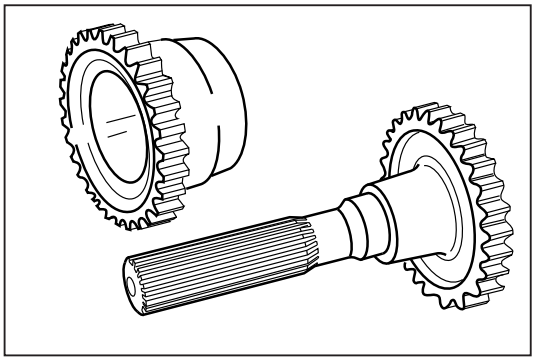
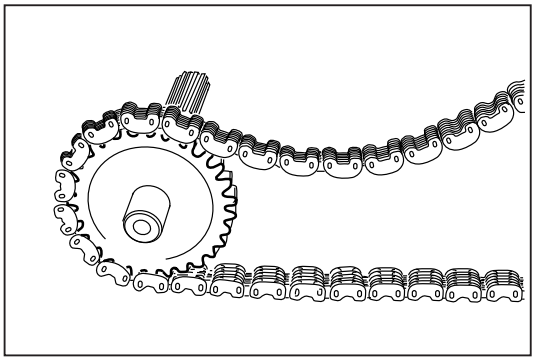
4. Visually inspect the transfer front drive gear and the transfer output front shaft gear for damage or wear.



JTR00043-00604

5. Visually inspect the transfer front drive chain for damage or wear.

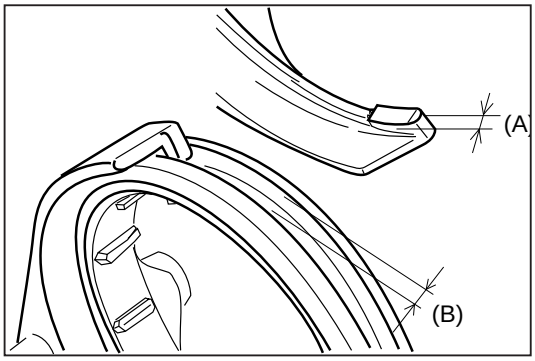


JTR00044-00605

6. Check the contact surface between the differential lock shift fork (A) and the transfer clutch outer hub (B).

Unit: mm

	Specified value	Allowable limit
(A)	$7^{-0.1}_{-0.2}$	6.7
(B)	$7.2^{+0.06}_{+0}$	7.3

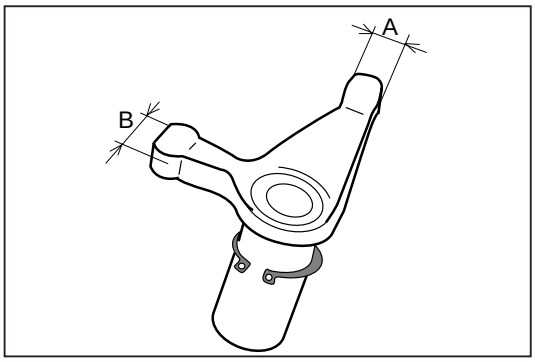


JTR00045-00606

7. Measure the outer diameter of the shaft and socket section.
If the measured valve does not conform to the specification, replace the parts.
Also inspect the snap ring for damage or wear.

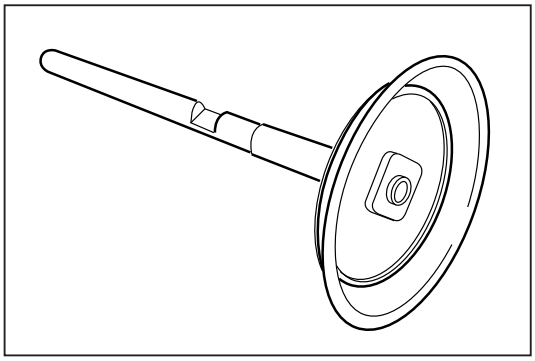
Unit: mm

	Specified value	Allowable limit
(A)	$12^{-0}_{-0.1}$	11.8
(B)	$12^{-0}_{-0.1}$	11.8
Outer diameter of the shaft	$14^{-0.13}_{-0.063}$	←



JTR00046-00607

8. Visually inspect the transfer shift shaft for damage or wear.
NOTE:
- Also inspect the diaphragm for damage.



JTR00047-00608

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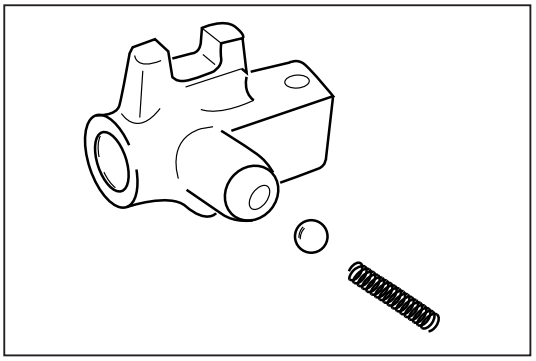
9. Visually inspect the transfer gear shift head for damage or wear
   NOTE:
   - Also inspect the ball and compression spring for damage or wear.

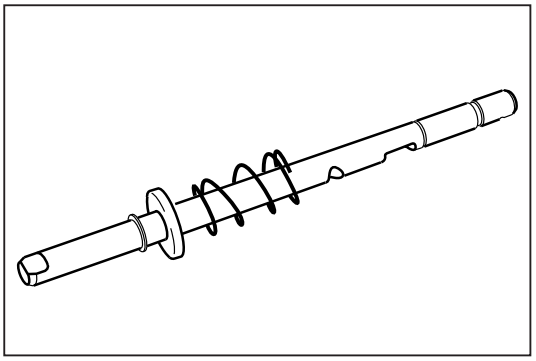


JTR00048-00609

10. Measure the outer diameter of the transfer fork shaft.
    If the measured value does not conform to the specification, replace the shaft.
    Also inspect the compression spring and the transfer control shaft washer for damage or wear.

Unit: mm

Specified value	$12\ ^{+0}_{-0.043}$

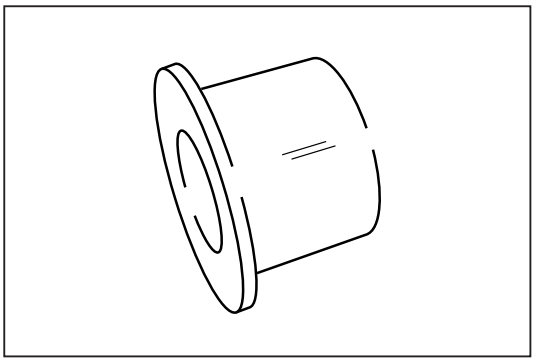


JTR00049-00610

11. Measure the outer and inner diameter of the transfer front drive gear bearing inner race.

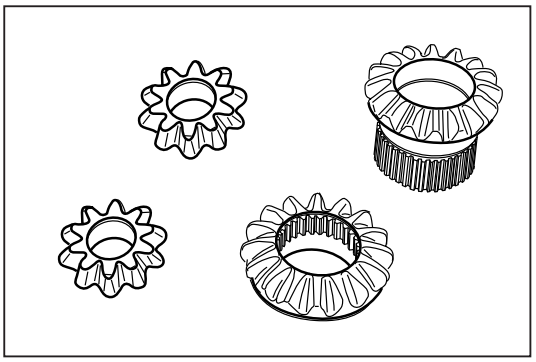
Unit: mm

	Specified value	Allowable limit
Inner diameter	$26\ ^{+0.02}_{+0.002}$	26.020
Outer diameter	$38\ ^{-0}_{-0.014}$	38.986



JTR00050-00611

12. Visually inspect the differential pinion for damage or wear.
13. Visually inspect the differential side gear for damage or wear.

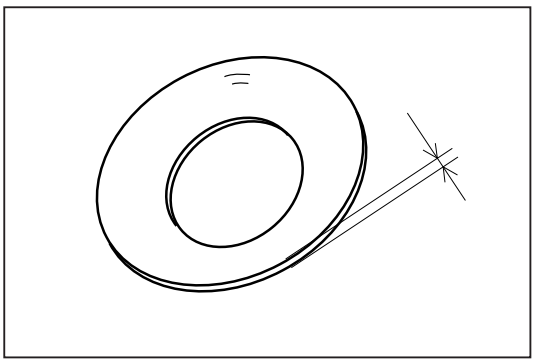


JTR00051-00613

14. Measure the thickness of the differential pinion thrust washer.

Unit: mm

Specified value	0.8 ± 0.06
Allowable limit	0.74



JTR00052-00614

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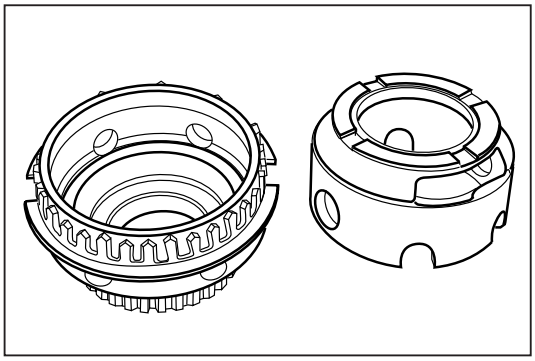
15. Visually inspect the differential case sub-assembly for damage or wear.

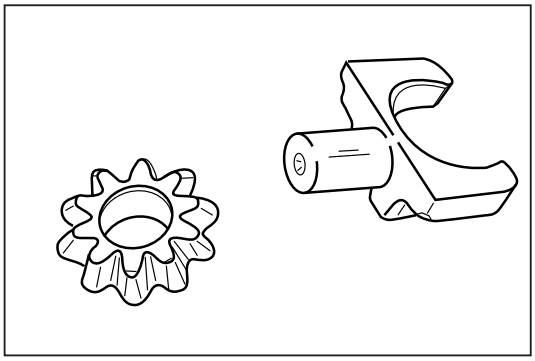


JTR00053-00615

16. Measure the outer diameter of the differential pinion shaft.
17. Measure the inner diameter of the differential pinion.

Unit: mm

		Specified value	Allowable limit
Pinion	Inner diameter	$15^{+0.06}_{+0.03}$	15.06
Pinion Shaft	Outer diameter	$15^{-0.016}_{-0.043}$	14.943

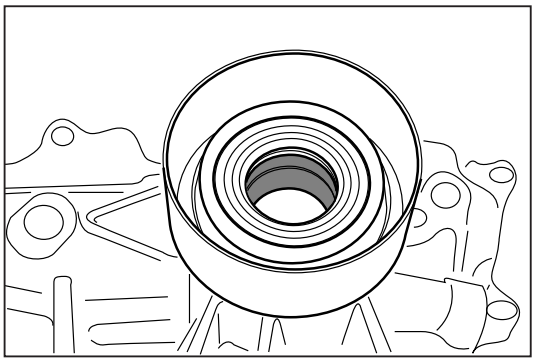


JTR00054-00617

18. Measure the inner diameter of the transfer front and rear output shaft bearing.
NOTE:
- If the measured value does not conform to the specification, replace the transfer case.

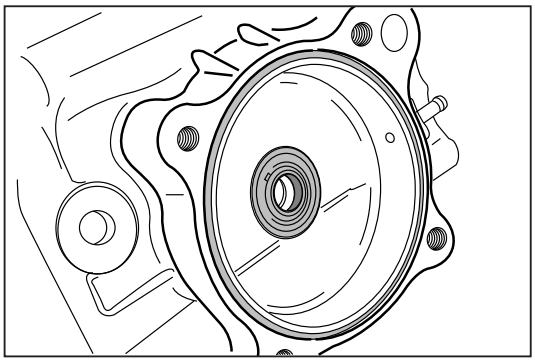
Unit: mm

		Inner diameter specified value
Output front shaft bearing	Front	$25^{-0}_{-0.010}$
	Rear	$17^{-0}_{-0.008}$
Output rear shaft bearing	Front	$50^{-0}_{-0.012}$
	Rear	$25^{-0}_{-0.010}$



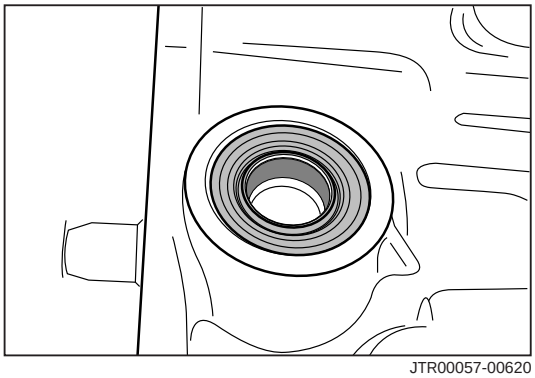
JTR00055-00618

19. Visually inspect the type T oil seal in the diaphragm cylinder for damage or wear.
NOTE:
- Replace the oil seal if it exhibits damage or wear.



JTR00056-00619

20. Visually inspect the type K oil seal of the front drive shift link lever for damage or wear.
NOTE:
- Replace the oil seal if it exhibits damage or wear.



JTR00057-00620

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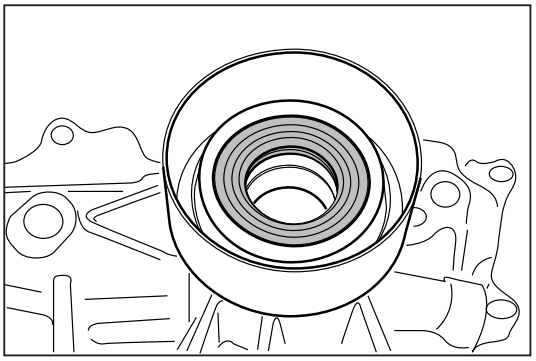
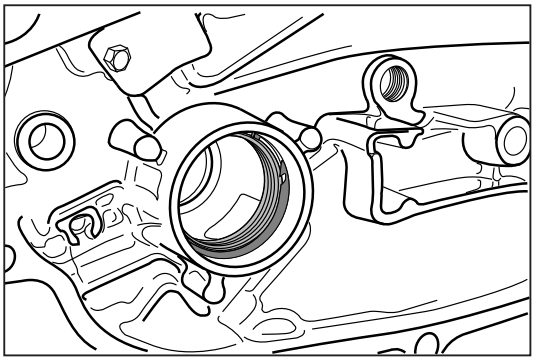
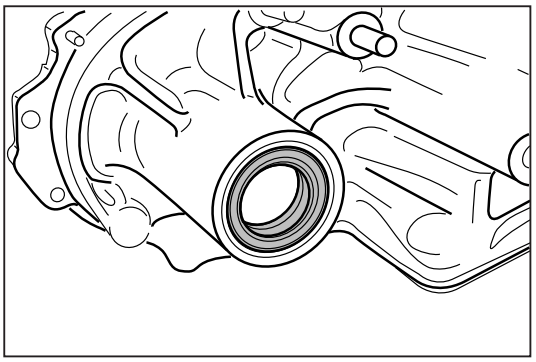
21. Visually inspect the type T oil seal of the transfer output rear shaft for damage or wear.
NOTE:
- Replace the oil seal if it exhibits damage or wear.
SST: 09308-10010-000
09309-87201-000


JTR00058-00621

22. Visually inspect the transfer rear drive output shaft inner oil seal for damage or wear.
NOTE:
- Replace the oil seal if it exhibits damage or wear.


JTR00059-00622

23. Visually inspect the type T oil seal of the transfer output front shaft for damage or wear.
NOTE:
- Replace the oil seal if it exhibits damage or wear.
SST: 09308-10010-000
09309-87201-000


JTR00060-00623

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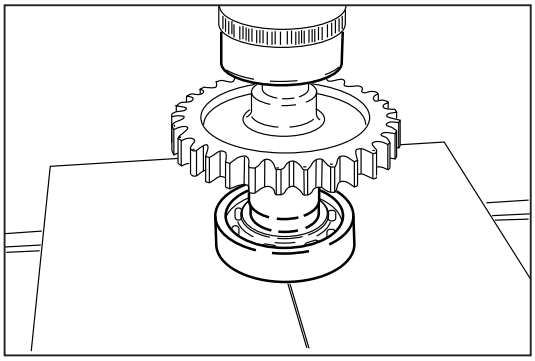
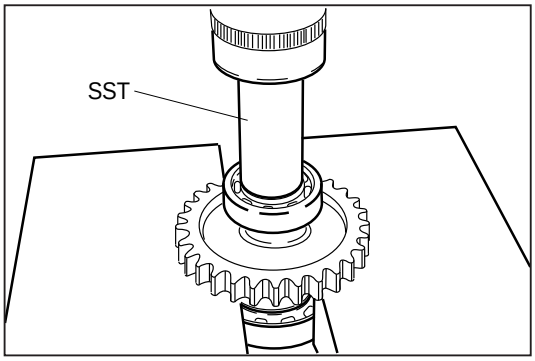
ASSEMBLY

NOTE:
- Prior to the assembly, clean the transfer case and the parts by removing any dirt or the like. And then, apply gear oil to the all parts.

1. Press the radial ball bearing (Front) to the transfer output front shaft.


JTR00061-00701

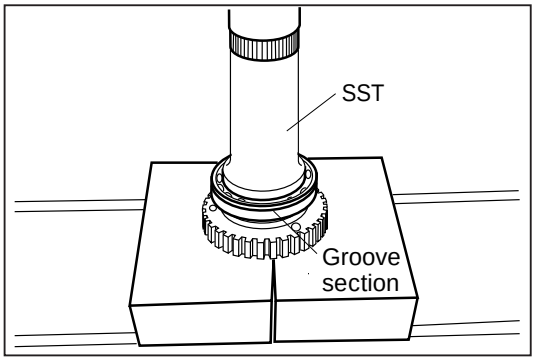
2. Press the radial ball bearing (Rear) to the transfer output front shaft, using the following SST.
   SST: 09238-87202-000



JTR00062-00702

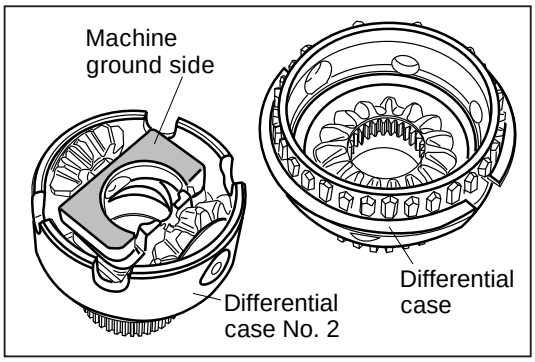
3. Press the radial ball bearing to the transfer inner hub, using the following SST.
   SST: 09388-20010-000

   NOTE:
   - Make sure that the groove section of the redial ball bearing comes upper side.



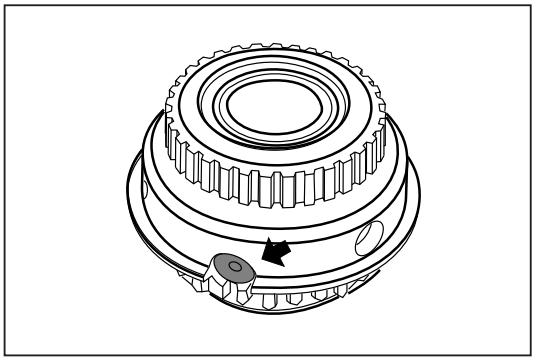
JTR00063-00703

4. Install the differential side gear to the differential case.
5. Install the differential pinion shafts, the differential pinions and the differential pinion thrust washers to the differential case No. 2.
   NOTE:
   - Make sure that the machine-ground side of the differential pinion shaft section faces toward differential side gear.



JTR00064-00705

6. Align the pinion shafts and shaft holes. Then, Insert the differential case sub-assembly to the differential case No. 2.


JTR00065-00706

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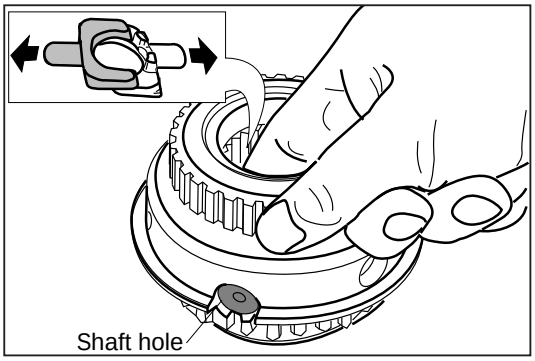
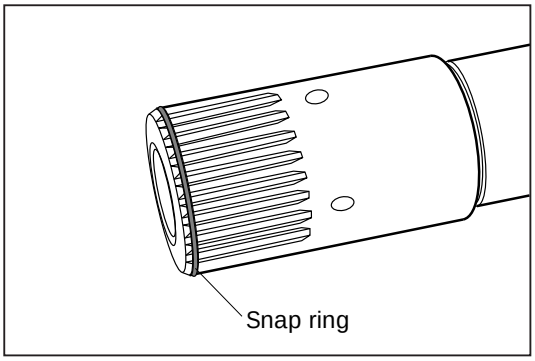
7. Push the pinion shaft in the shaft hole with finger to the differential case outside so as to the transfer output rear shaft can go through.



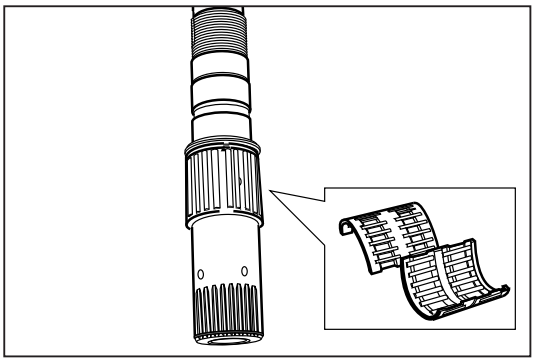
JTR00066-00707

8. Install the new snap ring to the transfer output rear shaft.

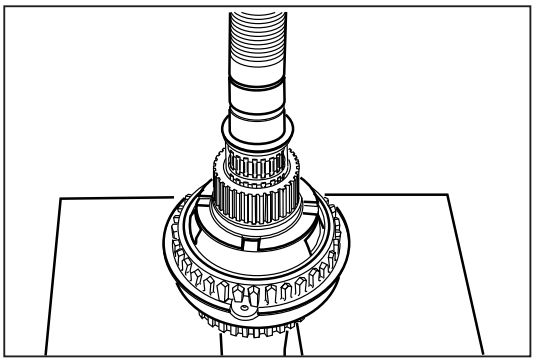


JTR00067-00708

9. Install the needle roller bearing to the transfer output rear shaft with applying the gear oil for not to fall off.
   Oil: API GL-3, SAE75W-85


JTR00068-00709

10. Insert the transfer output front shaft with the needle roller bearing to the differential case assembly, using a press.
    NOTE:
    - Make sure that the transfer output rear shaft rotates smoothly when inserting has been done.


JTR00069-00710

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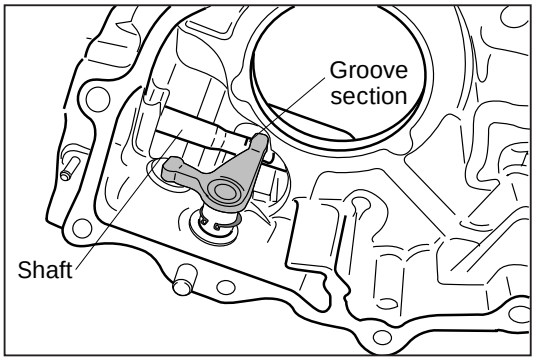
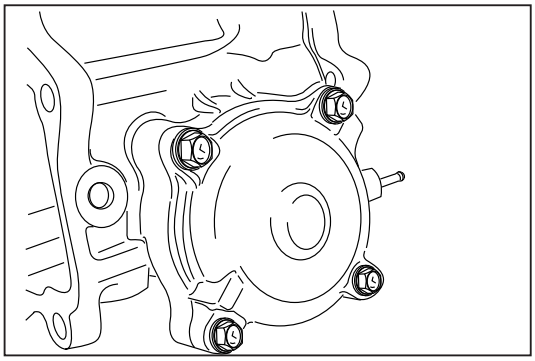
INSTALLATION

1. Install the transfer shift shaft sub-assembly to the diaphragm cylinder.
2. Install the front drive shift link lever to the transfer case.
   NOTE:
   - Make sure that the drive shift link lever is fitted securely in the groove.

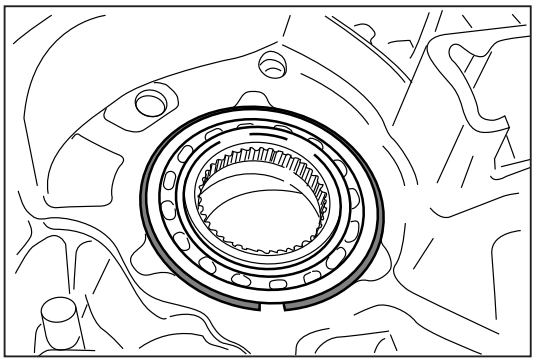


JTR00070-00802

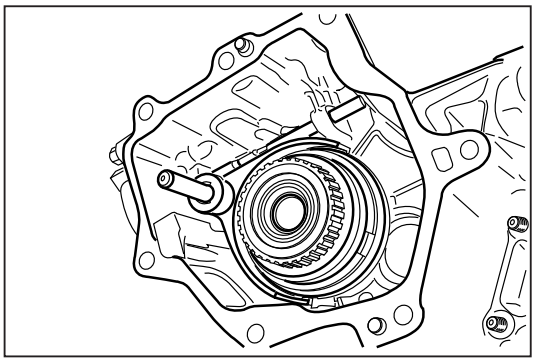
3. Install the diaphragm cylinder cover to the diaphragm cylinder and tighten the bolts.
   Tightening Torque: 14.7 - 21.6 N·m (1.5 - 2.2 kgf-m)


JTR00071-00803

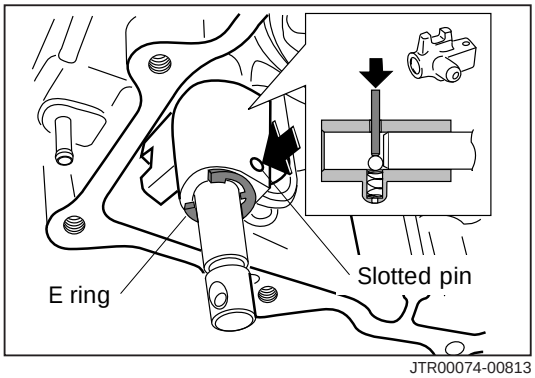
4. Install the radial ball bearing with the transfer clutch inner hub to the transfer case.
5. Install the snap ring to the radial ball bearing.
   NOTE:
   - Make sure that the snap ring is fitted securely in the groove.


JTR00072-00805

6. Insert the transfer output rear shaft and center differential assembly to the transfer clutch inner hub.
7. Install the transfer clutch outer hub to the transfer clutch inner hub.
8. Install the differential lock shift fork to the transfer clutch outer hub.
9. Insert the transfer fork shaft with the compression spring and transfer control shaft washer to the differential lock shift fork.
10. Insert the transfer fork shaft with the transfer differential lock shift fork. to the transfer case.


JTR00073-00810

11. Install the compression spring and ball to the transfer gear shift head.
12. With the ball pushed down by means of a suitable rod from the hole section of the head, insert the transfer gear shift head to the transfer fork shaft.
13. Drive new slotted pin to the transfer gear shift head.
    Install the new E ring.



JTR00074-00813

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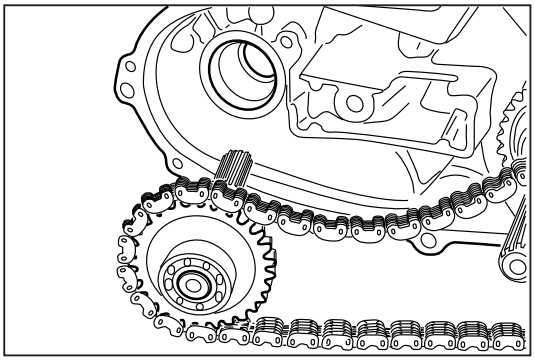
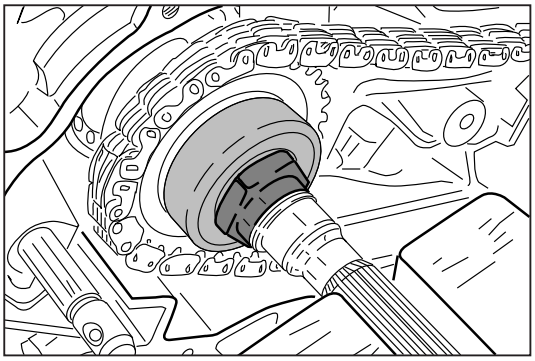
14. Insert the transfer front drive gear to the transfer output rear shaft.
15. Install the transfer output front shaft with the chain to the transfer case.
    NOTE:
    - Prior to the installation, make sure that the chain is set to the both gears.
      (After the installation, the chain will not be able to set.)

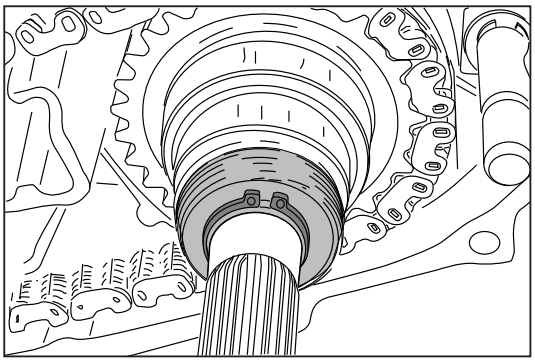

JTR00075-00815

16. Install the radial ball bearing to the transfer output rear shaft.
17. Install new lock nut to the transfer output rear shaft and tighten the lock nut.
    Tightening Torque:
    225.6 - 264.8 N·m (23.0 - 27.0 kgf-m)

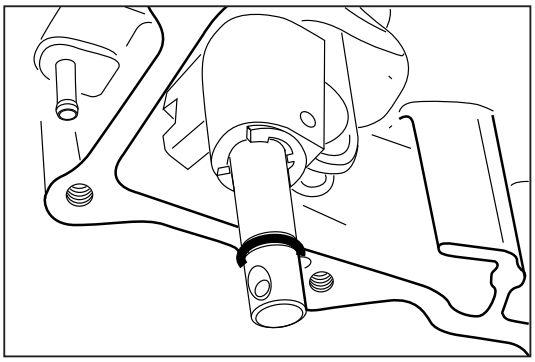
    NOTE:
    - When staking the lock nut, point a suitable staking tool toward the transfer output rear shaft axis center and stake to lock nut securely.
    - Prior to install new lock nut, grab the shaft by the vise with the soft metal for not rotating.


JTR00076-00817

18. Insert the speedometer drive gear to the transfer output rear shaft.
19. Install new snap ring of the speedometer drive gear.
    NOTE:
    - Make sure that the snap ring is fitted securely in the groove.

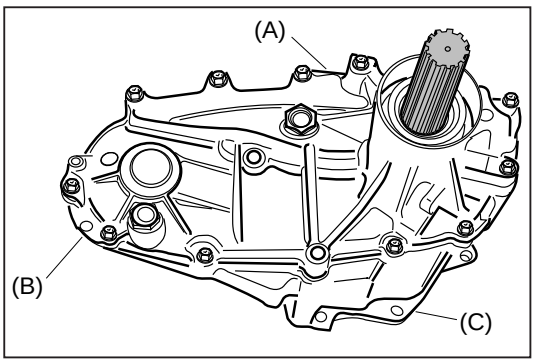

JTR00077-00819

20. Install new “O” ring to the transfer fork shaft.
    NOTE:
    - Prior to the installation of a new “O” ring, wind a suitable vinyl sheet around the transfer fork shaft and apply gear oil to the “O” ring installing section.


JTR00078-00820

21. Apply the liquid gasket interposed, assemble the transfer case and transfer case No. 2 by tapping it evenly and lightly at the rib sections (A), (B) and (C) by means of a plastic hammer or the like.
22. Tighten the transfer case with the bolts.
    Tightening Torque: 14.7 - 21.6 N·m (1.5 - 2.2 kgf-m)

    NOTE:
    - Be sure to tighten the bolts evenly and diagonally.
    - Prior to the tightening of the bolts, apply Three Bond 1216 to the threaded portions of the bolts.



JTR00079-00822

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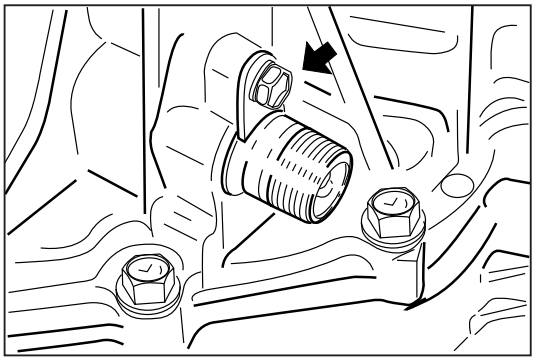
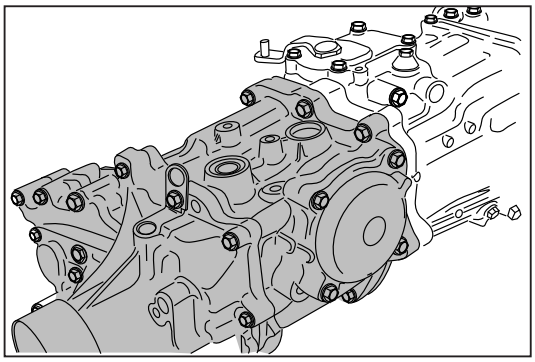
23. Apply gear oil to the “O” ring prior to the insertion of the speedometer shaft sleeve.
24. Insert the speedometer shaft sleeve into the output shaft bearing rear retainer.
25. Tighten the speedometer sleeve lock plate with a bolt.
    Tightening Torque: 5.9 - 8.8 N·m (0.6 - 0.9 kgf-m)

26. Tighten the transfer drain plug with new gasket.
    Tightening Torque: 29.4 - 49.0 N·m (3.0 - 5.0 kgf-m)



JTR00080-00825

27. Install the transfer assembly to the transmission. (Refer to the MT or AT section of the service manual.)
28. Fill the transfer with oil.
29. Tighten the transfer filler plugs with new gasket.
    Tightening Torque: 29.4 - 49.0 N·m (3.0 - 5.0 kgf-m)



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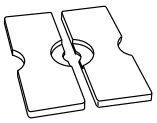
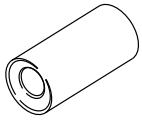
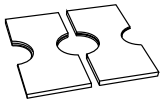
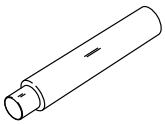
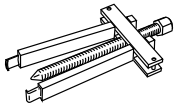
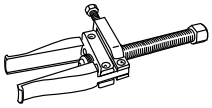
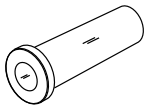
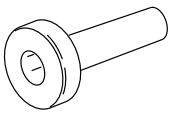
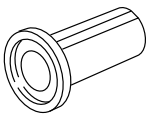
SSTs

Shape	Part No. and name	Purpose	See page
	09253-87101-000 Transfer output front shaft bearing anvil	Removal of bearing	TR–9
	09238-87202-000 Transfer output front shaft rear bearing replacer	Removal of output rear shaft Assembling bearing	TR–9 TR–15
	09253-87202-000 Transfer clutch inner hub bearing anvil	Removal of bearing	TR–8
	09301-87601-000 Tool, clutch guide	Removal of bearing	TR–9
	09306-87602-000 Transfer output rear shaft bearing replacer	Removal of bearing	TR–7
	09308-10010-000 Oil seal puller	Removal of oil seal	TR–14
	09309-87201-000 Transfer output shaft oil seal replacer	Assembling oil seal	TR–14
	09310-87102-000 Transfer clutch inner hub bearing puller	Removal of bearing	TR–8
	09388-20010-000 Transfer clutch inner hub bearing replacer	Removal of bearing	TR–15

JTR00082-00901

TIGHTENING TORQUE

Tightening components	Tightening torque		Reference
	N·m	kgf-m	
Diaphragm cylinder cover × Diaphragm cover	14.7 - 21.6	1.5 - 2.2	
Radial ball bearing × Transfer output rear shaft	225.6 - 264.8	23.0 - 27.0	
Transfer case × Transfer case No. 2	14.7 - 21.6	1.5 - 2.2	
Speedometer sleeve × Transfer case	5.9 - 8.8	0.6 - 0.9	
Transfer filler plug × Transfer case	29.4 - 49.0	3.0 - 5.0	
Transfer drain plug × Transfer case	29.4 - 49.0	3.0 - 5.0	

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PROPELLER SHAFT

COMPONENTS ..... PR– 2
IN-VEHICLE INSPECTION ..... PR– 3
REMOVAL ..... PR– 3
INSPECTION ..... PR– 4
INSTALLATION ..... PR– 5
TIGHTENING TORQUE ..... PR– 7

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PR

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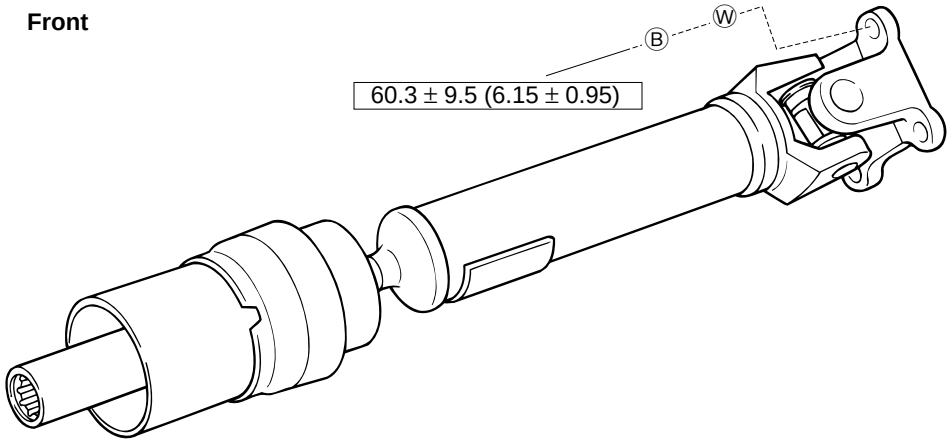
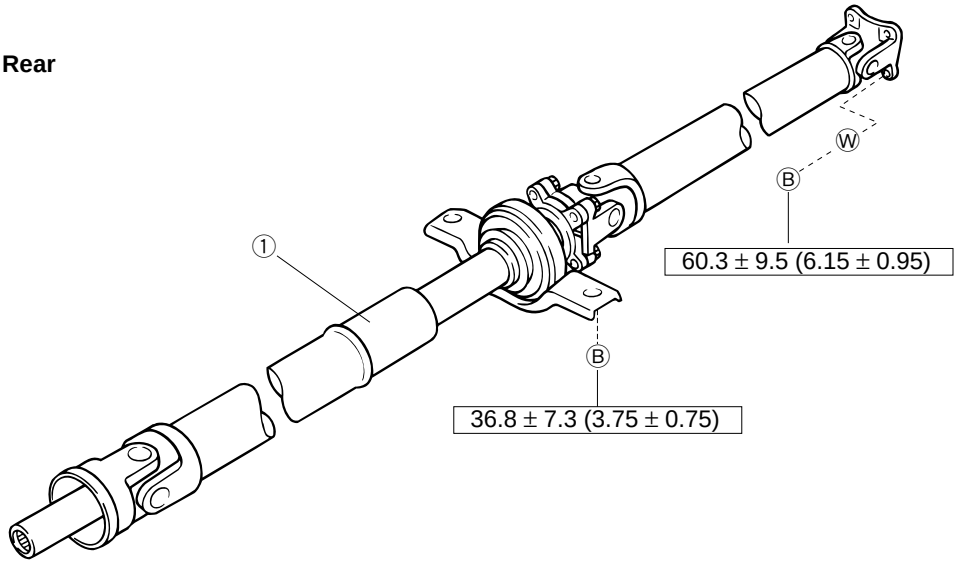
COMPONENTS

Front



Rear



① Propeller shaft assembly

□ : **Tightening torque**
Unit : N·m (kgf-m)

JPR00002-00001

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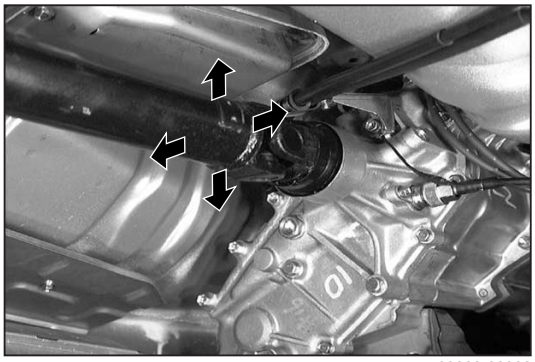
IN-VEHICLE INSPECTION

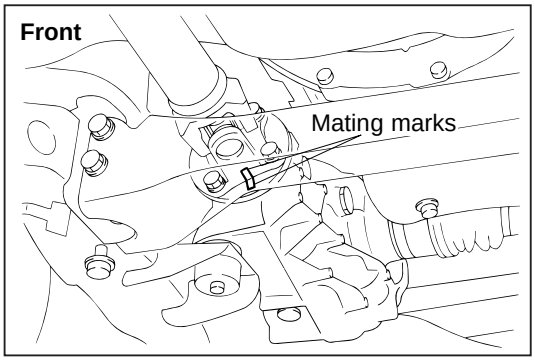
Ensure that the universal joint section of the propeller shaft exhibits no excessive play by turning it by your hand in up-and-down and right-and-left directions.
If any excessive play exists, replace the propeller shaft with a new one.



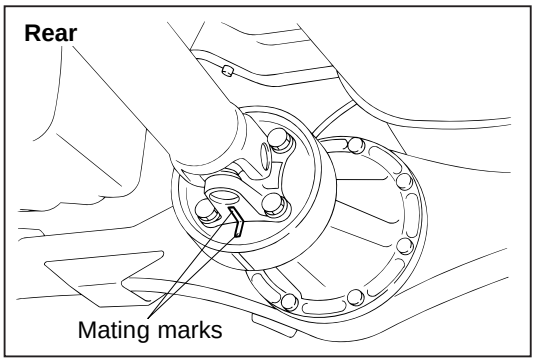
JPR00003-00002

REMOVAL

1. Jack up the vehicle and support it with safety stands. (As for the jacking-up points and supporting points for safety stands, refer to the GI section in this service manual.)
2. Put mate marks on the flange yoke and companion flange, respectively.

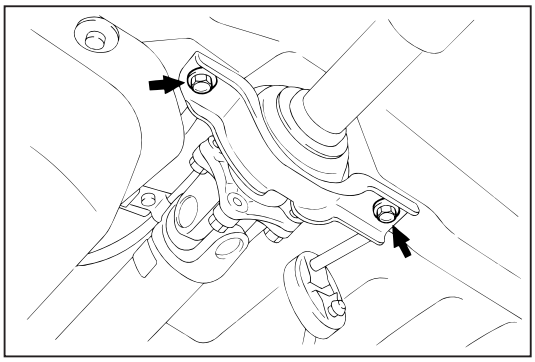


JPR00004-00003



JPR00000-00004

3. Remove the two attaching bolts of the center support bearing and support the center bearing with a suitable hanger or jack, etc., so that no bending force may be applied to the center support. (For rear propeller shaft)
   CAUTION:
   - Never apply the bending force to the center bearing and No. 2 joint of the rear propeller shaft.



JPR00005-00005

4. Loosen the attaching bolts of the flange yoke evenly.
5. Remove the propeller shaft assembly by removing the attaching bolts and disconnect it from the transfer case.
   NOTE:
   - Prior to disconnection of the propeller shaft from the transfer case, drain the transfer oil from the transfer case or prepare a suitable oil stopper and install it immediately after disconnection of the propeller shaft, for quite large amount of the transfer oil will flow out.

JPR00006-00006

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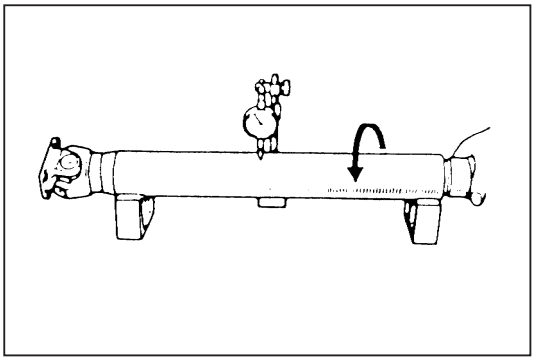
INSPECTION

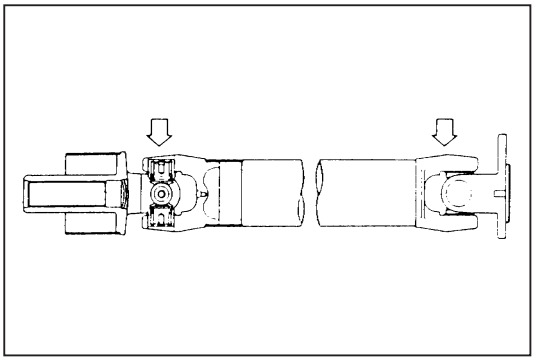
Front & rear

1. Check the propeller shaft for evidence of damage or bend.
   Limit of bend: 0.5 mm



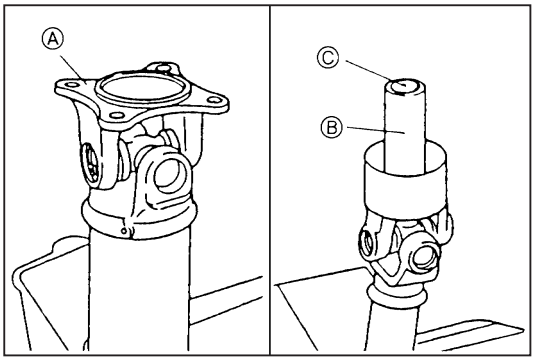
JPR00007-00007

2. Check the spider bearing cup-fitting section for damage.



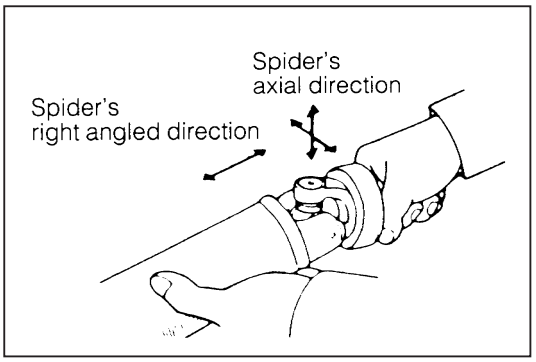
JPR00008-00008

3. Check the flange yoke and sleeve yoke.
   (1) Inspect to see whether any damage is present at the differential drive pinion companion flange-contact section Ⓐ.
   (2) Check the oil seal sliding section Ⓑ for damage or wear.
   (3) Check the spline Ⓒ for damage or wear.
   (4) Fit the sleeve yoke onto the sliding spline of the transmission output shaft.
   Ensure that the spline exhibits no looseness in the rotating direction and the sleeve can slide freely in the axial direction on the spline.



JPR00009-00009

4. Check the universal joint for looseness as follows:
   (1) Check the spider for looseness in an axial direction.
   (2) Check the spider for looseness in a right-angled-direction.
   (3) Check the spider for smooth rotation.
   If any damage is found, replace the propeller shaft with a new one.



JPR00010-00010

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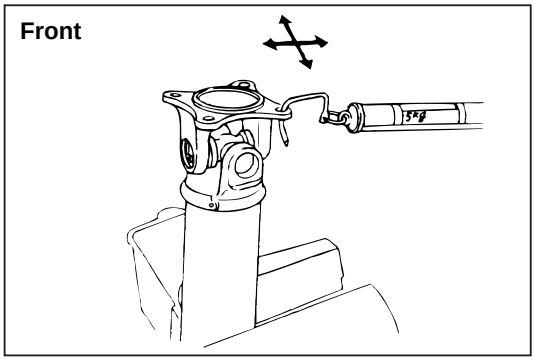
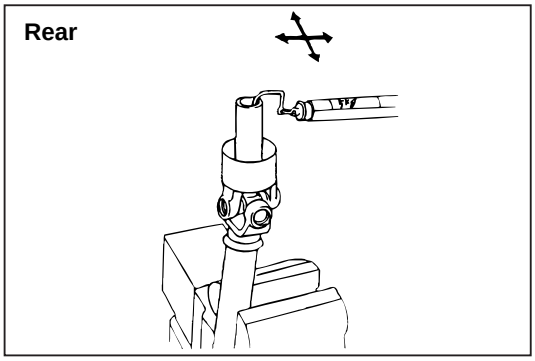
5. Check of universal joint preload
   (1) Hook a spring scale at the bolt hole of the flange yoke as well as at the sleeve yoke end.
   (2) Gently pull the spring scale to measure the starting torque.
   Starting Torque: 0.029 - 1.47 N·m (0.003 - 0.15 kgf-m)

   Replace the propeller shaft, if the preload fails to meet the specified value.



JPR00011-00011



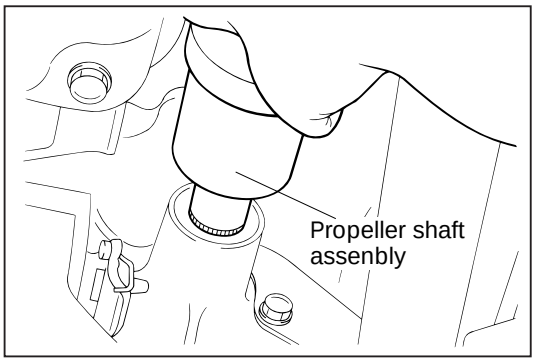
JPR00000-00012

INSTALLATION

1. Apply the specified transmission fluid to both the inner and outer sides of the sleeve.
   Specified Gear Oil
   Grade: API GL-3 or GL-4
   Viscosity: SAE 75W-85 or 75W-90

2. Insert the propeller shaft assembly into the output shaft of the transfer case.
   CAUTION:
   - Never insert the propeller shaft to the transfer case by force. Failure to observe this caution may damage the bush or oil seal in the transfer case.
   - Never apply the bending force to the center bearing and No. 2 joint of the rear propeller shaft.

3. Assemble the propeller shaft while aligning it with the mating mark put on the companion flange of the differential.
   (As for the illustration, refer to the disassembling procedure.)
   CAUTION:
   - Never insert the propeller shaft into the transfer case by force. Failure to observe this caution may damage the bush or oil seal in the transfer case.
   - Never apply the bending force to the center bearing and No. 2 joint of the rear propeller shaft.



JPR00012-00013

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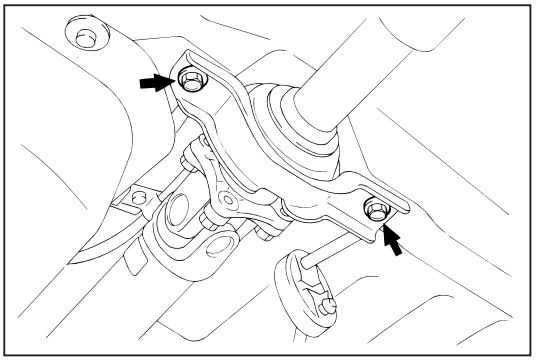
4. Install the propeller shaft yoke flange to the flange of the differential with new four attaching bolts with washers.
   CAUTION :
   - Be sure to clean the attaching surface of the yoke and flange properly. Failure to observe this caution may lead to propeller shaft vibration or damage, etc.

5. Tighten the attaching bolts evenly over two or three stages to the specified tightening torque.
   Tightening Torque: 60.3 ± 9.5 N·m (6.15 ± 0.95 kgf-m)

6. Temporarily install the center support with two attaching bolts.

JPR00014-00000



JPR00015-00014

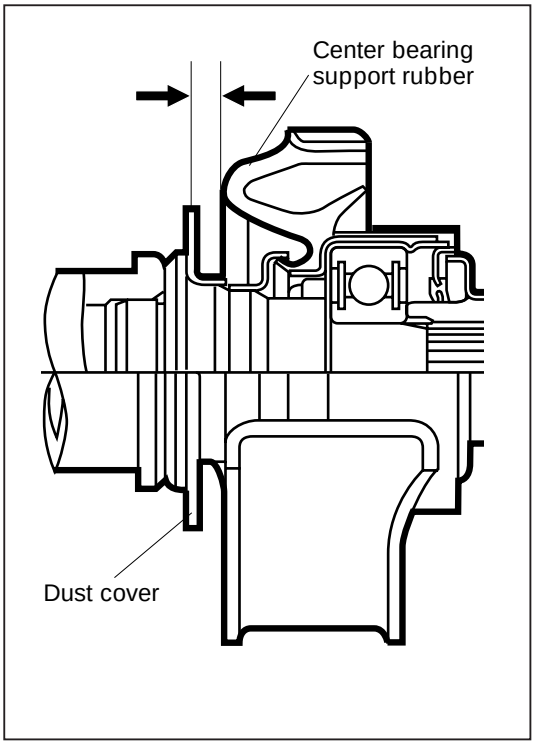
7. Ensure that the clearance between the center bearing support rubber and the dust cover is within the specified value.
   Specified clearance: 6 mm or more at installation.

   If the clearance fails to meet the specified value, adjust the clearance by adjusting the center support attaching position.

8. Tighten the attaching bolts to the specified tightening torque evenly in two or three stages.
   Tightening Torque: 36.8 ± 7.3 N·m (3.75 ± 0.75 kgf-m)

9. Check and fill the specified transfer oil to the transfer case.
   (Refer to the TR section.)
10. While turning the propeller shaft, ensure that the propeller shaft turns smoothly without exhibiting abnormal noise and/or binding.
11. Jack down the vehicle and check the clearance between the center support rubber and the dust cover.
12. Ensure that the clearance between the center bearing support rubber and the dust cover is within the specified value.
    Specified clearance: 10 mm or more

    If the clearance fails to meet the specified value, adjust the clearance by adjusting the center support attaching position. Then, tighten the attaching bolts to the specified tightening torque.



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TIGHTENING TORQUE

Tightening component	Tightening torque	
	N·m	kgf-m
Propeller shaft flange × Differential flange	60.3 ± 9.5	6.15 ± 0.95
Center bearing support × Body	36.8 ± 7.3	3.75 ± 0.75

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FRONT & REAR DIFFERENTIAL

FRONT DIFFERENTIAL ..... DF– 2
COMPONENTS ..... **DF– 2**
REAR DIFFERENTIAL ..... DF– 3
COMPONENTS ..... **DF– 3**
IN-VEHICLE SERVICE ..... DF– 4
REPLACEMENT OF FRONT AND REAR DIFFERENTIAL COMPANION FLANGE OIL SEALS ..... **DF– 4**
REPLACEMENT OF FRONT DIFFERENTIAL SIDE OIL SEAL ..... **DF– 7**
REMOVAL ..... **DF– 9**
DISASSEMBLY DF–11
INSPECTION DF–16
ASSEMBLY DF–18
INSTALLATION DF–25
SSTs DF–28
TIGHTENING TORQUE DF–30

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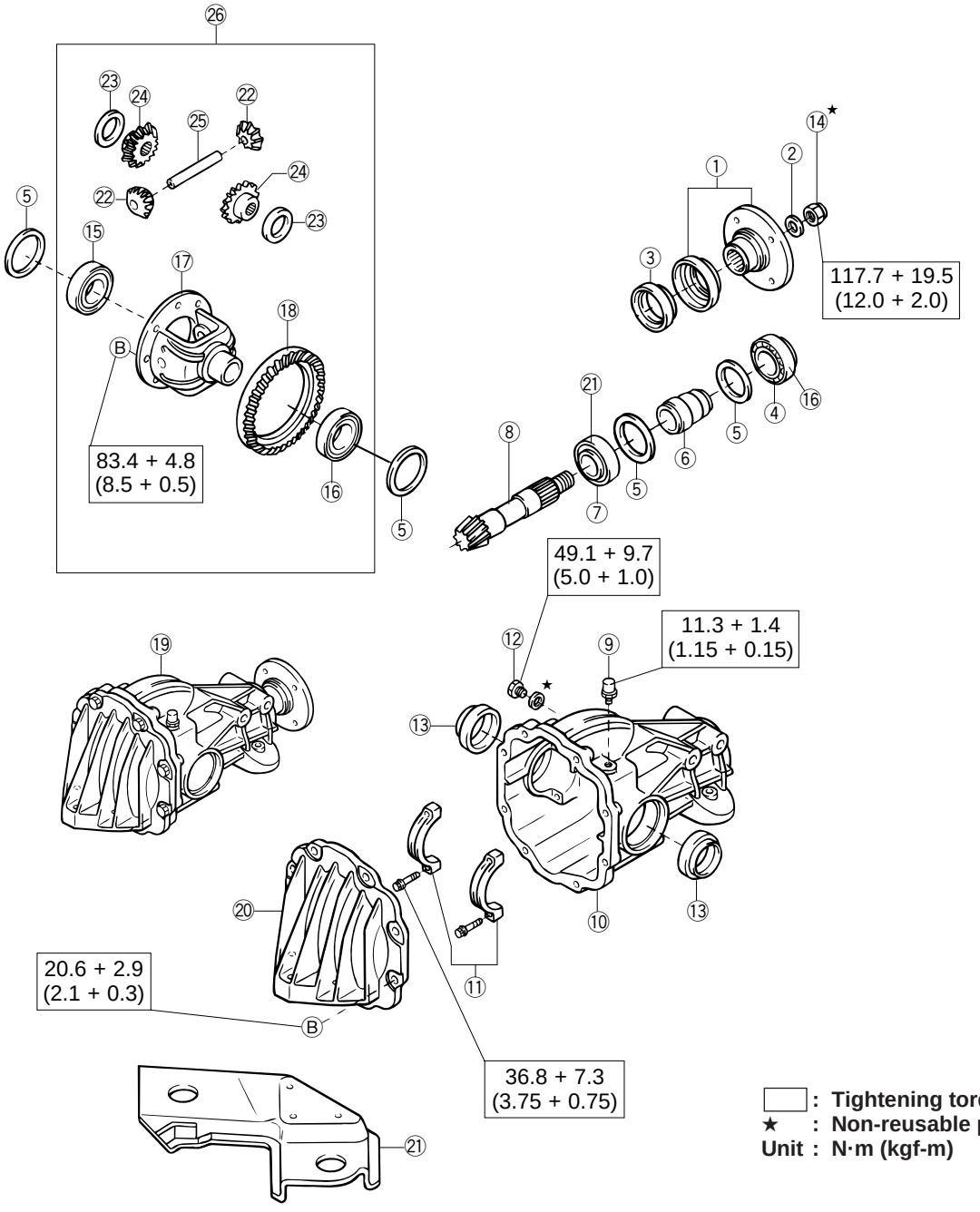
FRONT DIFFERENTIAL

COMPONENTS



① Drive pinion companion flange subassembly
② Plate washer
③ T type oil seal
④ Tapered roller bearing (rear inner)
⑤ Shim
⑥ Differential drive pinion bearing spacer
⑦ Tapered roller bearing (front inner)
⑧ Differential drive pinion
⑨ Breather plug
⑩ Differential carrier
⑪ Differential bearing cap
⑫ W/head straight screw plug
⑬ T type oil seal
⑭ Lock nut
⑮ Bearing
⑯ Tapered roller bearing (rear outer)
⑰ Differential case
⑱ Differential ring gear
⑲ Differential front carrier assembly
⑳ Front axle housing cover subassembly
㉑ Tapered roller bearing (rear inner)
㉒ Differential pinion
㉓ Differential side gear thrust washer
㉔ Differential side gear
㉕ Differential pinion shaft
㉖ Differential case assembly
㉗ Front differential carrier support bracket

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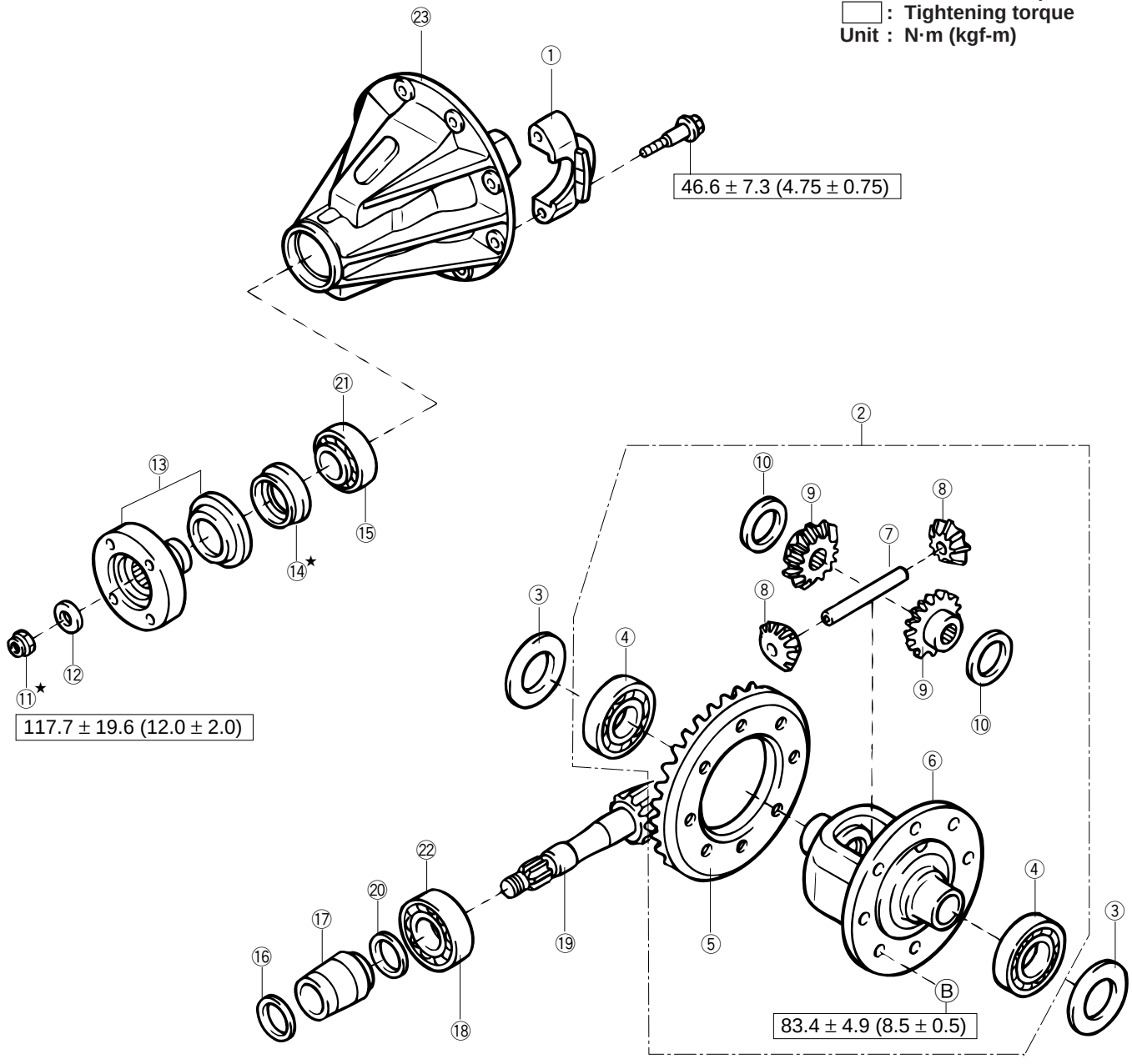
REAR DIFFERENTIAL

COMPONENTS



① Differential cap bearing
② Differential case assembly
③ Shim
④ Radial ball bearing
⑤ Differential ring gear
⑥ Differential case
⑦ Differential pinion shaft
⑧ Differential pinion
⑨ Differential side gear
⑩ Side gear thrust washer
⑪ Lock nut
⑫ Plate washer
⑬ Drive pinion companion flange subassembly
⑭ T type oil seal
⑮ Tapered roller bearing
⑯ Shim
⑰ Drive pinion bearing spacer
⑱ Tapered roller bearing
⑲ Differential drive pinion
⑳ Shim
㉑ Front tapered roller bearing outer race
㉒ Rear tapered roller bearing outer race
㉓ Differential carrier

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IN-VEHICLE SERVICE

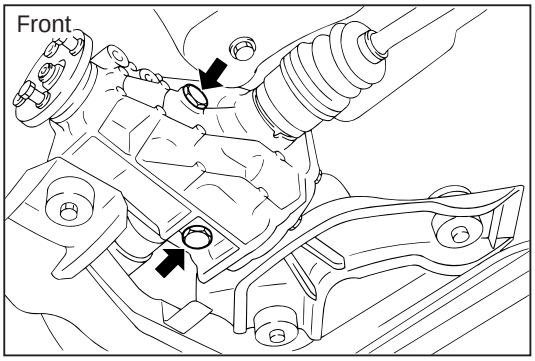
REPLACEMENT OF FRONT AND REAR DIFFERENTIAL COMPANION FLANGE OIL SEALS

NOTE:
- This section describes the replacement procedure both for the front and rear companion flange oil seals. Therefore, some descriptions and figures may not be applicable or differ from each other.

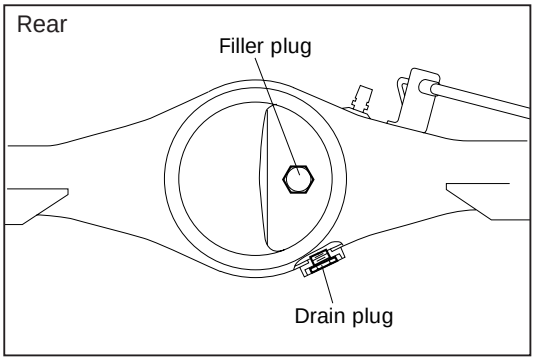
1. Jack up the vehicle and support it with safety stands. (As for the jacking-up points and support points for safety stands, refer to the GI section.)

JDF00004-00000

2. Drain the differential oil by removing the drain plug and gasket.
   CAUTION:
   - Do not reuse the used gasket.



JDF00005-00003

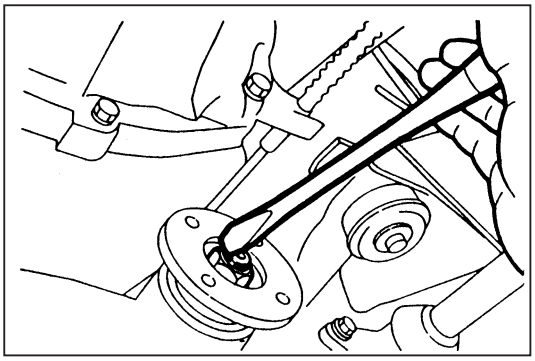


JDF00000-00004

3. Disconnect the propeller shaft from the companion flange of the front or rear differential.
   (Refer to the PR section.)
   CAUTION:
   - Sling the companion flange of the propeller shaft at the body side with a suitable string or the like to prevent the unnecessary force from applying to the spider section of each universal joint or the center bearing section of the front propeller shaft.

JDF00006-00000

4. Release the staking of the lock nut, using a suitable chisel and a hammer.



JDF00007-00005

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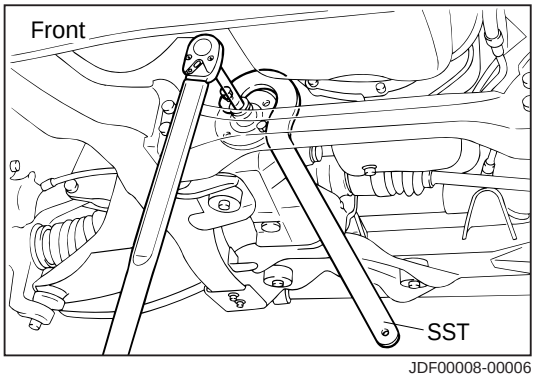
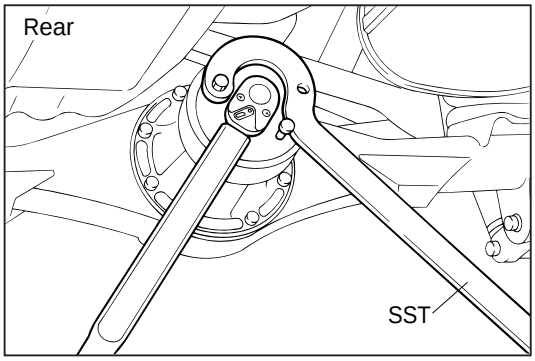
5. Loosen the lock nut of the companion flange while preventing the companion flange from turning, using the following SST in combination with a long box wrench or the like.
   SST: 09330-87301-000



JDF00008-00006

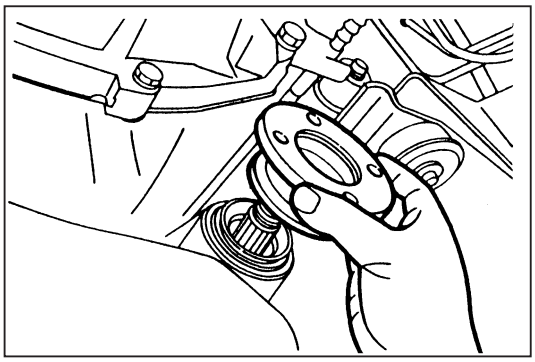
6. Remove the lock nut and plate washer.
   CAUTION:
   - Never reuse the removed lock nut and plate washer.



JDF00000-00007

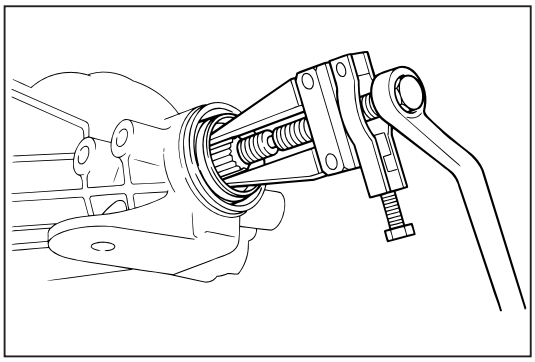
7. Remove the drive pinion companion flange subassembly.

   NOTE:
   - If any difficulty is encountered in removing the companion flange, use the following SST.
     SST: 09950-20017-000


JDF00009-00008

8. Remove the T type oil seal, using the following SST.
   SST: 09308-10010-000

   CAUTION:
   - Do not reuse the used oil seal.


JDF00010-00009

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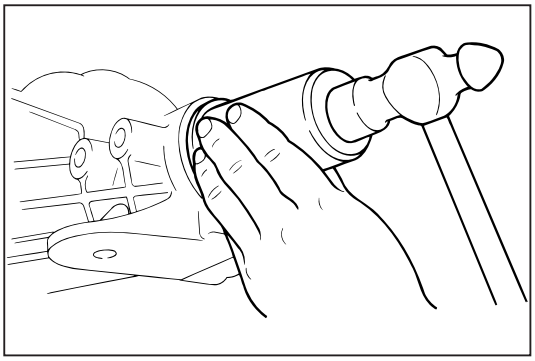
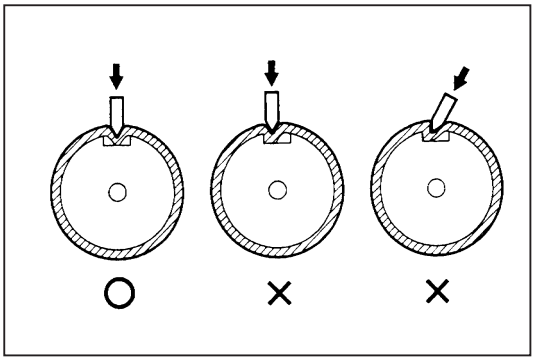
9. Clean the T type oil seal attaching surface with a piece of cloth or the like.
10. Thinly apply the lithium soap base multi-propose grease to the lip section of the T type oil seal.
11. Install a new T type oil seal, using the following SST.
    SST: 09635-20010-000

    CAUTION:
    - Drive the T type oil seal until the outer surface of the T type oil seal becomes flush with the flange surface of the front differential.


JDF00011-00010

12. Install the drive pinion companion flange subassembly, a new washer plate and a new lock nut.
13. Tighten the new lock nut to the specified tightening torque while preventing the companion flange from turning, using the following SST.
    SST: 09330-87301-000
    Tightening Torque: 98.1 - 137.2 N·m (10.0 - 14.0 kgf-m)

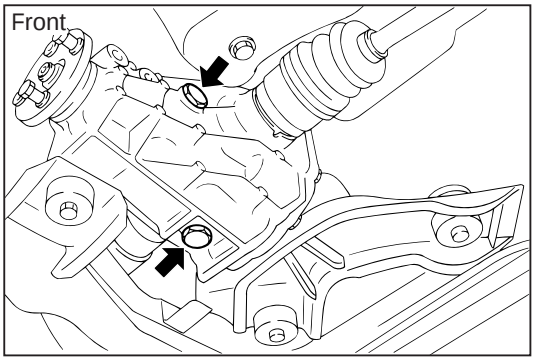
14. Stake the lock nut to the recessed part of the drive pinion shaft, using a suitable chisel or the like properly.
    CAUTION:
    - Make sure that the lock section of the nut is positively staked down to the bottom of the drive pinion groove. Failure to observe this caution may lead to looseness.


JDF00012-00011

15. Connect the propeller shaft.
    (Refer to the PR section)
16. Install and tighten the drain plug with a new gasket interposed.
    Tightening Torque:
    Front 39.3 - 58.8 N·m (4.0 - 6.0 kgf-m)
    Rear 53.9 - 68.6 N·m (5.5 - 7.0 kgf-m)

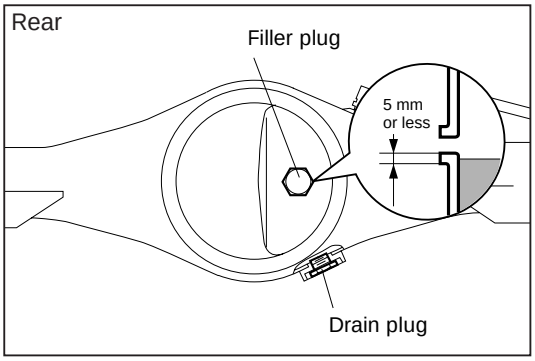
17. Remove the oil filler plug.
18. Fill the specified differential oil from the oil filler plug hole.
    Specified differential oil
    Grade : API GL-5 (Front & rear)
    Viscosity: SAE 80W-90 (Standard)
    : SAE 80W-90 LSD (For LSD)
    Capacity: 0.7 liters (Front)
    1.55 liters (Rear)

    NOTE:
    - The specified oil level is 0 to 5 mm from the lower end of the oil filler hole.



JDF00013-00012

19. Install the oil filler plug with a new gasket interposed and tighten it to the specified tightening torque.
    Tightening Torque:
    Front 39.3 - 58.8 N·m (4.0 - 6.0 kgf-m)
    Rear 53.9 - 68.6 N·m (5.5 - 7.0 kgf-m)



JDF00014-00013

20. Jack down the vehicle.
21. Ensure that no oil leakage exists.

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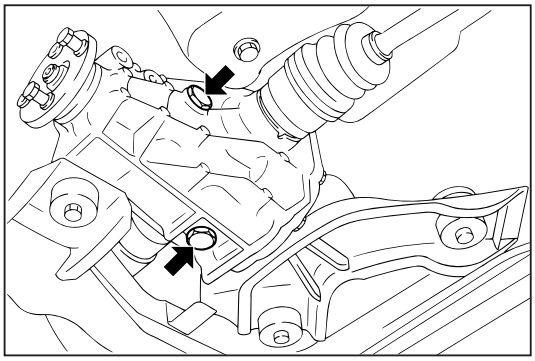
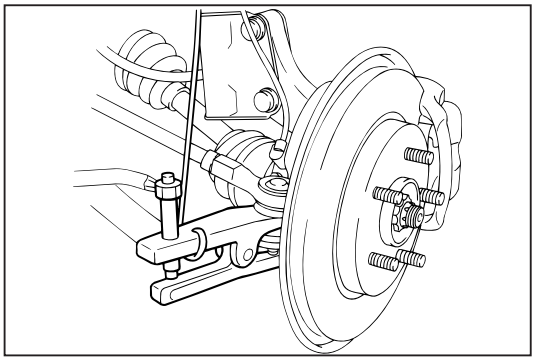
REPLACEMENT OF FRONT DIFFERENTIAL SIDE OIL SEAL

1. Jack up the vehicle and support it with stands. (As for the jacking-up points and support points for safety stands, refer to the GI section.)
2. Remove the front wheels.
3. Drain the differential oil by removing the drain plug and gasket.
   CAUTION:
   - Do not reuse the removed gasket.

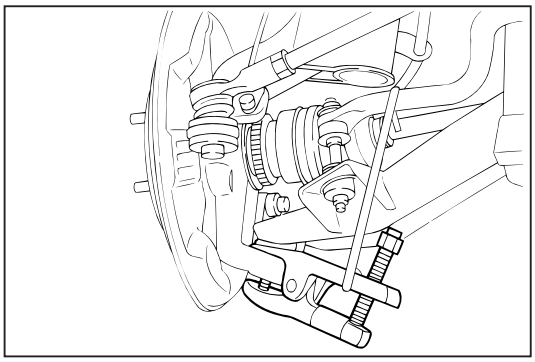

JDF00015-00014

4. Remove the tie rod end attaching castle nut lock clip.
5. Remove the tie rod end attaching castle nut.
6. Disconnect the tie rod end from the steering nuckle, using the following SST.
   SST: 09611-87701-000

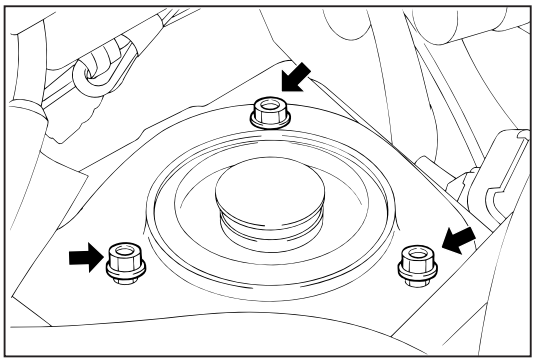

JDF00016-00015

7. Remove the lock clip of the castle nut for the lower arm.
8. Remove the castle nut for the lower arm.
9. Disconnect the lower arm from the steering nuckle, using the following SST.
   SST: 09611-87701-000

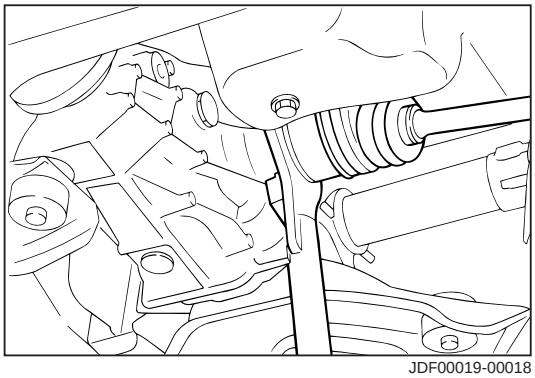
   CAUTION:
   - Be sure to protect the speed sensor rotor and sensor from damage, using a piece of cloth or the like.


JDF00017-00016

10. Loosen both sides of the suspension support attaching nuts.
    CAUTION:
    - Never reuse the used nut.


JDF00018-00017

11. Disconnect the front drive shaft assembly from the front differential, using the following SST.
    SST: 09648-87201-000


JDF00019-00018

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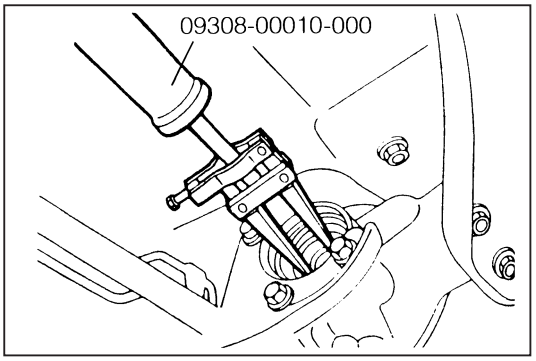
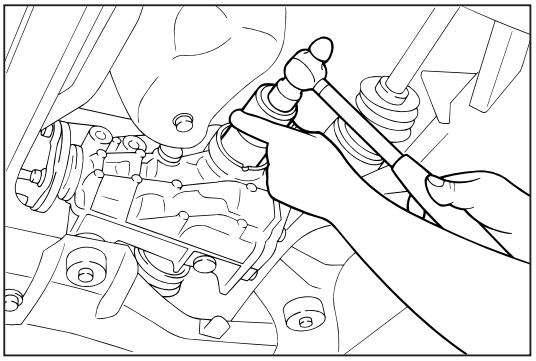
12. Remove the T type oil seal, using the following SST.
    SST: 09308-00010-000

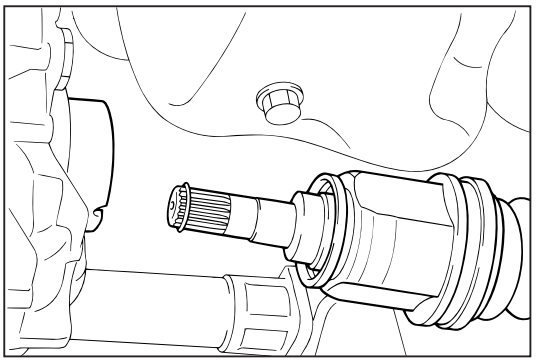


JDF00020-00019

13. Clean the oil seal attaching surface of the front differential.
14. Apply the lithium soap base multi-purpose grease to the lip section of the new oil seals.
15. Install a new T type oil seal, using the following SST.
    SST: 09636-20010-000

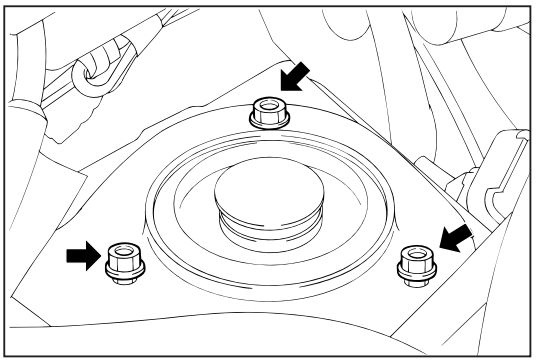

JDF00021-00020

16. Apply the lithium soap base multi-purpose grease to the oil seal attaching surface of the drive shafts.
17. Connect the drive shafts to the front differential carrier.
    CAUTION:
    - Never made scratch on the oil seal during the connection of driver shaft.


JDF00022-00021

18. Replace the suspension attaching nuts with new ones.
19. Tighten the new suspension attaching nuts evenly until the tightening torque reaches the specified tightening torque.
    Tightening Torque: 28.4 - 42.2 N·m (2.9 - 4.3 kgf-m)

    CAUTION:
    - Never reuse the used nut.


JDF00023-00022

20. Connect the lower arms to the steering knuckles with a new attaching castle nut and tighten it to the specified tightening torque.
    Tightening Torque: 44.1 - 58.8 N·m (4.5 - 6.0 kgf-m)

21. Install new clips securely.
    NOTE:
    - Never reuse the used clips.

22. Connect the tie rod end to the steering knuckle with a new attaching castle nut and tighten it to the specified tightening torque.
    Tightening Torque: 39.2 - 53.9 N·m (4.0 - 5.5 kgf-m)

23. Install a new clip.
    CAUTION:
    - Never reuse the removed clip.

24. Install and tighten the drain plug with a new gasket interposed.
    Tightening Torque: 39.3 - 58.8 N·m (4.0 - 6.0 kgf-m)

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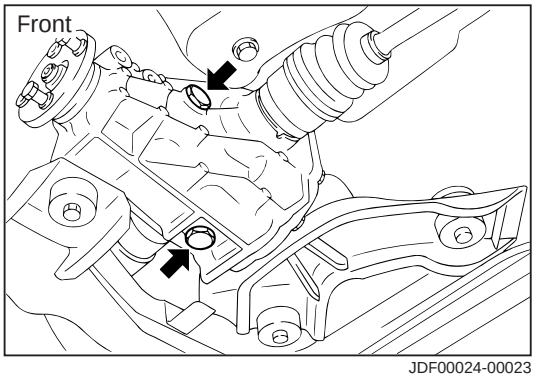
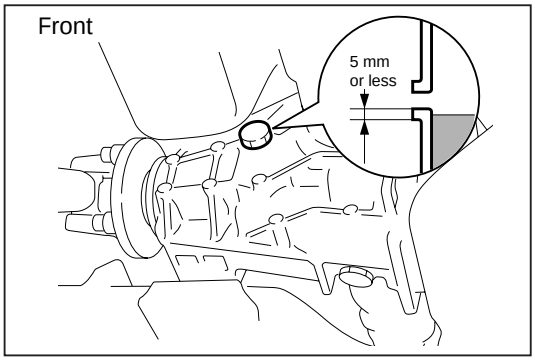
25. Remove the filler plug and gasket.
26. Fill the differential oil from the filler plug.
    Specified differential oil
    Grade: API GL-5
    Viscosity: SAE 80W-90
    Capacity: 0.7 liters

    NOTE:
    - The specified oil level is 0 to 5 mm from the lower end of the oil filler hole.



JDF00024-00023

27. Install and tighten the filler plug with a new gasket interposed.
    Tightening Torque: 39.3 - 58.8 N·m (4.0 - 6.0 kgf-m)



JDF00025-00024

28. Install the front wheels.
29. Jack down the vehicle.
30. Inspect the front wheel alignment.
31. Ensure that no oil leakage exists.

REMOVAL

NOTE:
- This section describes the removal procedure both for the front and rear differentials. Therefore, some descriptions and figures may not be applicable or differ from each other.

1. Jack up the vehicle and support it with safety stands. (As for the jacking-up points and support points for safety stands, refer to the GI section.)
2. Remove the front and/or rear wheels.
3. Drain the differential oil by removing the drain plug and gasket.
   CAUTION:
   - Never reuse the removed gasket.

4. Disconnect the tie rod end from the steering knuckle. (For front differential)
   (Refer to the procedure described in “REPLACEMENT OF FRONT DIFFERENTIAL SIDE OIL SEAL.”)
5. Disconnect the lower arm from the steering knuckle. (For front differential)
   (Refer to the procedure described in “REPLACEMENT OF FRONT DIFFERENTIAL SIDE OIL SEAL.”)
6. Loosen the suspension support attaching nuts. (For front differential)
   (Refer to the procedure described in “REPLACEMENT OF FRONT DIFFERENTIAL SIDE OIL SEAL.”)
   CAUTION:
   - Never reuse the suspension support attaching nuts.

7. Pull out the front drive shaft assembly from the differential carrier assembly, using the following SST.
   SST: 09611-87701-000

   (Refer to the procedure described in “ REPLACEMENT OF FRONT DIFFERENTIAL SIDE OIL SEAL.”)
8. Remove the propeller shaft assembly. (Refer to the PR section.)
   CAUTION:
   - Prior to the disconnection of the propeller shaft from the transfer case, drain the transfer oil or prepare the oil stopper to prevent the transfer oil from flowing out and install it immediately after disconnecting the propeller shaft from the transfer case.

JDF00026-00000

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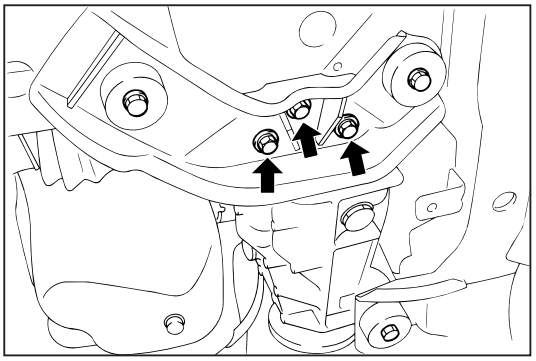
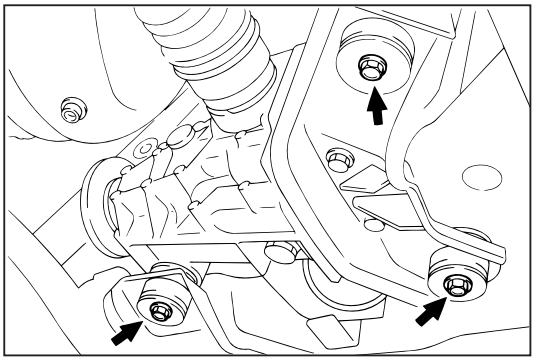
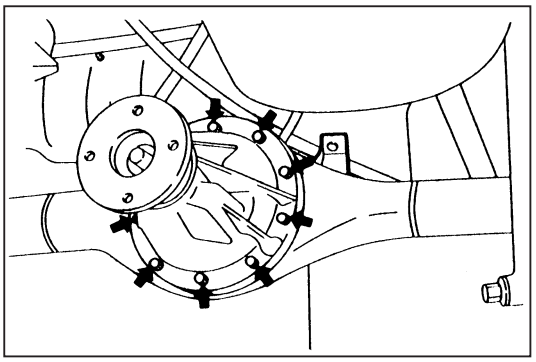
9. Support the differential carrier, using a suitable engine hanger, transmission jacks or the like.
10. Remove the three attaching bolts of the differential carrier support bracket and differential carrier assembly.
    (Only for front differential.)


JDF00027-00025

11. Remove the differential carrier assembly by removing three attaching bolts of the differential carrier support bracket mount.
    (Only for front differential.)
12. Remove the front axle housing cover by removing the attaching bolts.
    (Only for front differential.)
    NOTE:
    - Be sure to place a suitable container under the front axle housing connected sections, for a large amount of the differential oil may flow out.


JDF00028-00026

13. Remove the rear axle shaft assembly. (Refer to the RS section.)
    (Only for rear differential.)
14. Remove the propeller shaft assembly. (Refer to the PR section.)
    (Only for rear differential.)
15. Loosen the attaching bolts of the differential carrier assembly evenly.
    (Only for rear differential.)
16. Remove the rear differential carrier assembly by removing the attaching bolts.
    (Only for rear differential.)
    NOTE:
    - It should be noted that a large amount of oil may flow out. Hence, prior to the disconnecting of the differential carrier, place a suitable container under the connected section between the differential and the rear axle housing.


JDF00029-00027

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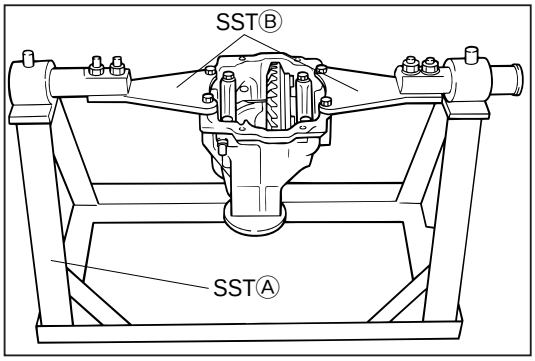
DISASSEMBLY

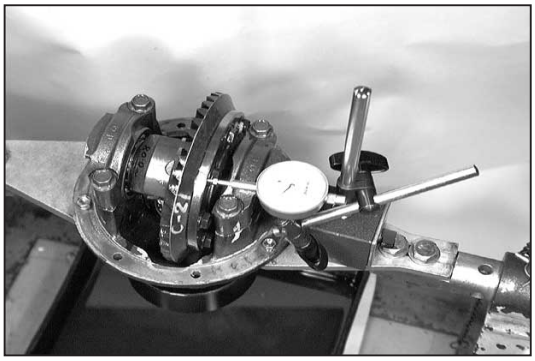
1. Place the differential carrier removed from the vehicle on a disassembly stand.
   SST: 09219-87202-000 Ⓐ
   09548-87201-000 Ⓑ



JDF00030-00028

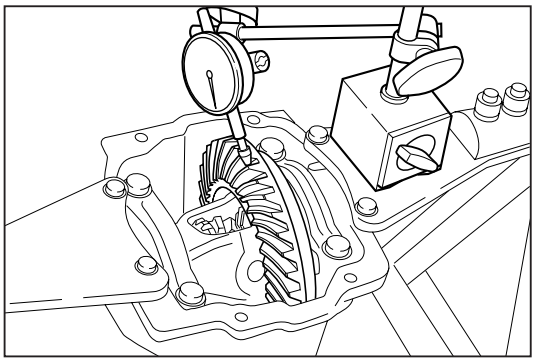
2. Inspection before disassembly
   (1) Checking of ring gear runout
   Ensure that the ring gear runout is within the specified value, using a dial gauge.
   Maximum limit: 0.1 mm or less

   If the ring gear runout fails to meet the specified value, retighten the ring gear attaching bolt evenly after loosening the bolts evenly or replace the ring gear and drive pinion as a set.


JDF00031-00029

   (2) Checking of ring gear backlash
   Ensure that the backlash of the ring gear is within the specified value.
   Ring gear backlash: 0.08 - 0.15 mm

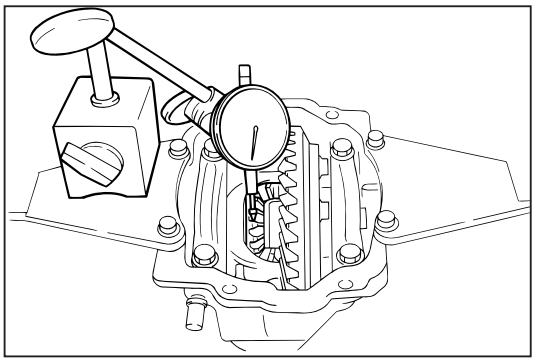
   NOTE:
   - If the measured backlash fails to meet the specified value, replace the ring gear and drive pinion as a set.


JDF00032-00030

   (3) Ensure that the backlash of the side gear is within the specified value.
   Side pinion backlash: 0.025 - 0.10 mm

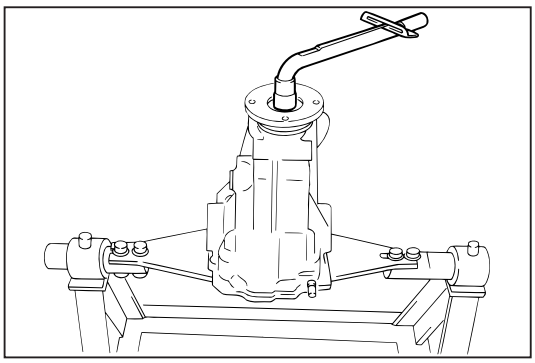
   CAUTION:
   - Be sure to employ the shims which have the same thickness at the right and left side.

   NOTE:
   - If the measured backlash fails to meet the specified value, adjust the backlash with the thrust washer thickness.


JDF00033-00031

   (4) Measure the preload of the drive pinion.
   Preload: 0.59 - 0.98 N·m (0.06 - 0.1 kgf-m)

   NOTE:
   - If the measured preload fails to meet the specified value, adjust the preload by selecting the thickness of shims.


JDF00034-00032

   (5) Check of tooth contact between ring gear and pinion
   (Refer to page DF–21)

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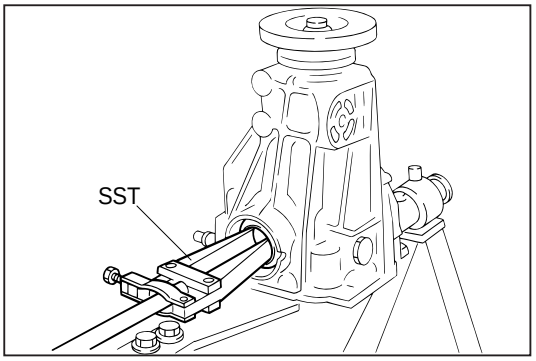
3. Remove the T type oil seals, using the following SST.
   SST: 09308-00010-000

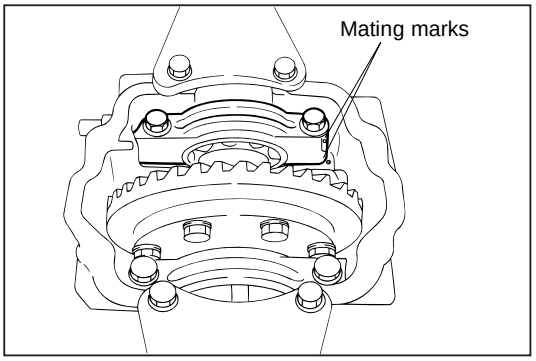
   (For front differential)



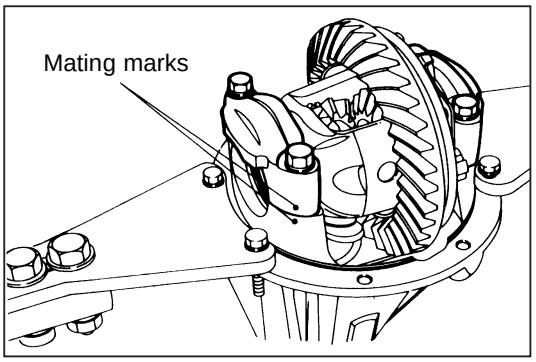
JDF00035-00033

4. Put mating marks (paint or the like) on the bearing caps and differential carrier.
   NOTE:
   - Machining process should be carried out with carrier and cap as a set. Arrange the removed bearing caps in order.

5. Remove the bearing caps by removing the four attaching bolts.

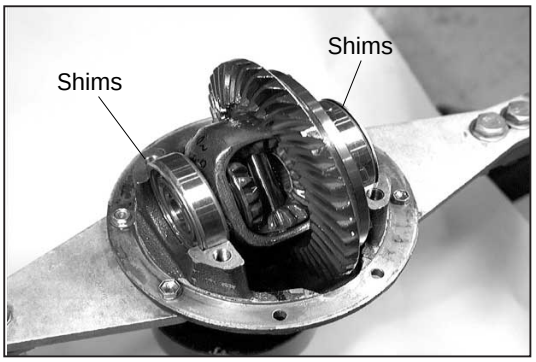


JDF00036-00034



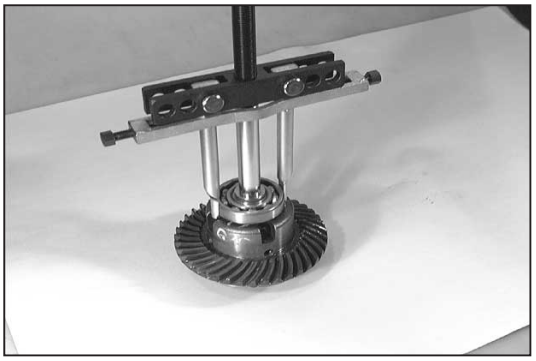
JDF00000-00035

6. Remove the shims and differential case assembly from the carrier.
   CAUTION:
   - Be sure to keep the shims installed at the right and left sides separately as a reference value for assembly.



JDF00037-00036

7. Remove the side bearings, using the following SST.
   SST: 09950-20017-000


JDF00038-00037

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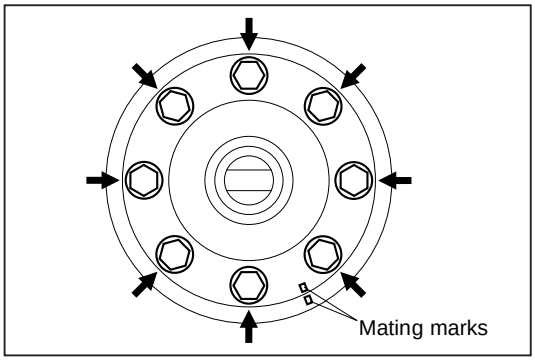
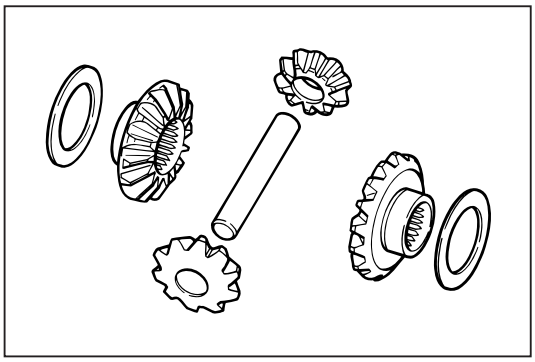
8. Put mating marks on the differential case and ring gear.
9. Loosen the differential ring gear attaching bolts evenly.
   CAUTION:
   - Be sure to loosen the attaching bolts evenly. Failure to observe this caution may damage the ring gear or the differential case.

10. Remove the differential ring gear by removing the eight attaching bolts.
    NOTE:
    - If any difficulty is encounter in separating the ring gear from the differential case, lightly tap the ring gear evenly, using a plastic hammer or the like.



JDF00039-00038

11. Remove the differential pinion, differential side gear and differential thrust washer from the differential case.
    (Except LSD)
    CAUTION:
    - Arrange the removed differential side gears and thrust washeres as a set.
    - Never disassemble the LSD. The inner parts are not available as spare parts.


JDF00040-00039

12. Release the staking of the lock nut, using a chisel and a hammer. (Refer to the procedure described in “REPLACEMENT OF FRONT DIFFERENTIAL COMPANION FLANGE OIL SEAL.”).
13. Loosen the companion flange attaching nut while preventing the companion flange from turning, using the following SST. (Refer to the procedure described in “(REPLACEMENT OF FRONT DIFFERENTIAL COMPANION FLANGE OIL SEAL.”).

JDF00041-00000

14. Remove the lock nut and plate washer.
    CAUTION:
    - Do not reuse the used lock nut and plate washer.

15. Remove the drive pinion companion flange subassembly, using the following SST. (Refer to the procedure described in “REPLACEMENT OF FRONT DIFFERENTIAL COMPANION FLANGE OIL SEAL.”).
    SST: 09950-20017-000

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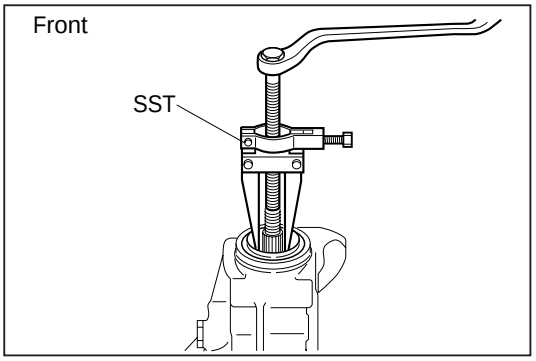
16. Remove the T type oil seal, using the following SST.
    SST: 09308-10010-000



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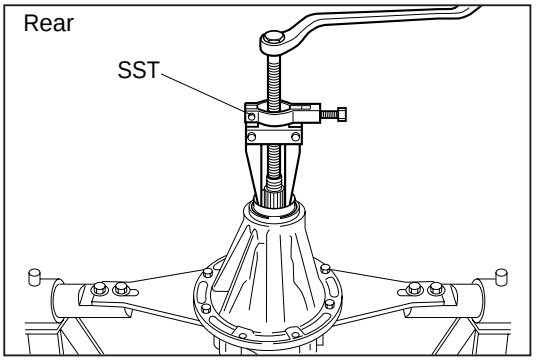
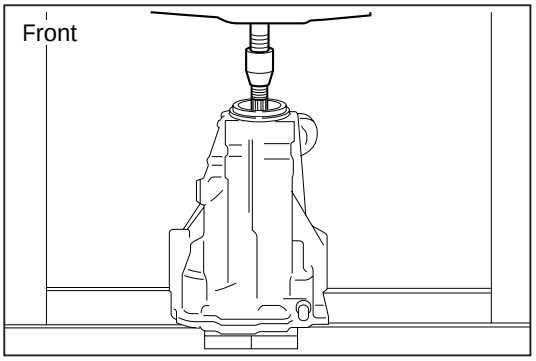


JDF00000-00041

17. Remove the differential drive pinion spacer and shims from the differential carrier, using a hydraulic press or tapping the drive pinion, using a hydraulic press.
    CAUTION:
    - Never drop the drive pinion on the floor.
    - Be very careful not to damage the threaded section of the drive pinion.

    NOTE:
    - Measure the thickness of the removed shims for the reference value at assembly.



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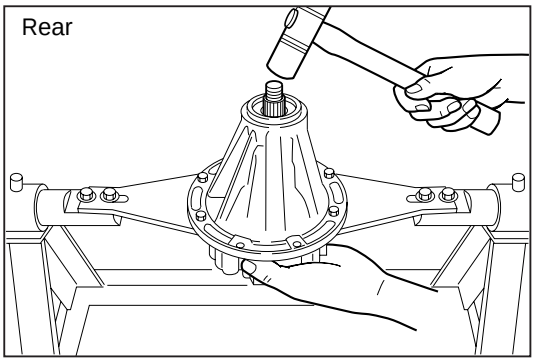
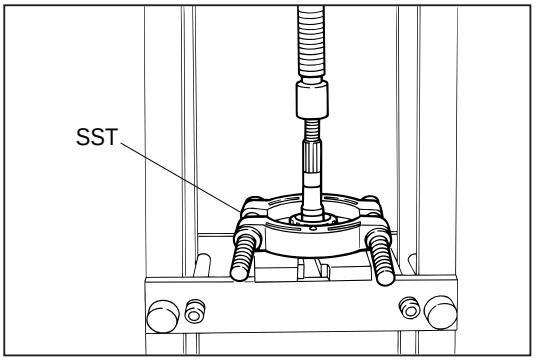


JDF00000-00043

18. Remove the tapered roller bearing from the drive pinion, using the following SST or the like.
    SST: 09950-87701-000



JDF00045-00044

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19. Remove the front and rear tapered roller bearing outer races and shims, using a press in combination with the following SST.

    SST: 09608-87501-000

    (Use No. 2 and No. 5 in the above component, in case front differential.)

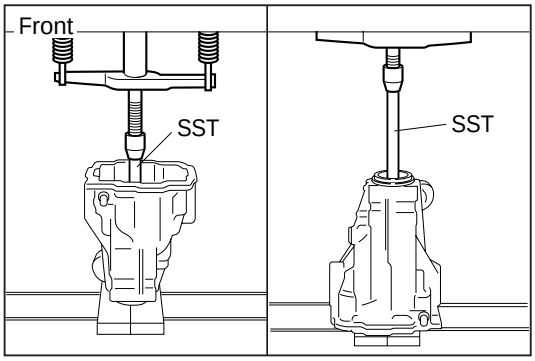
    (Use No. 3 and No. 5 in the above component, in case rear differential.)

    CAUTION:

    - Care must be exercised so that the outer race may not be tilted during removal.

    NOTE:

    - Measure the thickness of the removed shim for the reference value at assembly.
    - Be sure to remove the smaller sized bearing outer race first, otherwise some SST can not utilized.



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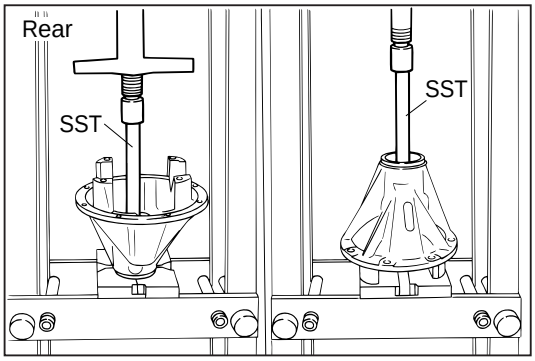

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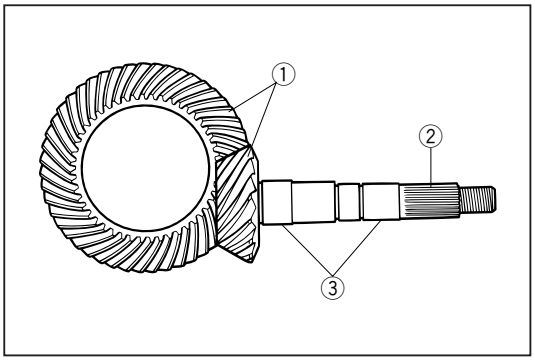
INSPECTION

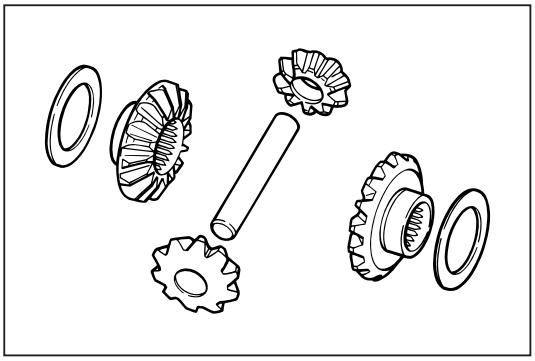
Inspect each section of the following parts for any sign of damage, wear or excessive looseness. Replace any parts which exhibit defects.

1. Differential drive pinion & ring gear
   (1) Gear teeth ①
   (2) Spline portion ② of drive pinion
   (3) Bearing fitting section ③
   CAUTION:
   - Replace the drive pinion and ring gear as a set, if any damage is found on either drive pinion or ring gear.

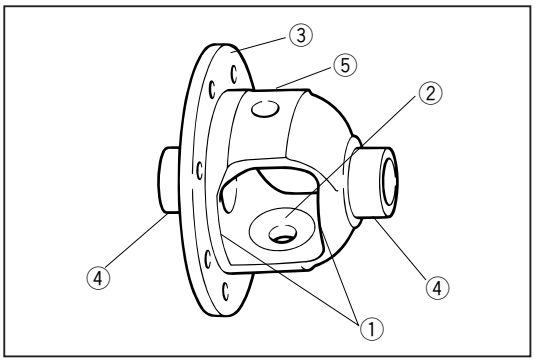


JDF00047-00047

2. Differential side gear, differential pinion and differential pinion shaft

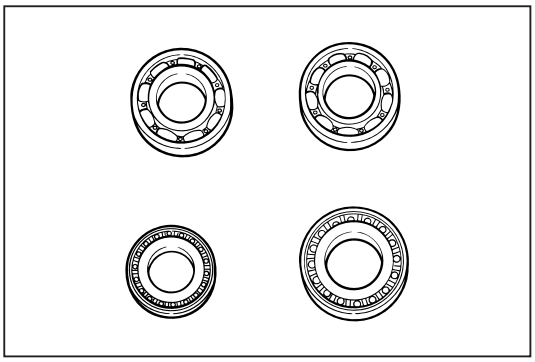

JDF00048-00048

3. Differential case
   (1) Side gear boss contact sections ①
   (2) Pinion contact section ②
   (3) Ring gear attaching section ③
   (4) Side bearing press-fitting section ④
   (5) The differential case proper ⑤

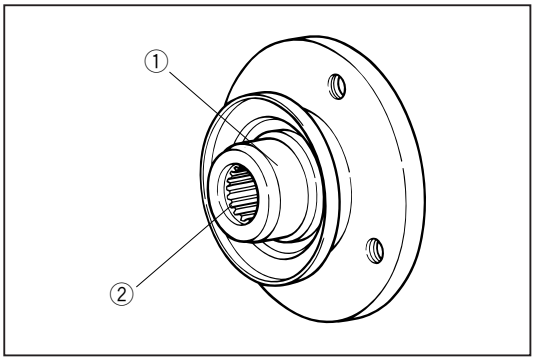


JDF00049-00049

4. Bearings
   Turn the bearings lightly. Ensure that the tapered roller bearing (front and rear) and bearing (differential side) rotate smoothly without any binding or abnormal noise.
   CAUTION:
   - Replace the front and rear bearings as a set, if any damage is found on any bearing.


JDF00050-00050

5. Drive pinion companion flange
   (1) Oil seal contact section ①
   (2) Spline section ②



JDF00051-00051

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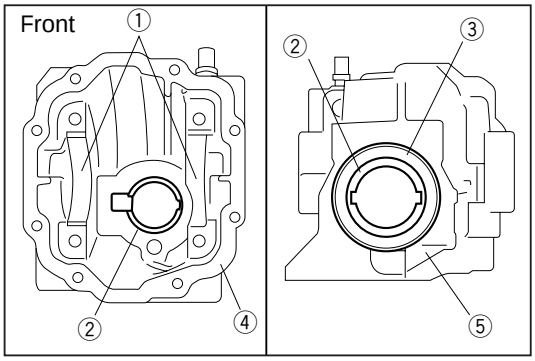
6. Differential carrier
   (1) Side bearing fitting sections ①
   (2) Tapered roller bearing outer race fitting sections ②
   (3) Oil seal inserting section ③
   (4) Carrier cover attaching section ④
   (5) The differential case proper ⑤



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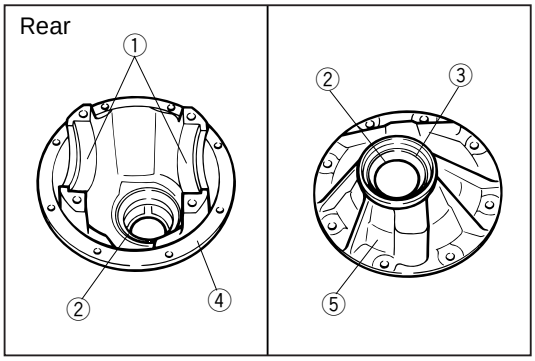
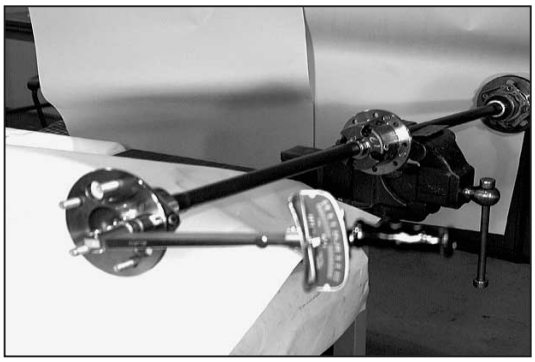


JDF00000-00053

7. Inspection of the LSD (Limited Slip Differential)
   (For LSD only)
   (1) Install the rear axle shaft to a vise.
   (2) Connect the differential case to the rear axle.
   (3) Connect the rear axle shaft to the differential case.
   (4) Install the wheel hub nut to one of the hub bolt with a suitable spacer interposed.
   (5) Install the torque wrench to the hub nut.
   (6) Ensure that the starting torque (a reading of the torque wrench at time when it is turned) is within the specified value.
   Starting torque: 49.0 ± 9.8 N·m (5.0 ± 1.0 kgf-m)

   If the specified measured starting torque fails to meet the specified value, replace the differential case with a new one.

   NOTE:
   - The distance from the shaft center to the hub bolt center is 57.15 mm. When measuring the starting torque with a torque wrench, the reading of the torque wrench should be compensated using this value.


JDF00053-00054

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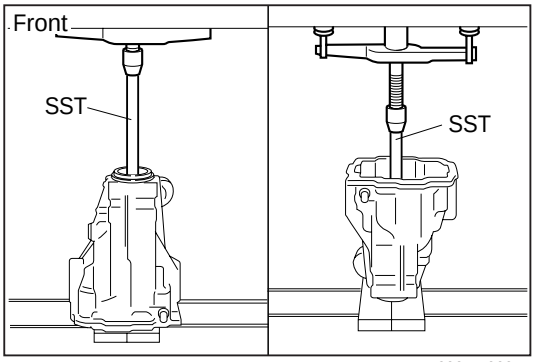
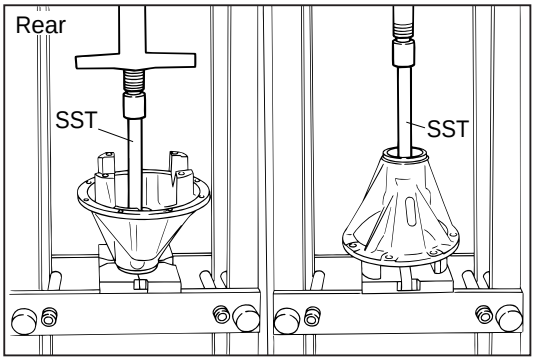
ASSEMBLY

1. Installation of differential drive pinion
   (1) Install the shim which was assembled or a shim having the same thickness with the one which was assembled as well as the front and rear tapered roller bearing outer races to the differential carrier, using the following SST in combination with a hydraulic press.
   SST: 09608-87501-000
   (Use No. 7 of the above SST in case front differential.)
   (Use No. 7 and 8 of the above SST in case rear differential.)



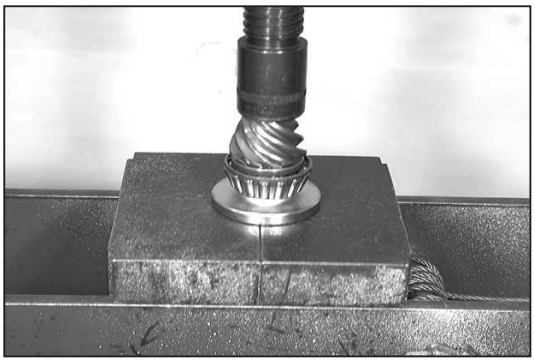
JDF00054-00055



JDF00000-00056

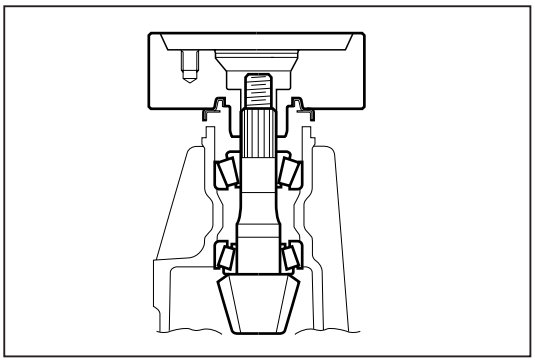
CAUTION:
- If any problem is found on the shims, replace the shims with new ones which have the same thickness with the former one.
- Never apply a force beyond 19.6 kN (2000 kgf) during the installation.
- Care must be exercised so that the race may not be tilted during the press-fitting operation.

   (2) Install the tapered roller bearing to the differential drive pinion, using the following SST in combination with a hydraulic press.
   SST: 09515-10010-000


JDF00055-00057

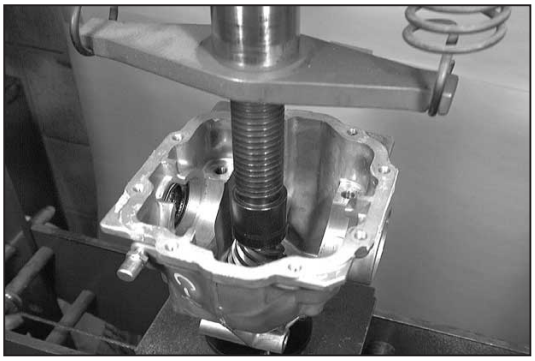
   (3) Install the drive pinion shaft assembly, drive pinion and companion flange to the differential carrier temporarily.

CAUTION:
- Liberally apply the specified differential oil to the tapered roller bearings.
- Do not assemble the drive pinion shaft bearing spacer and shims at this moment.


JDF00056-00058

   (4) Press the drive pinion shaft tapered roller bearing into position, using a hydraulic press.

CAUTION:
- Never apply excessive force to the bearings during pressing.
- Ensure that no excessive force is applied to the bearings by turning the differential carrier.


JDF00057-00059

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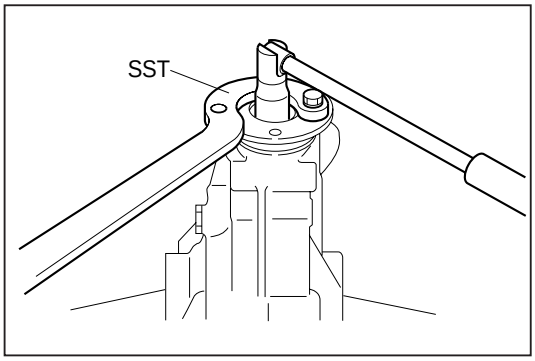
(5) Install the washer plate and lock nut for drive pinion companion flange subassembly.

CAUTION:

- Apply the specified differential oil to the threaded portion of the lock nut and drive pinion before the installation.
- Do not install the spacer, shim and T type oil seal at this moment.

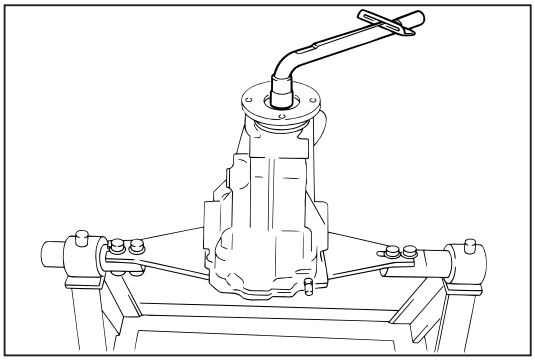


JDF00058-00060

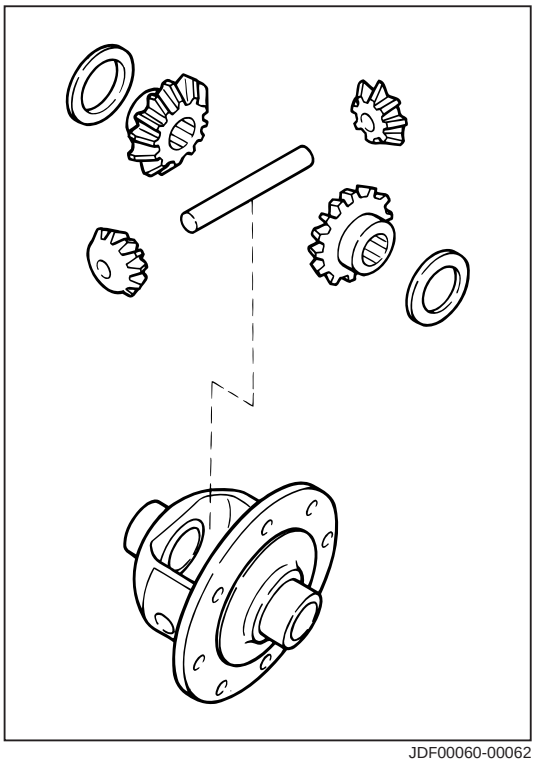
(6) Tighten the lock nut until the preload of the tapered bearings becomes the following specified value while preventing the companion flange from turning, using the following SST.
SST: 09330-87301-000
Preload: 0.59 - 0.98 N·m (0.06 - 0.1 kgf-m)

NOTE:

- Be sure to turn the companion flange several turns to stabilize the bearing contacting condition before measuring the preload.

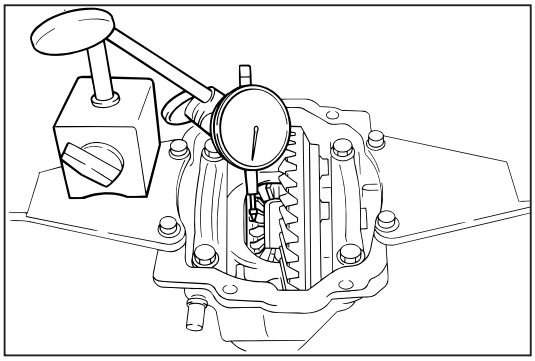

JDF00059-00061

2. Assembly of differential case
(1) Liberally apply the specified differential oil to the sliding surfaces of all component parts.
(2) Install the side gear thrust washer, side gear, pinion and pinion shaft to the differential case.


JDF00060-00062

(3) Ensure that the backlash of the differential side gear is within the specified value with a dial gauge.
Backlash: 0.025 - 0.1 mm

If the backlash is not within the specified value, select a suitable washer from the spare parts mentioned below.
Thrust washer availability: 0.8 mm
0.9 mm
1.0 mm


JDF00061-00063

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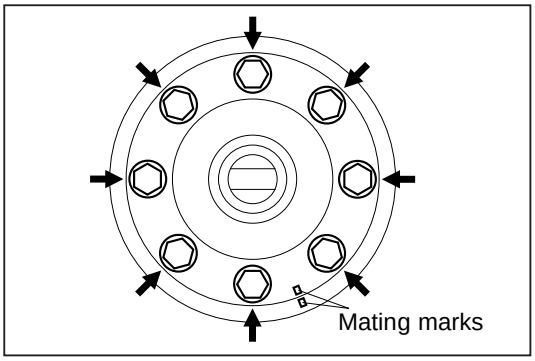
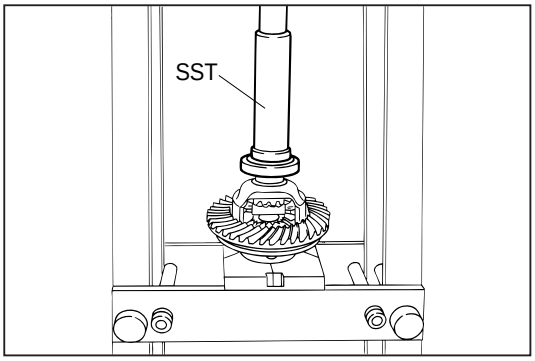
CAUTION:
- Be sure to adjust the backlash in such a manner that the thickness of the thrust washers at both sides should be the same or differ not more than 0.1 mm.

(4) Install the differential gear to the differential case while aligning the mating marks put at the disassembly procedure.
(5) Install and tighten the attaching bolts evenly to the specified tightening torque.
Tightening Torque: 78.5 - 88.2 N·m (8.0 - 9.0 kgf-m)

(6) Install the radial ball bearings into position, using a hydraulic press in combination with the following SST.
SST: 09309-87201-000



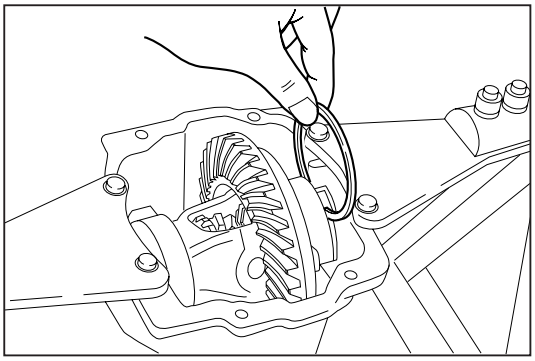
JDF00062-00064



JDF00063-00065

3. Inspection and adjustment of ring gear backlash
(1) Install the differential case assembly to the differential carrier. Also, install shims having the same thickness as the one that was assembled to the back side of the differential gear tooth.

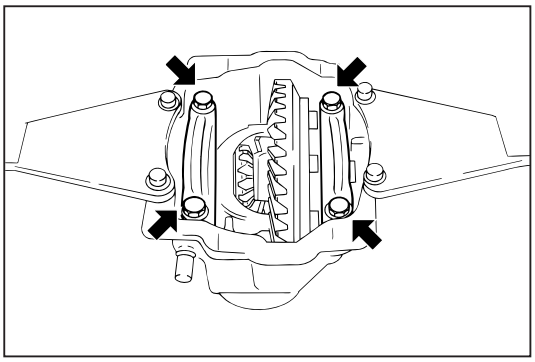
CAUTION:
- Apply the specified differential oil to the sliding surface of the component parts.
- Be sure to assemble the differential case assembly to the differential case while pushing the differential case assembly against the inserted shim side.


JDF00064-00066

(2) Install the differential bearing caps with bolts to the differential carrier according to the mating marks which were put during the disassembling.

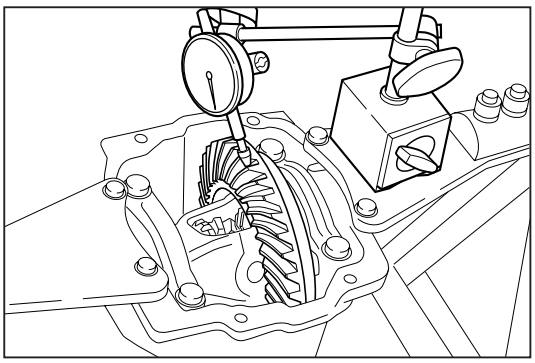
CAUTION:
- Be sure to push the differential case assembly against the inserted shim side when assembling the bearing cap.

(3) Tighten the attaching bolts evenly to the specified tightening torque.
Tightening Torque: 29.5 - 44.1 N·m (3.0 - 4.5 kgf-m)


JDF00065-00067

(4) While applying a dial gauge perpendicular to the tooth surface of the differential ring gear, secure the flange of the driving pinion. Under this condition, measure the backlash by moving the ring gear.
Specified value: 0.08 - 0.15 mm

CAUTION:
- The measurement should be performed at three or more points on the circumference of the ring gear.
- In cases where a backlash is too large, increase shims. Conversely, in cases where a backlash is too small, decrease shims.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(5) Adjust the backlash to the specified value by selecting suitable shims from spare part, if the backlash fails to meet the specified value.
Shim availability: 0.15 mm
0.20 mm
0.25 mm
0.50 mm

(6) Note the selected shim thickness.

4. Adjustment of play of differential case assembly in axial direction
(1) Remove the bearing cap.
(2) Measure the clearance between the bearing at the ring gear tooth surface side and the differential carrier, using a thickness gauge. Select and insert shims so that the clearance may become the specified value.
Specified Value: 0 - 0.05 mm

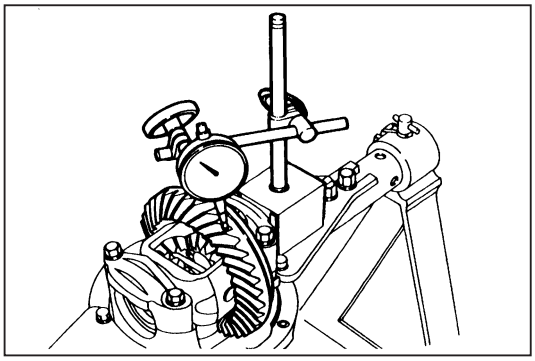
NOTE:
- If any difficulty is encountered in assembling shims, first insert shims at the back gear tooth surface side.
- Then, insert shims at the back side by lightly tapping the back side, using a plastic hammer.

Shim availability: 0.15 mm
0.20 mm
0.25 mm
0.50 mm

(3) Note the selected shim thickness.
(4) While aligning the mating marks that were put during the disassembling, assemble the differential bearing cap. Gradually tighten the four bolts evenly to the specified tightening torque.
Tightening Torque: 29.5 - 44.1 N·m (3.0 - 4.5 kgf-m)

(5) Ensure that the ring gear runout is within the specified value. (Refer to page DF–11.)
If the ring gear runout fails to meet the specified value, retighten the attaching bolts of the ring gear evenly after loosening them once or replace the ring gear and drive pinion gear as a set.

5. Check and adjustment of tooth contact condition with ring gear and drive pinion.
Apply blue lead to the gear teeth. Turn the flange to check the tooth contact between the ring gear and the drive pinion.
CAUTION:
- Be sure to turn the flange in both the forward and backward directions and check the tooth contact pattern at several points.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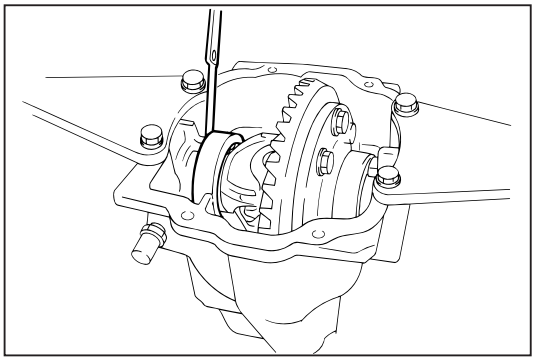
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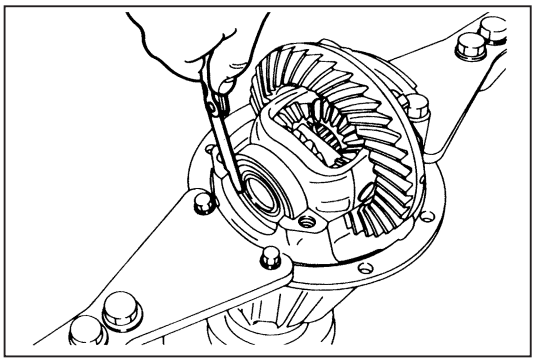
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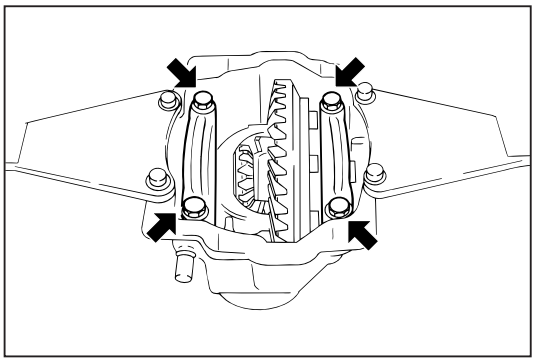
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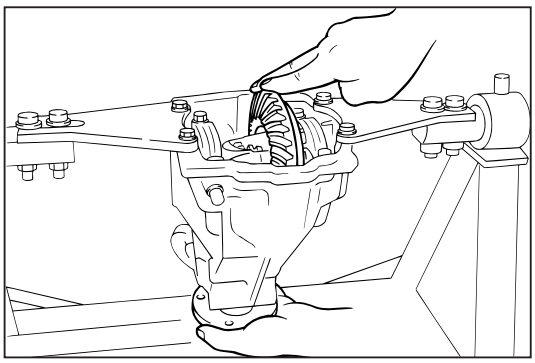
JDF00071-00073

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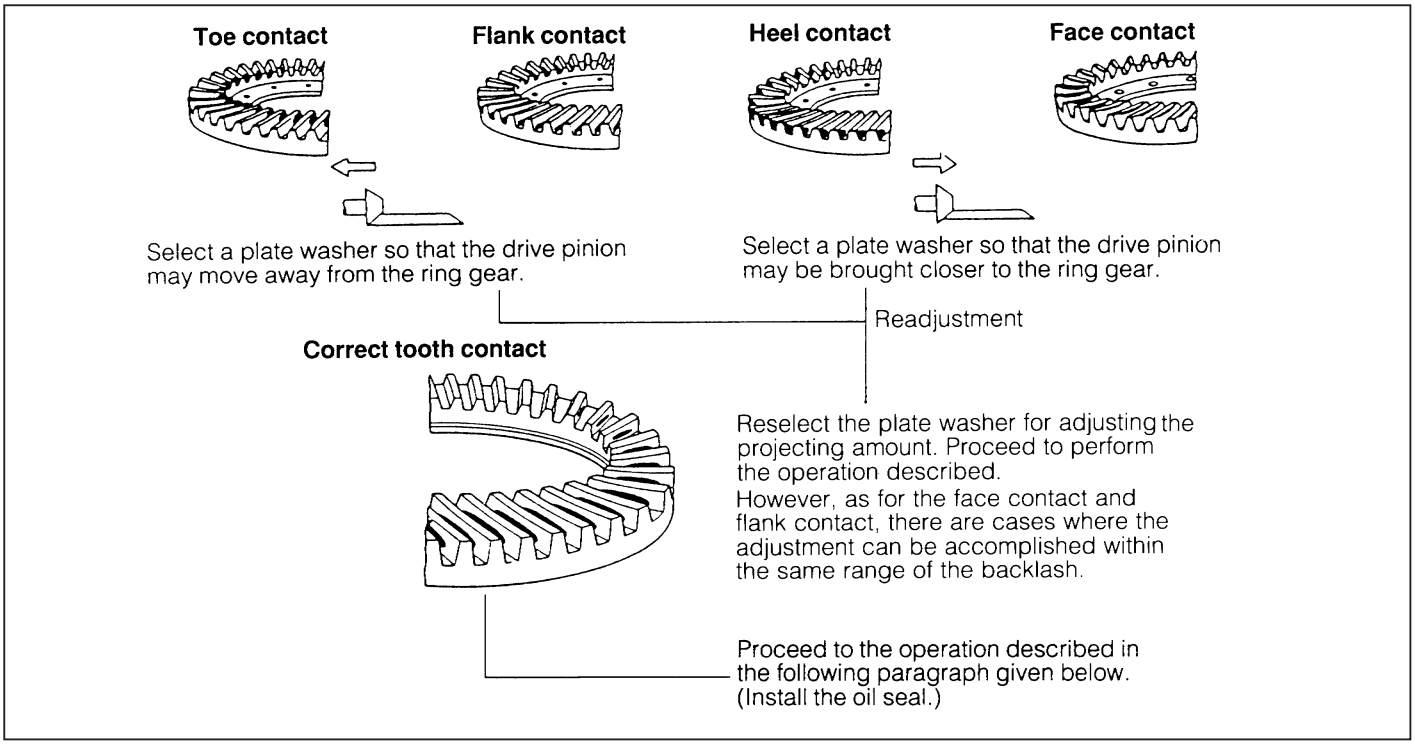

JDF00000-00074

6. Adjustment of drive pinion bearing preload
   (1) Remove the differential bearing caps by removing the attaching bolts and differential case with the shims. (Refer to the disassembly procedure.)

   NOTE:
   - Be sure to keep the removed shims at the right and left sides separately for reassembly.

   (2) Loosen the lock nut of the drive pinion while preventing the companion flange from turning, using the following SST. (Refer to the disassembly procedure.)
   SST: 09330-87301-000

   (3) Remove the lock nut.
   (Refer to the disassembly procedure.)
   (4) Remove the companion flange from the pinion shaft, using the following SST in combination with an adjustable wrench or the like.
   (Refer to the disassembly procedure.)
   SST: 09950-20017-000

   (5) Remove the drive pinion from the differential carrier, using a hydraulic press or lightly tapping the drive pinion, using the plastic hammer.
   (Refer to the disassembly procedure.)
   (6) Remove the outer race of the tapered roller bearing. (Pinion gear side.)

JDF00072-00000

   (7) Assemble the drive pinion spacer and shims having the same thickness as those measured during the disassembling to the drive pinion.

   NOTE:
   - Replace the shims to new ones which have the same thickness with former shims, if they are damaged.

JDF00073-00000

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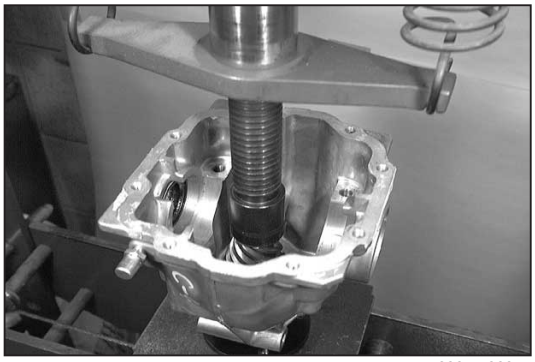
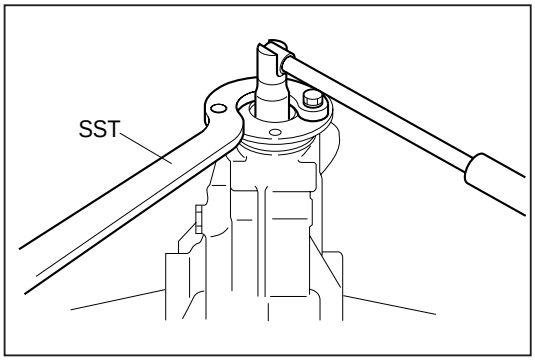
(8) Install the drive pinion shaft assembly, drive pinion and companion flange to the differential carrier temporarily.
(9) Press the drive pinion shaft bearing into position, using a hydraulic press.

CAUTION:
- Never apply excessive force to the bearings during pressing.
  Ensure that the no excessive force is applied to the bearings by turning the differential carrier.


JDF00074-00075

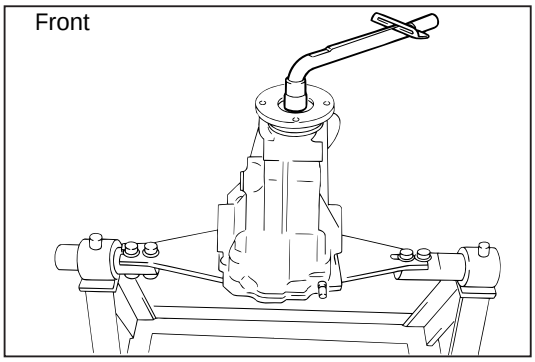
(10) Apply the specified differential oil to the threaded section of the drive pinion and lock nut.
(11) Install the plate washer and lock nut. Then, tighten the lock nut to the specified tightening torque while preventing the companion flange from turning, using the following SST.
(Refer to the assembly procedure.)
SST: 09330-87301-000
Tightening torque: 98.1 - 137.2 N·m
(10.0 - 14.0 kgf-m)



JDF00075-00076

(12) Ensure that the preload is within the specified value, using a torque wrench.
Preload: 0.59 - 0.98 N·m (0.6 - 1.0 kgf-m)

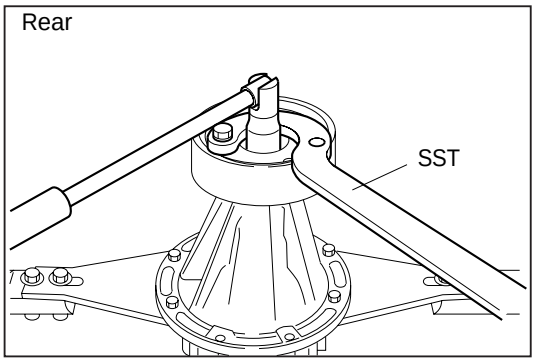
If the measured preload fails to meet the specified value, select suitable preload adjusting shims from the spare parts. Then, repeat the preload adjustment, until the specified preload is obtained.
Shim availability: 0.25 mm
0.30 mm
0.40 mm
0.50 mm



JDF00076-00077

7. Installation of drive pinion oil seal
(1) Remove the drive pinion shaft lock nut while preventing the companion flange from turning, using the following SST. (Refer to the assembly procedure.)
SST: 09330-87301-000

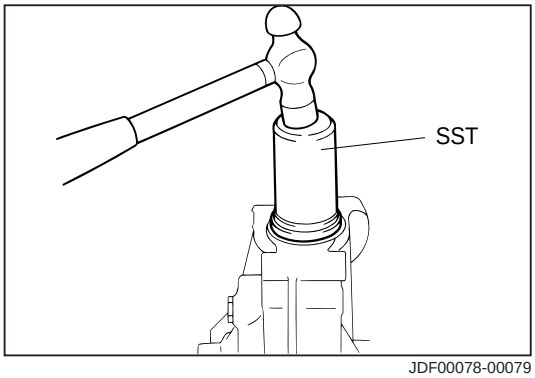
(2) Remove the companion flange, using the following SST in combination with a suitable adjusting wrench. (Refer to the disassembling procedure.)
SST: 09950-20017-000



JDF00077-00078

8. Assembly of companion flange
(1) Install a new T type oil seal to the differential case, using the following SST.
SST: 09635-20010-000

CAUTION:
- Apply lithium soap base multi purpose grease to the lip section of the oil seal.
- Make certain to drive the oil seal into position so that it becomes flush with the edge surface of the housing.



JDF00078-00079

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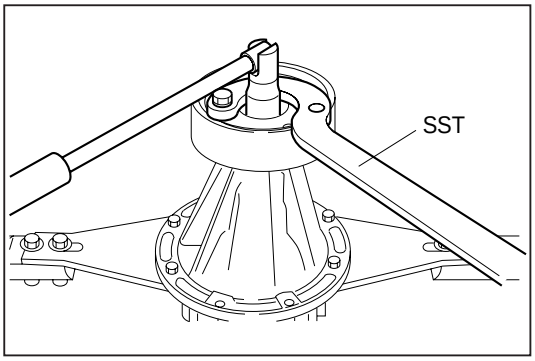
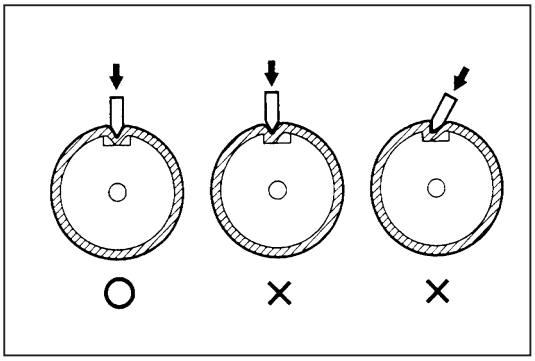
(2) Install the companion flange subassembly, washer plate and lock nut.
(3) Tighten the lock nut to the specified tightening torque while preventing the companion flange from turning, using the following SST.
SST: 09330-87301-000
Tightening Torque: 98.1 - 137.2 N·m
(10.0 - 14.0 kgf-m)



JDF00079-00080

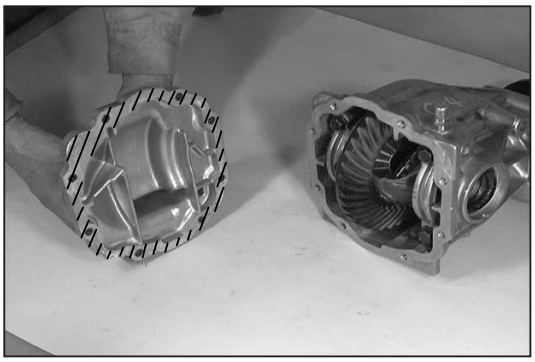
(4) Turn the drive pinion shaft several times.

(5) Ensure that the preload is within the specified value.
If not, adjust the preload to the specified value by replacing the adjusting shims, as required.
(6) Stake the lock nut to the recessed section of the drive pinion shaft by a chisel of the like.


JDF00080-00081

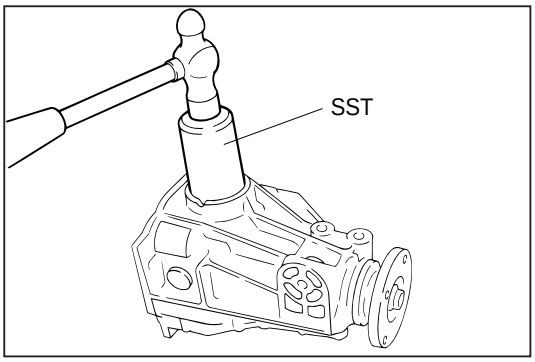
CAUTION:
- Make sure that the lock section of the lock nut is positively staked down to the bottom of the driving pinion groove.
- Never damage the threaded section of the drive pinion shaft.

9. Installation of front axle housing cover
(For front differential)
(1) Degrease the surface of the front axle housing cover attaching surface and front axle housing cover.
(2) Apply the specified seal adhesive to the front axle housing cover attaching surface.
Seal adhesive: Three bond 1216 or equivalents


JDF00081-00082

(3) Install the front axle housing cover with attaching bolts and tighten them evenly to the specified tightening torque.
Tightening torque: 17.7 - 23.5 N·m (1.8 - 2.4 kgf-m)

10. Installation of drive shaft oil seal
(For front differential)
(1) Install new T type oil seals to the differential case, using the following SST.
SST: 09635-20010-000



JDF00082-00083

(2) Apply the lithium soap base multi-purpose grease to the lip section of the T type oil seals.

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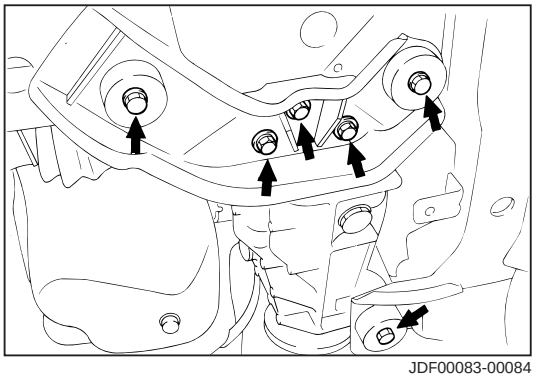
INSTALLATION

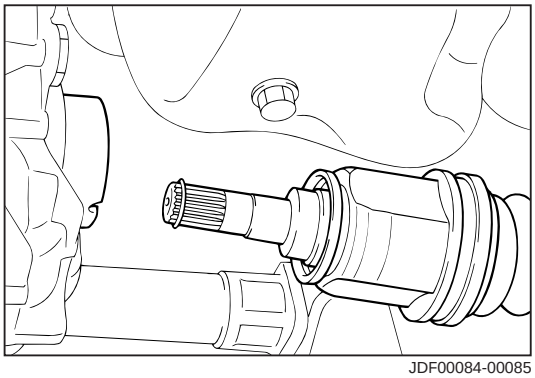
(Front differential)

1. Install the differential carrier assembly and differential support bracket with the attaching bolts.
2. Tighten the bolts to the specified tightening torque.
   Tightening Torque: Differential carrier
   68.6 - 83.4 N·m
   (7.0 - 8.5 kgf-m)
   Differential support
   34.3 - 61.8 N·m
   (3.5 - 6.3 kgf-m)



JDF00083-00084

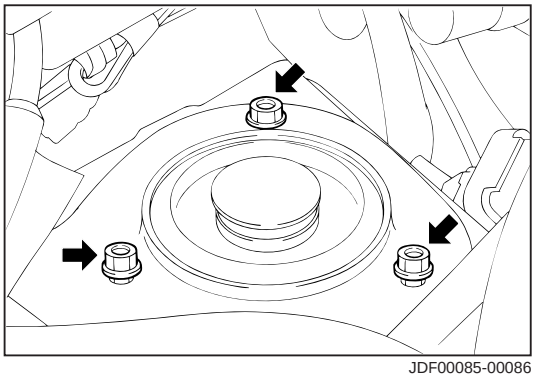
3. Install the propeller shaft to the front differential with the attaching bolts and tighten them to the specified tightening torque.
   (Refer to PR section)



JDF00084-00085

4. Insert the drive shaft assembly into the differential carrier assembly. (Refer to the procedure described in “Replacement of Front differential side Oil Seal” and FS section.)
   CAUTION:
   - Apply lithium soap base multi-purpose grease to the lip section of the differential side oil seal.

5. Tighten the new attaching nut of the suspension support to the specified tightening torque.
   Tightening Torque: 28.4 - 42.2 N·m (2.9 - 4.3 kgf-m)



JDF00085-00086

6. Install the lower arm to the steering nuckle and tighten the castle nut to the specified tightening torque.
   (Refer to the procedure described in “Replacement of Front differential side oil seal.”)
   Tightening Torque: 44.1 - 58.8 N·m (4.5 - 6.0 kgf-m)

7. Install a new clip.
   (Refer to the procedure described in “Replacement of Front differential side oil seal.”)
8. Install the tie rod end to the steering knuckle and tighten the castle nut to the specified tightening torque.
   (Refer to the procedure described in “Replacement of Front differential side oil seal.”)
   Tightening Torque: 39.2 - 53.9 N·m (4.0 - 5.5 kgf-m)

9. Install a new clip.
   (Refer to the procedure described in “Replacement of Front differential side oil seal.”)
10. Install the drain plug with a new gasket interposed and tighten the drain plug to the specified tightening torque.
    Tightening Torque:
    Front 39.3 - 58.8 N·m (4.0 - 6.0 kgf-m)

JDF00086-00000

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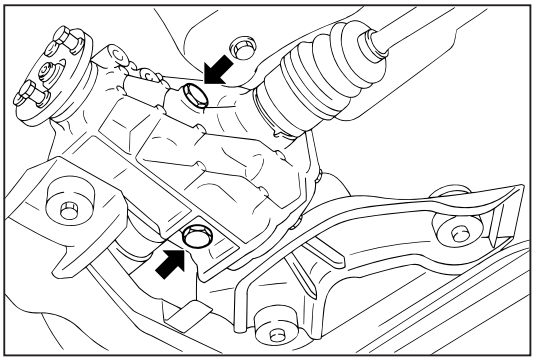
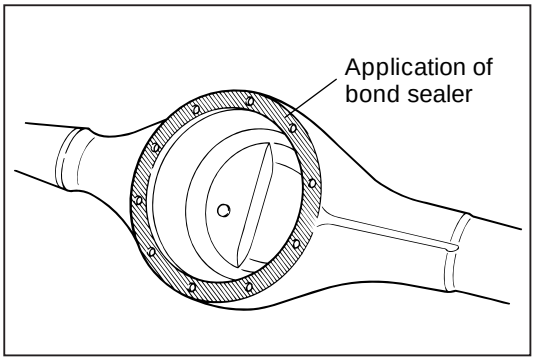
11. Fill the specified differential oil from the filler plug.
(Refer to the “REPLACEMENT OF FRONT DIFFERENTIAL COMPANION FLANGE OIL SEAL” section.)
12. Install the filler plug with a new gasket interposed and tighten it to the specified tightening torque.
Tightening Torque:
Front 39.3 - 58.8 N·m (4.0 - 6.0 kgf-m)

13. Install the front wheels.
14. Jack down the vehicle.
15. Ensure that no trouble persists.


JDF00087-00087

(Rear differential)
1. Apply liquid gasket to the mating surface of the rear axle housing cover.
(1) Degrease the surface of the rear differential attaching surface or the rear axle housing.
(2) Apply the specified seal adhesive to the rear axle.
Seal adhesive: Three bond 1217 or equivalents

2. Install the rear differential carrier assembly with the attaching bolts.
3. Tighten the attaching bolts to the specified tightening torque evenly.
Tightening Torque: 24.5 - 39.2 N·m (2.5 - 4.0 kgf-m)

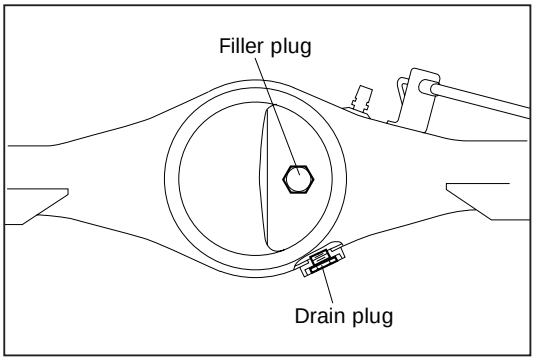


JDF00088-00088

4. Install the propeller shaft assembly. (Refer to the PR section.)
5. Install the rear axle shaft. (Refer to the RS section.)
6. Install the drain plug with a new gasket interposed and tighten the drain plug to the specified tightening torque.
Tightening Torque: 53.9 - 68.6 N·m (5.5 - 7.0 kgf-m)

JDF00089-00000

7. Fill the specified differential oil from the filler plug.
Specified differential oil
Grade : API GL-5
Viscosity : SAE 80W-90 (Standard)
SAE 80W-90 LSD (For LSD)
Capacity : 1.55 liters



JDF00090-00089

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8. Install the filler plug with a new gasket interposed and tighten it to the specified tightening torque.
   Tightening Torque: 53.9 - 68.6 N·m (5.5 - 7.0 kgf-m)

9. Install the rear wheel.
10. Jack down the vehicle.
11. Ensure that no trouble is persists.

JDF00091-00000

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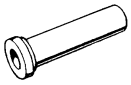
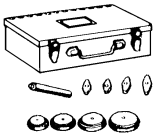
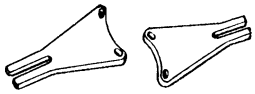
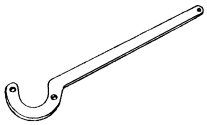
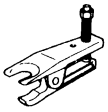
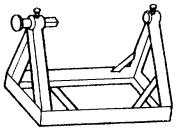
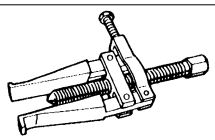
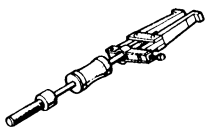
SSTs

	09515-10010-000	Rear axle bearing replacer
	09309-87201-000	Transmission bearing replacer
	09608-87501-000	Axle hub & drive pinion bearing tool set
	09635-20010-000	Lower ball joint dust cover replacer
	09548-87201-000	Differential overhaul attachment
	09330-87301-000	Drive pinion flange holding tool
	09611-87701-000	Tie rod end puller
	09648-87201-000	Drive shaft replacer
	09636-20010-000	Upper ball joint dust cover replacer
	09219-87202-000	Engine overhaul stand
	09308-10010-000	Oil seal puller
	09308-00010-000	Oil seal puller

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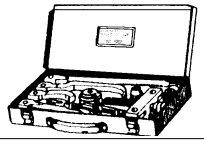
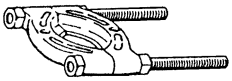
	09950-20017-000	Universal puller
	09950-87701-000	Bearing pulling attachment

JDF00092-00090

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TIGHTENING TORQUE

Tightening compartment	Tightening torque	
	N·m	kgf-m
Drive pinion companion flange subassembly × lock nut	98.1 - 137.2	10.0 - 14.0
Drain plug (Front) (Rear)	39.3 - 58.8 53.9 - 68.6	4.0 - 6.0 5.5 - 7.0
Oil filler plug (Front) (Rear)	39.3 - 58.8 53.9 - 68.6	4.0 - 6.0 5.5 - 7.0
Suspension support attaching nut	28.4 - 42.2	2.9 - 4.3
Lower arm × steering knuckle	44.1 - 58.8	4.5 - 6.0
Tie rod end × steering knuckle	39.2 - 53.9	4.0 - 5.5
Differential gear × differential case	78.5 - 88.2	8.0 - 9.0
Differential bearing cap × differential carrier	29.5 - 44.1	3.0 - 4.5
Front axle housing cover × front axle	17.7 - 23.5	1.8 - 2.4
Differential carrier × differential support bracket	68.6 - 83.4	7.0 - 8.5
Differential support bracket × frame Differential carrier × frame	34.3 - 61.8	3.5 - 6.3

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DAIHATSU

TERIOS

J100

FRONT AXLE & SUSPENSION

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REPLACEMENT OF SUSPENSION LOWER ARM BUSH **FS–18**
REPLACEMENT OF SUSPENSION LOWER ARM BALL JOINT DUST COVER **FS–18**
INSTALLATION **FS–19**
DRIVE SHAFT FS–20
COMPONENTS **FS–20**
REMOVAL **FS–20**
DISASSEMBLY **FS–21**
INSPECTION **FS–22**
ASSEMBLY **FS–23**
REPLACEMENT OF TRANSFER OIL SEAL **FS–25**
INSTALLATION **FS–25**
TIGHTENING TORQUE FS–26

FS

JFS00001-00000

NO. 9710-JE

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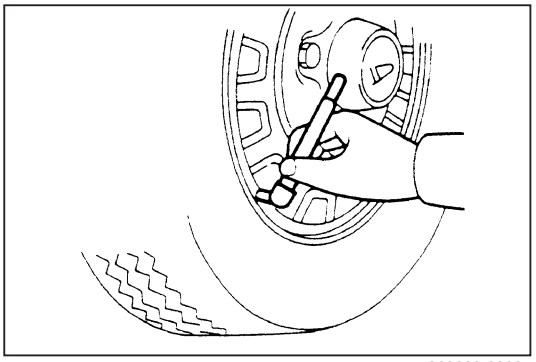
WHEEL ALIGNMENT

PREPARATION

Prior checks

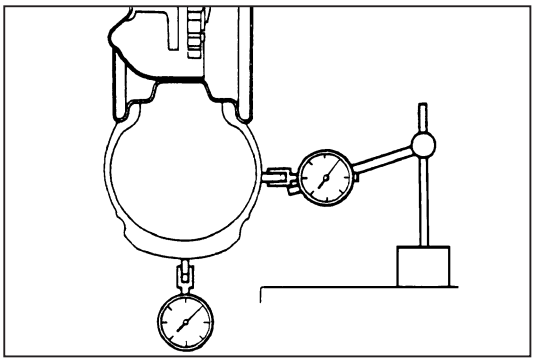
1. Inspect the wear of tires.
2. Inspect the air pressure of the tires.
   NOTE:
   - Perform the check on a level floor.
   - Make sure that the same maker's tires having the same size are mounted.
   - Keep the vehicle in an unloaded state. "Unloaded state" denotes a condition where the fuel tank is full, a spare tire is mounted, standard tools and a jack are mounted at correct storage locations.
     Tire Size: 205/70R15 95S
     Pressure: 180 kPa (1.8 kgf/cm^2)



JFS00002-00001

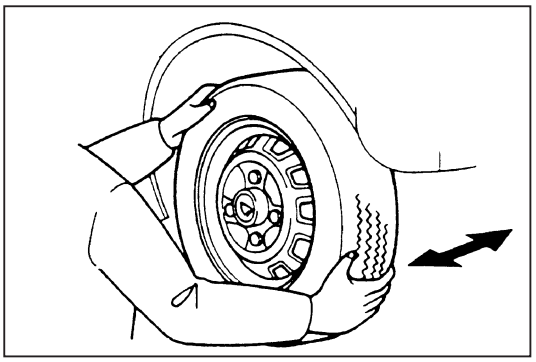
3. Inspect the runout of tires.
   Maximum Limit: 2 mm in a right-and-left direction
   1.4 mm in an up-and-down direction

   NOTE:
   - The measurement should be conducted within five minutes after the vehicle has been run for at least 30 minutes at a speed of 60 to 80 km/h.



JFS00003-00002

4. Ensure that the no looseness are exists on the bolts and nuts on the related parts of the front axle and steering linkage.
5. Check of related sections of the front axle and steering linkage for excessive play
   (1) Jack up the vehicle and support it with safety stands. (Refer to GI section.)
   (2) Ensure that no excessive play are exists on the connecting sections of the each front axle and steering linkage by rocking the tire alternately in-and-out or push and pull while holding the upper and lower parts of the tire.



JFS00004-00003

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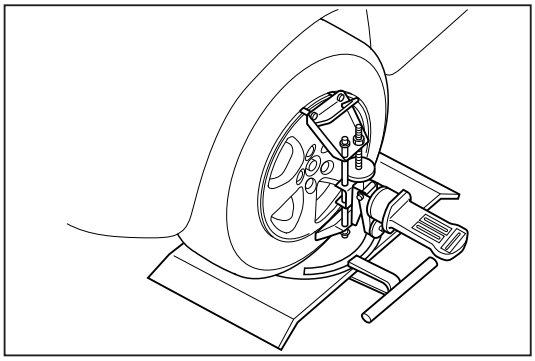
Camber, Caster and Kingpin angle

Specified Value

Camber	0°30′ ± 45′
Caster	2°35′ ± 1°
Kingpin angle	13°45′ ± 1°

NOTE:

- No adjustment can be made for the camber, caster and kingpin angle. Therefore, if the camber, caster or kingpin angle fails to meet the specified value, check that no damage or deformation exists on the frame or correct the frame, as required.



JFS00005-00004

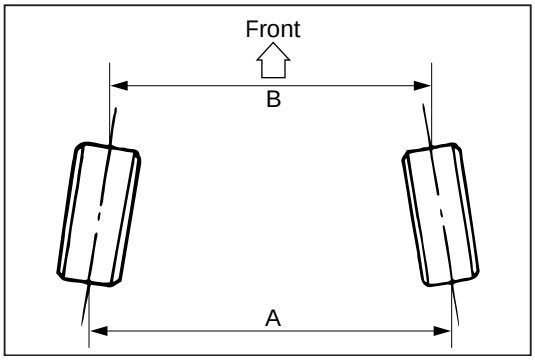
Toe-in, Turning radius

Specified Value:

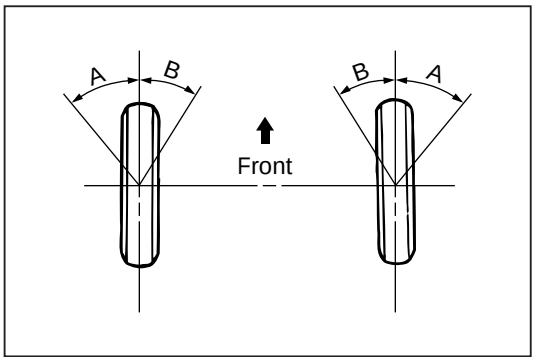
Toe-in		0 ± 1.5 mm
Turning Radius	In	$38°28' ^{+1°20'}_{-2°40'}$
	Out	$33°24' ^{+1°30'}_{-2°30'}$

NOTE:

- If the toe-in or turning radius fails to meet the specified value, perform the adjustment, following the procedure given below, so that both the toe-in and turning radius may conform to the specified values.



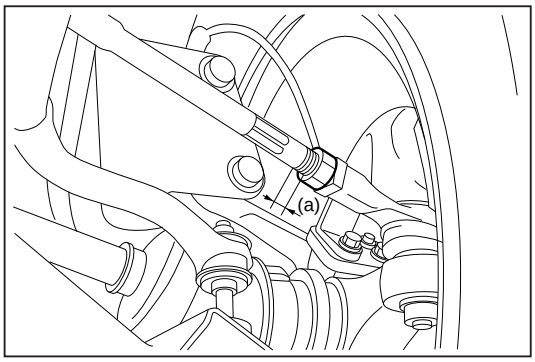
JFS00006-00005



JFS00000-00006

Adjustment of Toe-in and Turning radius

1. Loosen the lock nuts of the tie-rod ends.
2. Perform the toe-in and turning radius adjustment by turning the tie-rod ends.
   CAUTION:
   - When adjusting the toe-in, the tie-rods at the right and left sides should be turned by the same amount.
   - Make the length (a) indicated in the illustration equal between the right and left sides. If the length differs between the right and left sides, a difference occurs in the wheel turning angle between the right and left sides.



JFS00007-00007

3. Tighten the lock nut.
   Tightening Torque: 59.8 - 89.2 N·m (6.1 - 9.1 kgf-m)

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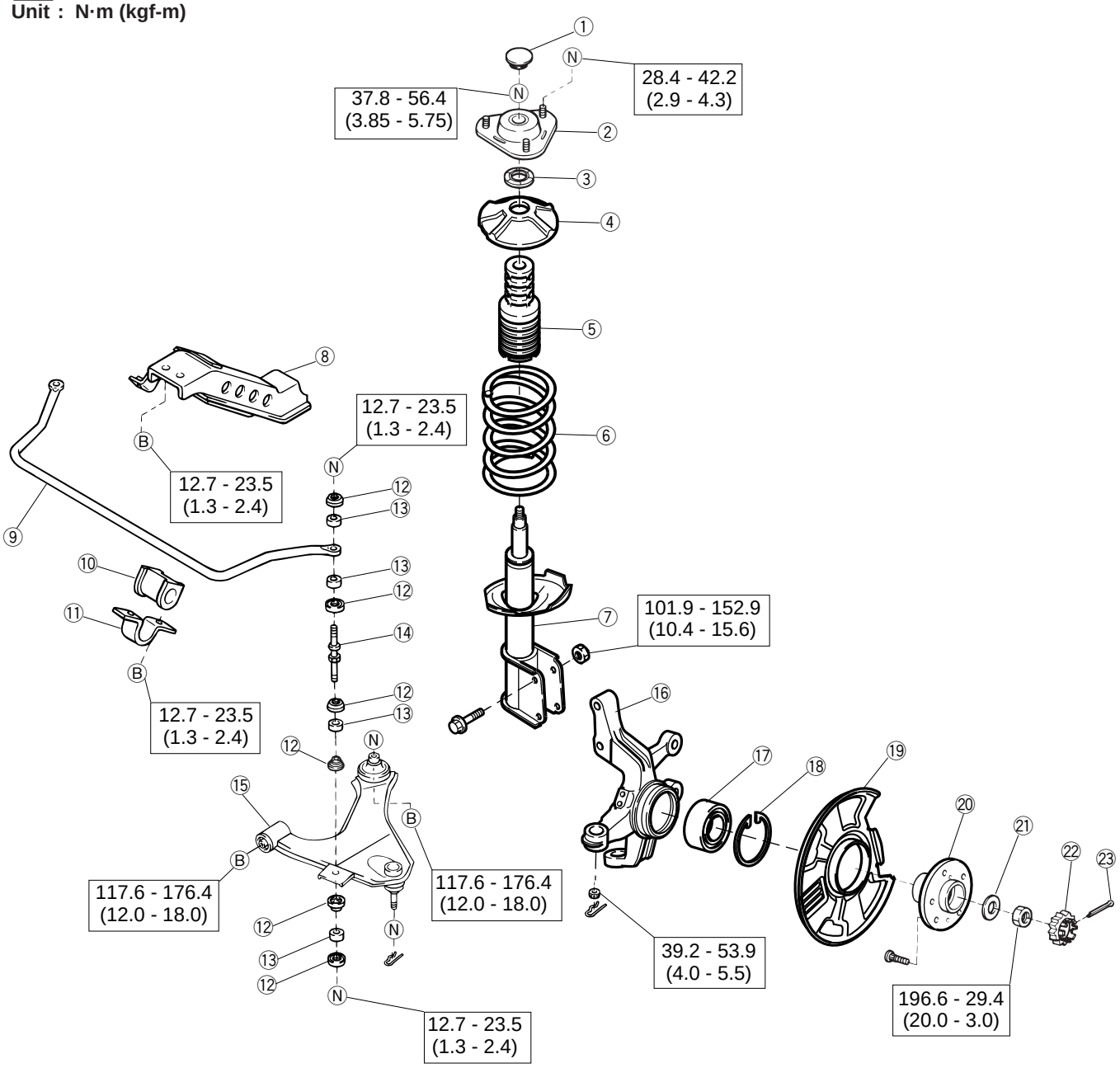
FRONT AXLE AND SUSPENSION

COMPONENTS

: Tightening torque
Unit : N·m (kgf-m)



① Bearing dust cover
② Front suspension support
③ Bearing
④ Front spring upper seat
⑤ Front spring bumper
⑥ Front spring
⑦ Front shock absorber
⑧ Front stabilizer bracket sub-assembly
⑨ Front stabilizer bar
⑩ Stabilizer bush
⑪ Stabilizer bracket
⑫ Washer
⑬ Bush
⑭ Stabilizer link rod
⑮ Suspension lower arm
⑯ Steering knuckle
⑰ Bearing
⑱ Snap ring
⑲ Disc brake dust cover
⑳ Front axle hub
㉑ Washer
㉒ Front wheel adjusting lock cap
㉒ Cotter pin

JFS00008-00008

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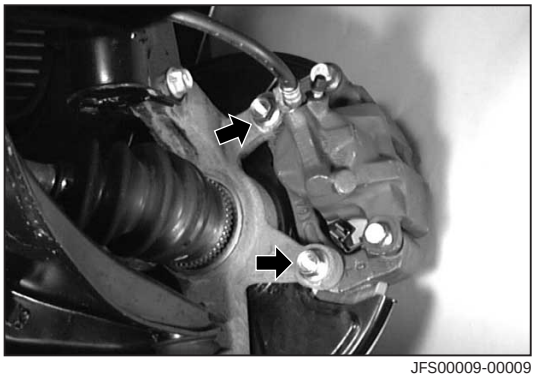
FRONT AXLE

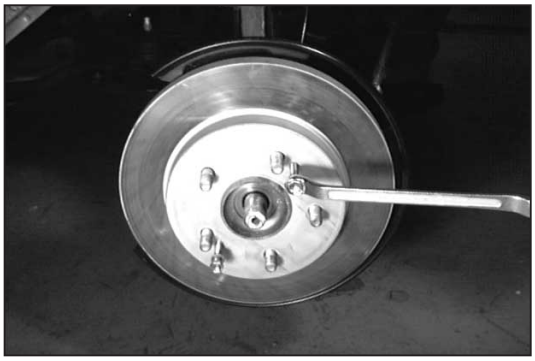
REMOVAL

1. Jack up the vehicle and support it with safety stands. (Refer to the GI section.)
2. Remove the front wheels.
3. Remove the attaching bolts of the disc brake assembly.
4. Suspend the disc brake assembly with suitable string.



JFS00009-00009

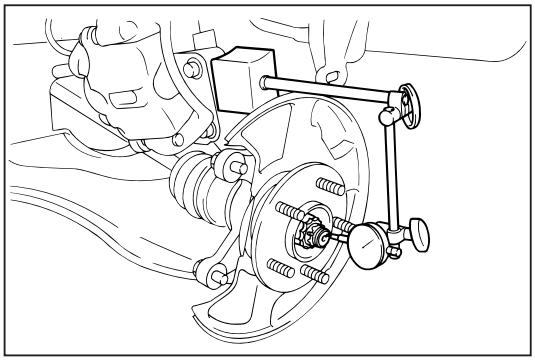
5. Remove the brake disc.
   NOTE:
   - Remove the brake disc by screw-in the two bolts (M8 1.25) evenly to the bolt holes provided on the brake disc, if any difficulty is encountered.



JFS00010-00010

6. Inspection of wheel bearing
   (1) Ensure that no excessive looseness exists between the drive shaft and axle hub.
   (2) Ensure that the free play with in the specified value, using the dial gauge as shown.
   Axial Free Play: Not more than 0.05 mm

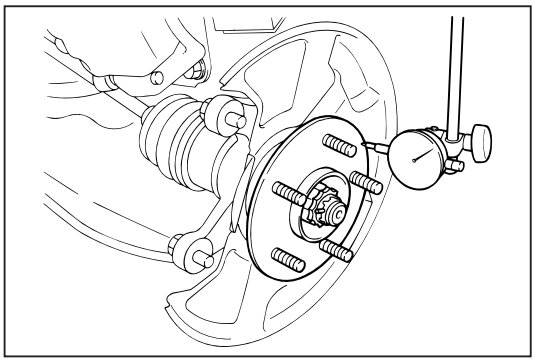
   If the free play is exceeds the allowable limit, replace the wheel bearing.



JFS00011-00011

7. Inspection of axle hub
   Ensure that the axle hub runout is with in specified value, using dial gauge.
   Runout Limit: Not more than 0.05 mm

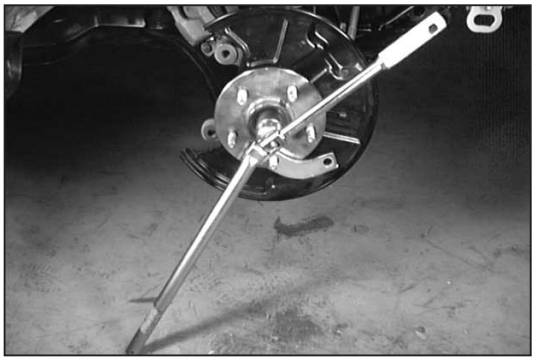
   If the runout exceeds the allowable limit, replace the axle hub.
   NOTE:
   - Measure the runout at a point of the axle hub outer edge.



JFS00012-00012

8. Removal of front axle hub
   (1) Remove the cotter pin, then remove the front wheel adjusting lock cap.
   (2) Remove the nut while preventing the front hub from turning, using the following SST.
   SST: 09511-87202-000

   CAUTION:
   - Prevent the hub bolt from damage by installing the suitable hub nut or the like, when using the SST.



JFS00013-00013

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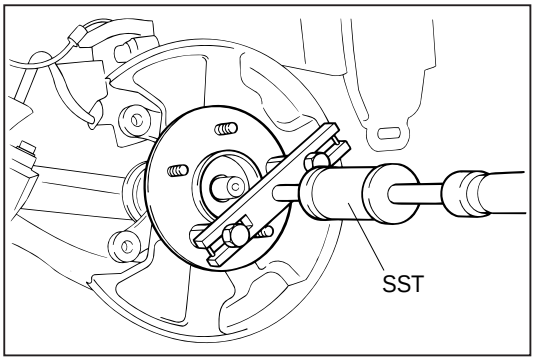
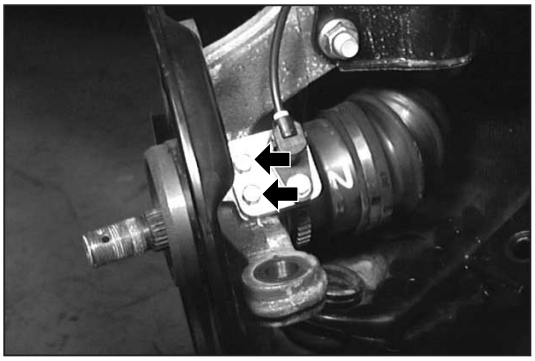
(3) Pull out the front axle hub sub-assembly with inner bearing race, using the following SST.
SST: 09520-00031-000

CAUTION:
- Never reuse the removed bearing.



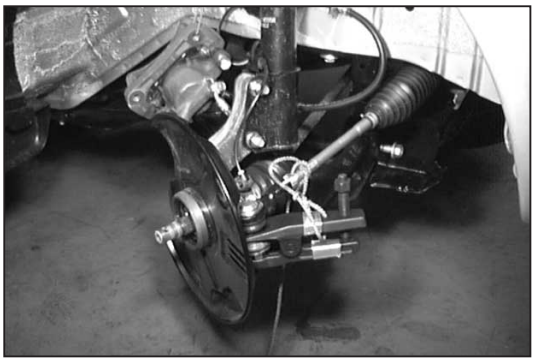
JFS00014-00014

9. Remove the sensor mounting bracket with the skid control sensor from the steering knuckle by removing the attaching bolts.
(Only for vehicles equipped with ABS.)


JFS00015-00015

10. Removal of steering knuckle
(1) Disconnection of tie-rod end from steering knuckle
① Remove the clip.
② Loosen the castle nut until the upper end of the castle nut becomes flash with the end of the threaded section of the lower ball joint.
③ Disconnect the tie-rod end from the steering knuckle, using the following SST.
SST: 09611-87701-000

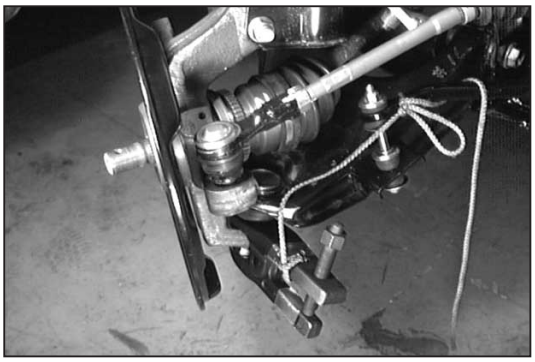
④ Disconnect the tie-rod end from the steering knuckle by removing the castle nut.


JFS00016-00016

CAUTION:
- Never make damage on the threaded section of ball joint during the disconnection using the SST.

(2) Disconnection of suspension lower arm from steering knuckle
① Remove the clip.
② Loosen the castle nut until the upper end of the castle nut becomes flash with the end of the threaded section of the lower ball joint.
③ Disconnect the suspension lower arm from the steering knuckle, using the following SST.
SST: 09611-87701-000

④ Disconnect the suspension lower arm from the steering knuckle by removing the castle nut.


JFS00017-00017

CAUTION:
- Never make damage on the threaded section of ball joint during the disconnection using the SST.

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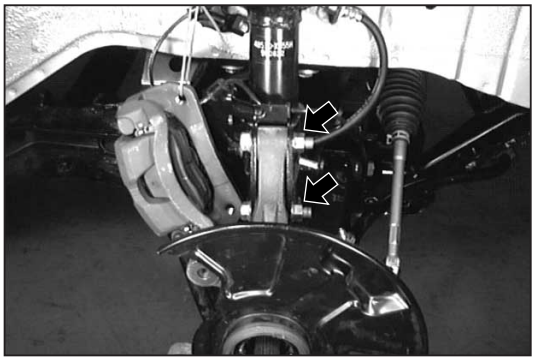
(3) Disconnection of shock absorber from steering knuckle
① Remove the attaching nuts of the steering knuckle to shock absorber.

NOTE:
- Never reuse the removed bolt and nut.

② Disconnect the front shock absorber from the steering knuckle.


JFS00018-00018

DISASSEMBLY

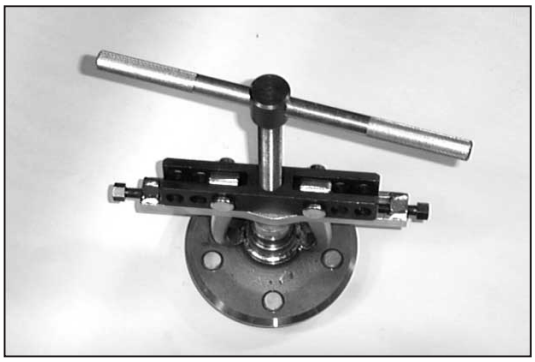
Front axle hub

1. Wrench out the bearing dust cover from the front axle hub, using screwdriver or the like.

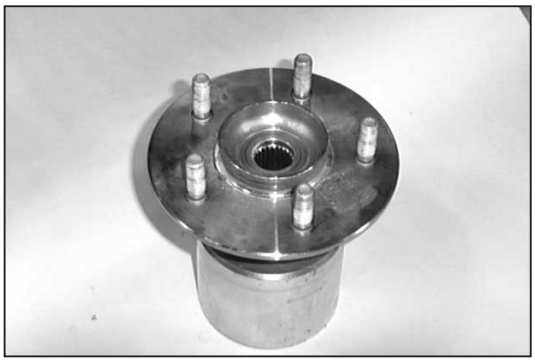
JFS00019-00019

2. Remove the inner bearing race (outer side) from the front axle hub, using the following SST.
   SST: 09950-20017-000

   CAUTION:
   - Never reuse the removed bearing.

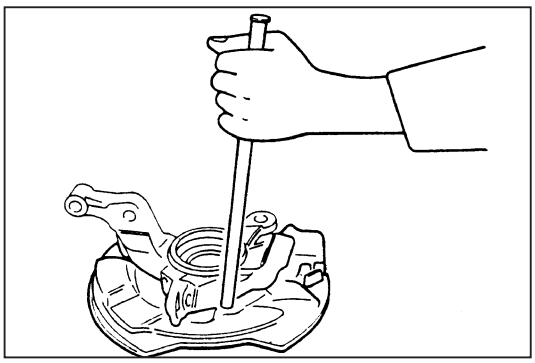

JFS00020-00020

3. Drive out the hub bolts from the front axle hub, using a plastic hammer or the like.


JFS00021-00021

Steering knuckle

1. Remove the disc brake dust cover, using a suitable brass bar or the like in combination with suitable hammer.
   NOTE:
   - Never remove the disc brake dust cover unless its replacement is required.


JFS00022-00022

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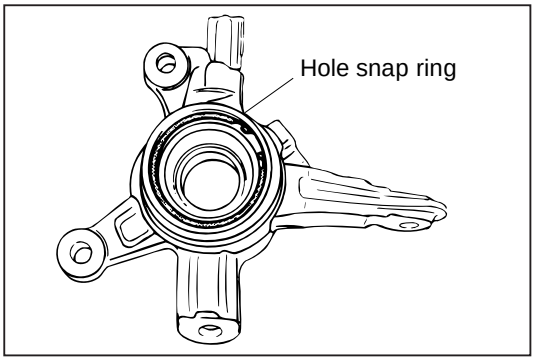
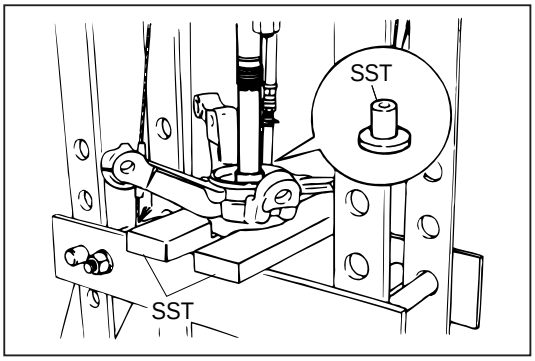
2. Removal of front axle bearing.
   (1) Detach the hole snap ring, using snap ring pliers.



JFS00023-00023

   (2) Remove the bearing from the steering knuckle, using a following SST in combination with the hydraulic press.
   SSTs: 09544-10010-000
   09252-10010-000 (Use the 09550-10012-000 that is a part of the set.) 09506-87302-000



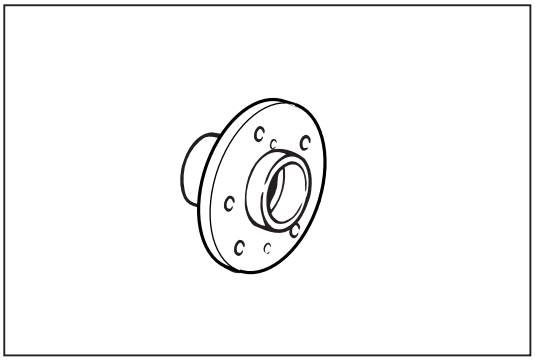
JFS00024-00024

CAUTION:
- Never reuse the removed bearing.

INSPECTION

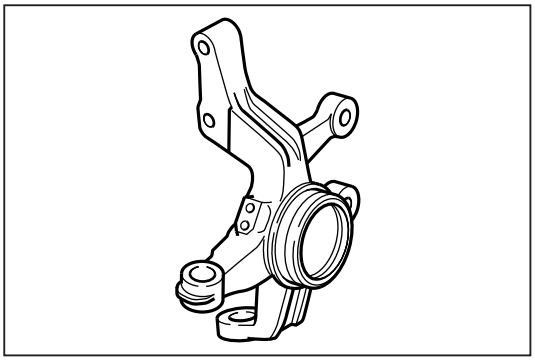
Front axle hub

Visually check front axle hub for crack, deformation or excessive wear.
Ensure that no damage is exits on the serration section of the front axle hub.
If any damage is exists replace the front axle hub with new one.


JFS00025-00025

Steering knuckle

Visually check steering knuckle for crack, deformation or any other damages.
Ensure that no damage exists on the bearing attaching section.
If any damage is exists replace the steering knuckle with new one.


JFS00026-00026

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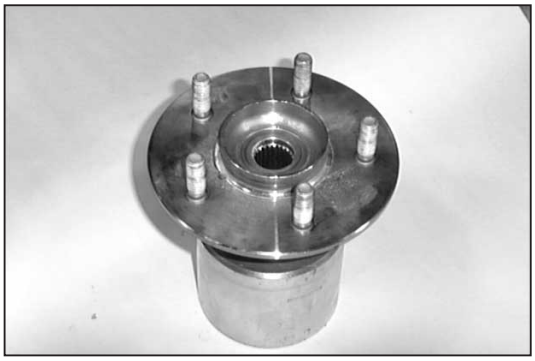
ASSEMBLY

Front axle hub

Install the hub bolt to the front axle hub by tapping it with suitable hammer.

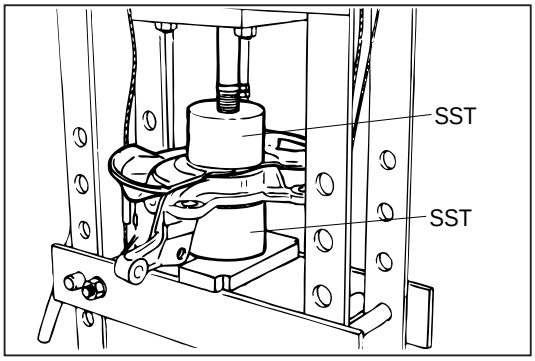


JFS00027-00027

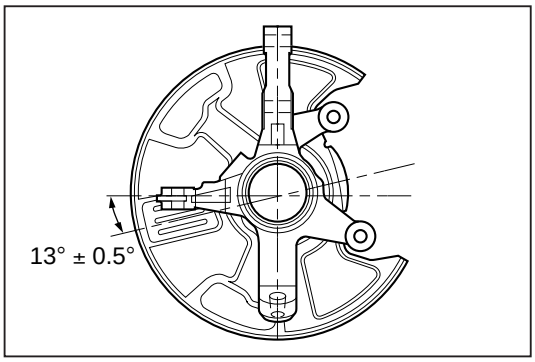
Steering knuckle

1. Installation of disc brake dust cover
   Press the disc brake dust cover until it comes in contact with the steering knuckle, using the following SSTs in combination with the hydraulic press.
   SSTs: 09506-87302-000
   09718-87702-000

   CAUTION:
   - Ensure that the disc brake dust cover is press-fitted to the steering knuckle positively by ensuring the dust cover properly contacts with the steering knuckle.
   - Be sure to assemble the brake dust cover to steering knuckle in such position, as indicated in the figure.



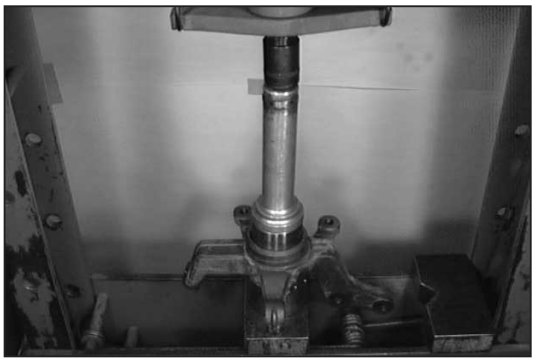
JFS00028-00028



JFS00029-00029

2. Installation of front axle bearing
   (1) Press a new bearing into the steering knuckle, using the following SSTs in combination with hydraulic press.
   SSTs: 09310-87302-000
   09506-87302-000

   (2) Install a new hole snap ring, using snap ring pliers.
   CAUTION:
   - Never reuse the used snap ring.



JFS00030-00030

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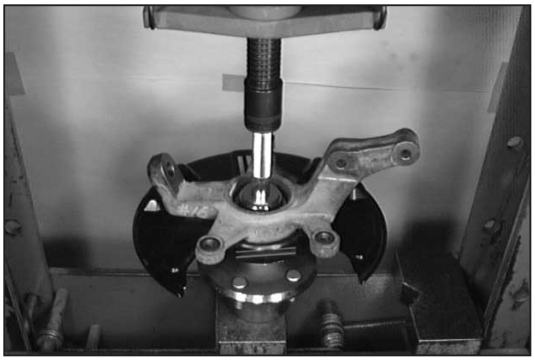
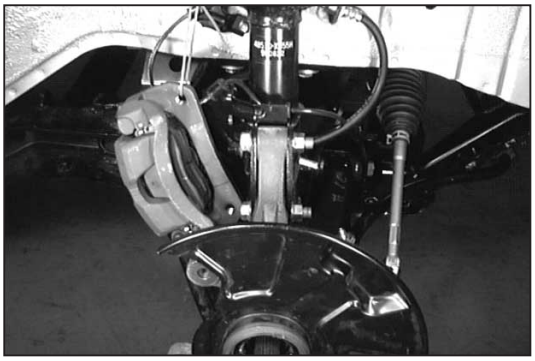
INSTALLATION

1. Press the front axle hub into the steering knuckle sub-assembly using the following SST in combination with hydraulic press.
   SST: 09559-10010-000, 09252-10010-000 (Use the 09550-10012-000 that is a part of the set.)

   NOTE:
   • Press in the steering knuckle into the axle hub after the axle hub placed on the SST 09506-87302-000.


JFS00031-00031

2. Install the steering knuckle after insert the drive shaft to the steering knuckle as follows.
   (1) Connection of shock absorber to steering knuckle
      ① Connect the steering knuckle on the shock absorber lower bracket.
      ② Install the new bolts and nuts, then tighten the bolts and nuts to specified tightening torque.
      Tightening Torque: 101.9 - 152.9 N·m (10.4 - 15.6 kgf-m)


JFS00032-00032

   CAUTION:
   • Be sure to tighten the attaching nuts when tightening.

   (2) Connection of tie-rod end to steering knuckle
      ① Connect the tie-rod end to the steering knuckle with the castle nut. Then, tighten the castle nut to specified tightening torque.
      Tightening Torque: 39.2 - 53.9 N·m (4.0 - 5.5 kgf-m)

JFS00033-00033

      ② Install the clip to the castle nut.

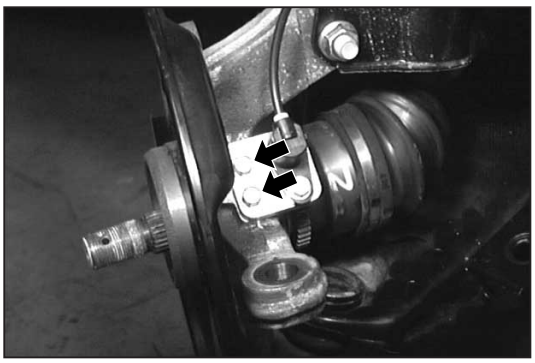
   CAUTION:
   • Never adhere a grease or oil, etc. to the taper section of the lower ball joint.
   • Never make any damage on the dust cover of the ball joint.

   (3) Connection of suspension lower arm to steering knuckle
      ① Connect the suspension lower arm to the steering knuckle with the castle nut. Then, tighten the castle nut to specified tightening torque.
      Tightening Torque: 44.1 - 58.8 N·m (4.5 - 6.0 kgf-m)

JFS00034-00034

      ② Install the clip to the castle nut.

   CAUTION:
   • Never adhere a grease or oil, etc. to the taper section of the lower ball joint.
   • Never made any damage on the dust cover of the ball joint.


JFS00035-00035

3. Install the sensor mounting bracket with the skid control sensor to the steering knuckle.
   Tightening Torque: 6.9 - 9.8 N·m (0.7 - 1.0 kgf-m)

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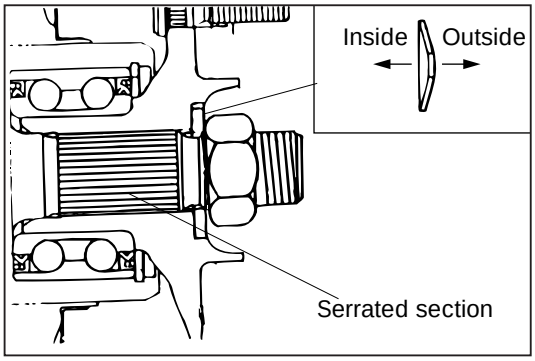
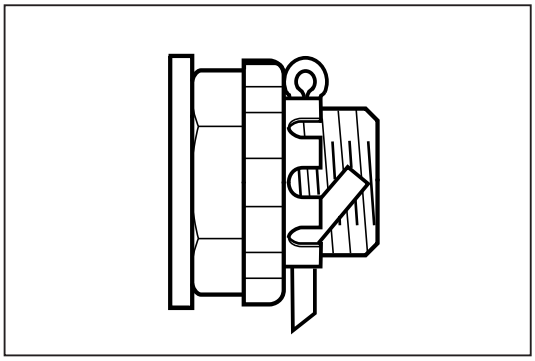
4. Tightening of drive shaft end nut
   (1) Install the conical washer to the drive shaft.
   (2) Install the nut and tighten the nut to specified tightening torque while prevent the front axle hub from turning, using the following SST.
   SST: 09511-87202-200
   Tightening Torque: 196.6 ± 29.4 N·m
   (20.0 ± 3.0 kgf-m)

   CAUTION:
   • Be sure to install the conical washer in the correct direction.

   (3) Install the front wheel adjusting lock cap to the nut.
   (4) Install a new cotter pin.
   CAUTION:
   • Bend the legs of the cotter pin, as indicated in the figure.
   • When bending the cotter pin, make sure that the cotter pin is not protruding from the head of the bolt.

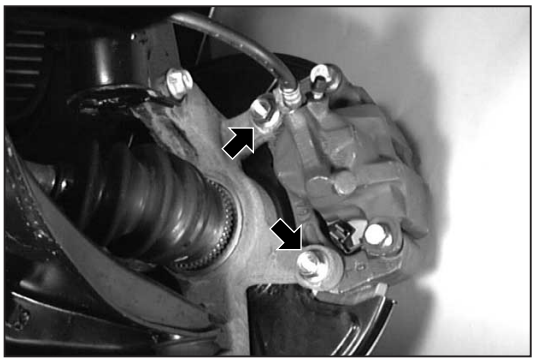


JFS00036-00036


JFS00037-00037

5. Install the brake disc to the front axle hub.
6. Install the disc brake assembly to the steering knuckle.
   Tightening Torque: 90.2 - 135.3 N·m
   (9.2 - 13.8 kgf-m)

7. Install the wheel with hub nuts and tighten the hub nut fully by hand.
8. Jack down the vehicle.
9. Tighten the hub nut to specified tightening torque.
   Tightening Torque: 88.2 - 117.6 N·m
   (9.0 - 12.0 kgf-m)


JFS00038-00038

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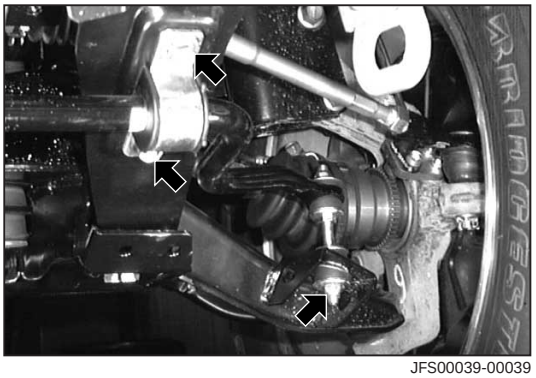
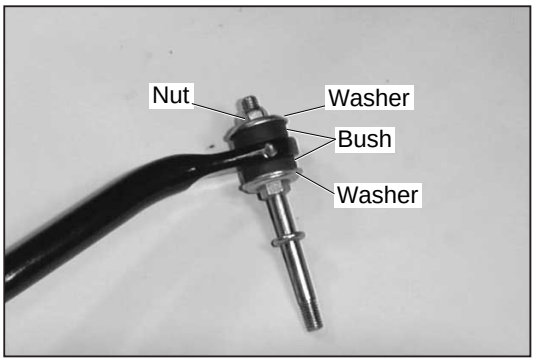
FRONT STABILIZER BAR

REMOVAL


JFS00039-00039

1. Jack up the vehicle and support it with safety stands. (Refer to the GI section.)
2. Remove the stabilizer bar end lower nut.
   CAUTION:
   - Never reuse the removed nut.
3. Remove the bush and washer.
4. Remove the stabilizer bracket from the stabilizer bracket sub-assembly.
5. Remove the stabilizer bar.

DISASSEMBLY



JFS00040-00040

1. Remove the stabilizer bar end upper nut.
   CAUTION:
   - Never reuse the removed nut.
2. Remove the bush, washer and stabilizer link rod from the stabilizer bar.

INSPECTION

Bush

Ensure that no damage such as crack, wear, deterioration, aging and/or so forth.

Stabilizer bar

Visually inspect that no damage or wear is exists on the stabilizer bracket.

Stabilizer bracket

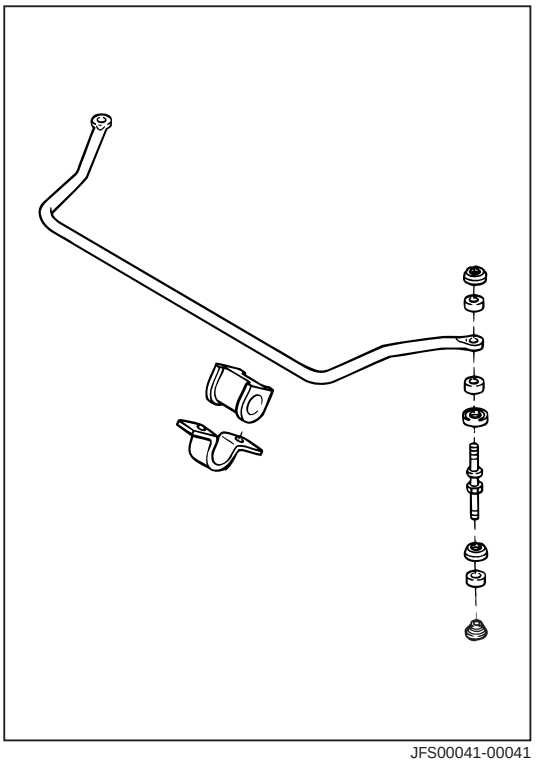
Visually inspect that no damage or wear is exists on the stabilizer bracket.

Stabilizer bush

Ensure that no damage such as crack, wear, deterioration, aging and/or so forth.

Stabilizer link rod

Ensure that the no wear, bent, damage on threaded section.
If any damage is exists replace the damaged part as required.


JFS00041-00041

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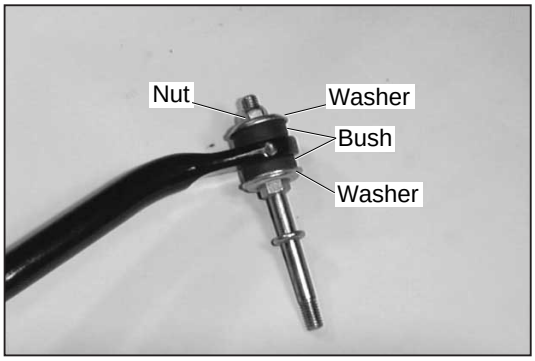
ASSEMBLY

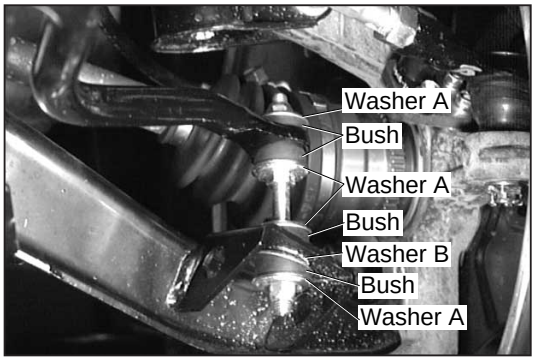
1. Install the washer and bush to the stabilizer link rod.
2. Install the stabilizer link rod to the stabilizer bar.
3. Install the bush and washer to the stabilizer link rod. Then, tighten the stabilizer bar end upper nut.
   CAUTION:
   - Be sure to assemble the bush and washer as shown in the right figure.



JFS00042-00042

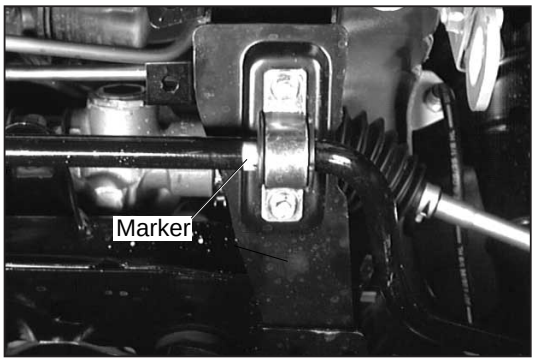
INSTALLATION

1. Install the stabilizer link rod, washer and bush to the suspension lower arm with the attaching nuts as shown in the right figure. Then, tighten the stabilizer bar end lower nut temporary.
   CAUTION:
   - Be sure to insert the protrusion section on the washer B to the hole provided on the stabilizer bracket on the suspension lower arm.



JFS00043-00043

2. Attach the bushes to the stabilizer bar.
   CAUTION:
   - Be sure to attach the bushes to the stabilizer bar in such manner that the bushes should be attached on the mark provided on the stabilizer bar during installation.

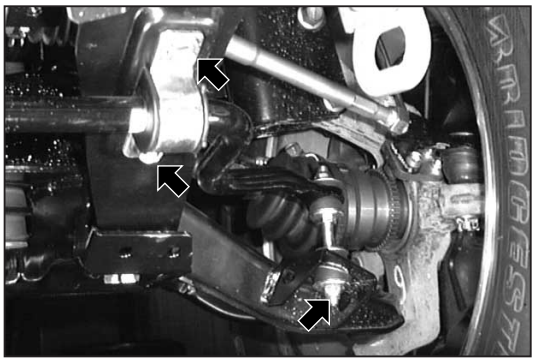


JFS00044-00044

3. Install the stabilizer bar to the stabilizer bracket sub-assembly by installing the stabilizer bracket with the attaching bolts. Then, tighten the attaching bolts to specified tightening torque.
   Tightening Torque: 12.7 - 23.5 N·m (1.3 - 2.4 kgf-m)

4. Tighten the stabilizer bar end lower nut.
   Tightening Torque: 12.7 - 23.5 N·m (1.3 - 2.4 kgf-m)

5. Jack down the vehicle.


JFS00045-00045

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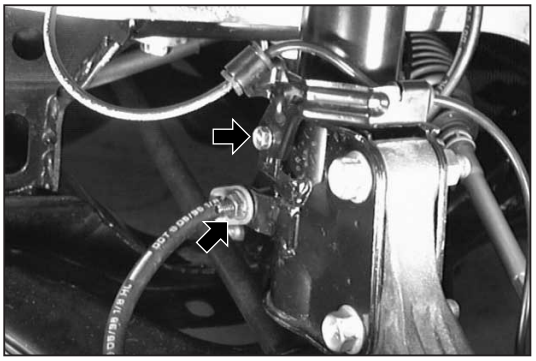
SHOCK ABSORBER AND SPRING

REMOVAL

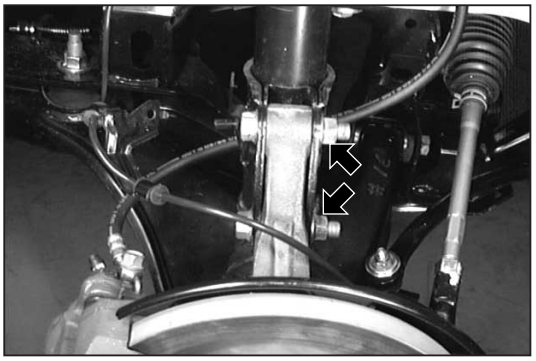
1. Jack up the vehicle and support it with safety stands. (Refer to the GI section.)

2. Remove the front wheels.
3. Remove the brake hose bracket from the shock absorber lower bracket by removing its attaching nut.



JFS00046-00046

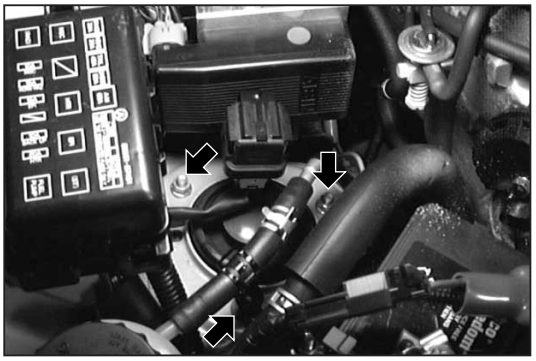
4. Remove the skid control sensor harness bracket from the shock absorber lower bracket by removing its attaching bolt.
   (Only for vehicles equipped with ABS.)
5. Remove the attaching nuts of the shock absorber lower bracket which is connected to the steering knuckle.
   CAUTION:
   - Never reuse the removed nut.



JFS00047-00047

6. Remove the attaching nuts of the suspension support at the front fender apron.
   CAUTION:
   - Never reuse the removed nut.

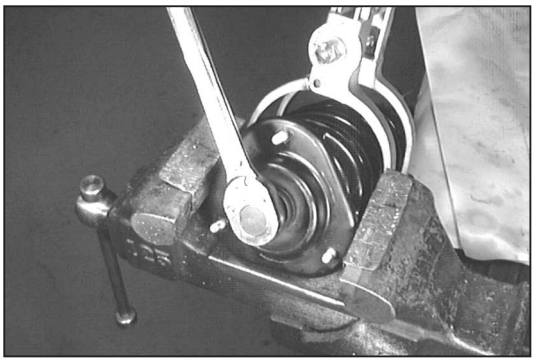
7. Remove the attaching nuts and bolts of the shock absorber lower bracket which is connected to the steering knuckle.
   NOTE:
   - Never reuse the removed nuts.
   - Be sure to prevent the drive shaft boot from the damage, using the suitable piece of cloth or the like.



JFS00048-00048

DISASSEMBLY

1. Compress the coil spring, using the following SST.
   SST: 09727-87701-000 or
   09727-30020-000



JFS00049-00049

2. Secure the front shock absorber in a vice.
3. Remove the bearing dust cover.
4. Remove the nut.
   CAUTION:
   - Never remove the nut by applying impacts to it, using an impact wrench or the like.
   - Never reuse the removed nut.

5. Remove the front suspension support.
6. Remove the bush and front spring upper seat.
7. Remove the coil spring and spring bumper.

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INSPECTION

CAUTION:

- Replace the parts with new one, if any damage or malfunction is found in following inspections.

Suspension support

Visually check that deformation, rust, crack nor other damage are not exists and also check that no damage is exists on the threaded portion of the stud bolts.

Spring upper seat

Ensure that the spring upper seat is free from crack, rupture, deformation aging, wear and other damage.

Bumper

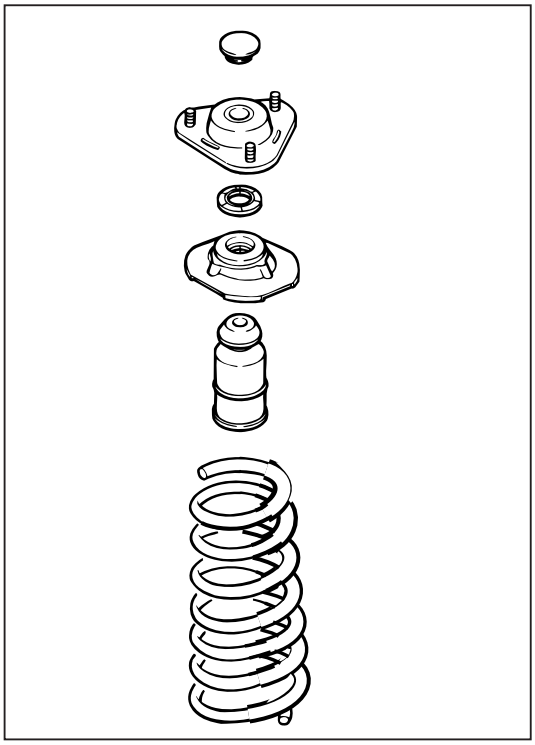
Ensure that the bumper is free from crack, rupture, deformation aging, wear and other damage.

Bearing

Ensure that the bearing is turns freely without any pulling.

Coil spring

Ensure that the coil spring is free from deformation, deterioration, crack or other damage.



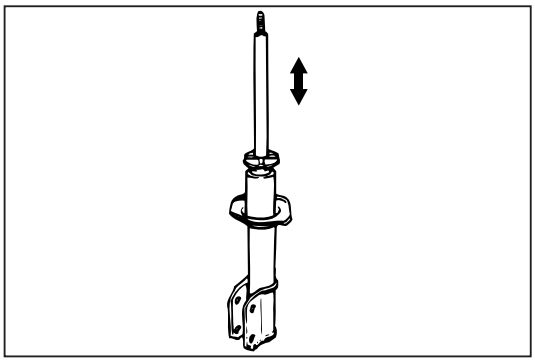
JFS00050-00050

Shock absorber

Ensure that the shock absorber piston operates smoothly without any rattling, shock or abnormal resistance or noise by pulling and pushing the piston rod.

WARNING:

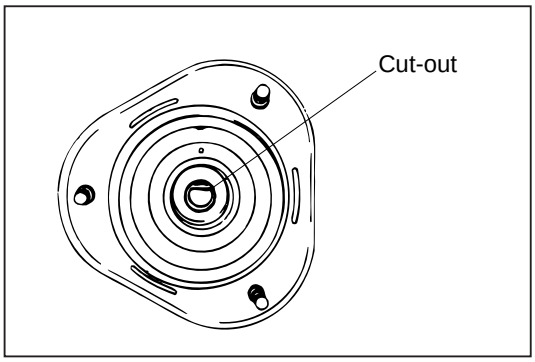
- Release the gas completely before discarding the shock absorber.



JFS00051-00051

ASSEMBLY

1. Insert the spring bumper to the piston rod.
2. Compress the coil spring, using the following SST.
   SST: 09727-87701-000 or
   09727-30020-000
3. Install the coil spring which is compressed with SSTs to the shock absorber.
4. Install the front spring upper seat to the shock absorber piston rod.
5. Install the bearing to the shock absorber piston rod.
6. Install the front suspension support.
   CAUTION:
   - Be sure to align the cut-out section of the front suspension support with the protrusion section of piston rod during the assembly.



JFS00052-00052

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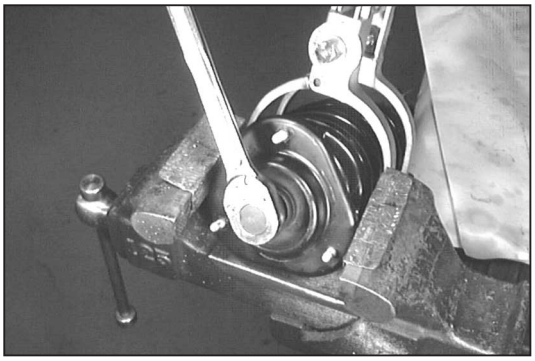
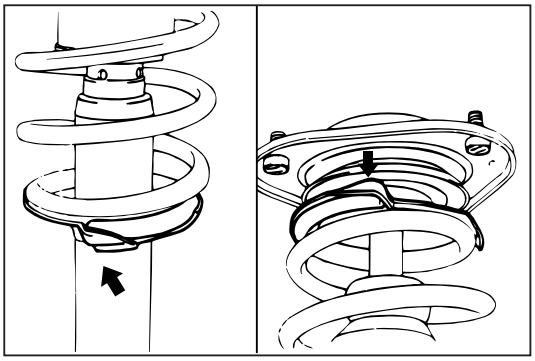
7. Temporarily attach the new piston end nut.
8. Hold the front suspension support in a vice.
   CAUTION:
   - Never apply the excessive force to the suspension support.

9. Tightening the piston end nut to specified tightening torque.
   Tightening Torque: 37.8 - 56.4 N·m
   (3.85 - 5.75 kgf-cm)

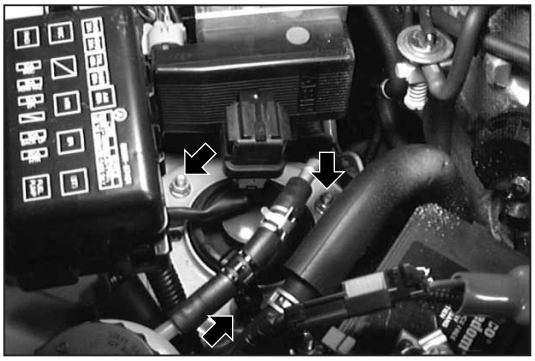

JFS00053-00053

10. Install the bearing dust cover.
11. Remove the SSTs which is compress the coil spring while aligning coil spring end with the recessed section provided on the each of the upper and lower seats.

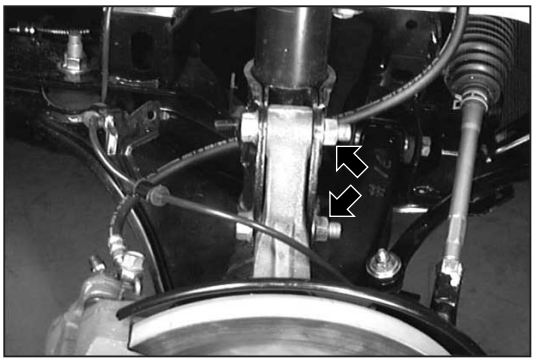

JFS00054-00054

INSTALLATION

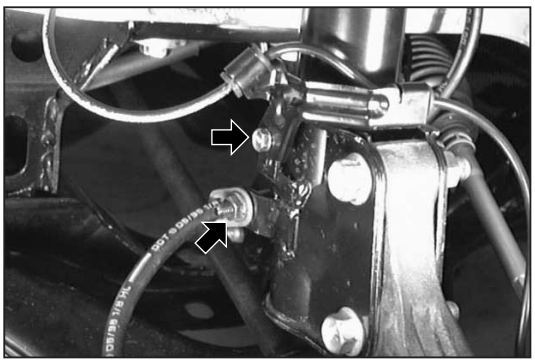
1. Install the suspension support to the fender apron with the new attaching nuts.
2. Tighten the suspension support attaching nuts to specified tightening torque.
   Tightening Torque: 28.4 - 42.2 N·m (2.9 - 4.3 kgf-cm)


JFS00055-00055

3. Connect the shock absorber to the steering knuckle.
   (Refer to the FS–10.)


JFS00056-00056

4. Install the skid control sensor harness bracket to the shock absorber lower bracket.
   (Only for vehicles equipped with ABS.)
5. Install the brake hose bracket to the shock absorber with the attaching bolt.
6. Install the wheel with hub nuts and tighten them fully by hand.
7. Jack down the vehicle.
8. Tighten the hub nut to specified tightening torque. (Refer to the FS–11.)
9. Perform the inspection of the front wheel alignment. (Refer to the “WHEEL ALIGNMENT” section.)


JFS00057-00057

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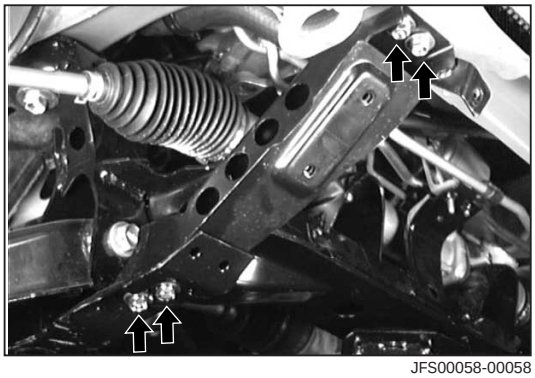
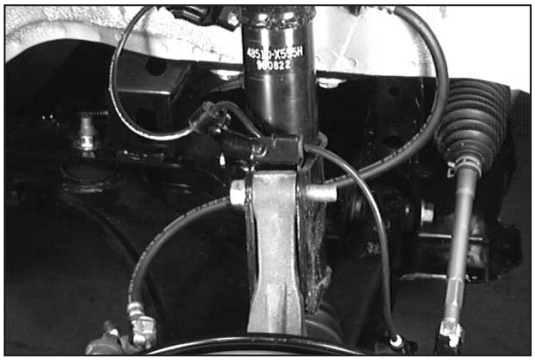
SUSPENSION LOWER ARM

REMOVAL

1. Jack up the vehicle and support it with safety stands. (Refer to the GI section.)
2. Remove the front wheels.
3. Remove the front stabilizer bar. (Refer to the “STABILIZER” section.)
4. Remove the stabilizer bracket sub-assembly from the suspension member.



JFS00058-00058



JFS00059-00059

5. Remove the skid control sensor from the sensor mounting bracket. (Only for vehicles equipped with ABS.)
6. Disconnection of suspension lower arm
   (1) Disconnect the suspension lower arm from the steering knuckle. (Refer to the FS–6.)
   (2) Loosen the attaching nuts of the shock absorber to the suspension lower arm.
   (3) Remove the lower side attaching bolt and nut of shock absorber.

   CAUTION:
   - Never reuse the removed bolts and nuts.

   (4) Remove the attaching bolts and nuts of the suspension lower arm to suspension member.

   CAUTION:
   - Never reuse the removed bolts.

   (5) Remove the suspension lower arm from the suspension member.

INSPECTION

Suspension lower arm

1. Ensure that the ball joint dust cover is free from rupture, crack, aging, deformation and other damages.
2. Ensure that the ball joint is operates smoothly without any rattle.
3. Visually inspect that no damage or wear exists on the suspension lower arm.
   If any damage is exists replace the damaged part with new one.

JFS00060-00060

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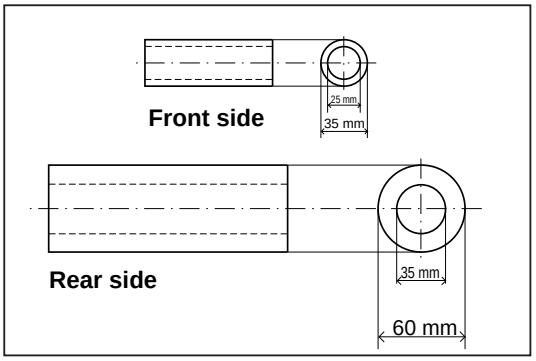
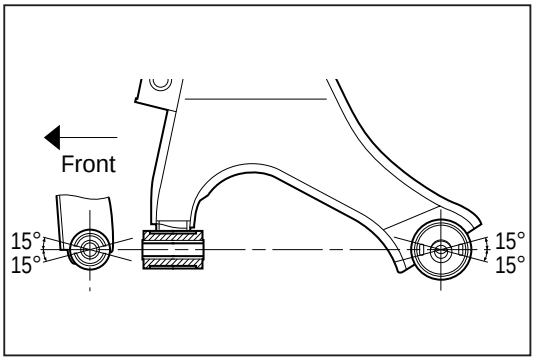
REPLACEMENT OF SUSPENSION LOWER ARM BUSH

1. Remove the bush, using a suitable tool in combination with a hydraulic press.
   NOTE:
   - Use a suitable tool, such as a tool indicated in the figure.

2. Apply the Samper® 115 to a new bush (Only for the front side bush.). Then, press-fit the bush in the suspension lower arm, using a suitable tool in combination with a hydraulic press.
   CAUTION:
   - Never apply the pressure to the inner sleeve of the bush.
   - Be sure to install the front side bush in such positions that the both flange section of the bush properly positioned as shown.
   - Be sure to install the rear bush to suspension lower arm in such positions that the holes provided on the bush align with the position as shown.
   - Be sure to install the rear side bush outer sleeve to suspension lower arm in such positions that the edge of the rear side bush outer sleeve be comes flash with the attaching hole edge of the suspension lower arm.



JFS00061-00061



JFS00062-00062

REPLACEMENT OF SUSPENSION LOWER ARM BALL JOINT DUST COVER

1. Remove the dust cover, using a screwdriver or the like.
   NOTE:
   - Never remove the dust cover, unless its replacement is required due to the damage or deterioration.

JFS00063-00063

2. Pack the specified amount of multi purpose grease to inside of the dust cover.
   Amount of Multi Purpose Grease: 4 ± 0.5 cc

3. Install the new dust cover to suspension lower arm by using following SST in combination with a hydraulic press.
   SST: 09618-87301-000

JFS00064-00064

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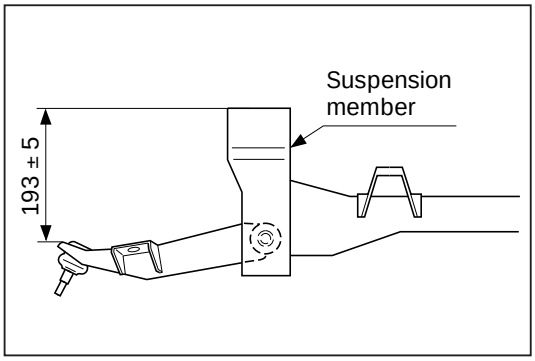
INSTALLATION

1. Install the suspension lower arm to the suspension member with the attaching bolts and nut.
2. Tighten the attaching bolts and nut to specified tightening torque.
   Tightening Torque: 117.6 - 176.4 N·m (12.0 - 18.0 kgf-m)

   CAUTION:
   - Be sure to tighten the bolts and nut while locating the suspension lower arm in position as show.

3. Connect the shock absorber to the steering knuckle. (Refer to the FS–10.)
4. Connect the suspension lower arm and steering knuckle. (Refer to the FS–10.)
5. Install the skid control sensor to the sensor mounting bracket. (Only for vehicles equipped with ABS.)
6. Install the stabilizer bracket sub-assembly to the suspension member. (Refer to the “STABILIZER” section.)
7. Install the stabilizer. (Refer to the “STABILIZER” section.)
8. Install the wheel with hub nuts and tighten the hub nut fully by hand.
9. Jack down the vehicle.
10. Tighten the hub nut to specified tightening torque. (Refer to the FS–11.)
11. Perform the inspection of the front wheel alignment. (Refer to the “WHEEL ALIGNMENT” section.)



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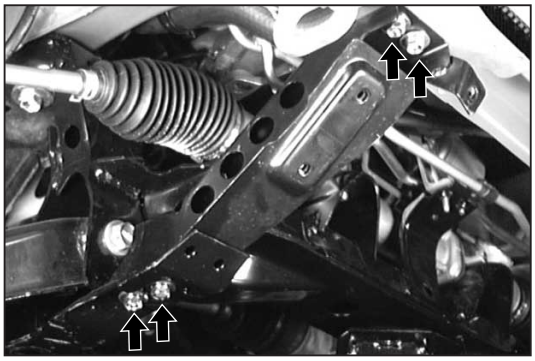
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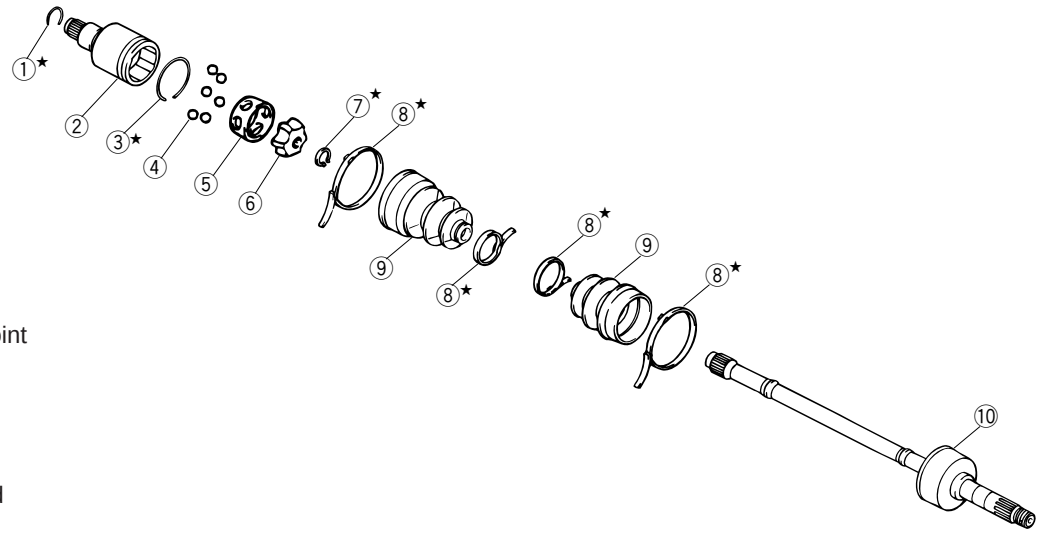
DRIVE SHAFT

COMPONENTS

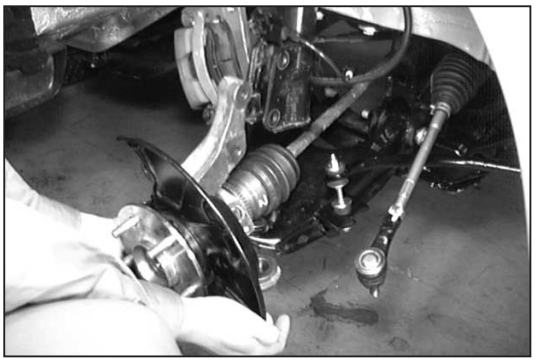


① Snap ring
② Inboard joint
③ Snap ring
④
⑤
⑥
⑦ Snap ring
⑧ Boot band
⑨ Boot
⑩ Outboard joint

JFS00067-00067

REMOVAL

1. Jack up the vehicle and support it with safety stands. (Refer of the GI section.)
2. Remove the front wheels.
3. Drain the transmission oil. (Refer to the MA section.)
4. Remove the disc brake assembly. (Refer to the FS–5.)
5. Remove the brake disc. (Refer to the FS–5.)
6. Remove the skid control sensor from the sensor mounting bracket. (Only for the vehicles equipped with ABS.)
7. Remove the cotter pin.
8. Remove the adjusting lock cap.
9. Remove the drive shaft end nut and washer. (Refer to the FS–5.)
10. Disconnect the tie-rod end from the steering knuckle. (Refer to the FS–6.)
11. Disconnect the suspension lower arm from the steering knuckle. (Refer to the FS–6.)
12. Disconnect the shock absorber from the steering knuckle. (Refer to the FS–7.)
13. Remove the steering knuckle with the front axle hub from the drive shaft.



JFS00068-00068

14. Disconnect the drive shaft from the transfer, using the following SST.
    SST: 09648-87201-000

JFS00069-00069

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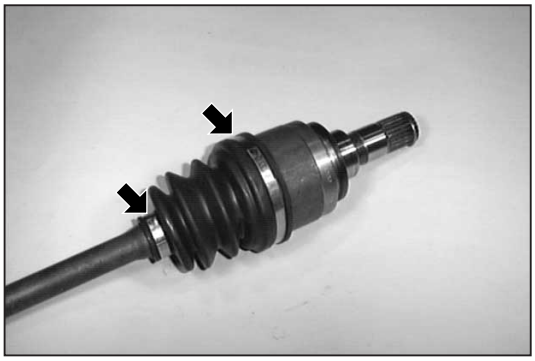
DISASSEMBLY

Inboard joint side

1. Pry up the boot band clip with a screwdriver.
   NOTE:
   - Be very careful not to damage the boot.


JFS00070-00070

2. Remove the snap ring, using a screwdriver or the like.

JFS00071-00071

3. Remove the front axle inboard joint sub-assembly from shaft.
4. Remove the balls.

JFS00072-00072

5. Remove the snap ring, using snap ring pliers.

JFS00073-00073

6. Remove the inner race, using the following SST.
   SST: 09950-20017-000

7. Remove the cage from the shaft.

JFS00074-00074

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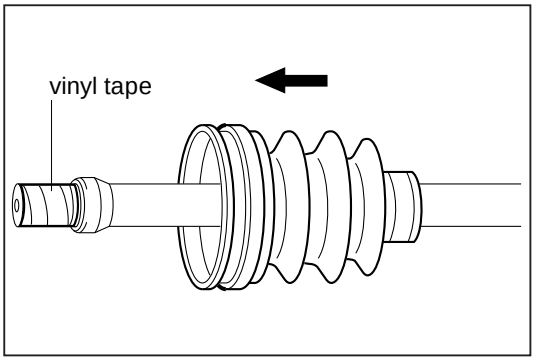
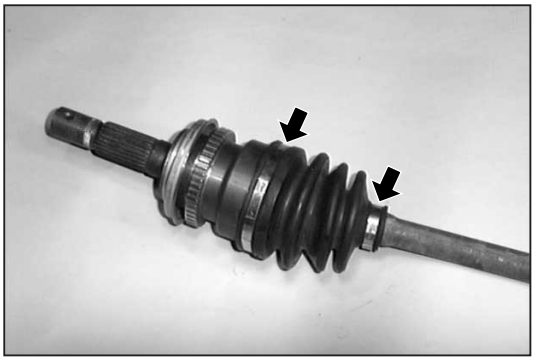
8. Wind vinyl tape to the splined section of the shaft so that the boot may not be damaged during the removal.
9. Remove the boot.



JFS00075-00075

Outboard joint side

1. Pry up the boot band clip with a screwdriver.
2. Remove the boot.
   NOTE:
   - Outboard joint is non-disassembling parts.
   - Be very careful not to damage the boot.


JFS00076-00076

INSPECTION

Ball sub-assembly

Visually check that no damage such as crack excessive wear or any other damage.

Shaft and outboard joint

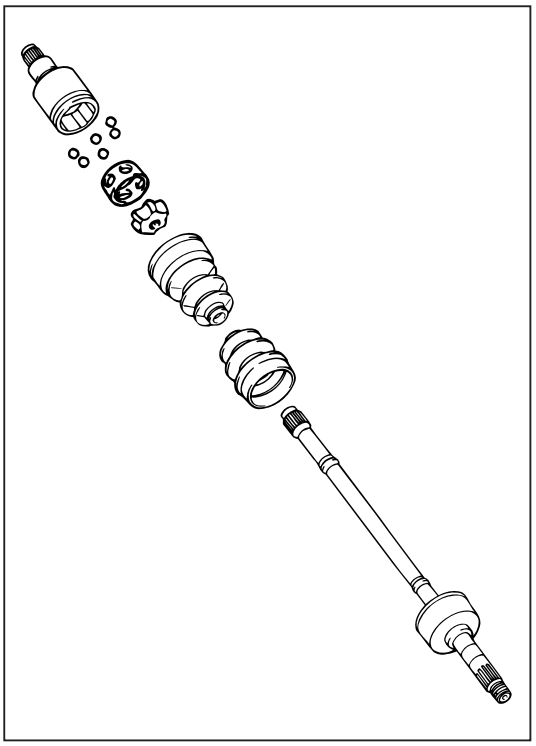
Ensure that the outboard joint operates smoothly with out any rattle or pulling.

Inboard joint

Visually check that no damage such as crack excessive wear or any other damage.

Boot

Ensure that the boot is free from damage such as crack, deterioration, aging or any other damage.
If any damage is exists replace the damaged part with new one.


JFS00077-00077

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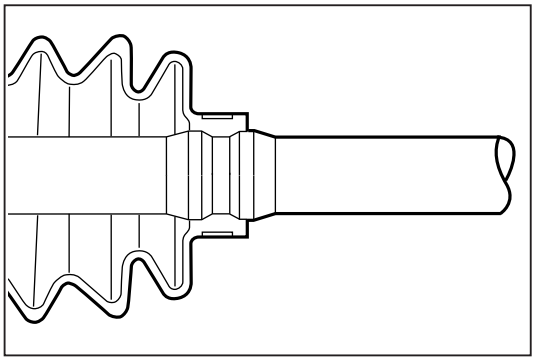
ASSEMBLY

Outboard joint side

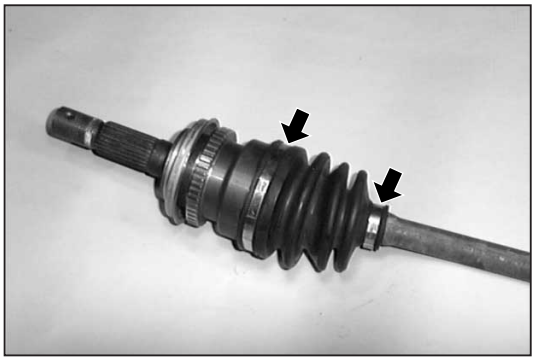
1. Wind vinyl tape to the spline section of the inboard joint shaft, so that the boot may not be damaged during the installation.
2. Install the boot to outboard joint in position as shown.
3. Install the new boot band (smaller diameter side) on the outboard joint.



JFS00078-00078

4. Pack the specified amount of specified grease into outboard joint.
   Specified Amount of Grease: 65 ± 10 g

   CAUTION:
   - The grease for outboard joint should be use specified grease only which is supplied with the spare parts.



JFS00079-00079

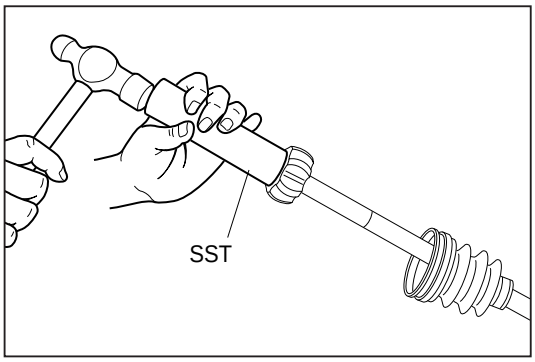
5. Install and tie-up the new boot band (Larger diameter side) in place.

Inboard joint side

1. Temporarily install the boot and boot band (smaller diameter side).
2. Remove the vinyl tape that was wound around the splined portion.
3. Install the cage to the shaft.
   NOTE:
   - The cage should be inserted in the direction indicated in the figure.

JFS00080-00080

4. Install the inner race, using the following SST.
   SST: 09309-87201-000



JFS00081-00081

5. Install the new snap ring to the shaft, using a snap ring pliers.
   CAUTION:
   - Ensure that the snap ring installed in the groove properly after installation.

JFS00082-00082

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6. Assemble the inner race and cage, and install the ball. While holding the ball to prevent it from dropping, assemble the inboard shaft subassembly.

JFS00083-00083

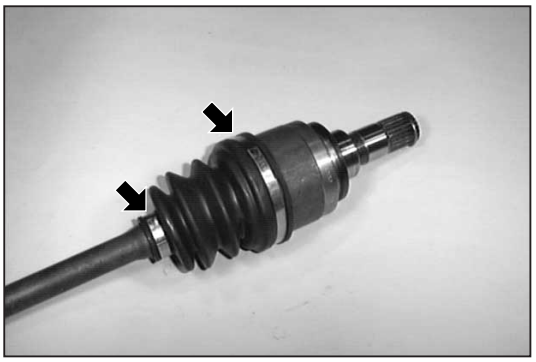
7. Install the snap ring to the inboard joint.
   CAUTION:
   - Ensure that the snap ring installed in the groove properly after installation.

JFS00084-00084

8. Tie-up the smaller side boot band.
   CAUTION:
   - Place the boot in position as shown. (Refer to the FS–23.)

9. Pack the specified amount of grease into inboard joint.
   Specified Amount of Grease: 75 ± 10 g

   CAUTION:
   - The grease for inboard joint should be use specified grease only which is supplied with the spare parts.



JFS00085-00085

10. Install and tie-up the new band (Larger diameter side) in place.

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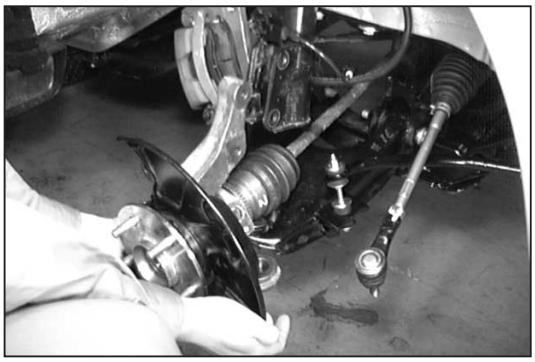
REPLACEMENT OF TRANSFER OIL SEAL

Replace the oil seal, as required. (For the replacement procedure, refer to the TR section.)

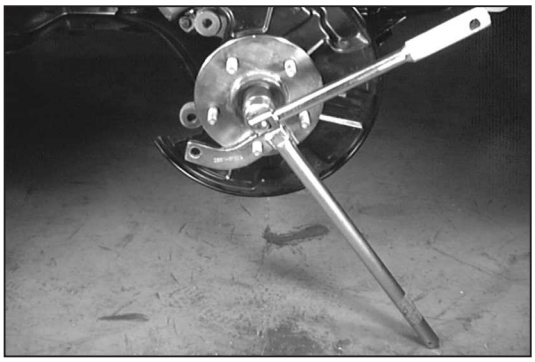
JFS00086-00000

INSTALLATION

1. Apply chassis grease to the whole serrated section of the front drive shaft at the outboard joint side.
2. Connect the inboard joint section of the front drive shaft into the transfer.
   NOTE:
   - Apply lithium soap base multi purpose grease to the lip section of the oil seal.
   - Never made scratch on the oil seal during the installation of the drive shaft.
3. Install the steering knuckle with front axle hub to the drive shaft.
4. Connect the steering knuckle to the shock absorber with attaching bolts and nuts. (Refer to the FS–10.)
5. Connect the suspension lower arm to the steering knuckle. (Refer to the FS–10.)
6. Connect the tie-rod end to the steering knuckle. (Refer to the FS–10.)
7. Install the drive shaft end washer and nut. (Refer to the FS–11.)
8. Install the adjusting lock cap.
9. Install the new cotter pin. (Refer to the FS–11.)
10. Install the skid control sensor to the sensor mounting bracket. (Only for vehicles equipped with ABS.)
11. Install the brake disc to the steering knuckle.
12. Install the disc brake assembly to the steering knuckle. (Refer to the FS–11.)
13. Fill the specified transmission oil to the transfer. (Refer to the TR section.)
14. Install the wheel with hub nuts and tighten the hub nut fully by hand.
15. Jack down the vehicle.
16. Tighten the hub nut to specified tightening torque. (Refer to the FS–11.)
17. Perform the inspection of the front wheel alignment. (Refer to the “WHEEL ALIGNMENT” section.)



JFS00087-00086



JFS00088-00087

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TIGHTENING TORQUE

Components	N·m	kgf-m	
Wheel hub nut	88.2 - 117.6	9.0 - 12.0	
Steering knuckle × Suspension lower arm	44.1 - 58.8	4.5 - 6.0	
Suspension lower arm × Member	117.6 - 176.4	12.0 - 18.0	
Stabilizer link × Suspension lower arm	12.7 - 23.5	1.3 - 2.4	
Shock absorber × Steering knuckle	101.9 - 152.9	10.4 - 15.6	
Stabilizer bracket × Stabilizer bracket sub-assembly	12.7 - 23.5	1.3 - 2.4	
Shock absorber piston end nut	37.8 - 56.4	3.85 - 5.75	
Suspension support × Front fender apron	28.4 - 42.2	2.9 - 4.3	
Stabilizer bracket sub-assembly × Frame	12.7 - 23.5	1.3 - 2.4	
Drive shaft × Front axle hub	196.6 ± 29.4	20.0 ± 3.0	
Tie-rod end lock nut	59.8 - 89.2	6.1 - 9.1	
Tie-rod end × Steering knuckle	39.2 - 53.9	4.0 - 5.5	
Steering knuckle × Speed sensor bracket	6.9 - 9.8	0.7 - 1.0	
Speed sensor bracket × Speed sensor	6.9 - 9.8	0.7 - 1.0	
Steering knuckle × Disc brake assembly	90.2 - 135.3	9.2 - 13.8	

JFS00089-00000

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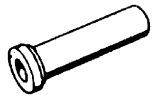
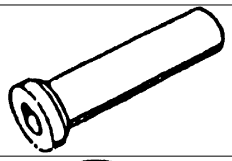
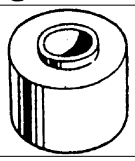
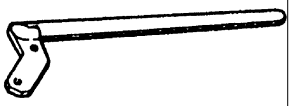
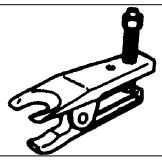
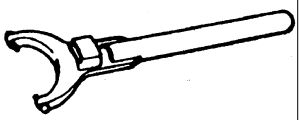
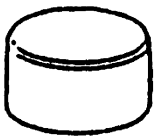
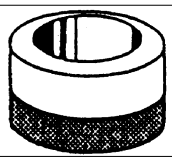
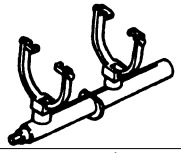
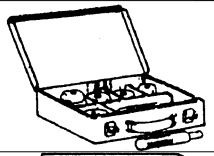
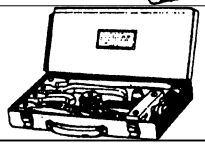
Shape	Part number	Part name	Remarks
	09309-87201-000	Replacer	
	09310-87302-000	Replacer	
	09506-87302-000	Replacer	
	09511-87202-00	Stopper, brake drum	
	09520-00031-000	Puller, axle shaft	
	09611-87701-000	Puller, tie-rod end	
	09648-87201-000	Replacer, drive shaft	
	09718-87702-000	Replacer, front disc	
	09722-87702-000	Attachment, camber	
	09727-87701-000	Compressor, spring	
	09950-10012-000	Tool set, replacer	
	09950-20017-000	Puller, universal	

JFS00000-00088

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DAIHATSU

TERIOS

J100

REAR AXLE & SUSPENSION

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RS

NO. 9710-JE

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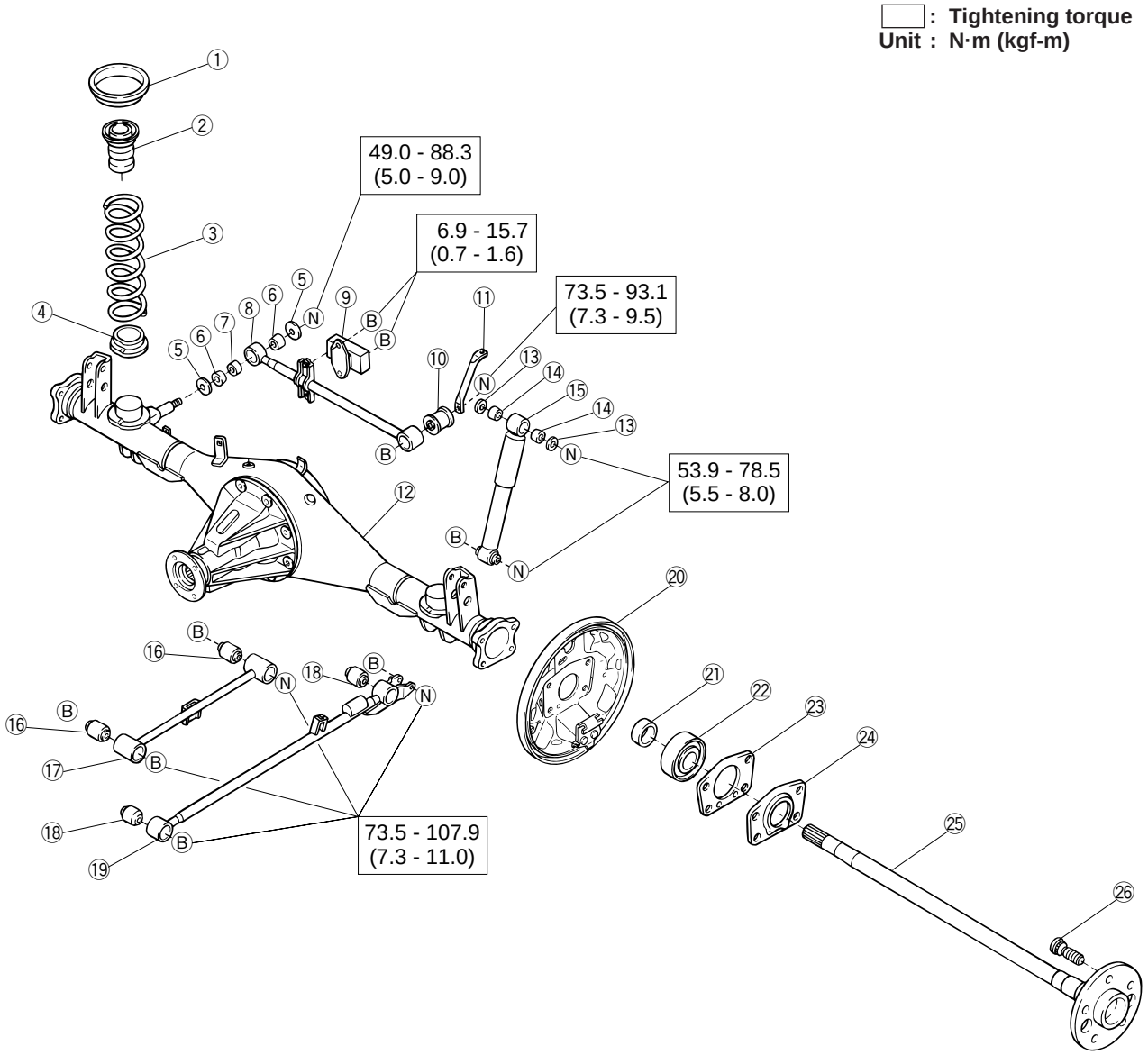
REAR AXLE & SUSPENSION

COMPONENTS



① Upper rear spring seat
② Rear spring bumper
③ Coil spring
④ Under rear spring seat
⑤ Plate
⑥ Bush
⑦ Collar
⑧ Lateral control rod
⑨ Dynamic dumper
⑩ Bush
⑪ Stay
⑫ Rear axle shaft housing
⑬ Plate
⑭ Bush
⑮ Shock absorber
⑯ Bush
⑰ Upper control arm
⑱ Bush
⑲ Lower control arm
⑳ Backing plate
㉑ Rear axle shaft bearing inner retainer
㉒ Rear axle shaft bearing
㉓ Shim
㉔ Rear axle shaft bearing outer retainer
㉕ Rear axle shaft
㉖ Hub bolt

JRS00002-00001

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PRIMARY INSPECTION

Inspection of tire & wheel

1. Check that the wheel exhibits no breakage, cracks, dent, and so forth.
2. Check the tire for wear, breakage and cracks. Also, check that no foreign substance is embedded into the tire.
3. Inspect the air inflation pressure of the tires.
4. Inspect the runout of the tires. (Refer to the FS section.)

Inspection of wheel bearing free play

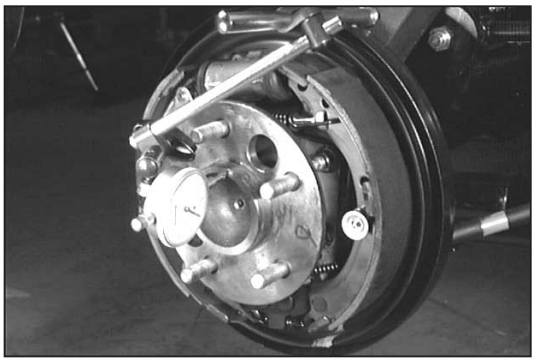
1. Jack up the vehicle and support it with safety stands. (Refer to the GI section.)
2. Remove the rear wheels.
3. Perform the free play measurement at a point of the hub edge with a dial gauge.
4. If the free play exceeds the allowable limit, replace the rear axle bearing.

   Allowable Limit

   Axial Direction: 0.8 mm or less

   Vertically Against Axial Direction: 0.1 mm or less

JRS00003-00000

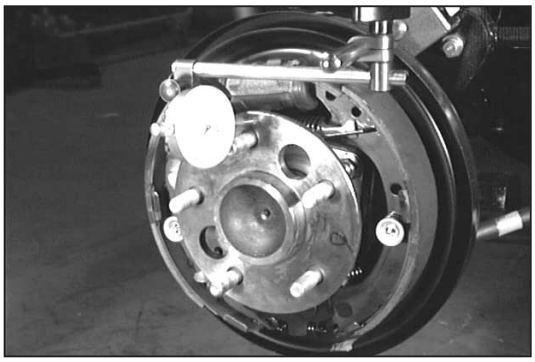


JRS00004-00002

Inspection of rear axle shaft runout

1. Jack up the vehicle and support it with safety stands. (Refer to the GI section.)
2. Remove the rear wheels.
3. Remove the brake drum. (Refer to the BR section.)
4. Perform the runout measurement at a point of the axle hub outer edge.
5. If the runout exceeds the allowable limit, change the rear axle shaft.

   Runout Limit : 0.2 mm



JRS00005-00003

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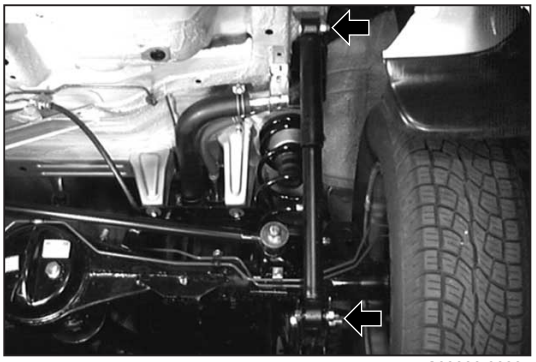
SHOCK ABSORBER

REMOVAL

1. Jack up the vehicle and support it with safety stands. (Refer to the GI section.)
2. Remove the rear wheels.
3. Remove the shock absorber attaching nuts.
   NOTE:
   - At this stage, do not take out the bolt.
4. Lift the rear axle carrier, using a garage jack, so that no tension may be applied to the shock absorber attaching bolt. Under this condition, remove the shock absorber attaching bolt.
5. Remove the plates, bushes and shock absorber from the shock absorber attaching stud bolt.



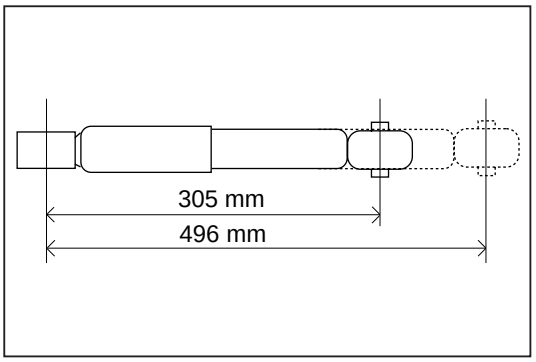
JRS00006-00004

INSPECTION

Shock absorber

Check that the shock absorber exhibits no oil leakage nor major scores by observing its external appearance.
Extend and contract the shock absorber by your hands. During this operation, ensure that the shock absorber moves smoothly and that there is no abnormal resistance or rattle.
Ensure that the maximum and minimum lengths conform to the specified values.

Specified Length: Min: 305 mm
Max: 496 mm



JRS00007-00005

If any damage or malfunction is exists, replace the part with new one.

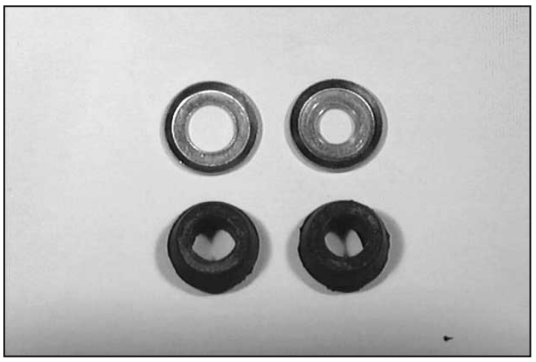
Upper bush and Plate

Bush

Check that the bush exhibits no breakage cracks, deformation, and so forth.

Plate

Check that the plate exhibits no deformation, warpage, and so forth.

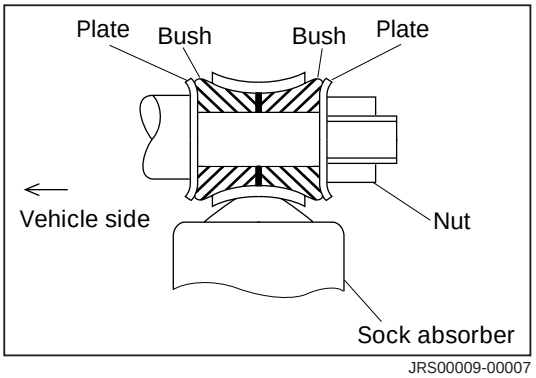


JRS00008-00006

If any damage is exists, replace the part with new one.

INSTALLATION

1. Install the plate and bush to the shock absorber attaching stud bolt.
   CAUTION:
   - Assemble the plate and bush as indicated in the figure.



JRS00009-00007

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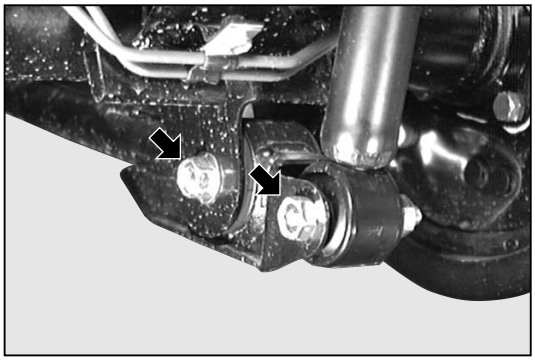
2. Install the shock absorber to the shock absorber attaching stud bolt.
3. Install the bush and plate to the shock absorber attaching stud bolt.
   CAUTION:
   - Assemble the plate and bush, as indicated in the figure in Step 1.

4. Temporarily tighten the shock absorber attaching nut.

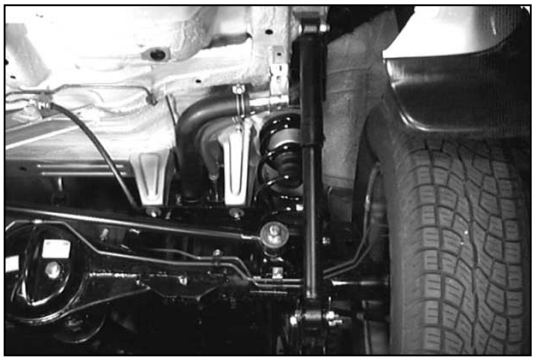
JRS00010-00008

5. Lift the rear axle carrier, using a garage jack, so that the installation section of the shock absorber may be aligned with that of the lower control arm. Under this condition, install and temporarily tighten the shock absorber attaching bolt.
   CAUTION:
   - Make sure that the threaded portions of the bolts face toward the vehicle outside.


JRS00011-00009

6. Install the rear wheels.
   Tightening Torque: 88.2 - 117.6 N·m (9.0 - 12.0 kgf-m)

7. Jack down the vehicle.
8. Rock the vehicle in an up-and-down direction several times so that the suspension may be settled.
9. Tighten the sock absorber attaching bolt and nuts.
   Tightening Torque: 53.9 - 78.5 N·m (5.5 - 8.0 kgf-m)


JRS00012-00010

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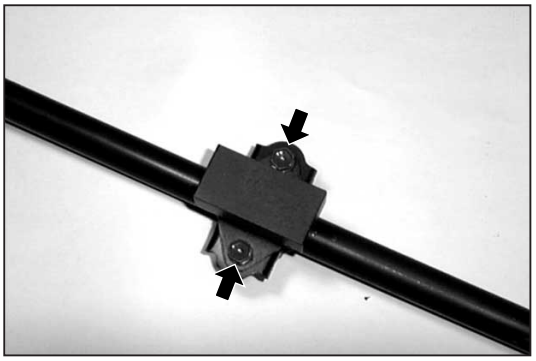
LATERAL CONTROL ROD

REMOVAL

1. Jack up the vehicle and support it with safety stands. (Refer to the GI section.)
2. Remove the lateral control rod.
   CAUTION:
   - Never reuse the removed nuts.

JRS00013-00011

3. Remove the dynamic dumper from the lateral control rod.



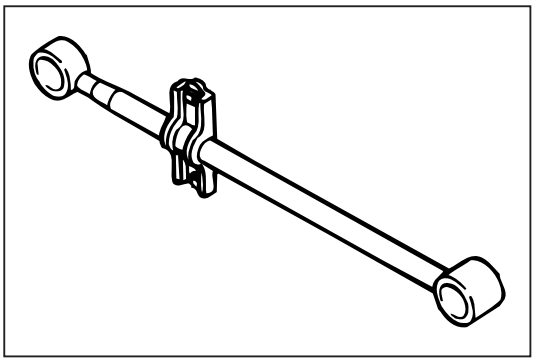
JRS00014-00012

INSPECTION

Lateral control rod

Check that the lateral control rod exhibits no warpage, deformation and major scores.

If any damage is exists, replace the damaged part with new one.
Check that the bush exhibits no cracks, breakage, deformation, and so forth.
Replace any abnormal bush.

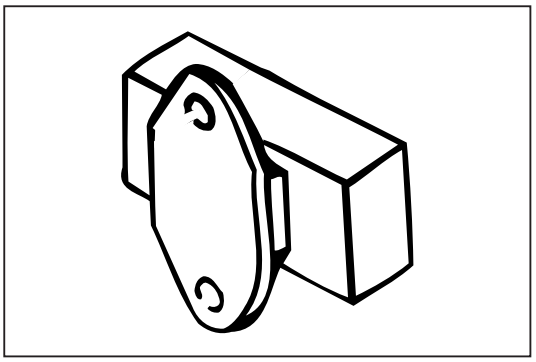


JRS000015-00013

Dynamic dumper

Check that the rubber section exhibits no cracks, deformation, and so forth.

If any damage is exists, replace the damaged part with new one.



JRS00016-00014

Bush, Plate and collar

Bush

Check that the bush exhibits no cracks, deformation, and so forth.

Plate and collar

Check that the bush and collar exhibit no deformation, warpage, and so forth.

If any damage is exists, replace the damaged part with new one.

JRS00017-00015

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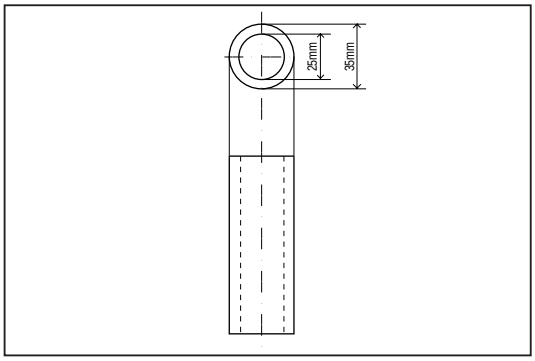
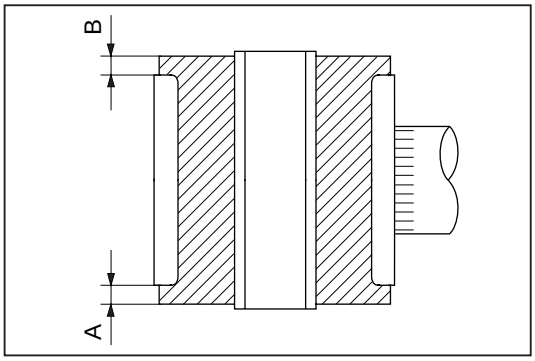
Replacement of lateral control rod bush

1. Remove the bush, using a suitable tool in combination with a hydraulic press.
   NOTE:
   - Use a suitable tool, such as a tool indicated in the figure.



JRS00018-00016

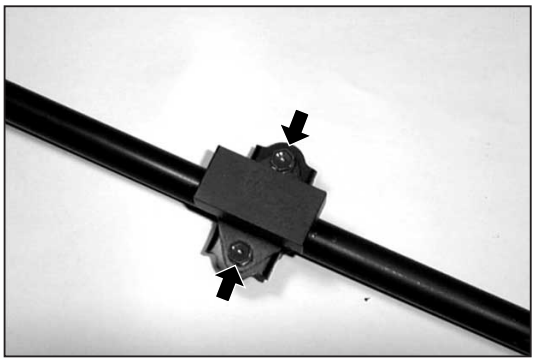
2. Apply the Samper® 107 to a new bush. Then, press-fit the bush in the lateral control rod, using a suitable tool in combination with a hydraulic press.
   CAUTION:
   - Be very careful not to apply pressure to the inner sleeve of the bush. Make sure that the difference in dimensions at the sections A and B is within 1 mm during the press-fitting, as indicated in the figure.



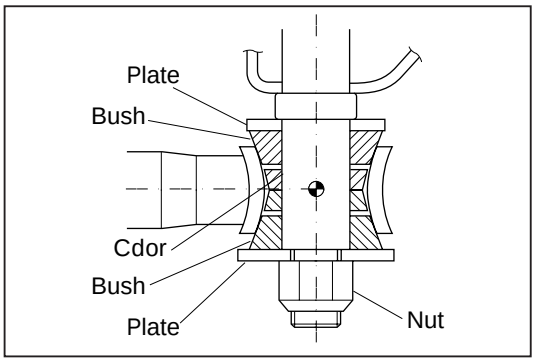
JRS00019-00017

INSTALLATION

1. Install the dynamic dumper to the lateral control rod.
   Tightening Torque: 6.9 - 15.7 N·m (0.7 - 1.6 kgf-m)


JRS00020-00018

2. Install the plate and bush to the lateral control rod attaching stud bolt.
   CAUTION:
   - Assemble the plate and bush, as indicated in the figure.



JRS00021-00019

3. Install the lateral control rod to the lateral control rod attaching stud bolt. (Lower control arm attaching side)
4. Install the collar, bush and washer to the lateral control rod attaching stud bolt. (Lower control arm attaching side.)
   CAUTION:
   - Assemble the collar, bush and plate, as indicated in the figure in Step 2.

5. Temporarily tighten the lateral control rod attaching nut. (Lower control arm attaching side)

JRS00022-00020

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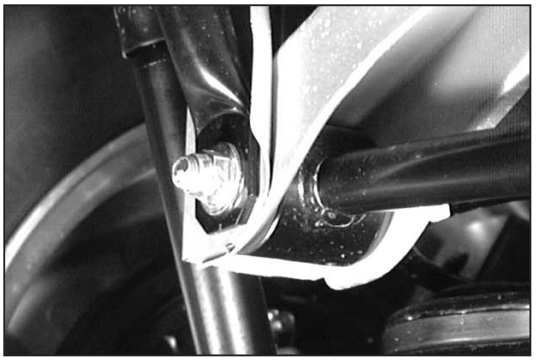
5. Temporarily install the lateral control rod to the reinforcement.
   CAUTION:
   - Make sure that the threaded portions of the bolts face toward the vehicle outside.



JRS00023-00021

6. Jack down the vehicle.
7. Rock the vehicle in an up-and-down direction several times so that the suspension may be settled.
8. Tighten the lateral control rod attaching nuts.
   Tightening Torque:
   Rear axle shaft housing side:
   49.0 - 88.3 N·m (5.0 - 9.0 kgf-m)
   Reinforcement side:
   73.5 - 93.1 N·m (7.5 - 9.5 kgf-m)

JRS00024-00022

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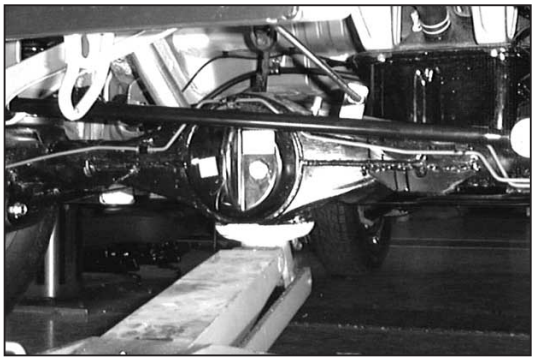
UPPER CONTROL ARM

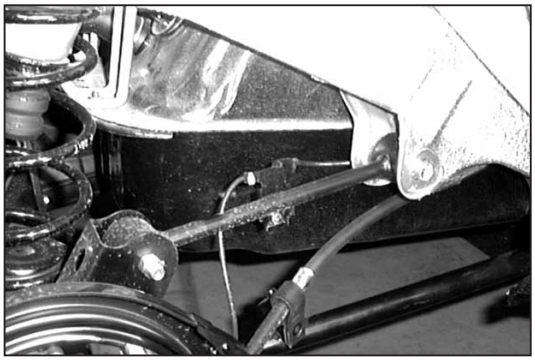
REMOVAL

1. Jack up the vehicle and support it with safety stands. (Refer to the GI section.)
2. Remove the rear wheels.
3. Retain the rear axle shaft housing, using a garage jack, etc.



JRS00025-00023

4. Remove the speed sensor wire from the bracket at the upper control arm. (Only for vehicles equipped with ABS)
5. Remove the upper control arm.



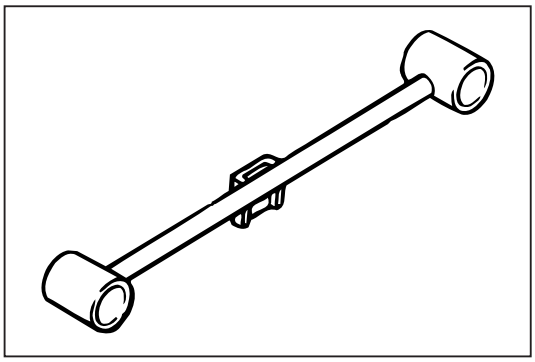
JRS00026-00024

INSPECTION

Upper control arm

Check that the upper control arm exhibits no warpage, deformation and major scores.

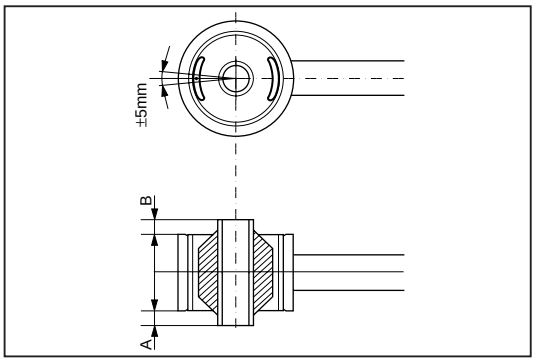
If any damage is exists, replace the damaged part with new one.
Check that the bush exhibits no cracks, breakage, deformation, and so forth.
Replace any abnormal bush.



JRS00027-00025

Replacement of upper control arm bush

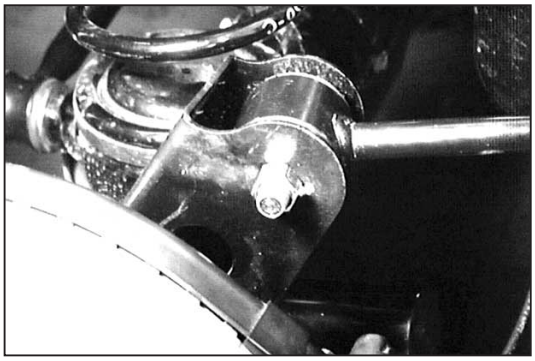
For the replacement procedure for the bush, refer to the procedure for the lateral control rod bush, for the replacement procedure is the same. However, care must be exercised so that the difference in dimensions at the sections A and B of the bush may become within 1 mm. Also, make sure that the slit assumes the position indicated in the figure during the press-fitting.



JRS00028-00026

INSTALLATION

1. Temporarily install the upper control arm.
   CAUTION:
   - With regard to the bolts connecting the upper control and rear axle shaft housing, make sure that the threaded portions of the bolts face toward the vehicle outside.



JRS00029-00027

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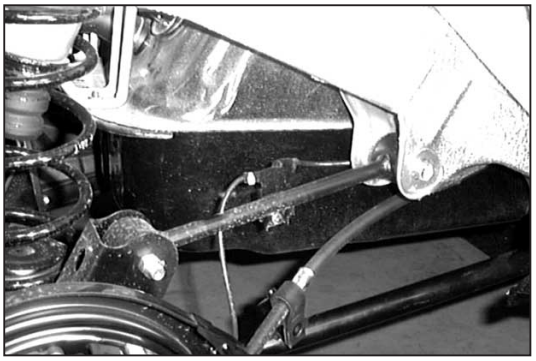
2. Install the rear wheels. (Refer to the RS–5.)
3. Jack down the vehicle.
4. Rock the vehicle in an up-and-down direction several times so that the suspension may be settled.
5. Tighten the upper control arm attaching bolt and nut.
   Tightening Torque:
   73.5 - 107.9 N·m (7.5 - 11.0 kgf-m)



JRS00030-00028

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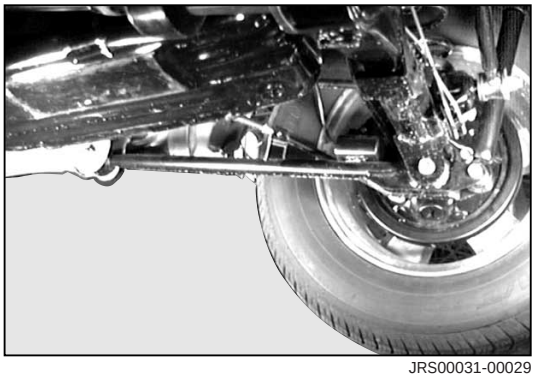
LOWER CONTROL ARM

REMOVAL


JRS00031-00029

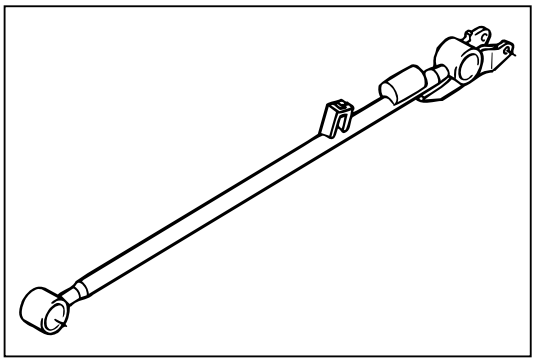
1. Jack up the vehicle and support it with safety stands. (Refer to the GI section.)
2. Remove the rear wheels.
3. Remove the brake cable from the bracket at the lower control arm.
4. Loosen the bolts and nuts at the following sections: Lower control arm × shock absorber, lower control arm × rear axle shaft housing, and lower control arm × body.
5. Lift the rear axle carrier, using a garage jack, so that no tension may be applied to each bolt that has been loosened in Step 4. Then, remove the lower control arm by removing the bolts and nuts.

INSPECTION

Lower control arm

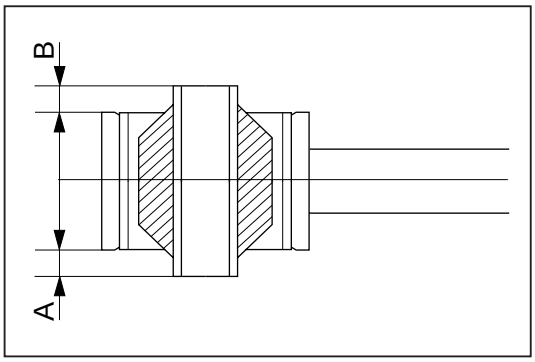
Check that the lower control arm exhibits no warpage, deformation and major scores.

If any damage is exists, replace the damaged part with new one.
Check that the bush exhibits no cracks, breakage, deformation, and so forth.
Replace any abnormal bush.


JRS00032-00030

Replacement of lower control arm bush

For the replacement procedure for the bush, refer to the procedure for the lateral control rod bush, for the replacement procedure is the same.



JRS00033-00031

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INSTALLATION

JRS00034-00032

1. Temporarily install the lower control arm attaching bolts and nuts.
   CAUTION:
   - As regards the bolts connecting the lower control arm to the shock absorber, and the lower control arm to the rear axle shaft housing, make sure that the threaded portions of the bolts face toward the vehicle outside.
2. Install the rear wheels. (Refer to the RS–5.)
3. Jack down the vehicle.
4. Rock the vehicle in an up-and-down direction several times so that the suspension may be settled.
5. Tighten the lower control arm attaching bolts and nuts.
   Tightening Torque:
   lower control arm × shock absorber :
   53.9 - 78.5 N·m (5.5 - 8.0 kgf-m)
   lower control arm × rear axle shaft housing :
   73.5 - 107.9 N·m (7.5 - 11.0 kgf-m)
   lower control arm × body :
   73.5 - 107.9 N·m (7.5 - 11.0 kgf-m)
6. Connect the brake cable to the bracket at the lower control arm.

JRS00035-00000

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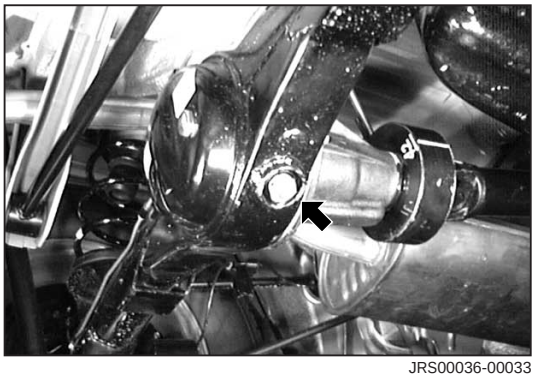
REAR AXLE SHAFT

REMOVAL

1. Jack up the vehicle and support it with safety stands. (Refer to the GI section.)
2. Remove the rear wheels.
3. Drain the rear differential oil. (Refer to the DF section.)

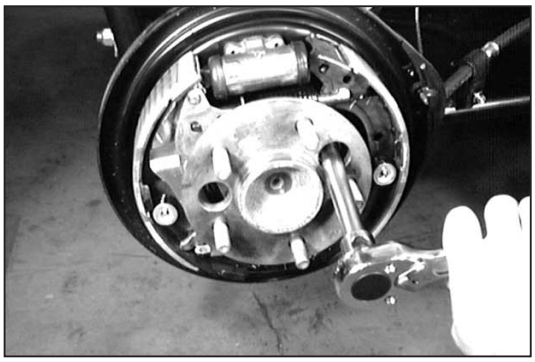


JRS00036-00033

4. Remove the rear brake drum. (Refer to the BR section.)

JRS00037-00034

5. Remove the rear axle shaft bearing outer retainer attaching nuts, using the box wrench through the hole on the rear axle hub.



JRS00038-00035

6. Remove the rear axle shaft assembly, using the following SST.
   SST : 09520-00031-000

   CAUTION:
   - Be very careful not to damage the oil seal of the rear axle shaft housing when removing the rear axle shaft.

7. Remove the shim.
   CAUTION:
   - Never make damage on the shim during removal.

JRS00039-00036

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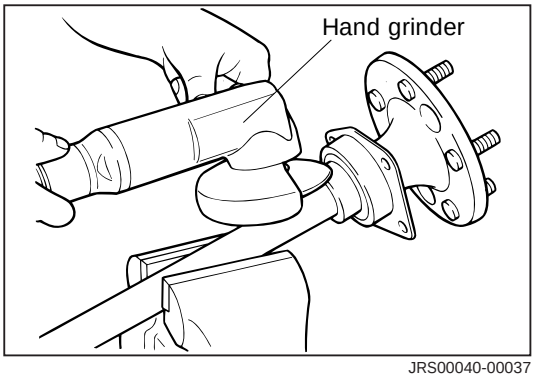
DISASSEMBLY

1. Clamp the rear axle shaft in a vice.
2. Grind off the rear axle shaft bearing inner retainer, using a hand grinder or the like.
   WARNING:
   - Be sure to observe the operation instructions by the hand grinder manufacturer.
   - Be sure to wear goggles during the grinding operation.

   CAUTION:
   - When grinding the retainer with a grinder, if the bearing should be ground inadvertently, most likely the bearing may break off during the vehicle running, (because this bearing is a critical part that sustains fully the vehicle weight.) Also a defective bearing could result in poor sealing. Therefore, be certain to replace the bearing with a new one.
   - Likewise, when the bearing inner race should be ground inadvertently, also be sure to replace it with a new one.



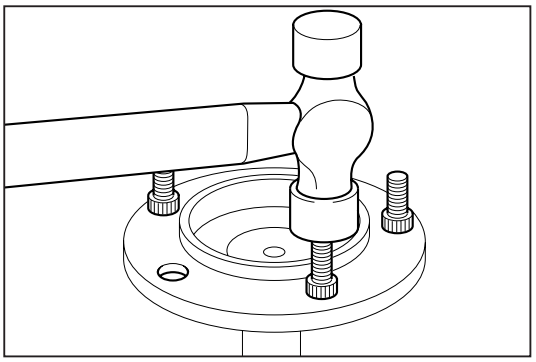
JRS00040-00037

3. Split the retainer with a chisel and a hammer.
   WARNING:
   - Before splitting the retainer with a chisel, be sure to wear protective goggles and gloves.

4. Pull out the rear axle shaft bearing with the rear axle shaft bearing inner retainer.
5. Remove the rear axle shaft outer retainer from the rear axle shaft.

JRS00041-00000

6. Drive out the hub bolts from the rear axle shaft, using a plastic hammer or the like.
   CAUTION:
   - Never reuse the removed hub bolts.


JRS00043-00040

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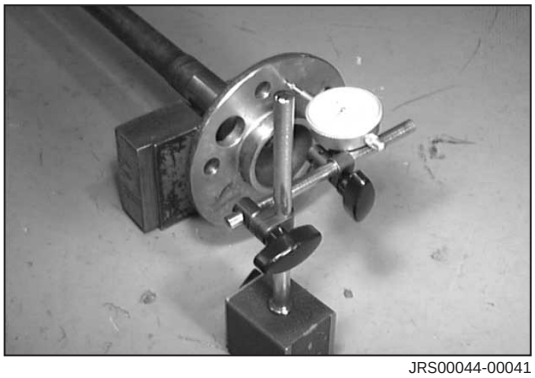
INSPECTION

Rear axle shaft

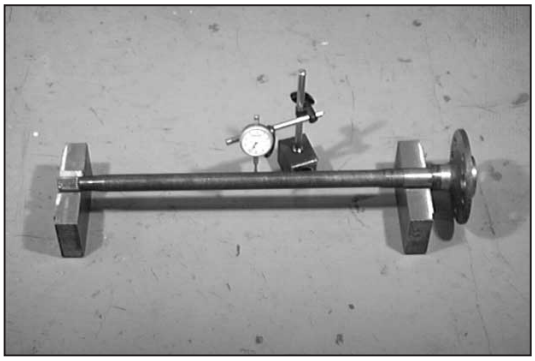
1. Place the rear axle shaft on a V-block.
2. Ensure that the runout at the flange end surface is within the allowable limit.
   Maximum Allowable Limit: 0.2 mm

   NOTE:
   - This maximum allowable runout does not include the runout caused by roughness on the flange surface.
   - If the flange surface exhibits roughness, finish the surface with an abrasive paper or the like.



JRS00044-00041

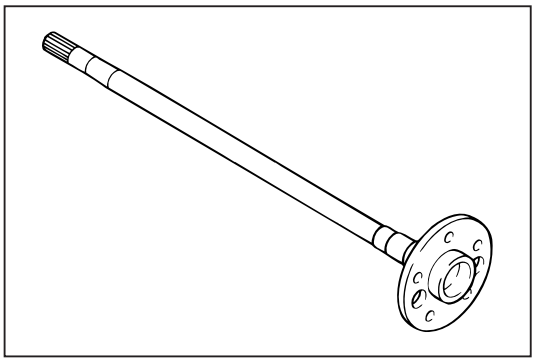
3. Ensure that the runout at the center unmachined section is within the allowable limit.
   Maximum Allowable Limit: 1.5 mm



JRS00045-00042

4. Ensure that the rear axle shaft spline section exhibits no damage, such as cracks and/or wear.
5. Ensure that the oil seal contact surface or rear axle shaft exhibits no damage, such as cracks, scores and/or rust.

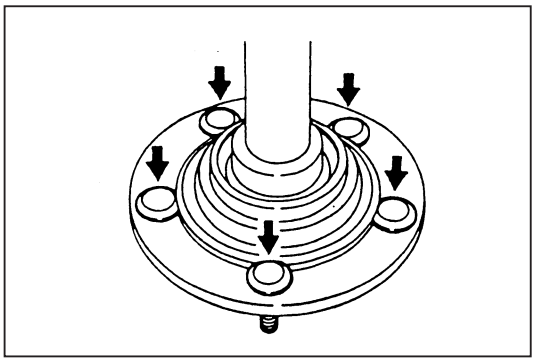
   If any damage is exists, replace the damaged part with new one.



JRS00046-00043

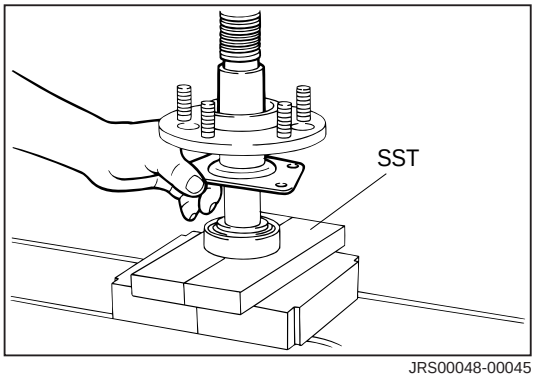
ASSEMBLY

1. Install the hub bolt to the rear axle shaft.



JRS00047-00044

2. Install the rear axle shaft bearing outer retainer to the rear axle shaft.
3. Install the rear axle shaft bearing to the rear axle shaft, using a hydraulic press.



JRS00048-00045

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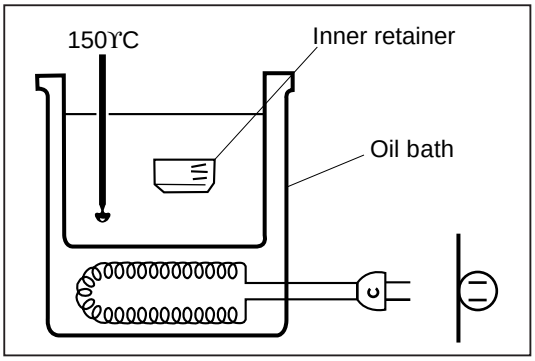
4. Installation of rear axle shaft bearing inner retainer.
   (1) Heat the retainer to 150 ± 15°C in an oil bath.
   NOTE:
   - Perform this operation promptly before the retainer temperature drops.
   - When the temperature exceeds 150 ± 15°C, the surface of the retainer will be turned to yellow. In this case, be careful not to heat the retainer any further.

   WARNING:
   - Special attention must be paid not to burn yourself.

   (2) Install a new retainer to the rear axle shaft, using a hydraulic press.

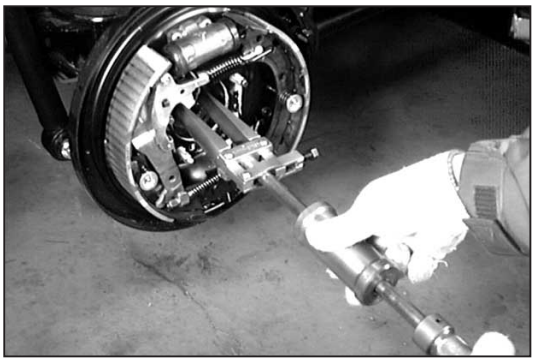


JRS00049-00046

JRS00050-00000

Replacement of rear axle shaft housing oil seal

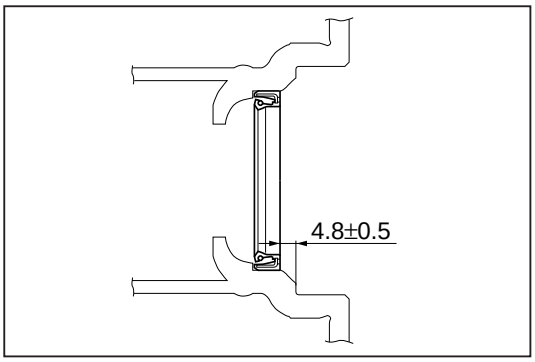
1. Remove the rear axle shaft housing oil seal, using the following SST.
   SST : 09308-00010-000


JRS00051-00048

2. Install a new oil seal to the rear axle shaft housing, using the following SST.
   SST : 09517-12010-000

   CAUTION:
   - Make sure that the oil seal assumes the position indicated in the figure.

3. Apply lithium-based multi purpose grease to the lip section of the installed oil seal.



JRS00052-00049

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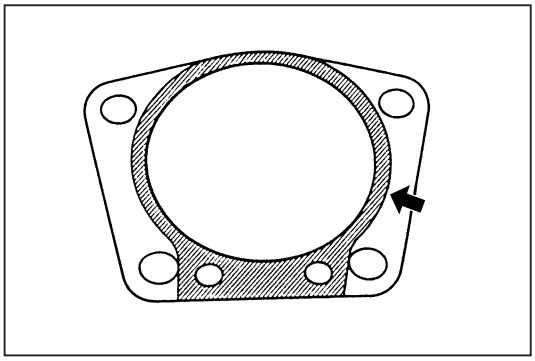
INSTALLATION

1. Apply Three Bond® 11040 or relevant to both sides of the shim, as indicated in the figure.
   CAUTION:
   - Do not apply sealer to the drain hole.
   - As regards the rear axle shaft bearing shim, the thickness of the shim has been determined according to the thickness of the backing plate. Therefore, be sure to select a shim having the same thickness as that of the removed shim. (For selection of the rear axle bearing shim, refer to the BR section.)

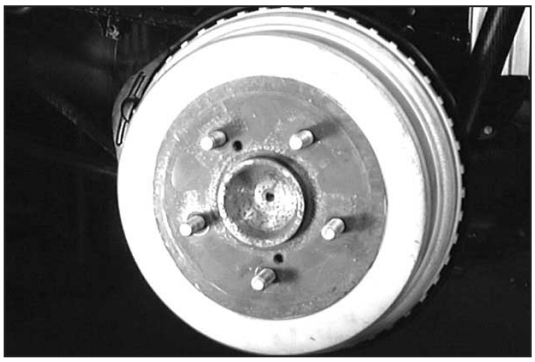


JRS00053-00050

2. Install the rear axle shaft bearing shim to the backing plate.
3. Install the rear axle shaft to the rear axle shaft housing.
   CAUTION:
   - Be very careful not to damage the rear axle shaft housing oil seal by the spline section of the rear axle shaft.
   - Care must be exercised so that the rear differential may not be damaged when inserting the rear axle shaft. Never insert it forcibly.

JRS00054-00051

4. Tighten the attaching nuts of the rear axle shaft.
   Tightening Torque : 53.9 - 68.6 N·m (5.5 - 7.0 kgf-m)



JRS00055-00052

5. Install the brake drum to the backing plate.
6. Fill the differential oil. (Refer to the DF section.)
7. Install the rear wheels. (Refer to the RS–5.)
8. Jack down the vehicle.

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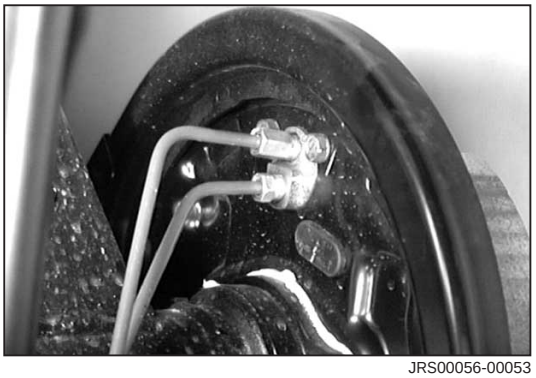
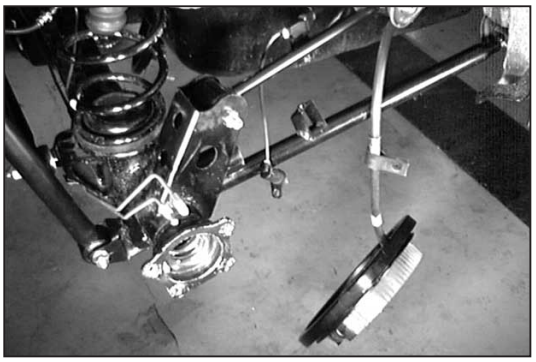
REAR AXLE SHAFT HOUSING

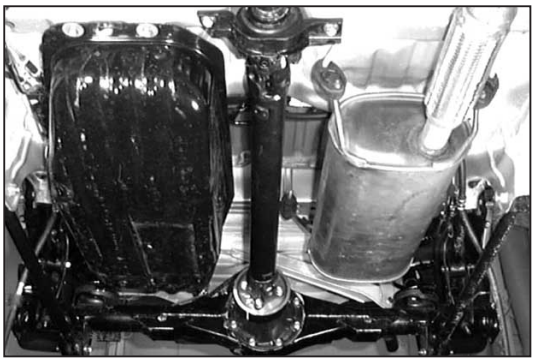
REMOVAL


JRS00056-00053

1. Drain the brake fluid. (Refer to the BR section.)
2. Jack up the vehicle and support it with safety stands. (Refer to the GI section.)
3. Remove the rear wheels.
4. Drain the differential oil. (Refer to the DF section.)
5. Remove the brake drum. (Refer to the BR section.)
6. Remove the rear axle shaft. (Refer to the “REAR AXLE SHAFT” section.)
7. Disconnect the brake tube from the backing plate.
   CAUTION:
   - Since the brake fluid flows out, be very careful not to get the fluid to your hands. Also, care must be exercised so that the fluid may not get to other parts.
8. Remove the ABS sensor from the backing plate. (Only for vehicles equipped with ABS)
9. Remove the backing plate from the rear axle housing.
   NOTE:
   - If any difficulty is encountered in removing the backing plate, prior to the removal, lightly tap the backing plate, using a plastic hammer or the like.
   - Leave the backing plate suspended, as indicated in the figure.


JRS00057-00054

10. Remove the rear propeller shaft. (Refer to the PR section.)


JRS00058-00055

11. Disconnect the brake tube from the brake hose at the rear axle shaft housing.
    CAUTION:
    - Since the brake fluid flows out, be very careful not to get the fluid to your hands. Also, care must be exercised so that the fluid may not get to other parts.
12. Disconnect the brake hose from the bracket by removing the E-ring.

JRS00059-00056

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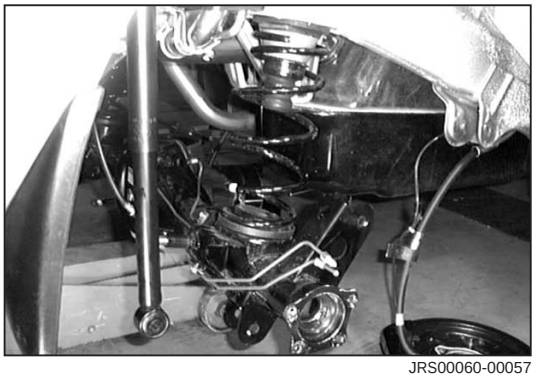
13. Remove the lateral control rod and upper control arm so that the rear axle shaft housing may be retained by the lower control arm and shock absorber. (Refer to the “LATERAL CONTROL ROD, UPPER CONTROL ARM” section.)
14. Retain the rear axle shaft housing with a garage jack, etc. Under this condition, remove the shock absorber and lower control arm.
15. Remove the coil spring.


JRS00060-00057

16. Take out the rear axle shaft housing.

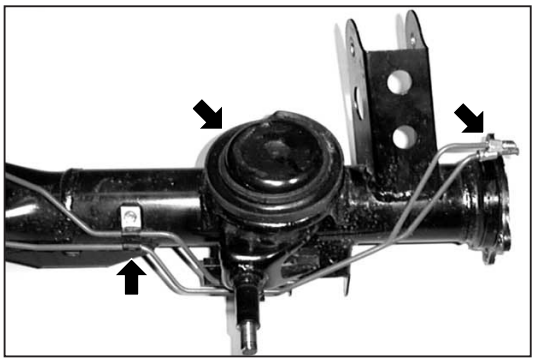
JRS00061-00058

17. Remove the rear spring bumper from the body.
18. Remove the upper rear spring seat from the body.

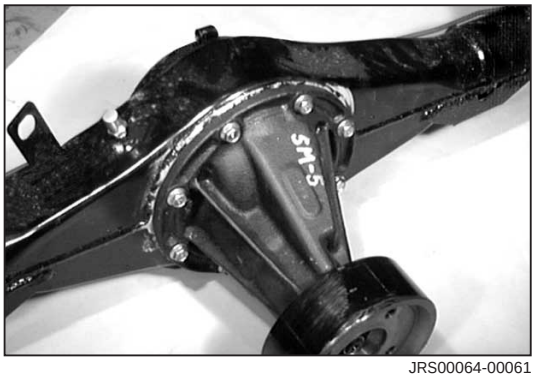
JRS00062-00059

DISASSEMBLY

1. Remove the under rear spring seat from the rear axle shaft housing.
2. Remove the brake tube from the rear axle shaft housing.


JRS00063-00060

3. Remove the breather plug oil deflector from the rear axle shaft housing.
4. Remove the rear differential carrier assembly from the rear axle shaft housing. (Refer to the DF section.)



JRS00064-00061

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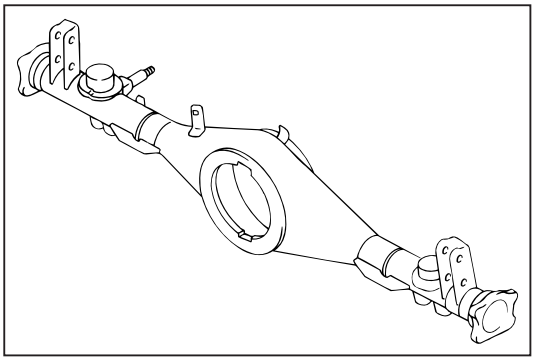
INSPECTION

Rear axle shaft housing

Check that the external appearance of the rear axle shaft housing exhibits no major dent and scores. Also, check that the lateral control rod attaching stud bolt exhibits no scores.

If any damage is exists, replace the damaged part with new one.
Replace the oil seal, if necessary. (For the changing procedure, refer to the RS–16.)

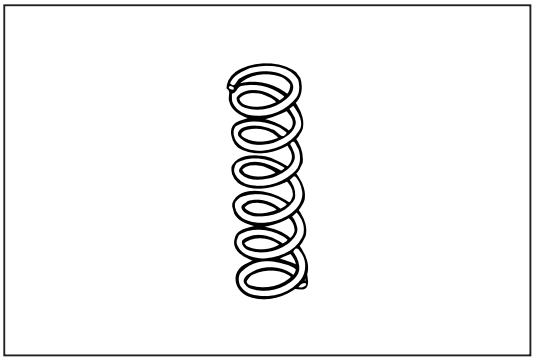


JRS00065-00062

Coil spring

Ensure that the coil spring is free from deformation, deterioration, crack or other damage.

If any damage is exists, replace the damaged part with new one.

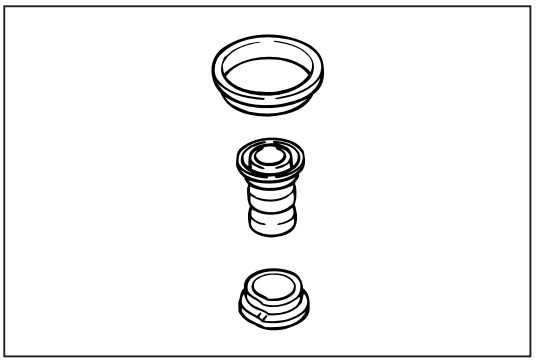


JRS00066-00063

Upper and under rear spring seats and rear spring bumper

Ensure that the upper and under rear spring seats and rear spring bumper free from cracks, deterioration, aging and other damage.

If any damage is exists, replace the damaged part with new one.



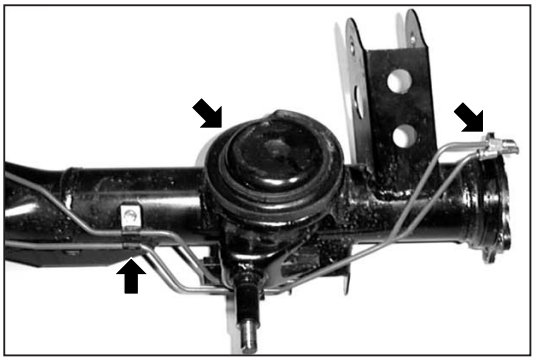
JRS00067-00064

ASSEMBLY

1. Install the rear differential carrier assembly to the rear axle shaft housing. (Refer to the DF section.)
2. Install the breather plug oil deflector to the rear axle shaft housing.

JRS00068-00065

3. Install the brake tube to the rear axle shaft housing.
4. Install the under rear spring seat to the rear axle shaft housing.



JRS00069-00066

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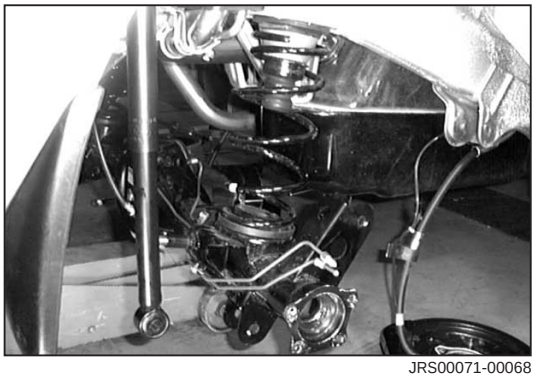
INSTALLATION

1. Install the rear spring bumper to the body.
2. Install the upper rear spring seat to the body.

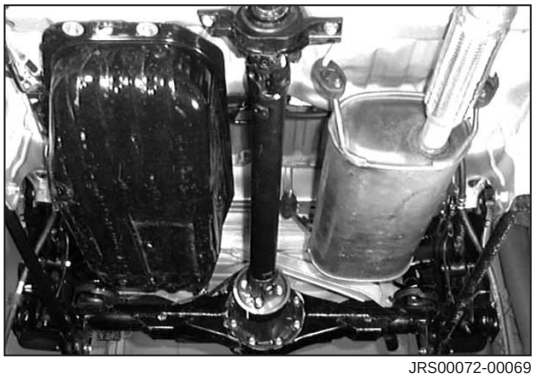
JRS00070-00067

3. Put the coil spring on the spring seat. Then, lift the rear axle shaft housing to an appropriate height, using a garage jack or the like.
   NOTE:
   - Set the coil spring in such a way that the marking comes at the lower side, as viewed from the rear side of the vehicle.
   - Be sure to insert the coil spring into the specified position when lifting the rear axle shaft housing, using a garage jack.



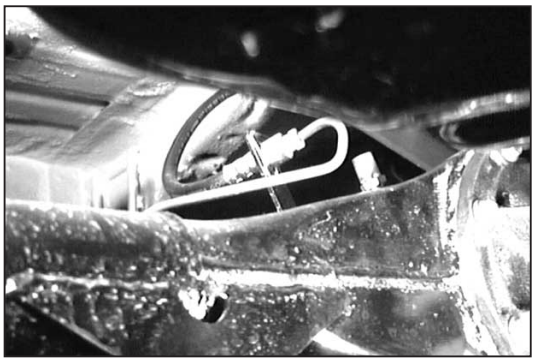
JRS00071-00068

4. Temporarily install the lateral control rod, upper control arm, lower control arm and shock absorber.
5. Install the rear propeller shaft. (Refer to the PR section.)



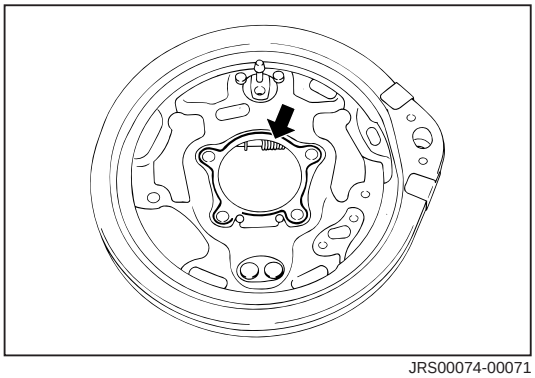
JRS00072-00069

6. Connect the brake hose to the bracket with the E-ring.
7. Connect the brake tube to the brake hose
   Tightening Torque : 12.8 - 17.6 N·m (1.3 - 1.8 kgf-m)



JRS00073-00070

8. Installation of backing plate
   (1) Apply silicon bond No. 1212 or relevant to the housing end, as indicated in the figure.
   (2) Install the backing plate to the rear axle shaft.



JRS00074-00071

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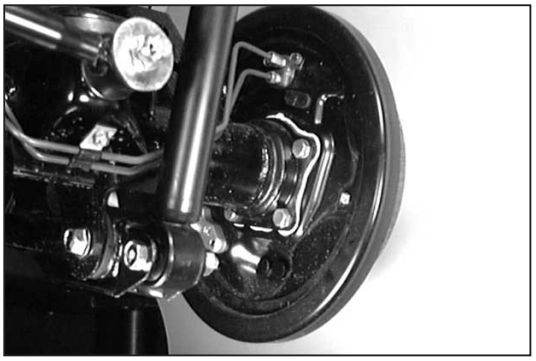
9. Install the rear axle shaft. (Refer to the “REAR AXLE SHAFT” section.)
10. Connect the brake tube to the backing plate.
    Tightening Toque : 12.8 - 17.6 N·m (1.3 - 1.8 kgf-m)
11. Connect the brake hose to the bracket of the upper control arm.
12. Install the ABS sensor to the backing plate.



JRS00075-00072

13. Install the brake drum.

JRS00076-00073

14. Fill the differential oil. (Refer to the DF section.)
15. Install the rear Wheel. (Refer to the RS–5.)
16. Jack down the vehicle.
17. Rock the vehicle in an up-and-down direction several times so that the suspension may be settled.
18. Securely tighten the attaching bolts and nuts of the lateral control rod, upper control rod, lower control rod and shock absorber. (For the tightening torque and tightening procedure, refer to the relevant sections.)
19. Fill the brake oil. (Refer to the MA section.)

JRS00077-00000

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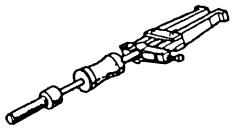
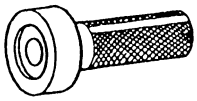
TIGHTENING TORQUE

Components	N·m	kgf-m	
Shock absorber × Body	53.9 - 78.5	5.5 - 8.0	
Shock absorber × Lower control arm	53.9 - 78.5	5.5 - 8.0	
Lateral control rod × Dynamic dumper	6.9 - 15.7	0.7 - 1.6	
Lateral control rod × Rear axle shaft housing	49.0 - 88.3	5.0 - 9.0	
Lateral control rod × Stay	73.5 - 93.1	7.5 - 9.5	
Upper control arm × Body	73.5 - 107.9	7.5 - 11.0	
Upper control arm × Rear axle shaft housing	73.5 - 107.9	7.5 - 11.0	
Lower control arm × Rear axle shaft housing	73.5 - 107.9	7.5 - 11.0	
Lower control arm × Body	73.5 - 107.9	7.5 - 11.0	
Rear axle shaft × Backing plate	53.9 - 68.6	5.5 - 7.0	
Brake tube × Brake hose	12.8 - 17.6	1.3 - 1.8	At the rear axle shaft housing
Brake tube × Backing plate	12.8 - 17.6	1.3 - 1.8	

JRS00078-00000

SST

Shape	Part number	Part name	Remarks
	09520-00031-000	Puller, rear axle shaft	
	09308-00010-000	Puller, oil seal	
	09517-12010-000	Replacer, oil seal	

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DAIHATSU

TERIOS

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BRAKES

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BRAKE PEDAL ..... BR– 5
BRAKE MASTER CYLINDER ..... BR– 7
BRAKE BOOSTER BR–13
FRONT BRAKE BR–16
REAR BRAKE BR–22
PARKING BRAKE BR–30
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JBR00001-00000

BR

NO. 9710-JE

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BASIC CHECK

BRAKE PEDAL

1. Ensure that the brake pedal height is with in specified valve by measuring the brake pedal height.
   Specified Value: 162.8 mm (*155.8 mm)

   CAUTION:
   - "*" Mark denote brake pedal height between upper surface of brake pedal pad and upper surface of protrude section of floor panel.

2. Pedal height adjustment
   (1) Disconnect the connector from the stop lamp switch.
   (2) Slacken the nut of the stop lamp switch and screw out the stop lamp switch, until the brake pedal has a free travel.
   (3) Slacken the lock nut of the brake pedal clevis. Turn the push rod so as to adjust the pedal height to the specified value.
   (4) Tighten the lock nut of the brake pedal clevis to the specified tightening torque.
   Tightening Torque: 25.5 ± 2.9 N·m (2.6 ± 0.3 kgf-m)

   (5) Screw in the stop lamp switch, until the clearance between the brake pedal cushion and the edge of the threaded portion of the stop lamp switch becomes 1.5 mm.
   (6) Tighten the lock nut of the stop lamp switch to the specified tightening torque.
   Tightening Torque: 19.6 ± 7.8 N·m (2.0 ± 0.8 kgf-m)

   (7) Connect the connector of the stop lamp switch.Then, proceed to the brake pedal free play check.

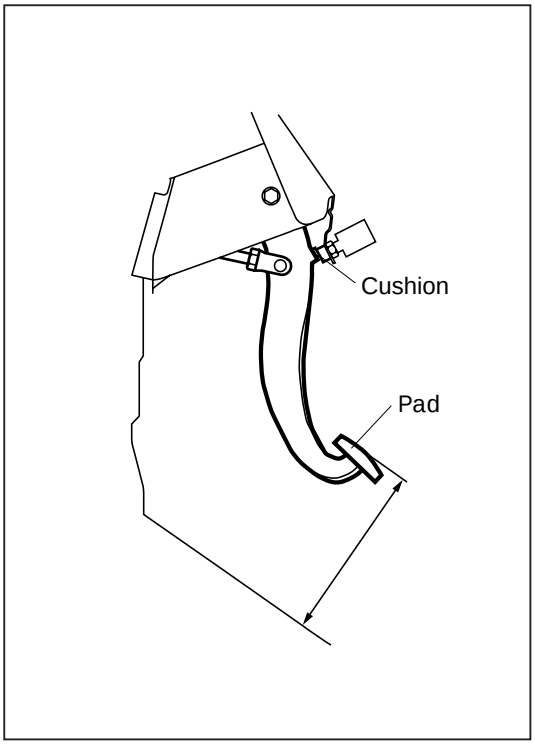
3. Pedal free play check
   (1) After turning off the engine, depress the brake pedal several times so that no vacuum may remain in the brake booster.
   (2) Measure the brake pedal free play by pushing the brake pedal lightly by hand. Here, the brake pedal free play means the distance from a point where the brake pedal is free to a point where you begin to feel a resistance.
   Specified Value: 0.5 - 2 mm

   (3) Ensure that the free play is within the specified value.
   If the brake pedal free play fails to meet the specified value, adjust the brake pedal free play to the specified value.

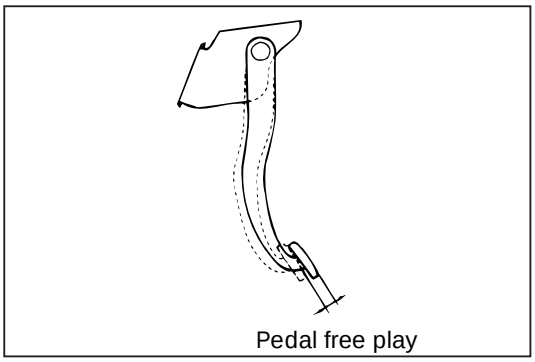
4. Pedal free play adjustment
   (1) Slacken the nut of the brake pedal clevis.
   (2) Turn the push rod so as to adjust the pedal free play to the specified value.
   Specified Value: 0.5 - 2 mm

   (3) Tighten the lock nut of the brake pedal clevis.
   Tightening Torque: 25.5 ± 2.9 N·m (2.6 ± 0.3 kgf-m)

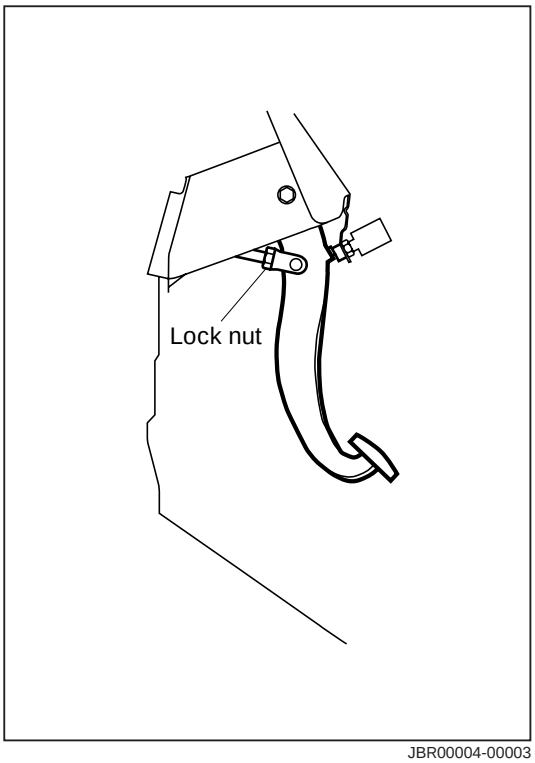
   (4) Ensure that the brake pedal height is within the specified value and the stop lamp functions properly.



JBR00002-00001



JBR00003-00002



JBR00004-00003

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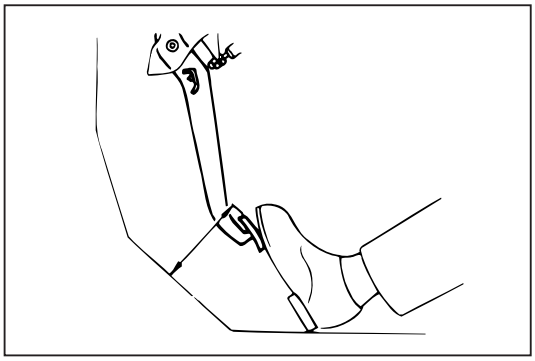
5. Pedal reserve travel check
   (1) Start the engine and run the engine at idling.
   (2) Depress the brake pedal with a pedal applying force of 300 N (30kgf) with the parking brake lever returned.
   (3) Measure the distance between the upper surface of brake pedal pad center and the upper surface of protrude section of floor panel.
   Specified Value: 85 mm or more



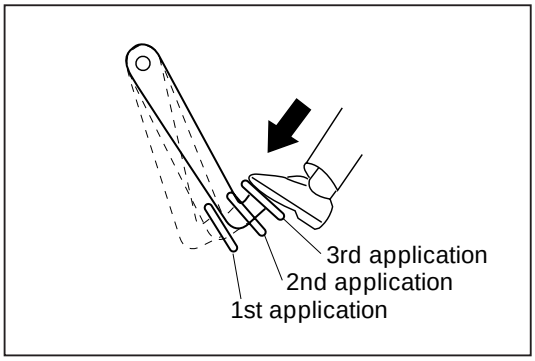
JBR00005-00004

BOOSTER

IN-VEHICLE CHECK

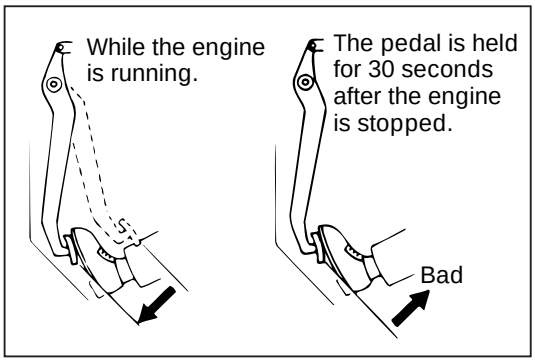
1. Booster air-tight performance check
   (1) Start the engine.
   (2) Turn off the engine after a few minutes.
   (3) Ensure that the position of the brake pedal height progressively rises every time the brake pedal is depressed.
   If the position of the brake pedal rises progressively at the second and third applications, it indicates the brake booster is functioning properly.

   CAUTION:
   • Be sure to keep intervals of each application of the brake pedal at least five seconds or more between the first and second applications as well as the second and third applications.



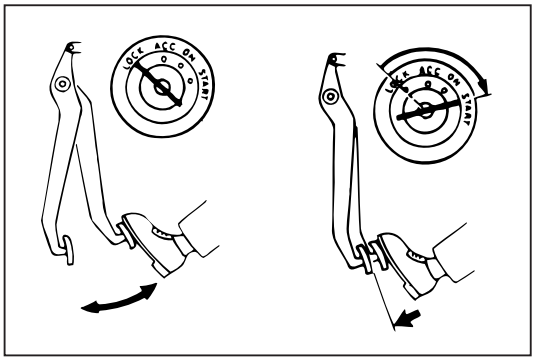
JBR00006-00005

2. Booster air-tight performance check under loaded condition
   (1) Start the engine.
   (2) Depress the brake pedal fully.
   (3) Turn off the engine while depressing the brake pedal.
   (4) Ensure that the brake pedal height remains unchanged for more than 30 seconds. It indicates that the booster is functioning properly.



JBR00007-00006

3. Booster operation check
   (1) Depress the brake pedal several times under the engine stopped state, until the brake pedal height will no longer change (to release the vacuum pressure retained in the brake booster).
   (2) Ensure that the height of the brake pedal will go down when the engine is started while keeping the depressing force of the brake pedal unchanged.
   It indicates that the booster is functioning properly.



JBR00008-00007

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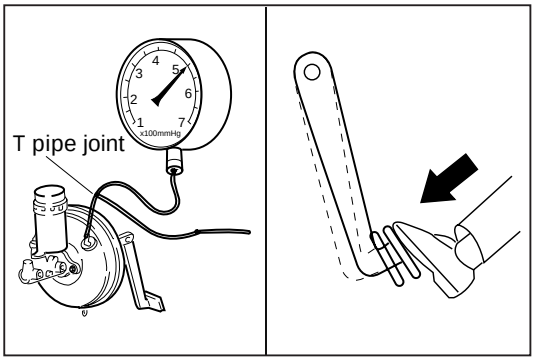
4. Booster air-tight performance check under loaded condition
   (1) Connect a negative pressure gauge to the booster, using a “T or Y” pipe joint.
   (2) Start the engine with the brake pedal depressed with a force of 200 N.
   (3) Stop the engine when the negative pressure exceeds 500 mmHg.
   (4) Ensure that the negative pressure retained in the brake booster will not drop 25 mmHg or more for 15 seconds since the engine is stopped.
   It means that the air tightness is proper. If not, check air leakage of the check valve in the brake booster hose.



JBR00009-00008

JBR00010-00009

AIR BLEEDING

1. Fill and maintain the brake fluid level in the reservoir tank at the upper level during the operation.
   NOTE:
   • If the brake fluid is spilled inadvertently over the paint-finish surface of the vehicle or resin-made parts, immediately wipe off the brake fluid and flush with fresh water.
   • When drain the brake fluid, do not fill brake fluid into the reservoir tank.

2. Connection of vinyl hose to bleeder plug of wheel cylinder
   Connect a suitable vinyl or rubber hose to the bleeder plug of the wheel cylinder and submerge one end of the vinyl or rubber hose in a container filled with the brake fluid. Connect the other end of the vinyl hose to the wheel cylinder bleeder plug of the vehicle.
   NOTE:
   • Start the air bleeding operation at the wheel cylinder which is located at the furthermost point from the master cylinder.

JBR00011-000010

3. Air bleeding
   (1) Perform the operation by two persons. One person should depress the brake pedal slowly and hold it in a depressed state.
   (2) While depressing the brake pedal, the other person slackens the bleeder plug 1/3 through 1/2 turn to drain the brake fluid. Then, tighten the bleeder plug temporarily.
   (3) Repeat the steps (1) and (2) above, until bubbles are no longer observed in the fluid.
   NOTE:
   • It may require more time than the ordinary brake system if the vehicle is equipped with ABS.

JBR00012-00011

(4) Tighten the bleeder plug securely to the specified tightening torque.
   Tightening Torque: 6.9 - 9.8 N·m (0.7 - 1.0 kgf-m)

4. Checking of brake fluid leakage
   Ensure that no brake fluid leakage exists on the brake line when the brake pedal is depressed fully.

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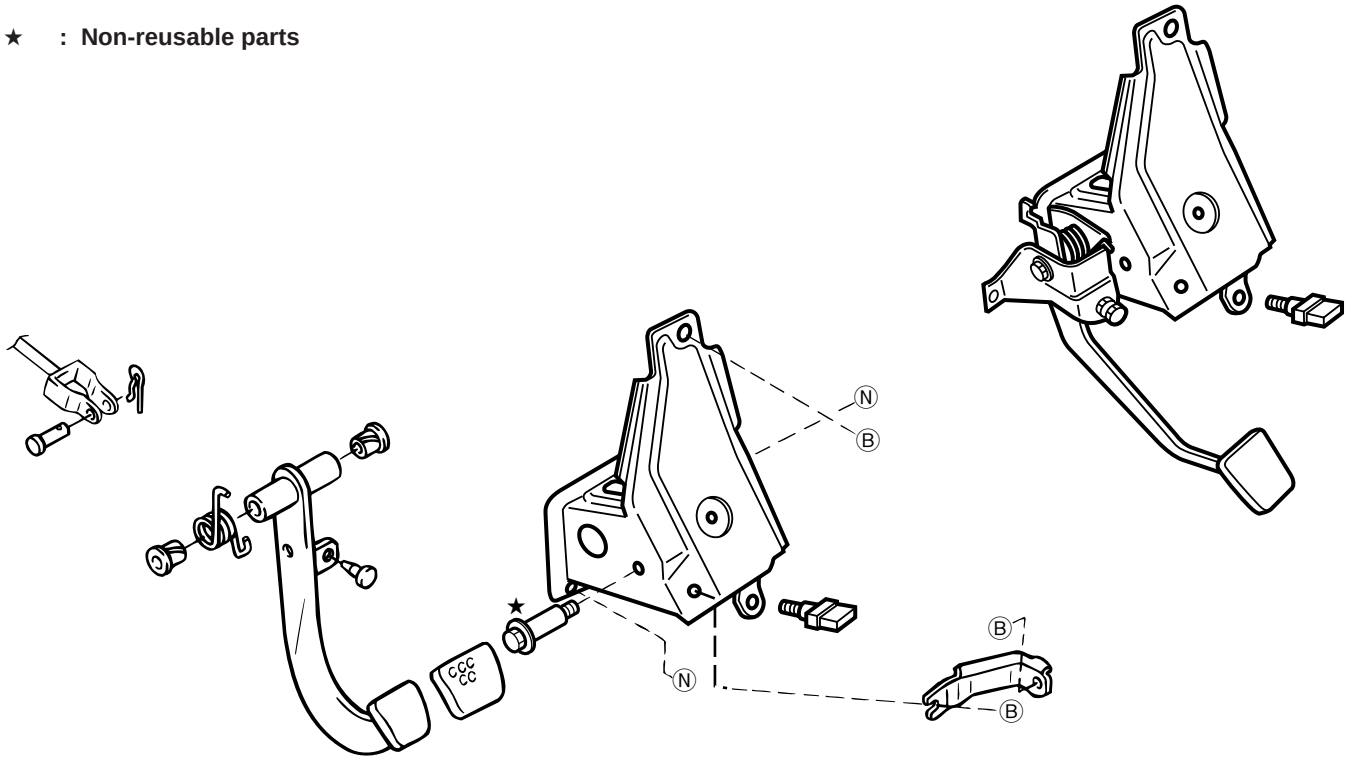
BRAKE PEDAL

COMPONENTS

★ : **Non-reusable parts**



① Brake pedal subassembly
② Brake pedal pad
③ Cushion
④ Brake pedal bracket
⑤ Brake pedal shaft
⑥ Pedal bracket stay
⑦ Bush
⑧ Spring

NOTE:
★: The brake pedal shaft installed from right side when model with left hand drive. Contrary, the brake pedal shaft installed from left side when model with right hand drive.

JBR00013-00012

REMOVAL

1. Remove the instrument panel. (Only when the brake pedal bracket removal is required) (Refer to the BO section.)
2. Disconnect the connector from the stop lamp switch while unlocking its lock.
3. Remove the stop lamp switch by screwing it out.
4. Disengage the clutch cable from the clutch pedal. (Only for models with manual transmission.) (Refer to the CL section.)
5. Remove the clip and pin from the brake pedal clevis.
6. Disconnect the wire harness clamp from the brake pedal bracket.
7. Remove the brake pedal bracket by removing the attaching bolts and nuts.
8. Remove the brake pedal by removing its attaching bolts and nuts.
7. Remove the spring from the brake pedal.
8. Remove the bushes from the brake pedal.
9. Remove the brake pedal pad and cushion from the brake pedal.

JBR00014-00000

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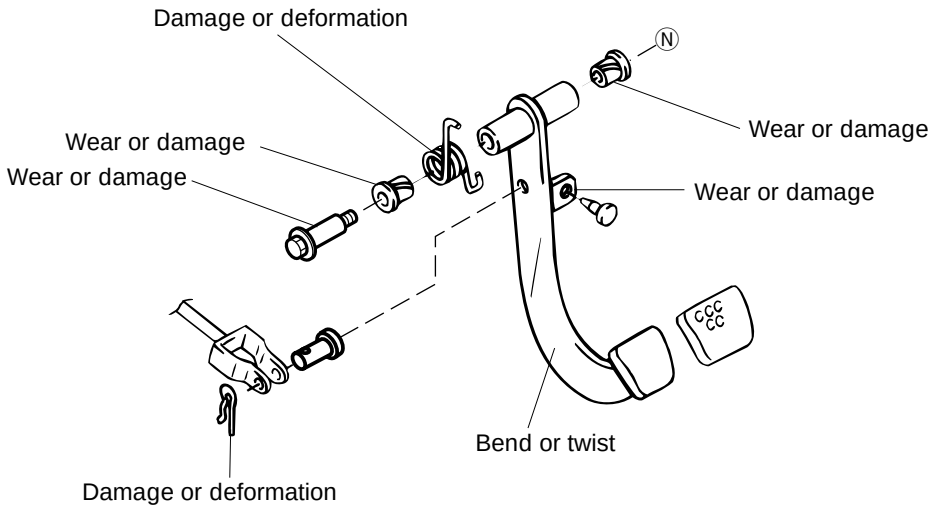
10. Inspect the following parts.

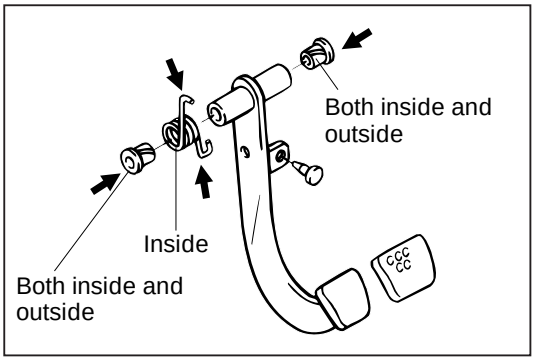


JBR00015-00013

INSTALLATION

1. Apply the specified grease to those points indicated in the right figure.
   Specified Grease:
   Lithium soap base multi-purpose grease

2. Install the cushion, brake pedal pad, bushes and spring to the brake pedal.



JBR00016-00014

3. Install the brake pedal on the brake pedal bracket.
4. Install the brake pedal to the brake pedal bracket while connecting the spring end to the brake pedal bracket with the brake pedal shaft and nut. Then, tighten the nut to the specified tightening torque.
   Tightening Torque: 15.2 - 23.0 N·m (1.55 - 2.35 kgf-m)

5. Apply the lithium soap base multi-purpose grease to the clevis pin contacting surface of the brake pedal.
6. Connect the clevis to the brake pedal with the pin and install the clip to the pin securely.
7. Install the brake pedal bracket to the body with the pedal bracket stay, attaching bolts and nuts.
8. Screw in the stop lamp switch to the brake pedal bracket. (Refer to the “Brake pedal” section.)
9. Perform the check and adjustment of the brake pedal. (Refer to the “Brake pedal” section.)
10. Install the instrument panel. (Refer to BO section.)
11. Check that no abnormal noise is emitted when the brake papal is depressed.

JBR00017-00000

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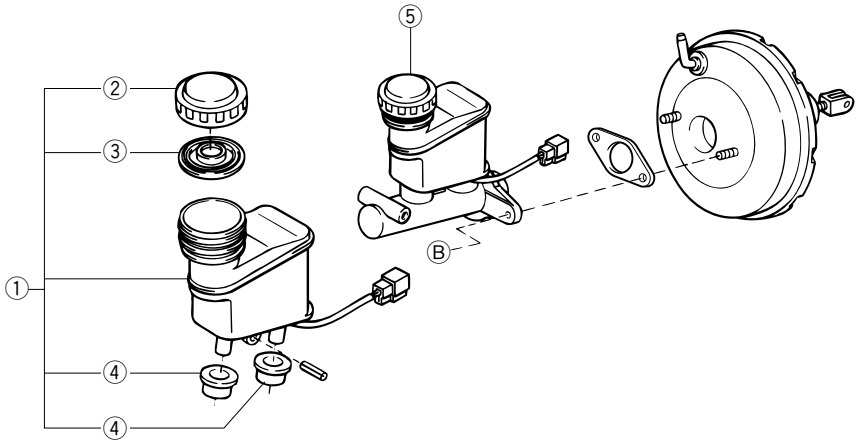
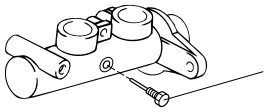
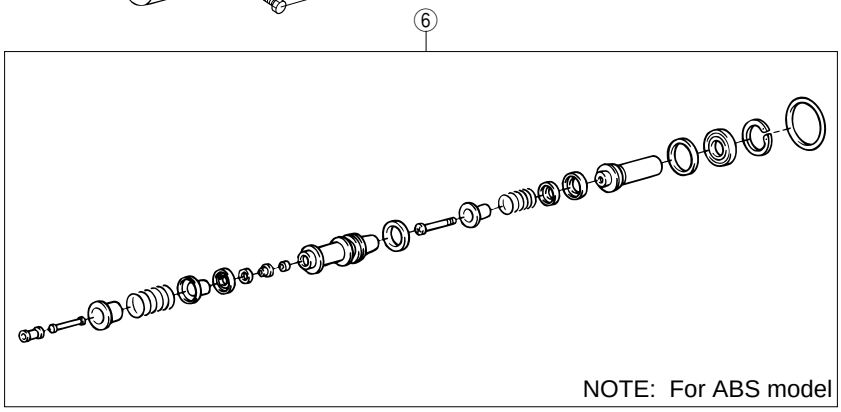
BRAKE MASTER CYLINDER

COMPONENTS





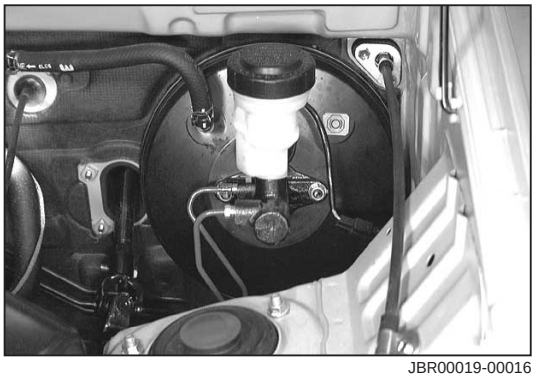


① Brake master cylinder reservoir tank
② Reservoir filler cap
③ Reservoir diaphragm
④ Grommet
⑤ Brake master cylinder assembly
⑥ Tandem master cylinder repair kit

JBR00018-00015

REMOVAL

1. Disconnect the connector of the brake fluid level switch.
2. Drain the brake fluid from the master cylinder.
   (Refer to the “Air bleeding” section for procedure.)
3. Disconnect the brake pipes from the master cylinder.
   CAUTION:
   - If the brake fluid is spilled inadvertently over the paint-finish surface of the vehicle or resin-made parts, immediately wipe off the brake fluid and wash with fresh water.



JBR00019-00016

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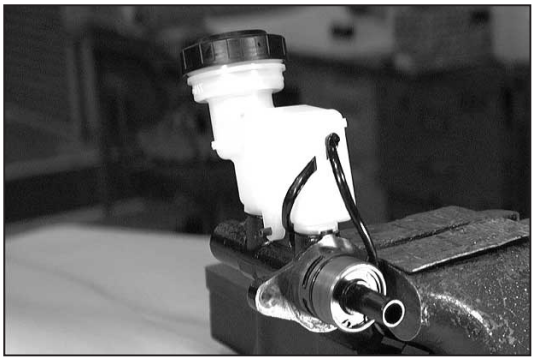
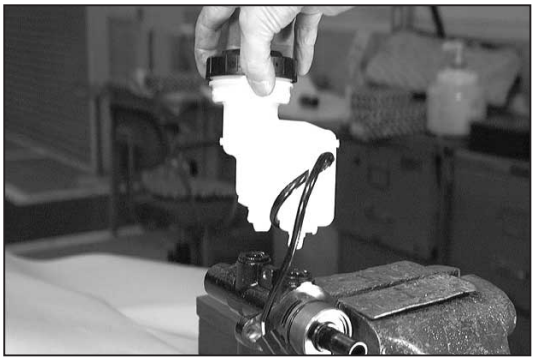
4. Remove the master cylinder from the brake booster.
   NOTE:
   - The O-ring is installed on the master cylinder.
     It may be hard to remove the master cylinder from the brake booster.

5. Secure the master cylinder to a vise.



JBR00020-00017

6. Remove the slotted pin of the master cylinder reservoir tank, using a suitable knock pin punch.
7. Pull out the brake master cylinder reservoir tank from the master cylinder.

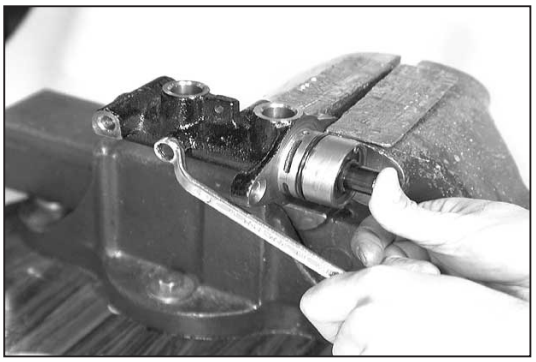


JBR00021-00018

8. Remove the grommets from the master cylinder or reservoir tank.

JBR00022-00019

9. Remove the set bolt and gasket while the pistons are being pushed fully by means of a suitable bar.
   (Only when equipped)
   NOTE:
   - Do not push the piston rapidly in order to prevent the brake fluid from splashing.



JBR00023-00020

10. Using snap ring pliers, detach the snap ring while the pistons are being pushed by means of a suitable bar.

JBR00024-00021

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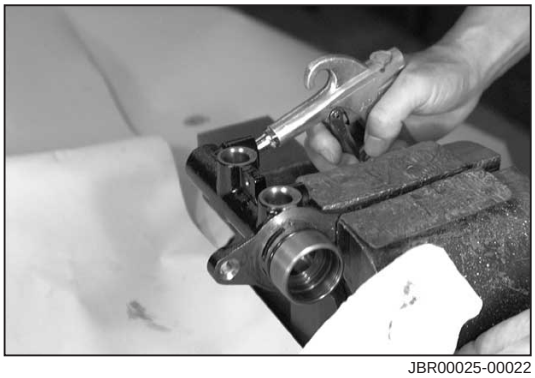
11. Remove the piston No. 1 from the master cylinder.
    CAUTION:
    - Remove the piston straight, being very careful not to scratch the cylinder bore.

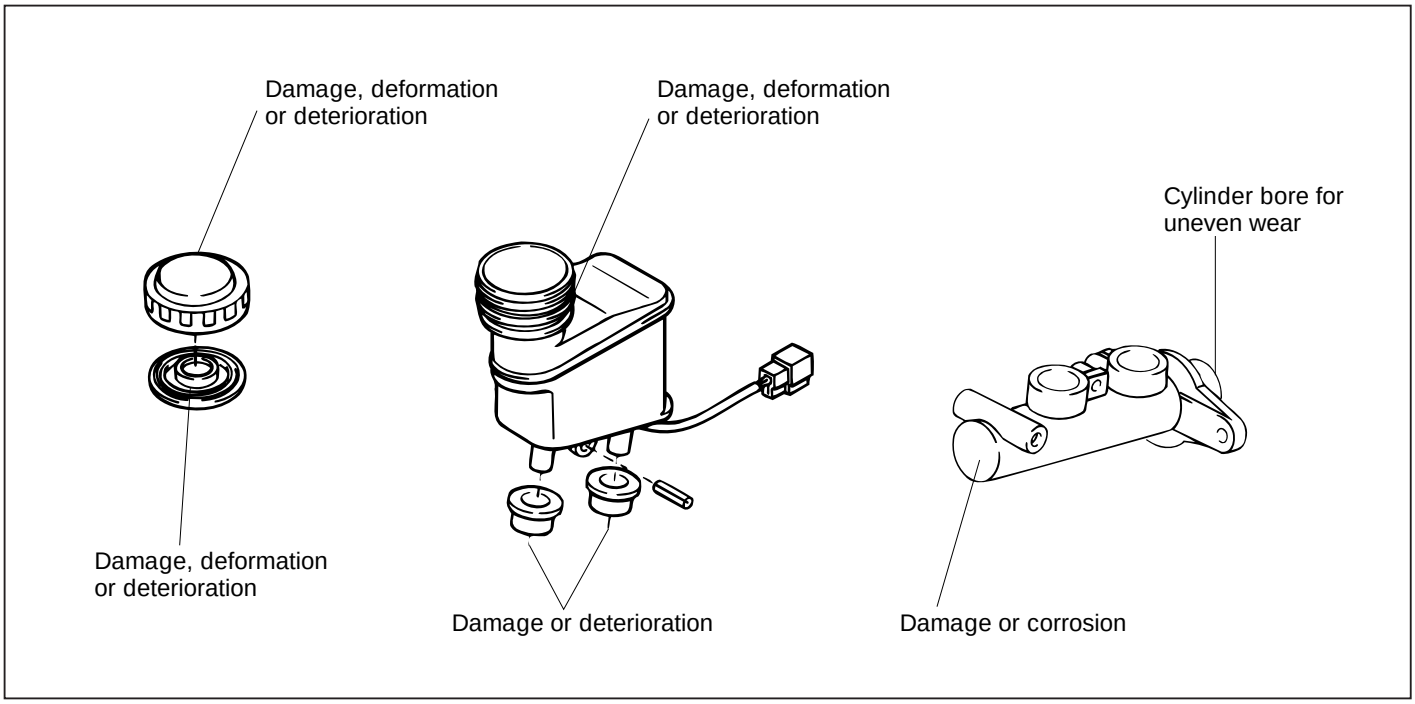

JBR00025-00022

12. Remove the piston No. 2 by lightly applying compressed air at the brake pipe hole.
    WARNING:
    - Be sure to protect your eyes by wearing safety goggles, when using compressed air.

    CAUTION:
    - Never score the cylinder bore during the removal of the piston No. 2.
      Remove the piston in a straight direction.

    NOTE:
    - Be sure to prevent the brake fluid from splashing, using a piece of cloth or the like.

13. Inspect the following parts. If any problem is found, repair them, as required.



JBR00026-00023

ASSEMBLY

1. Wash the master cylinder and components with washing solvent and dry them with compressed air.
   WARNING:
   - Be sure to protect your eyes by wearing safety goggles, when using compressed air.

JBR00027-00024

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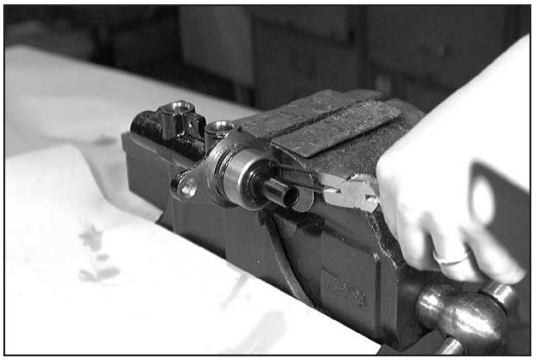
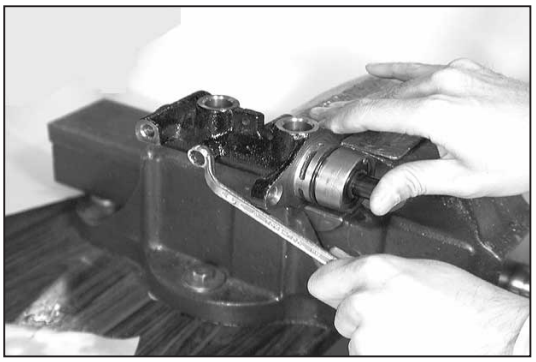
2. Thinly apply brake rubber grease to the lip section of the cups of the piston No. 2 assembly.
3. Install the piston No. 2 into the master cylinder.

JBR00028-00025

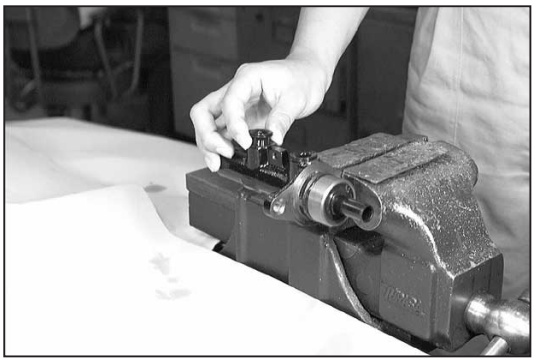
4. Thinly apply brake rubber grease to the lip section of the cups and O-ring on the piston No. 1 assembly.
5. Install the piston No. 1 assembly into the master cylinder.
6. Install a new snap ring while pushing the piston No. 1 into the master cylinder, using snap ring pliers.
   WARNING:
   - Never reuse the removed snap ring.


JBR00029-00026

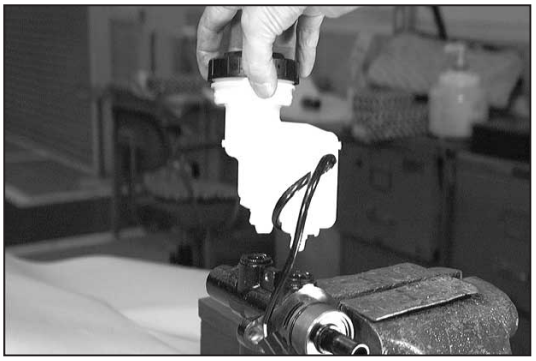
7. Install the set bolt of the piston No. 2 assembly to the master cylinder with a new gasket interposed while pushing the piston No. 2.
   Tightening Torque: 7.9 - 11.7 N·m (0.8 - 1.2 kgf-m)


JBR00030-00027

8. Thinly apply brake rubber grease to the grommets.
9. Install the grommets to the master cylinder.


JBR00031-00028

10. Install the brake master cylinder reservoir tank to the master cylinder.
11. Secure the master cylinder reservoir tank to the master cylinder by installing a new slotted pin.
    CAUTION:
    - Never reuse the used slotted pin.


JBR00032-00029

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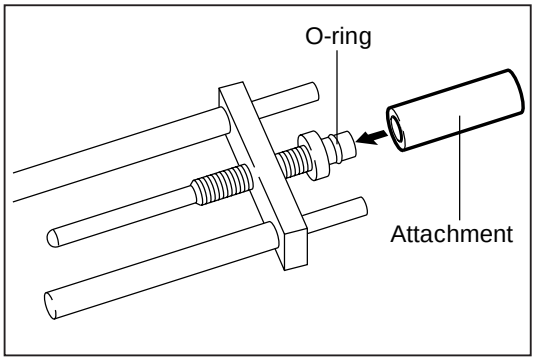
INSTALLATION

1. Check the clearance between the master cylinder and the brake booster push rod.
   (1) Prepare the following SSTs.
   SST: 09730-87401-000
   09737-87003-000①
   09733-87401-000②
   09731-87401-000③
   09732-87401-000④
   09734-87401-000⑤
   09735-87401-000⑥

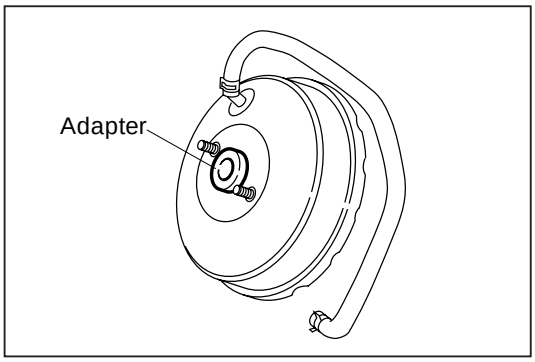
JBR00033-00000



JBR00034-00030

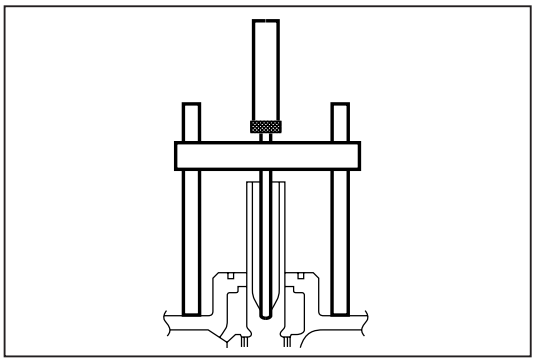
   (2) Assemble the components of the above SSTs as follows.
   ① Install the O-ring (②) to the O-ring groove of the adjusting rod(①).
   ② Install the attachment (③) on the adjusting rod (①).
   ③ Thinly apply the brake rubber grease to the outer surface of the attachment (③).

   (3) Install the O-ring (⑤) and O-ring (⑥) to the adapter (④) and apply the brake rubber grease to the O-rings.
   (4) Install the adapter (④) to the brake booster.



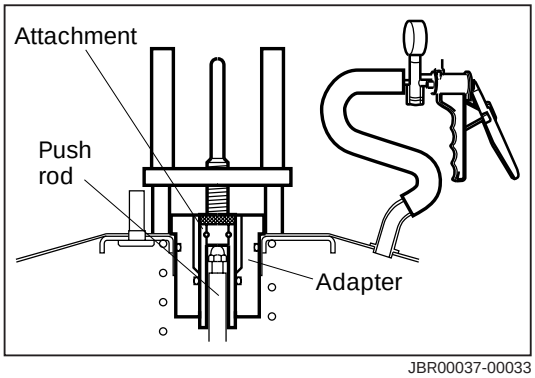
JBR00035-00031

   (5) Attach the SST assembled in step (2) on the master cylinder.
   (6) Turn the adjusting rod to adjust the clearance between the SST and the piston rod end to zero.



JBR00036-00032

   (7) Set the SST on the brake booster as shown.
   NOTE:
   • Apply brake rubber grease to the attaching section of the SST.



JBR00037-00033

   (8) Connect a Mity Vac to the brake booster.
   (9) Apply a vacuum of 500 mmHg to the booster housing, using the Mity Vac.
   (10) Ensure that the clearance between the SST and the piston rod is zero by turning the adjusting rod lightly.

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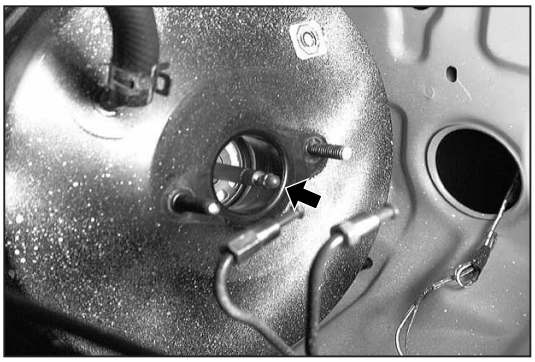
WARNING:
- Be sure to adjust the clearance properly. Failure to observe this warning may lead to brake system problem.

NOTE:
- If the clearance fails to meet the specified value, adjust the clearance between the SST and the push rod of the brake booster to zero, by turning the adjusting tip provided at the top of the push rod of the brake booster.

JBR00038-00000

(11) Adjustment of brake booster push rod height
Adjust the brake booster push rod height while depressing the brake pedal fully.
(12) Ensure that the clearance between the push rod and the SST is zero.



JBR00039-00034

WARNING:
- Be sure to adjust the clearance properly. Failure to observe this warning may lead to brake system problem.

(13) Remove the SST from the brake booster.
(14) Remove the Mity Vac from the brake booster.
(15) Connect the vacuum hose to the brake booster.

2. Thinly apply brake rubber grease to the oil seal on the master cylinder piston shaft.
3. Install the master cylinder to the brake booster with attaching nuts. Tighten the attaching nuts evenly to the specified tightening torque.
   Tightening Torque: 12.7 ± 2.5 N·m (1.3 ± 0.3 kgf-m)

WARNING:
- Be sure to perform the adjustment of the brake booster push rod height, if any inner part of the master cylinder has been replaced.
  Failure to observe this warning may lead to damage or malfunction of the brake system.

JBR00040-00000

JBR00041-00035

4. Temporarily connect the brake pipes to the master cylinder and tighten the flare nuts to the specified tightening torque.
   Tightening Torque: 12.7 - 17.7 N·m (1.3 - 1.8 kgf-m)

5. Connect the brake fluid level switch connector.
6. Perform air bleeding for the brake system.
7. Ensure that no fluid leakage exists on the brake system.
8. Perform the checks and adjustments of the brake pedal height. (Refer to the brake papal section.)
9. Check the brake fluid leakage on the brake system.

JBR00042-00036

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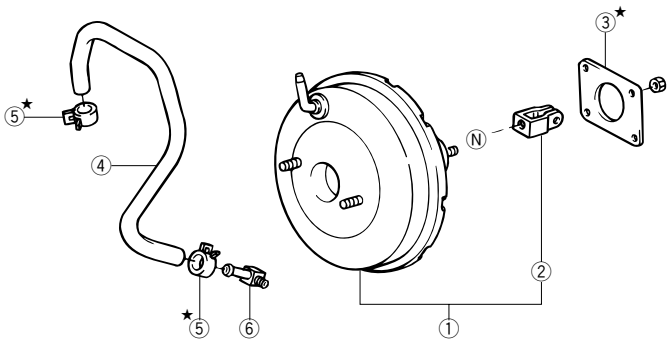
BRAKE BOOSTER

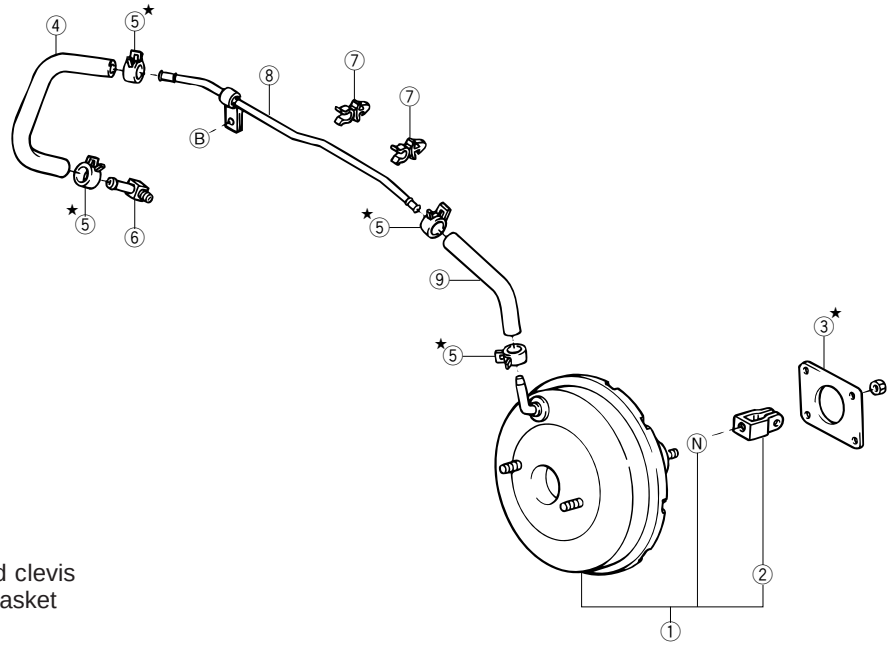
COMPONENTS

★ : Non-reusable parts

RHD



LHD



① Brake booster assembly
② Master cylinder push rod clevis
③ Brake booster bracket gasket
④ Union to connector tube
⑤ Clip
⑥ Union
⑦ Intake manifold tube clamp
⑧ Intake manifold to connector tube
⑨ Union to check valve hose

JBR00043-00037

REMOVAL

1. Remove the brake master cylinder.
   (Refer to the “Brake master cylinder” section for removal.)
   CAUTION:
   - If the brake fluid is spilled inadvertently over the paint finish surface of the vehicle or resin part, immediately wipe off the brake fluid and wash with fresh water.

2. Remove the vacuum hose from the vehicle.

JBR00044-00038

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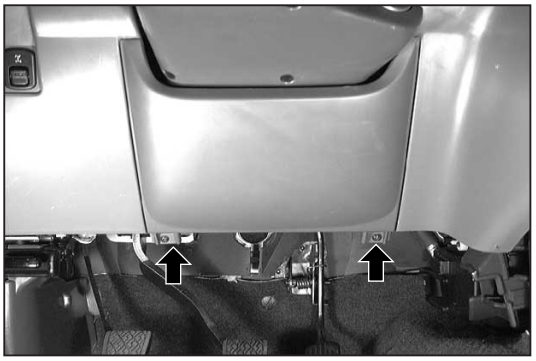
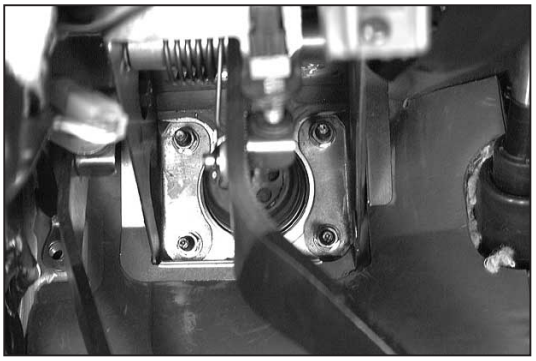
3. Remove the instrument finish lower panel by removing the two attaching bolts.



JBR00045-00039

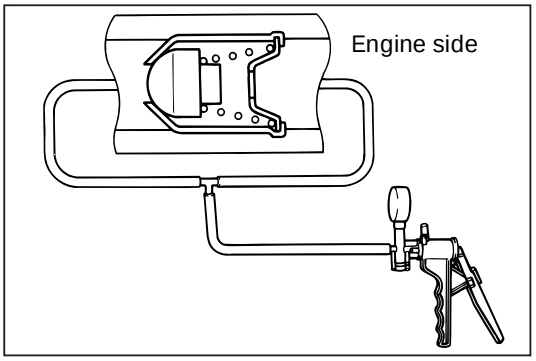
4. Remove the clip of the push rod clevis pin.
5. Remove the push rod clevis pin.
6. Loosen the brake booster attaching nuts evenly.
7. Remove the brake booster attaching nuts.
8. Remove the brake booster from the dash panel.
   CAUTION:
   - Be very careful not to deform the brake tubes during the removal of the brake booster.



JBR00046-00040

INSPECTION

1. Inspection of check valve (vacuum hose)
   Check that continuity exists from the booster side to the engine side. Also, check that no continuity exists from the engine side to the booster side.
   If the inspection results are not satisfactory, replace the vacuum hose.
2. Inspection of booster push rod-to-master cylinder clearance
   Check the clearance of the brake booster push rod.
   (Refer to the “Brake master cylinder” section.)



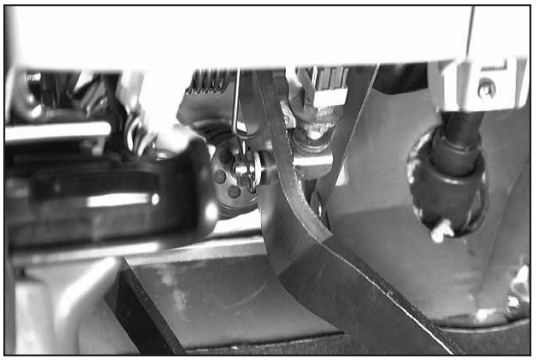
JBR00047-00041

INSTALLATION

1. Install the brake booster to the dash panel with a new brake booster bracket gasket interposed.
2. Install the attaching nuts and tighten them to the specified tightening torque.
   Tightening Torque: 9.8 - 15.7 N·m (1.0 - 1.6 kgf-m)

   CAUTION:
   - Care must be exercised so that the brake tubes may not be interfered with the brake pedal during the installation.

JBR00048-00000



JBR00049-00042

3. Connect the clevis and brake pedal with the clevis pin.
   If any difficulty is encountered in installing the clevis pin, loosen the lock nut of the clevis and adjust the length of the push rod of the brake booster by turning the brake booster push rod or clevis.
4. Apply chassis grease to the sliding surface of the components.
5. Install a new clip to the clevis pin.
6. Perform the check and adjustment of the brake pedal.
   (Refer to the “Brake pedal” section.)

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6. Install the instrument finish lower panel and install two attaching screws.
7. Install the brake master cylinder.
   (Refer to the brake master cylinder section for installation.)
   CAUTION:
   - Be sure to follow the installation procedure for the brake master cylinder described in the above mentioned section. Failure to observe this caution may lead to serious accidents or problems.

8. Perform the air bleeding.
   (Refer to BR–4.)
9. Check the brake performance with a four-wheel brake tester.

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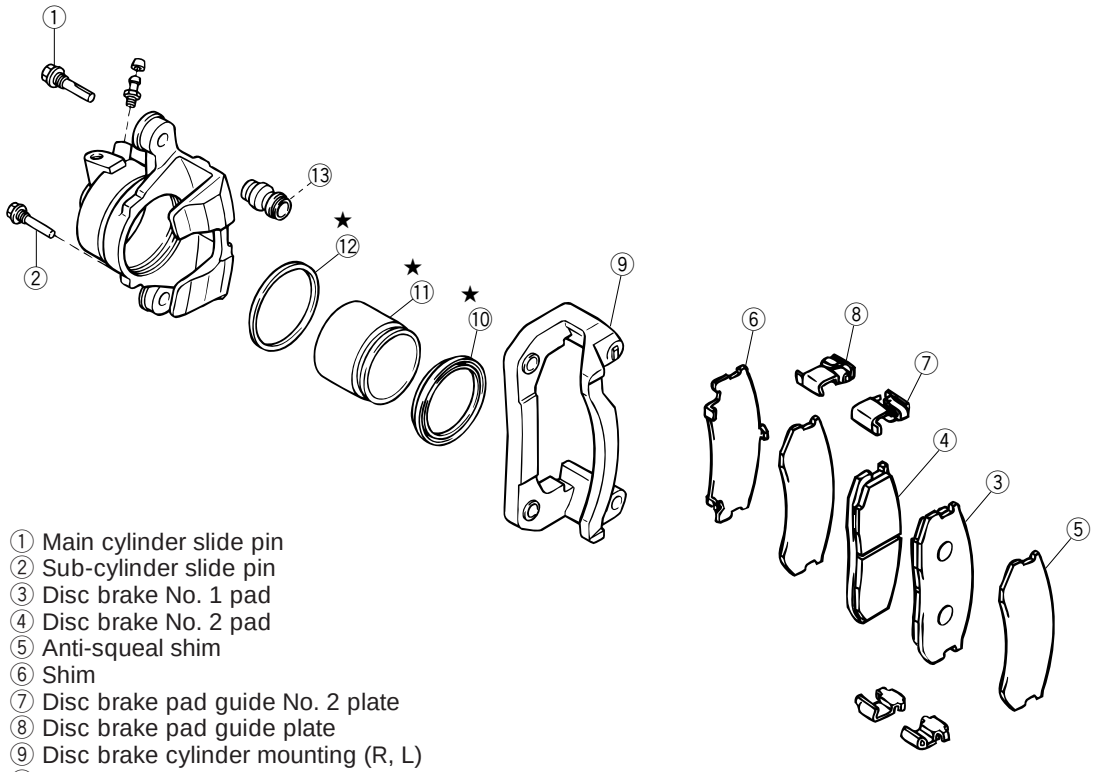
FRONT BRAKE

COMPONENTS

★ : Non-reusable parts



① Main cylinder slide pin
② Sub-cylinder slide pin
③ Disc brake No. 1 pad
④ Disc brake No. 2 pad
⑤ Anti-squeal shim
⑥ Shim
⑦ Disc brake pad guide No. 2 plate
⑧ Disc brake pad guide plate
⑨ Disc brake cylinder mounting (R, L)
⑩ Cylinder boot
⑪ Front disc brake piston
⑫ Piston seal
⑬ Pin boot

JBR00051-00043

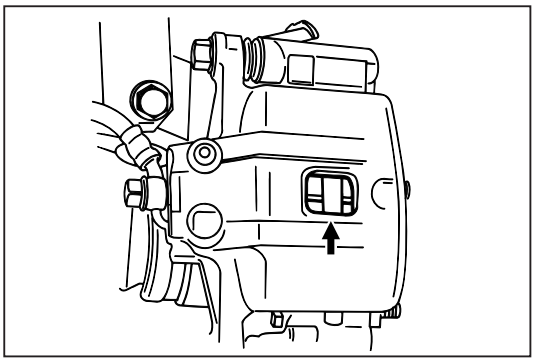
INSPECTION

1. Jack up the vehicle and support the vehicle with safety stands. (Refer to the GI section.)
2. Remove the front wheels.
3. Check the pad thickness through the inspection hole provided at the disc brake caliper as shown.

   Specified Thickness: 10 mm
   Minimum Thickness: 1 mm

   If the brake pad thickness is less than the specified value or the wear indicator emits a warning sound, replace the brake pad with a new one.
   CAUTION:
   - Be sure to replace the right and left side brake pads as a set. Failure to observe this caution may lead to side pull of the brake function.

4. Install the front wheels.



JBR00052-00044

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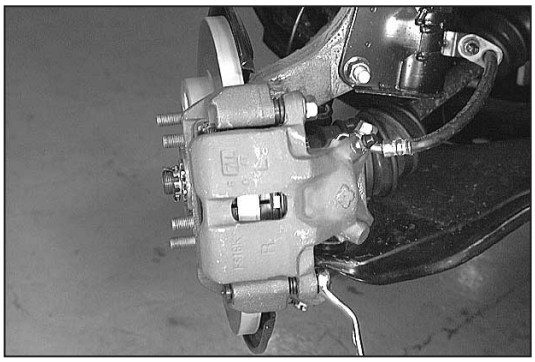
REMOVAL

NOTE:
- The replacement procedure of the brake pads is not mentioned in this service manual. Refer to the procedure which is necessary to replace the brake pads.

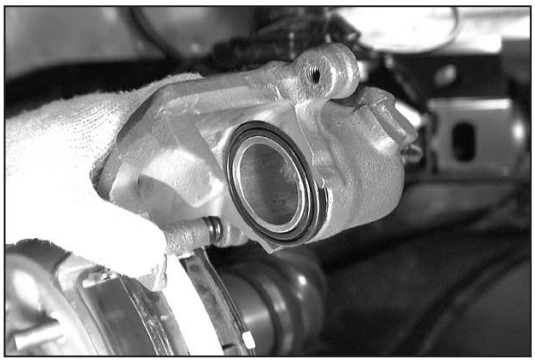
1. Jack up the vehicle and support the vehicle with safety stands. (Refer to the GI section.)
2. Remove the front wheels.
3. Drain the brake fluid from the front brake line.
   (When only necessary. Refer to the “Air bleeding” section.)

JBR00053-00000



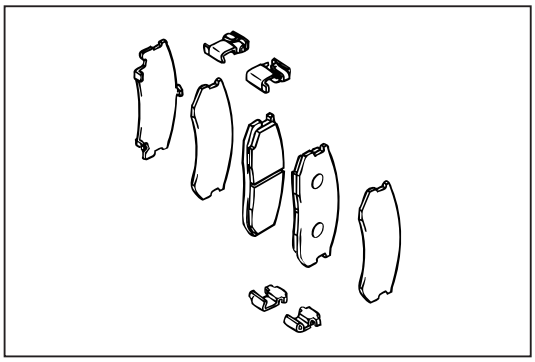
4. Disconnect the brake hose from the disc brake cylinder by removing the union bolt and gasket. (When necessary)
5. Loosen the cylinder slide pins.
6. Remove the cylinder slide sub pin.

JBR00054-00045



7. Turn up the disc brake assembly as shown.
   CAUTION:
   - Be very careful not to pull the brake hoses more than necessary.
8. Remove the disc brake cylinder assembly from the disc brake cylinder mounting.

JBR00055-00046



9. Detach the following parts from the disc brake cylinder mounting.
   (1) Disc brake pad
   (2) Anti-squeal shims No. 1 and No. 2
   (3) Brake pad guide plates No. 1 and No. 2
10. Inspection of brake pad-related parts
    Ensure that the disc brake pad-related parts are free from damage, deformation, deterioration or corrosion.
    If any damage is found, replace the damaged part with a new one.
    CAUTION:
    - Replace the brake pad when damage or uneven wear exists.
    - Replace the right and left side brake pads as a set when replacing the brake pads. Failure to observe this caution may lead to side pull of the brake function.
    - Be sure to perform the brake pad replacement one side by one side. Failure to observe this caution may cause the piston to jump out.

JBR00056-00047

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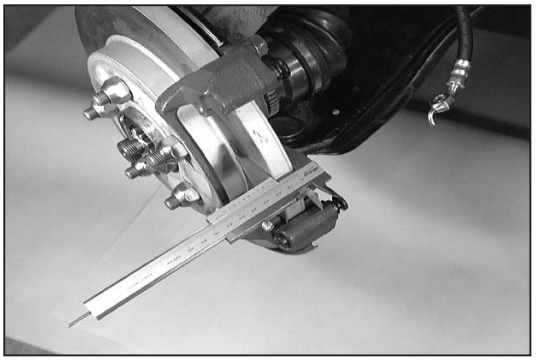
11. Ensure that the disc rotor thickness is more than that specified value by means of vernier calipers.
    Inspect the disc rotor thickness.
    Specified Thickness: 16 mm
    Minimum Thickness: 15 mm

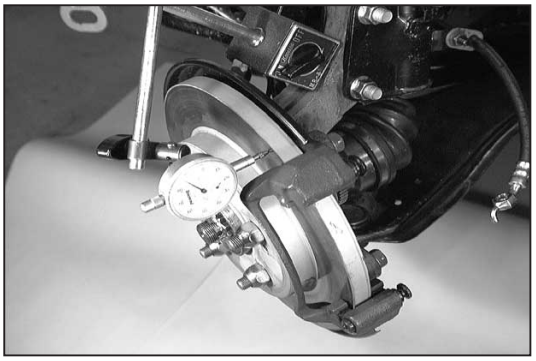

JBR00057-00048

12. Inspection of disc rotor runout
    (1) Secure the disc rotor with hub nuts properly.
    CAUTION:
    • Be sure to use suitable hub nuts if the hub is of a decorated type.

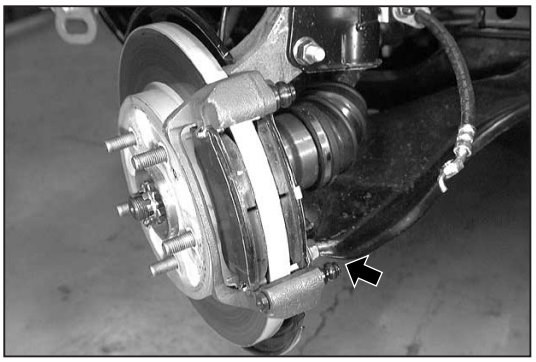
    (2) Ensure that the wheel bearings exhibit no looseness.
    If an excessive play is found, replace the wheel bearings.
    (3) Ensure that the disc rotor runout is within the specified value, using a dial gauge.
    Maximum disc runout: 0.10 mm

    CAUTION:
    • Be sure to check the runout at a point 10 mm inward from the outer edge of the disc rotor.

    If the measured runout exceeds the allowable limit, replace the disc with a new one.

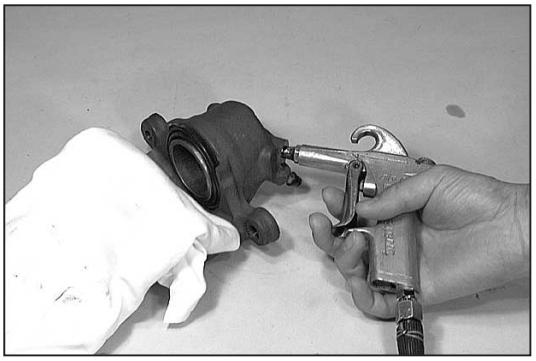

JBR00058-00049

13. Remove the pin boots from the disc brake cylinder mounting.
14. Remove the disc brake cylinder mounting by removing the attaching bolts.
15. Remove the disc rotor.


JBR00059-00050

Disassembly of front disc brake cylinder assembly

1. Removal of brake piston
   Apply compressed air gradually to the brake hose connecting hole of the disc brake cylinder assembly while a piece of cloth is placed at the piston end side, in order to prevent the piston from getting damaged and to prevent the brake fluid from splashing.
   WARNING:
   • Utmost care must be exercised so that your fingers or hands may not be pinched by the piston end.
   • Be sure to protect your eyes by wearing safety goggles when using compressed air.


JBR00060-00051

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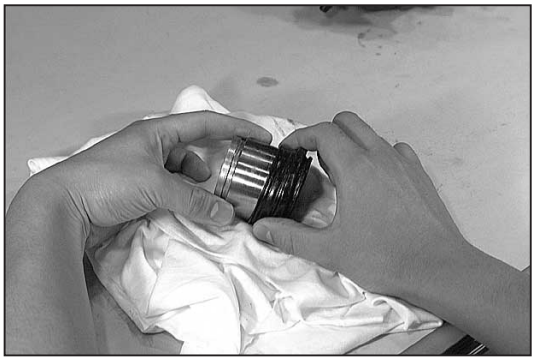
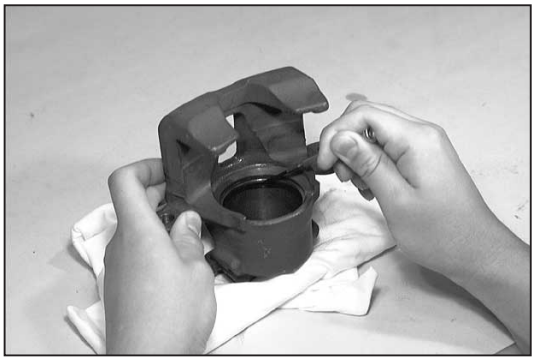
2. Remove the cylinder boot from the cylinder.



JBR00061-00052

3 Detach the piston seal from the cylinder, using a suitable minor screwdriver or the like.
CAUTION:
- Be very careful not to score the cylinder bore wall, etc. during the removal.



JBR00062-00053

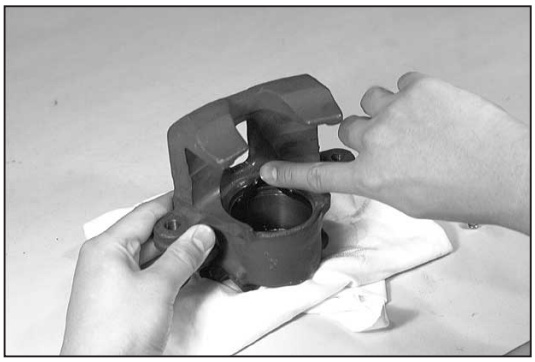
Assembly of front disc brake cylinder assembly

NOTE:
- The assembly procedure is basically reverse to the disassembly procedure. Therefore, some illustrations are not mentioned in this installation procedure.
- Please refer to the illustration mentioned in the disassembly procedure if any difficulty is encountered.

JBR00063-00000

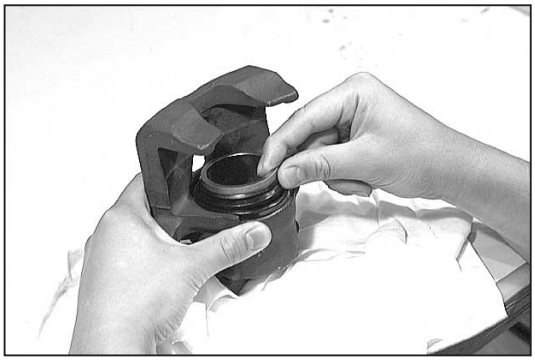
1. Assembly of front brake cylinder assembly
(1) Wash the disc brake cylinder and related parts, except rubber parts, with washing solvent and dry them with compressed air.
WARNING:
- Be sure to protect your eyes by wearing safety goggles, when using compressed air.
- If any damage, deformation, deterioration or wear exists on the components, replace the parts with new ones.

CAUTION:
- Replace the rubber parts with new ones.



JBR00064-00054

(2) Thinly apply brake rubber grease to the cylinder wall and the piston seal.
(3) Insert the piston seal to the groove in the disc brake cylinder.
(4) Thinly apply brake rubber grease to the piston and boot.
(5) Install the outer end of the boot to the groove in the cylinder.
(6) Insert the piston into cylinder through the boot, making sure that the piston is not tilted during the installation.
WARNING:
- Never score or damage the piston seal, boots, piston and cylinder during the installation.



JBR00065-00055

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(7) Insert the outer end of the boot to the groove provided on the piston properly.

CAUTION:

- Never score or damage the boots.

(8) Install the cylinder main pin to the disc brake cylinder assembly by hand.

JBR00066-00056

INSTALLATION

NOTE:

- The installation procedure is basically reverse to the removal procedure. Therefore, some illustrations are not mentioned in this installation procedure.
- Please refer to the illustration mentioned in the disassembly procedure if any difficulty is encountered.

JBR00067-00000

1. Install the disc rotor on the front hub.
   CAUTION:
   - Be sure to clean the disc rotor attaching surface of the front hub and disc rotor before assembly.
2. Install the disc brake cylinder mounting with the attaching bolts and tighten the attaching bolts to the specified tightening torque.
   Tightening Torque: 90.2 -135.3 N·m (9.2 - 13.8 kgf-m)
3. Thinly apply the brake rubber grease to the pin boots.
4. Install the pin boots to the disc brake cylinder mounting.
   NOTE:
   - Install the sub-cylinder slide pin boot, using the sub-cylinder slide pin.
5. Install the disc brake pad guide plates on the disc brake cylinder mounting.
6. Install the brake pads, anti-squeal shims and shims to the disc brake cylinder mounting.
7. Thinly apply the brake rubber grease to the sliding surface of the cylinder slide main pin.
8. Install the disc brake cylinder assembly to the disc brake cylinder mounting.
9. Turn over the disc brake assembly onto the disc brake pads, anti-squeal shims and shim while the pin boots of the sub-cylinder slide pin are being pushed by fingers.
   CAUTION:
   - Be very careful not to pull the brake hoses more than necessary. (When the brake hose is not disconnected)
   - Be very careful not to damage the pin boots during the assembly.
   - Care must be exercised so that the brake cylinder may not be interfered with the disc brake pads, anti-squeal shims and shim during the installation.

JBR00068-00000

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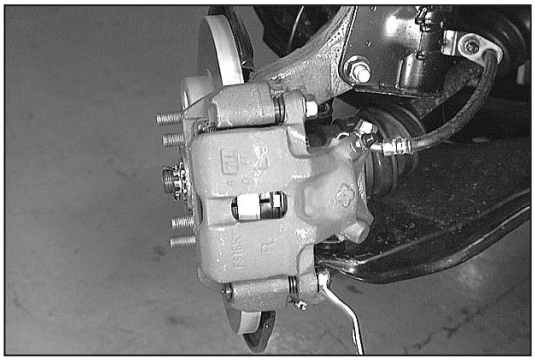
10. Thinly apply the brake rubber grease to the sliding surface of the sub-cylinder slide pin.
11. Install the sub-cylinder slide pin of the disc brake cylinder assembly to the disc brake mounting.
    CAUTION:
    - Be very careful not to damage the pin boot during the assembly.



JBR00069-00057

12. Tighten the main and sub cylinder slide pins to the specified tightening torque.
    Tightening Torque:
    Main: 78.5 - 88.3 N·m (8.0 - 9.0 kgf-m)
    Sub: 44.1 - 53.9 N·m (4.5 - 5.5 kgf-m)

13. Connect the brake hose to the disc brake cylinder assembly by the union bolt with new gaskets interposed.
14. Tighten the union bolt to the specified tightening torque.
    Tightening Torque: 26.5 - 34.3 N·m (2.7 - 3.5 kgf-m)

    NOTE:
    - Make sure that the brake hose is not twisted or stretched.
    - After completion of the installation, turn the steering wheel from lock to lock position. Make sure that the brake hose is not interfered with other parts.

15. Perform the air bleeding for the brake line.
    (Refer to the “Air bleeding” section.)
16. Ensure that no fluid leakage is present on the brake hose connected section and parts between the disc brake cylinder and the disc brake piston.
17. Install the front wheels.
18. Depress the brake pedal more than 10 times.
19. Check to see if the brake disc can rotate smoothly.
20. Ensure that no abnormal sound is emitted or no drag exists when the wheel is rotated.
21. Check the brake performance with a brake tester.

JBR00070-00000

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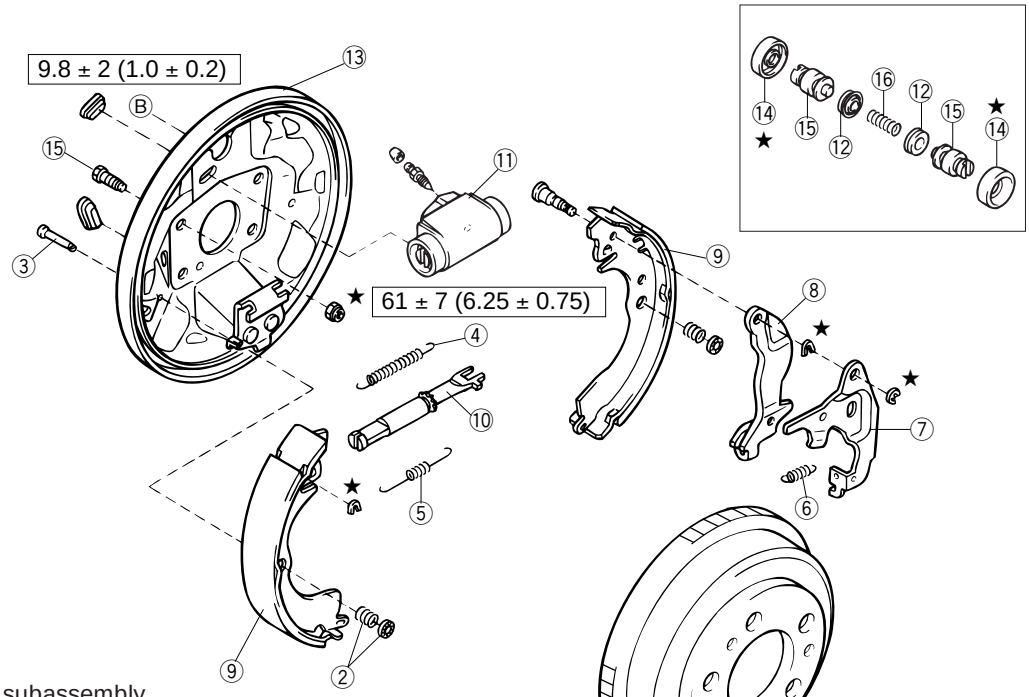
REAR BRAKE

COMPONENTS

□ : Tightening torque
Unit : N·m (kgf-m)
★ : Non-reusable parts

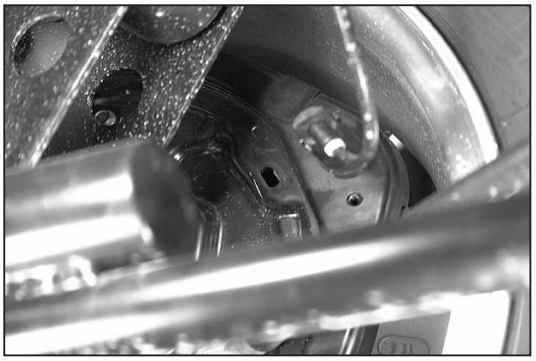


① Brake drum subassembly
② Shoe hold-down spring & retainer
③ Shoe hold-down spring pin
④ Tension No. 4 spring
⑤ Tension No. 3 spring
⑥ Tension spring
⑦ Automatic adjust lever (R, L)
⑧ Parking brake shoe lever (R, L)
⑨ Brake shoe assembly
⑩ Parking brake shoe strut
⑪ Cylinder assembly
⑫ Cylinder cap
⑬ Brake backing plate subassembly
⑭ Wheel cylinder boot
⑮ Wheel brake cylinder piston
⑯ Compression spring
⑰ Cylinder cup

JBR00071-00058

REMOVAL

1. Remove the hole plug at the inspection hole provided on the backing plate.
2. Inspect that the thickness of the brake shoe lining is more than the specified value, through the inspection hole.
   Standard thickness: 5.0 mm
   Minimum thickness: 1.0 mm



JBR00072-00059

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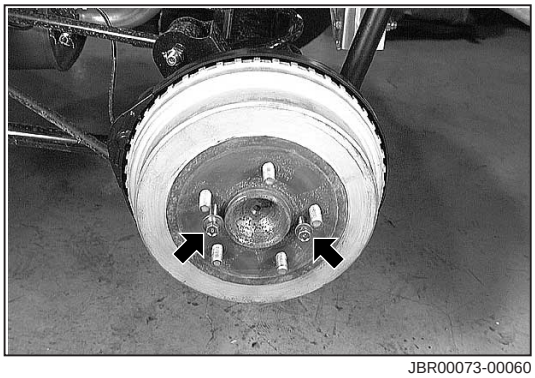
DISASSEMBLY

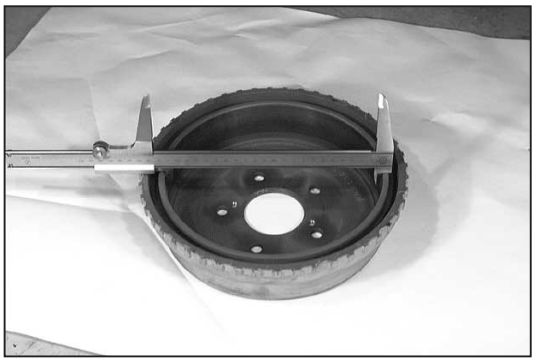
1. Jack up the vehicle and support it with safety stands.
   (Refer to the GI section.)
2. Drain the brake fluid from the rear brake line.
   (Refer to the Air breeding section.)
3. Remove the rear wheels.
4. Release the parking brake fully.
5. Remove the rear brake drum from the rear axle hub by pulling it out.
   NOTE:
   - If any difficulty is encountered in removing the brake drum, screw in the 8mm bolts to the brake drum evenly.
   - The bolt hole is offset. Therefore, after tightening the bolt to a certain extent, lightly tap the brake drum, using a plastic hammer or the like, so that the brake drum may be lifted up evenly.



JBR00073-00060

6. Check the brake drum inner diameter, using suitable vernier calipers.
   Specified Diameter: 228.6 mm
   Allowable Limit: 229.6 mm

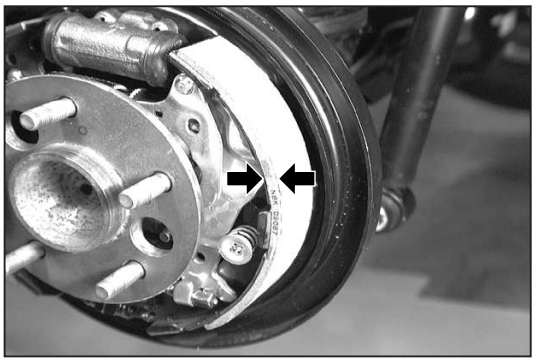
   If the diameter exceeds the specified value, replace the brake drum with a new one.



JBR00074-00061

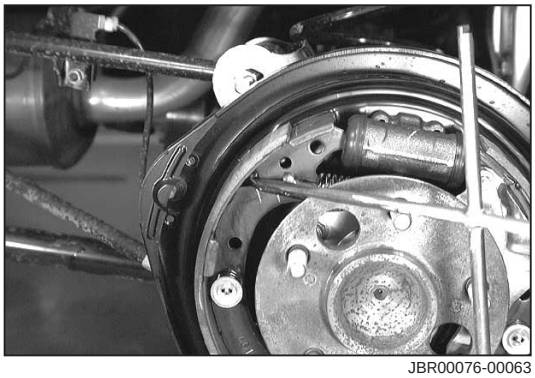
7. Check the brake shoe thickness, using suitable vernier calipers or ruler.
   Specified Thickness: 5.0 mm
   Allowable Limit: 1.0 mm

   If the diameter exceeds the specified value, replace the brake drum with a new one.
8. Check the brake shoe for seizure or abnormal wear, etc.
   If any damage exists, replace the brake shoe with a new one.



JBR00075-00062

9. Remove the tension No. 4 spring, using the following SST.
   SST: 09703-30010-000



JBR00076-00063

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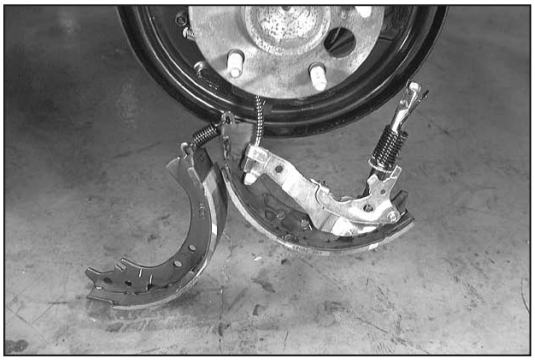
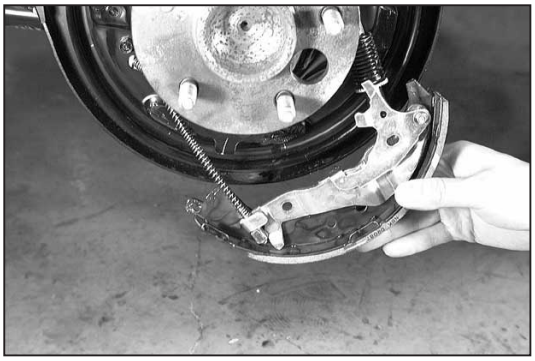
10. Remove the shoe hold-down spring pin retainers and springs from the shoe hold-down spring pins.
11. Remove the shoe hold-down spring pins.
12. Detach the brake shoes from the backing plate.
13. Remove the leading side brake shoe from the tension No. 3 spring.
14 Remove the tension No. 3 spring.
15. Remove the parking brake shoe strut from the brake shoe.



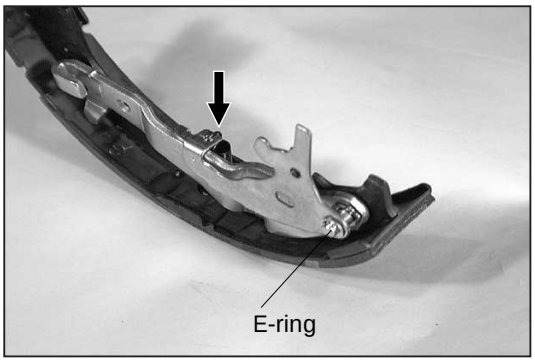
JBR00077-00064

16. Disconnect the parking brake cable from the parking brake shoe lever.
    NOTE:
    - If any difficulty is encountered in disconnecting the parking brake cable from the parking brake shoe lever, loosen the parking brake lever adjusting nut fully.



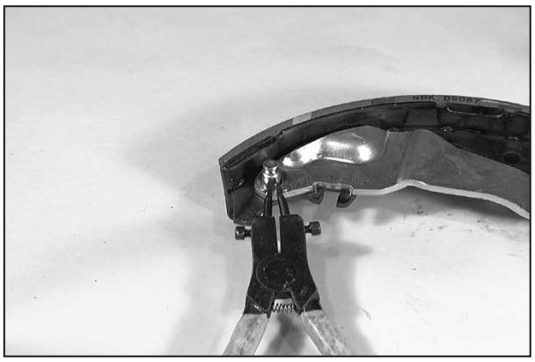
JBR00078-00065

17 Remove the tension spring.
18. Remove the automatic adjuster lever from the brake shoe by removing the E-ring.
    CAUTION:
    - Never reuse the removed E-ring.



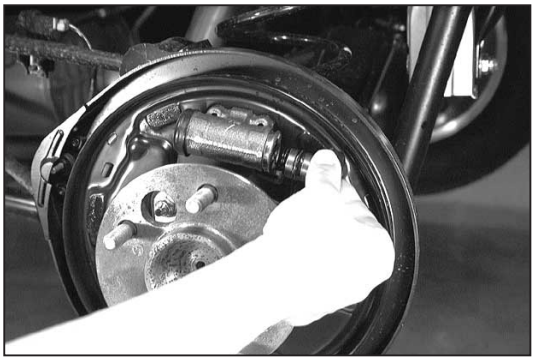
JBR00079-00066

19. Remove the parking brake shoe lever and parking brake lever pin from the brake shoe by extracting the C-ring, using outside nose pliers or the like.
    CAUTION:
    - Never reuse the removed C-ring.



JBR00080-00067

20. Remove the wheel cylinder boots, wheel cylinder pistons with the cup and compression spring from the wheel cylinder.
21. Remove the piston cup and boots from the wheel cylinder pistons.



JBR00081-00068

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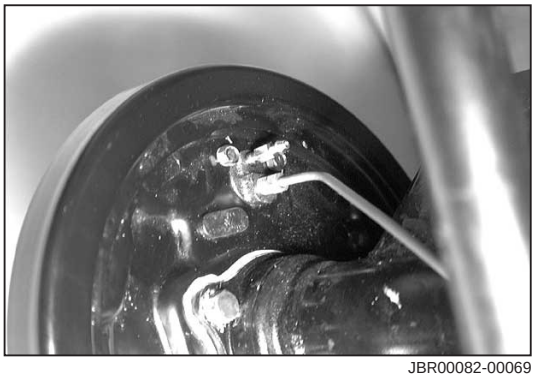
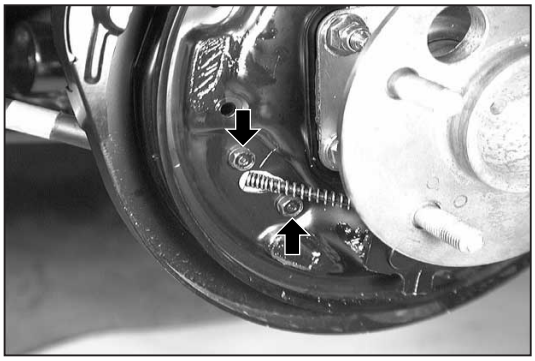
22. Disconnect the brake pipe from the wheel cylinder by disconnecting the flare nut, using a flare nut wrench.
23. Remove the wheel cylinder by removing the attaching bolts.



JBR00082-00069

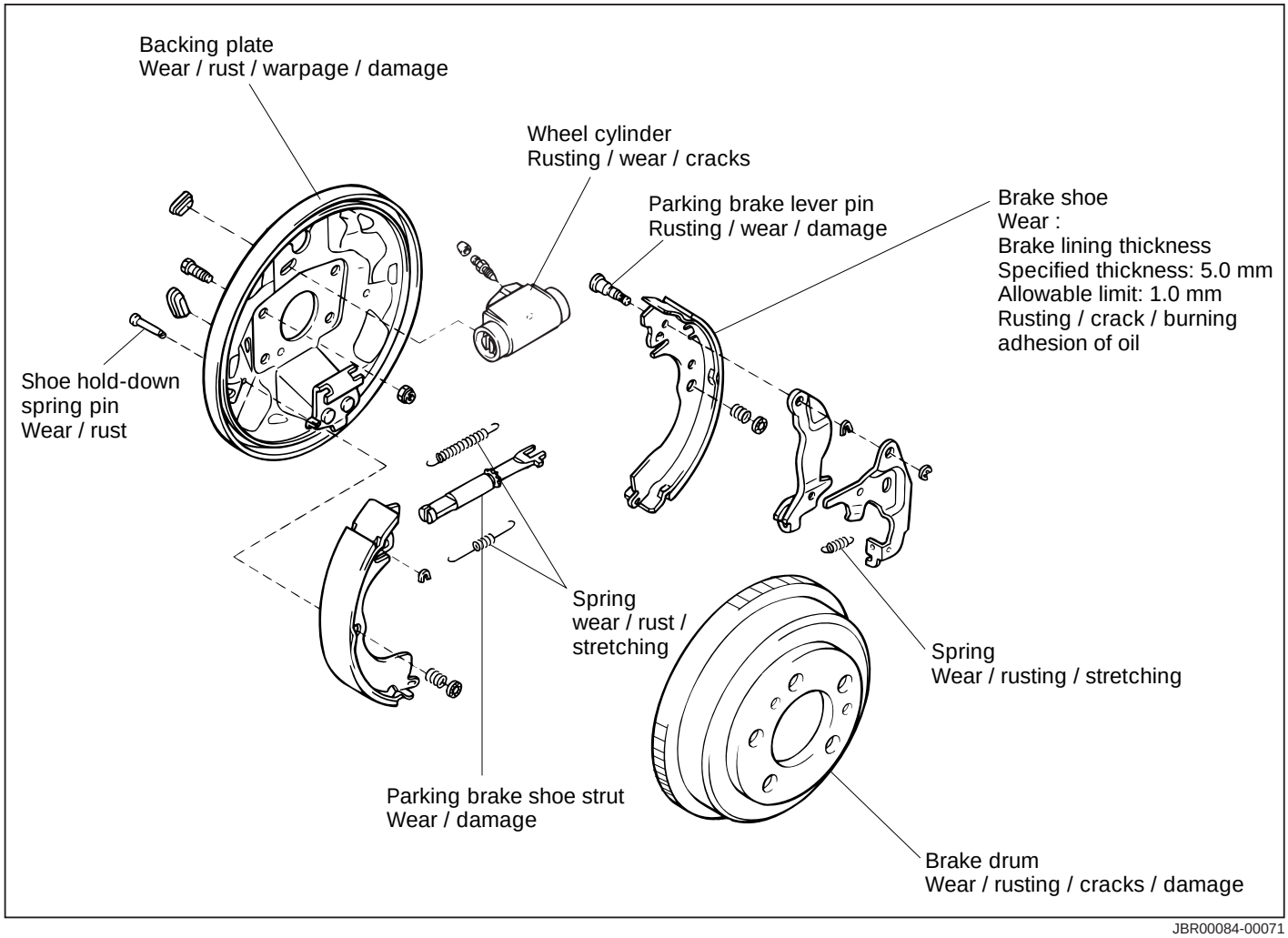
24. Disconnect the parking brake cable from the backing plate by removing the two attaching bolts.
25. Remove the wheel speed sensor by removing the attaching bolt. (Only when equipped)
26. Remove the backing plate.
(Refer to the RS section.)



JBR00083-00070

INSPECTION

1. Inspect the components with point mentioned in figure.
If any damage is found, replace the damaged parts with new ones.



JBR00084-00071

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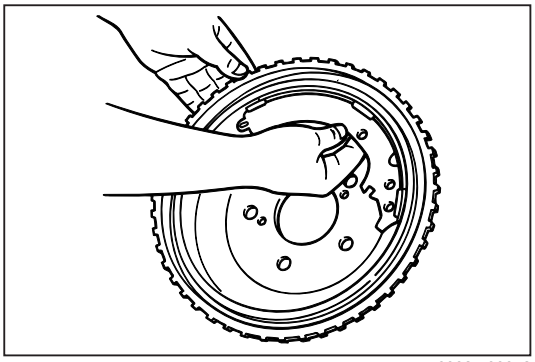
2. Checking of brake lining contacting condition with brake drum
   (1) Apply powder of chalk to the brake drum. Then, check the brake lining surface contacting condition with the brake drum by rubbing the brake lining in the brake drum.
   If the contacting condition of the brake lining with brake drum is poor, grind the brake lining surface with abrasive paper or the like.



JBR00085-00072

   CAUTION:
   - Replace the brake lining with a new one if an excessive uneven contact exists.
   - Ensure that the brake lining thickness is within the specified value after grinding.

   (2) Make sure that the contacting condition of the brake lining is sufficient after grinding the brake lining.
   (3) Clean the brake lining and brake drum after performing the checking of the brake lining contacting condition.

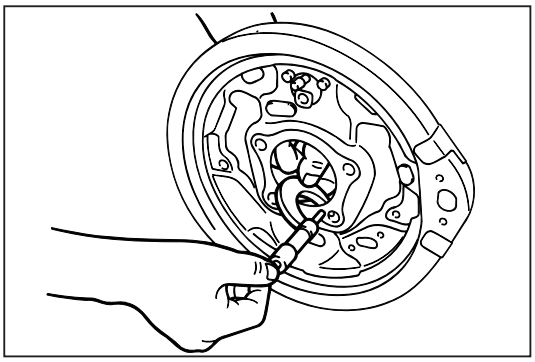
INSTALLATION

CAUTION:
- Be sure to apply brake grease to the metal and metal sliding surfaces, unless otherwise specified.

NOTE:
- The installation procedure is basically reverse to the removal procedure. Therefore, some illustrations are not mentioned in this installation procedure.
- Please refer to the illustration mentioned in the removal procedure if any difficulty is encountered.

JBR00086-00000

1. Installation of backing plate
   Refer to the RS section for installation of the backing plate. Be sure to select the correct shim when the backing plate is replaced with a new one in the manner described as follows.
   Selection of shim
   (1) Measure the thickness of the new backing plate.
   (2) Select the shim from the following table which corresponds to the thickness of the new backing plate.



JBR00087-00073

   Rear axle bearing retainer gasket (shim)

Thickness of backing plate	Thickness of shim
2.650 - 2.790	0.15
2.505 - 2.650	0.30
2.410 - 2.505	0.40

2. Install the backing plate with the selected shim.
   (Refer to the RS section for installation.)
3. Connect the parking brake cable to the brake backing plate with two attaching bolts and tighten them to the specified tightening torque.
   Tightening torque: 6.0 - 9.0 N·m (0.64 - 0.96 kgf-m)

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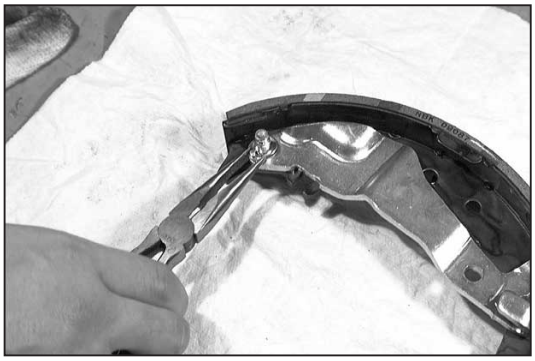
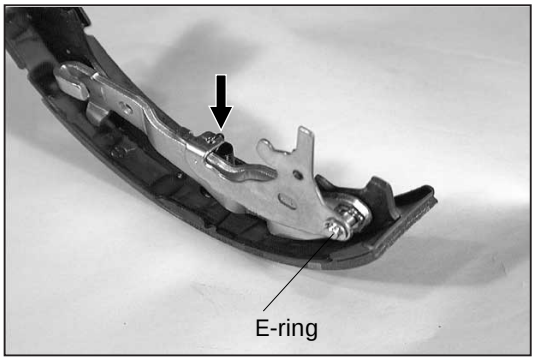
4. Thinly apply brake grease to the sliding portions of the parking brake shoe lever.
5. Install the parking brake shoe lever to the trailing side brake shoe with the parking brake lever pin together with a new C-ring. Then, retract the C-ring with pliers or the like.
   WARNING:
   - Never reuse the removed C-ring.

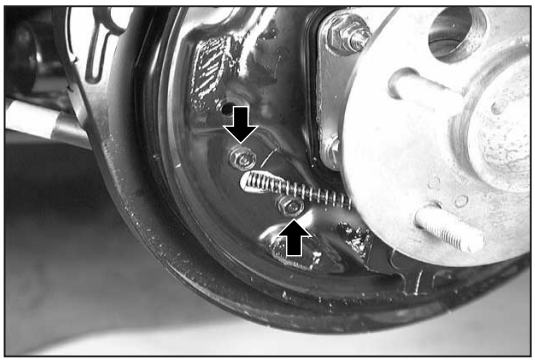

JBR00088-00074

6. Connect the automatic adjuster lever to the parking brake lever pin. Then, install the new E-ring.
7. Install the tension spring to the brake shoe and automatic adjuster lever.



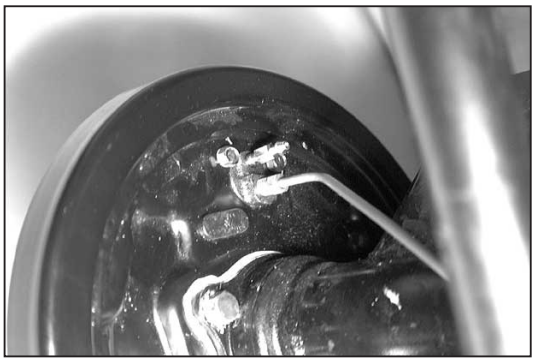
JBR00089-00075

8. Clean the backing plate thoroughly.
9. Connect the parking brake cable to the backing prate with two attaching bolts and tighten them to the specified tightening torque.


JBR00090-00076

10. Install the wheel cylinder to the backing plate with attaching bolts and tighten the attaching bolts to the specified tightening torque.
    Tightening Torque: 7.5 - 11.5 N·m (0.8 - 1.2 kgf-m)

11. Connect the flare nut of the brake tube to the wheel cylinder fully by hand and tighten the flare nut to the specified tightening torque.
    Tightening Torque: 12.7 - 17.6 N·m (1.3 - 1.8 kgf-m)


JBR00091-00077

12. Assemble new piston cups and rubber boots to the pistons.
13. Thinly apply brake rubber grease to the lip section of the piston cup.
    WARNING:
    - Never install the piston cups in a wrong direction. Failure to observe this warning may lead to brake fluid leakage or serious brake malfunction.

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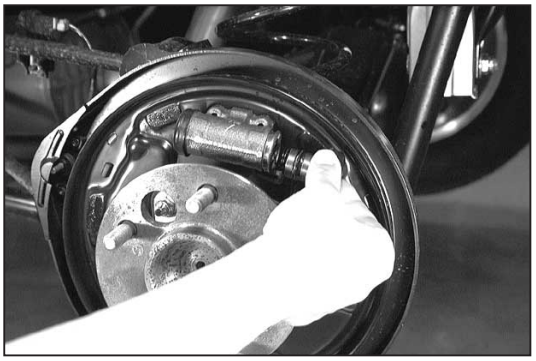
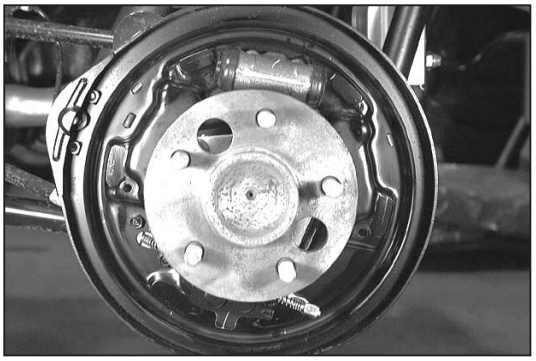
14. Install the compression spring and wheel cylinder pistons with the wheel cylinder boots to the wheel cylinder.
    NOTE:
    - Loosen the bleeder plug fully before installing the wheel pistons.



JBR00092-00078

15. Apply brake grease to the six brake shoe contacting points on the backing plate, one point each on the wheel cylinder pistons and two points on the brake lining anchor.
    WARNING:
    - Be careful not to allow lubricants, such as grease or oil etc., to get to the wheel cylinder boot or brake shoe lining.



JBR00093-00079

16. Connect the parking brake cable to the parking brake shoe lever.
17. Install the rear side brake shoes on the backing plate with the shoe hold-down pin, spring and retainer.
18. Connect the tension spring to the back side of the brake shoe.
19. Connect the other side of the brake shoe to the tension spring.
20. Thinly apply brake grease to the sliding section of the parking brake shoe strut.

JBR00094-00000

21. Install the other side of the brake shoe to the backing plate with the shoe hold-down pin, spring and retainer while placing the parking brake shoe strut in position.
22. Install the tension No. 4 spring to the brake shoes, using the following SST.
    SST: 09921-00010-000

23. Clean the brake drum contacting surface of the rear axle hub and axle hub contacting surface of the brake drum properly.
24. Install the brake drum to the rear axle hub.
    CAUTION:
    - Never allow the brake drum to interfere with the brake shoe during the installation.
    - Make sure that the parking brake lever strut is retracted fully before the installation.

25. Install the rear wheels.
    Tighten the attaching hub nuts to the specified tightening torque.
    Tightening Torque: 103.0 ± 14.7 N·m (10.5 ± 1.5 kgf-m.)

26. Perform air bleeding. (Refer to the “Air bleeding” section.)
27. Apply the parking lever several times, until the clicking sounds emitted from the rear brake will stops.

JBR00095-00000

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Reference:

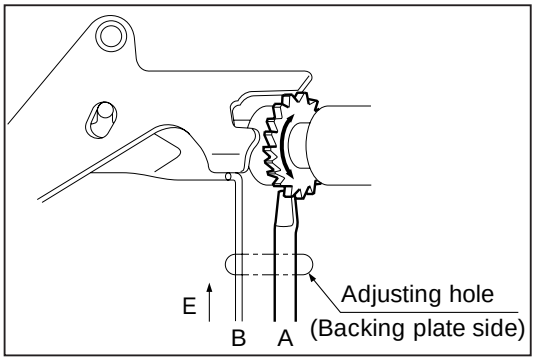
Manual adjusting method of brake shoe-to-drum clearance

NOTE:

- The illustration shows the brake at the right hand side. The brake at the left hand side is symmetric to the brake at the right hand side.

(1) Remove the adjusting hole plug provided on the backing plate.
(2) Turn the adjusting wheel by a flat screwdriver (A) inserted from the adjusting hole in the direction (C) as shown in the figure, until the brake shoe comes in contact with the brake drum.
(3) Turn back the adjusting wheel in the direction (D) by the screwdriver (A) while pushing up the adjusting lever with the L-shaped head bar (E), until the brake drum turns without dragging.
(4) Install the adjusting hole plug to the backing plate.

28. Adjust the working travel of the parking brake lever.
(Refer to the “Parking brake” section for adjustment.)
29. Check the brake performance with a four-wheel brake tester.



JBR00096-00080

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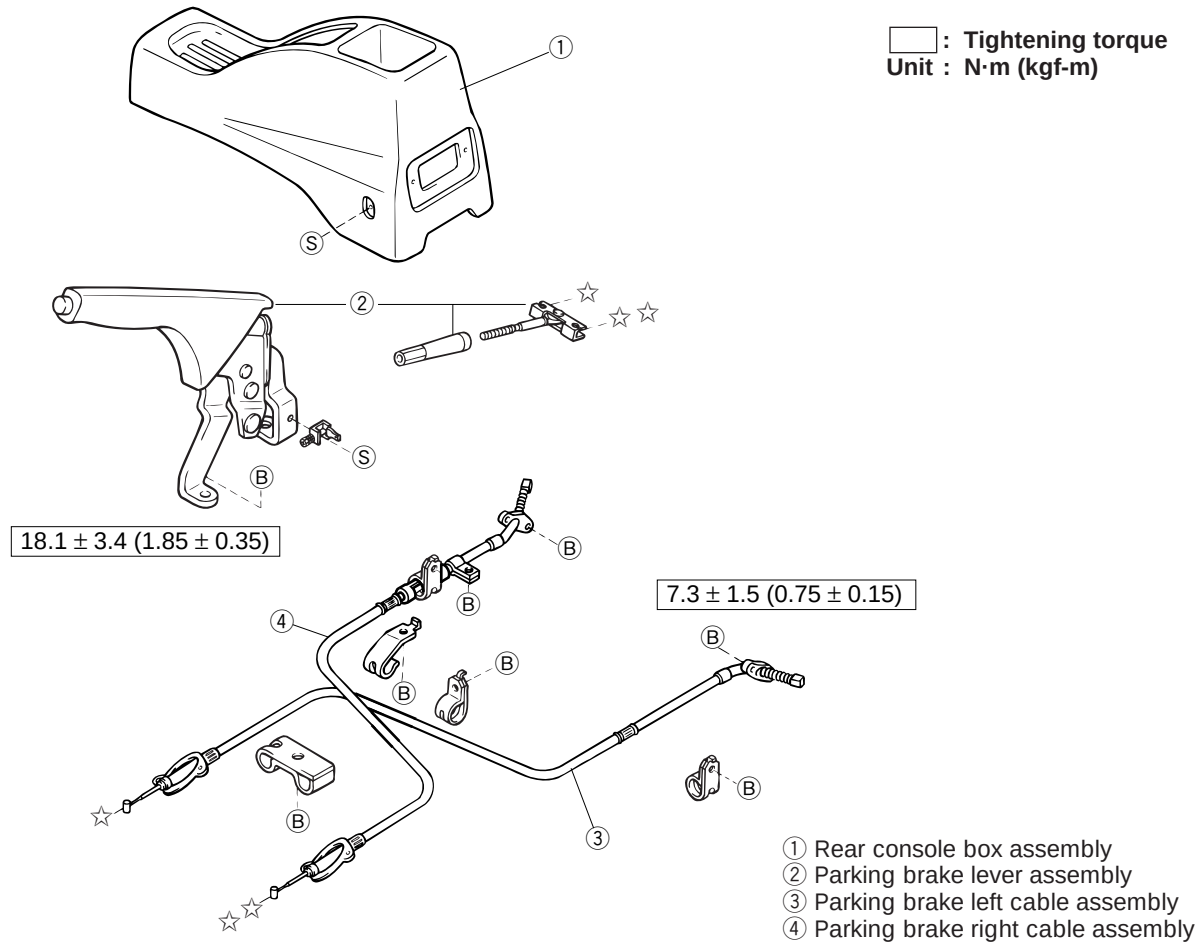
PARKING BRAKE

COMPONENTS



JBR00097-00081

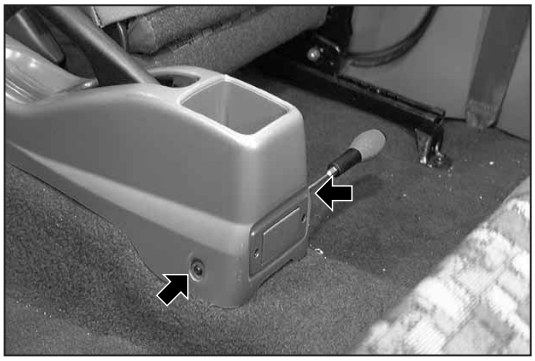
INSPECTION

1. Pull up the parking brake control handle several times and place it to fully-returned position.
2. Ensure that the parking brake control handle travel is 5 to 7 notches when the parking brake control handle in pulled up with a force of 196 N (20 kgf).
   If the number of the notches fails to meet the specified numbers, adjust the parking brake control handle travel to the specified value.

JBR00098-00082

ADJUSTMENT

1. Depress the brake pedal fully several times and ensure that the parking control lever travel fails to meet the specified notches.
2. Remove the rear console box by removing the two attaching screws.



JBR00099-00083

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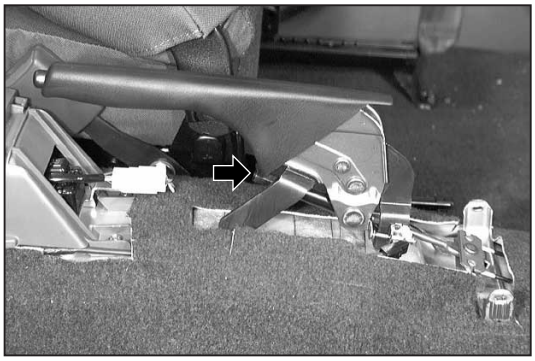
3. Adjust the parking brake control handle travel to the specified number of notches by turning the adjusting nut of the parking brake pull rod.
   Specified Value: 5 - 7 notches

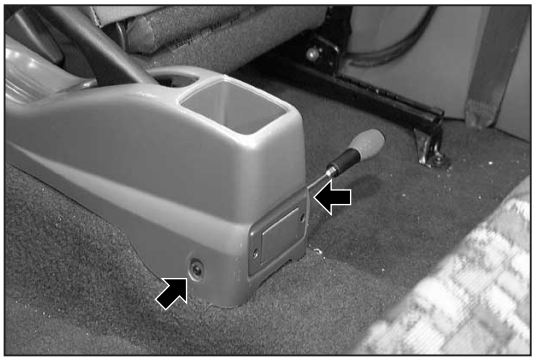
   CAUTION:
   - Be sure to use a hexagon socket (box) wrench for adjustment to prevent the adjusting nut from being damaged.

4. Install the rear console box with the two attaching screws.

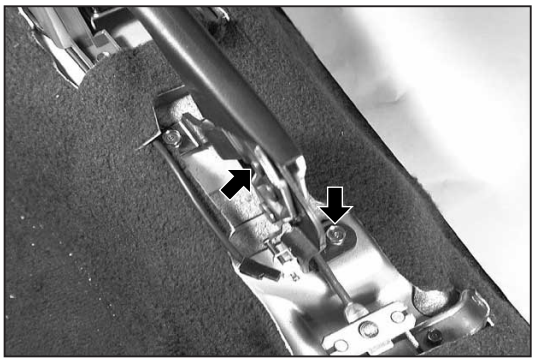

JBR00100-00084

REMOVAL

1. Remove the rear console box by removing the two attaching screws. (Refer to the BO section.)


JBR00101-00085

2. Remove the adjusting nut from the parking brake pull rod.
3. Disconnect the connector from the parking brake switch.
4. Remove the parking brake control handle by removing the two attaching bolts.


JBR00102-00086

5. Remove the parking brake pull rod by disconnecting the parking brake cables from the parking brake pull rod.
6. Lift up the vehicle and support the vehicle with safety stands.
   (Refer to the GI section for supporting section of the safety stands.)
7. Disconnect the parking brake cable assembly from the brake backing plate.
   (Refer to the rear brake section.)
8. Remove the parking brake cable by removing the attaching bolts of the parking brake cable and its clamps.
9. Remove the clamps from the parking brake cable assembly.

JBR00103-00000

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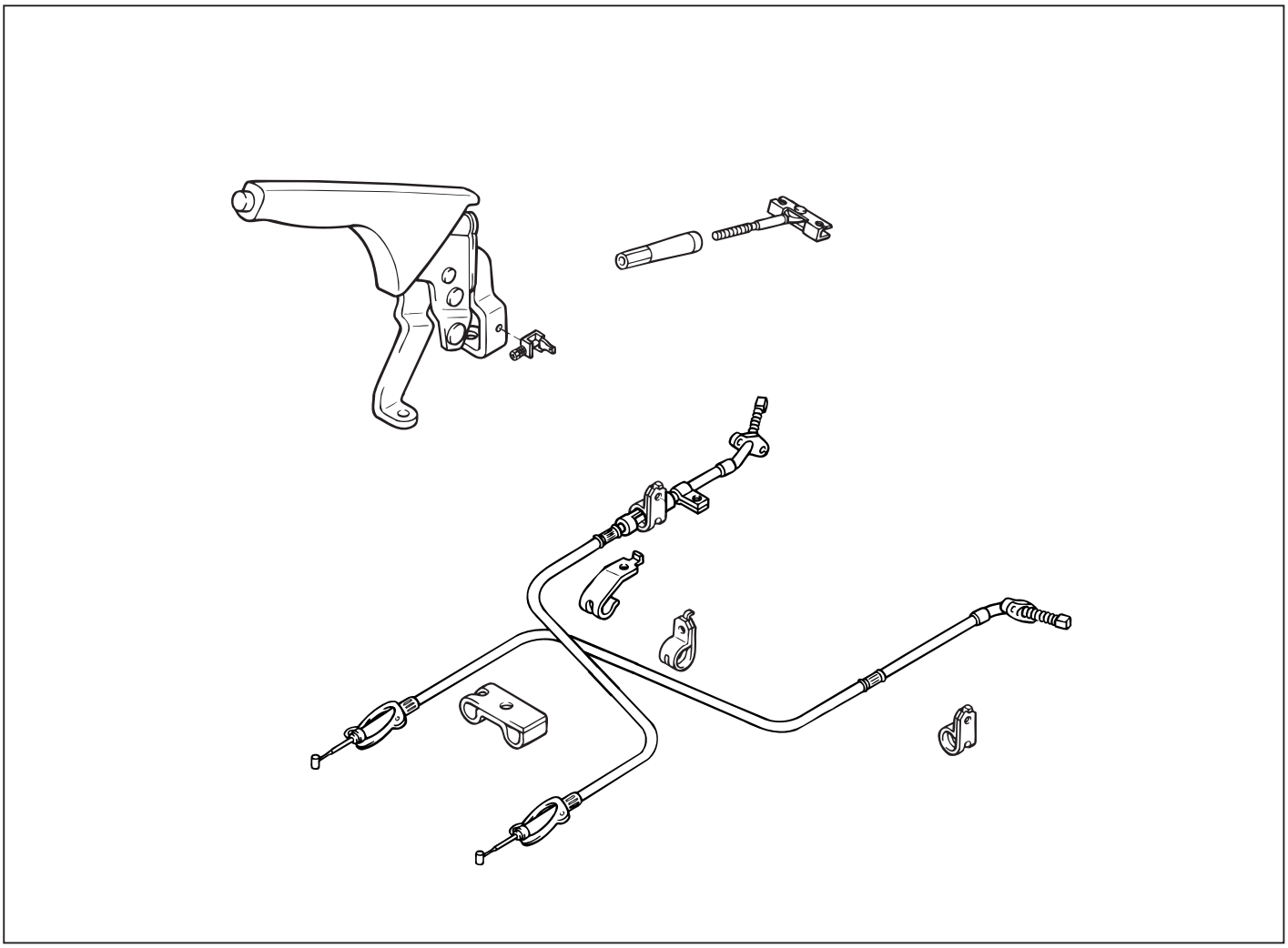
INSPECTION

Inspect the components with the following point. Replace any damaged parts.



JBR00104-00087

INSTALLATION

NOTE:
- The installation procedure is basically reverse to the removal procedure. Therefore, some illustrations are not mentioned in this installation procedure.
- Please refer to the illustration mentioned in the removal procedure, if any difficulty is encountered.

1. Install the parking brake cable to the vehicle with the attaching bolts of the parking brake cable and its clamps.
   Tightening Torque: 5.8 - 8.8 N·m (0.6 - 0.9 kgf-m)

2. Connect the parking brake cable assembly to the brake backing plate. (Refer to the rear brake section.)
3. Lift down the vehicle.
4. Connect the parking brake cables to the parking brake pull rod.
5. Install the parking brake handle assembly to the floor panel while connecting the parking brake pull rod to the parking brake handle assembly and tighten the attaching bolts to the specified tightening torque.
   Tightening Torque: 14.7 - 21.6 N·m (1.5 - 2.0 kgf-m)

6. Install the adjusting nut.
7. Connect the connector of the parking brake switch.
8. Perform the adjustment of the parking brake lever. (Refer to the adjustment section.)
9. Install the rear console box with the two attaching screws.

JBR00105-00000

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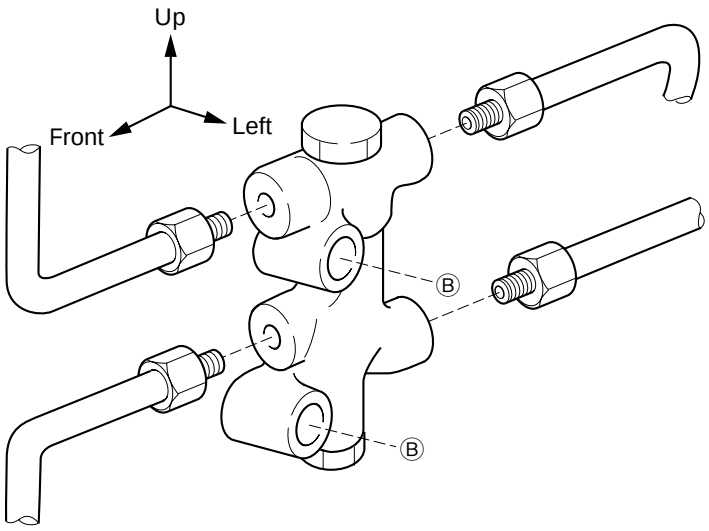
PROPORTIONING VALVE

COMPONENTS



JBR00106-00088

INSPECTION

Inspect the proportioning valve function with a four-wheel brake tester.

1. Place the vehicle on the four-wheel brake tester.
2. Ensure that the rear wheels will not be locked before the front wheels are locked.
   If the rear wheel will be locked simultaneously or before the front wheels are locked, replace the proportioning valve with a new one.

JBR00107-00000

REPLACEMENT

1. Open the engine hood.
2. Drain the brake fluid from the brake line.
   (Refer to the “Air bleeding” section.)
3. Remove the battery and battery carrier. (For RHD vehicle)
4. Disconnect the brake tubes from the proportioning valve.
5. Remove the proportioning valve by removing the attaching bolts.

JBR00108-00000

INSTALLATION

1. Install a new proportioning valve with the bolts and tighten them to the specified tightening torque.
   Tightening Torque: 13 - 15 N·m (1.3 - 1.5 kgf-m)

2. Connect the brake tubes to the proportioning valve fully by hand.
3. Tighten the flare nut to the specified tightening torque.
   Tightening Torque: 12.7 - 17.6 N·m (1.3 - 1.8 kgf-m)

4. Perform the air bleeding for the brake system.
   (Refer to the “Air bleeding” section.)
5. Perform the brake performance test with a four-wheel brake tester.

JBR00109-00000

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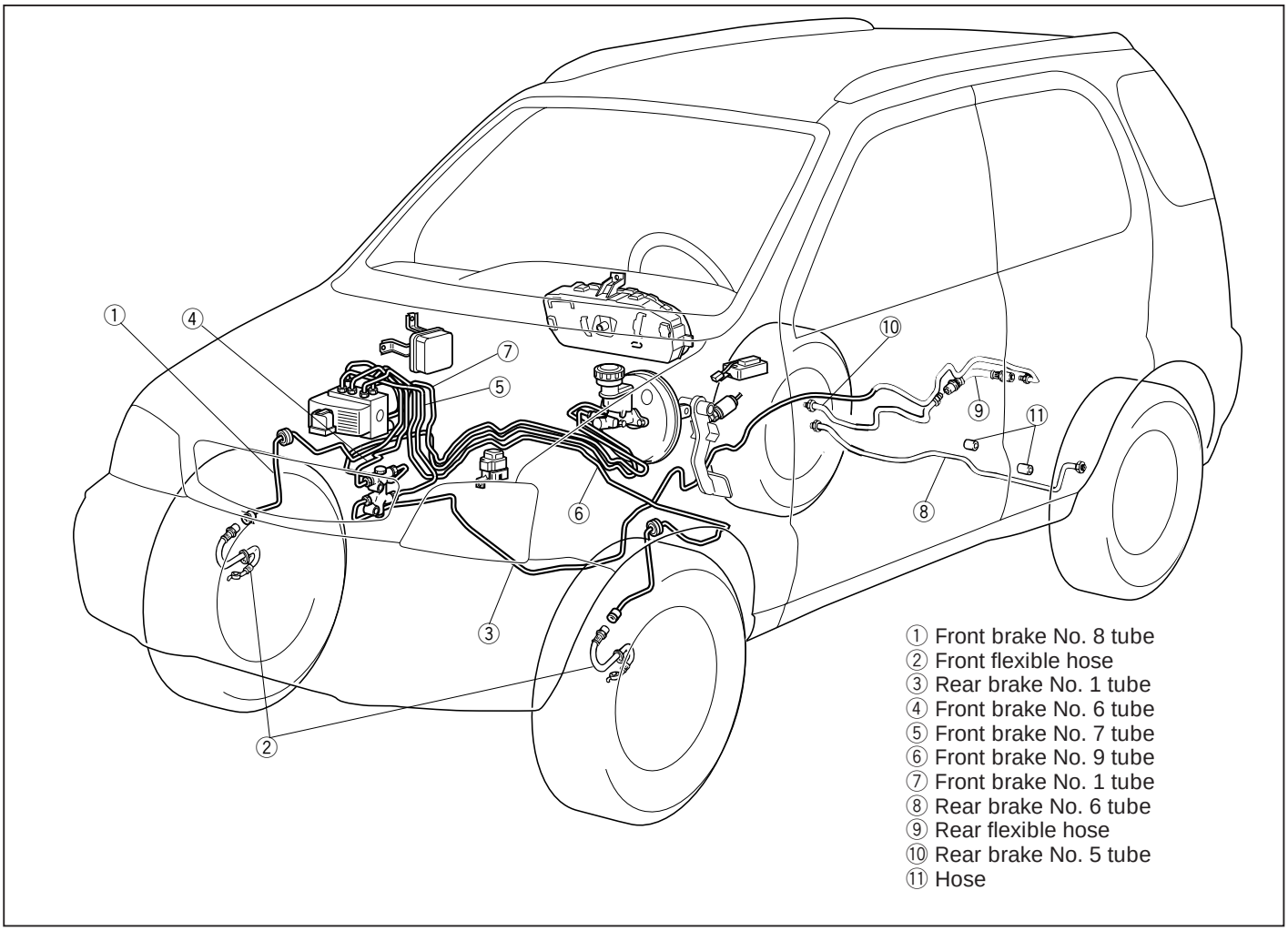
BRAKE HOSE

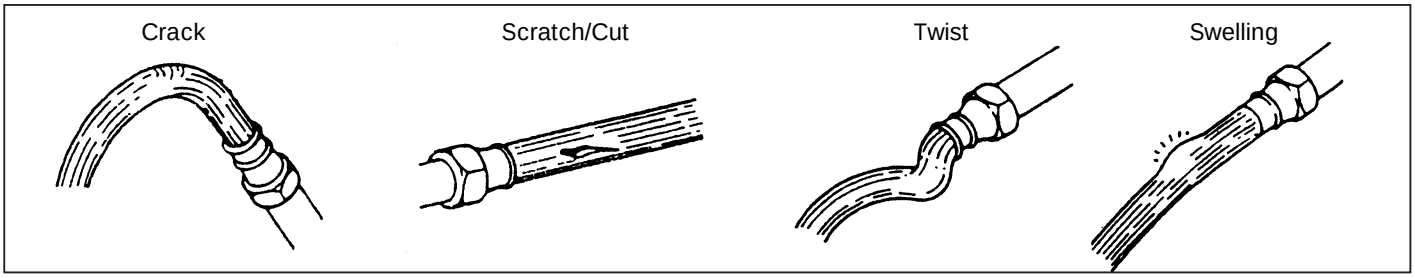
COMPONENTS



JBR00110-00089

INSPECTION

Inspect the brake hose for following points and replace it with a new one if any damage exists.

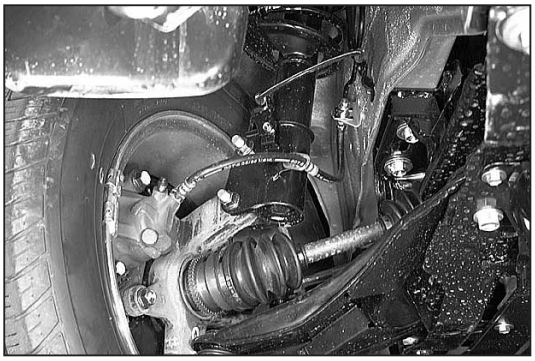


JBR00111-00090

REPLACEMENT

Front brake hose

1. Drain the brake fluid from the brake system. (Refer to the “Air bleeding” section.)
2. Disconnect the flare nut of the brake pipe from the brake hose, using a flare nut wrench.
3. Disconnect the brake hose from the clamp by removing the E-ring.
   NOTE:
   - Never reuse the used E-ring.



JBR00112-00091

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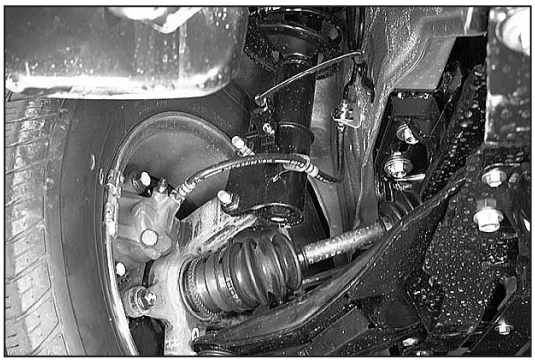
4. Disconnect the brake hose from the disc brake cylinder assembly by removing the union bolts and washers.
   CAUTION:
   • Do not reuse the used washers.

5. Remove the brake hose by removing the attaching bolt of the clamp bolts.
6. Install the brake hose with the clamp bolt and tighten the clamp bolt to the specified tightening torque.
   Tightening Torque: 6.9 - 15.7 N·m (0.7 - 1.6 kgf-m)

7. Connect the brake hose to the disc brake cylinder assembly with the union bolt with a new gasket interposed.

JBR00113-00000



JBR00114-00092

8. Tighten the union bolt to the specified tightening torque.
   Tightening Torque: 26.5 - 34.3 N·m (2.7 - 3.5 kgf-m)

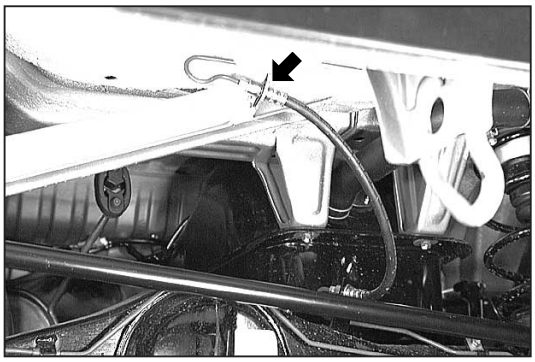
9. Connect the brake hose to the bracket and secure it by installing a new E-ring.
   CAUTION:
   • Be sure to connect the E-ring in such a manner that the E-ring is securely inserted in the groove provided on the brake hose end properly.

10. Connect the flare nut of the brake pipe to the brake hose fully by hand.
11. Tighten the flare nut to the specified tightening torque.
    Tightening Torque: 12.7 - 17.6 N·m (1.3 - 1.8 kgf-m)

12. Perform the air bleeding.
    (Refer to the “Air bleeding” section.)
13. Ensure that no brake fluid leakage exists.

Rear brake hose

1. Drain the brake fluid from the brake system.
   (Refer to the “Air bleeding” section.)
2. Disconnect the flare nut of the brake pipes from the brake hose, using a flare nut wrench.
3. Remove the brake hose from the clamps by removing the E-rings.
   WARNING:
   • Never reuse the used E-rings.



JBR00115-00093

4. Connect the brake hose to the brackets and secure it by installing new E-rings.
   WARNING:
   • Never reuse the used E-ring.
   • Be sure to connect the E-ring in such a manner that the E-ring is securely inserted in the groove provided on the brake hose end properly.

5. Connect the flare nuts of the brake pipes to the brake hose fully by hand.
6. Tighten the flare nuts to the specified tightening torque.
   Tightening Torque: 12.7 - 17.6 N·m (1.3 - 1.8 kgf-m)

7. Perform the air bleeding.
   (Refer to the “Air bleeding” section.)
8. Ensure that no brake fluid leakage exists.

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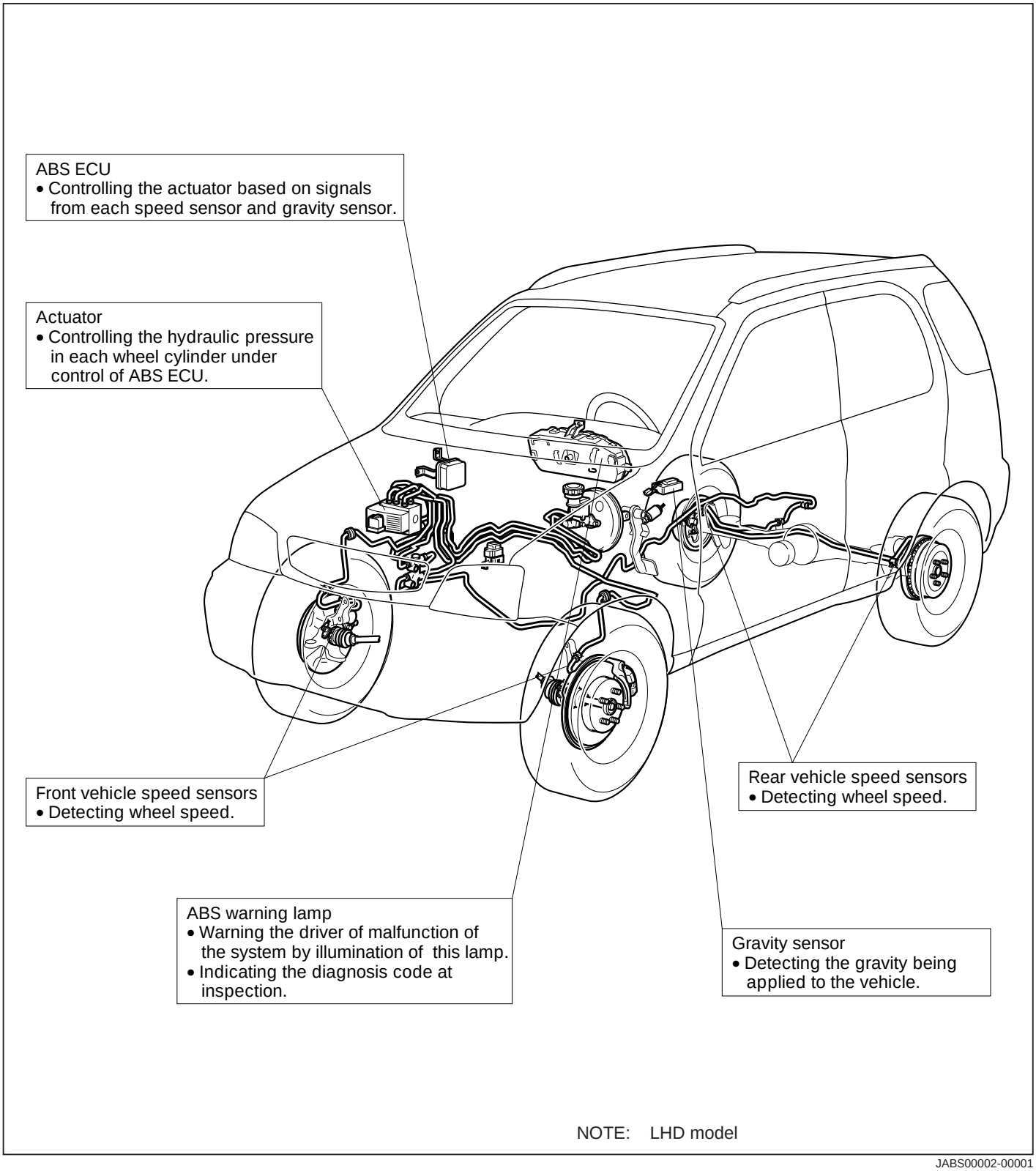
ANTI-LOCK BRAKE SYSTEM

SYSTEM OUTLINE

The ABS is a brake system to prevent the wheels from locking which may cause the vehicle to slip. For this purpose, the ABS assures proper braking forces at all times by maintaining the coefficient of friction between the tires and the road surface to an optimum level through controlling the hydraulic pressure of each of the front right, front left and rear wheels. In this way, the controllability or steerability of the steering wheel is assured even under sudden braking/hard braking, except for the case of over-speeding or sharp turning in a corner.



NOTE: LHD model

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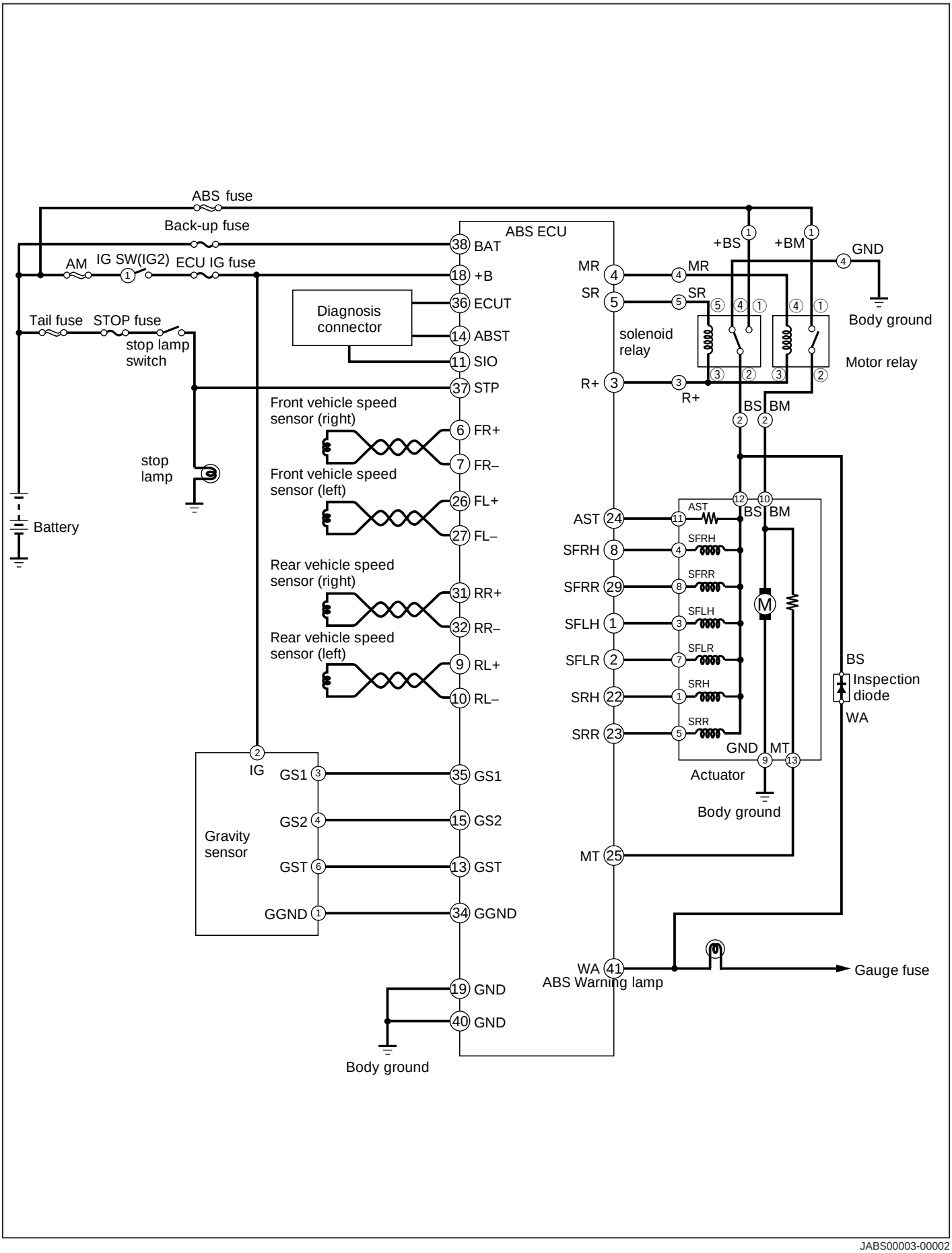
JABS CIRCUIT DIAGNOSIS



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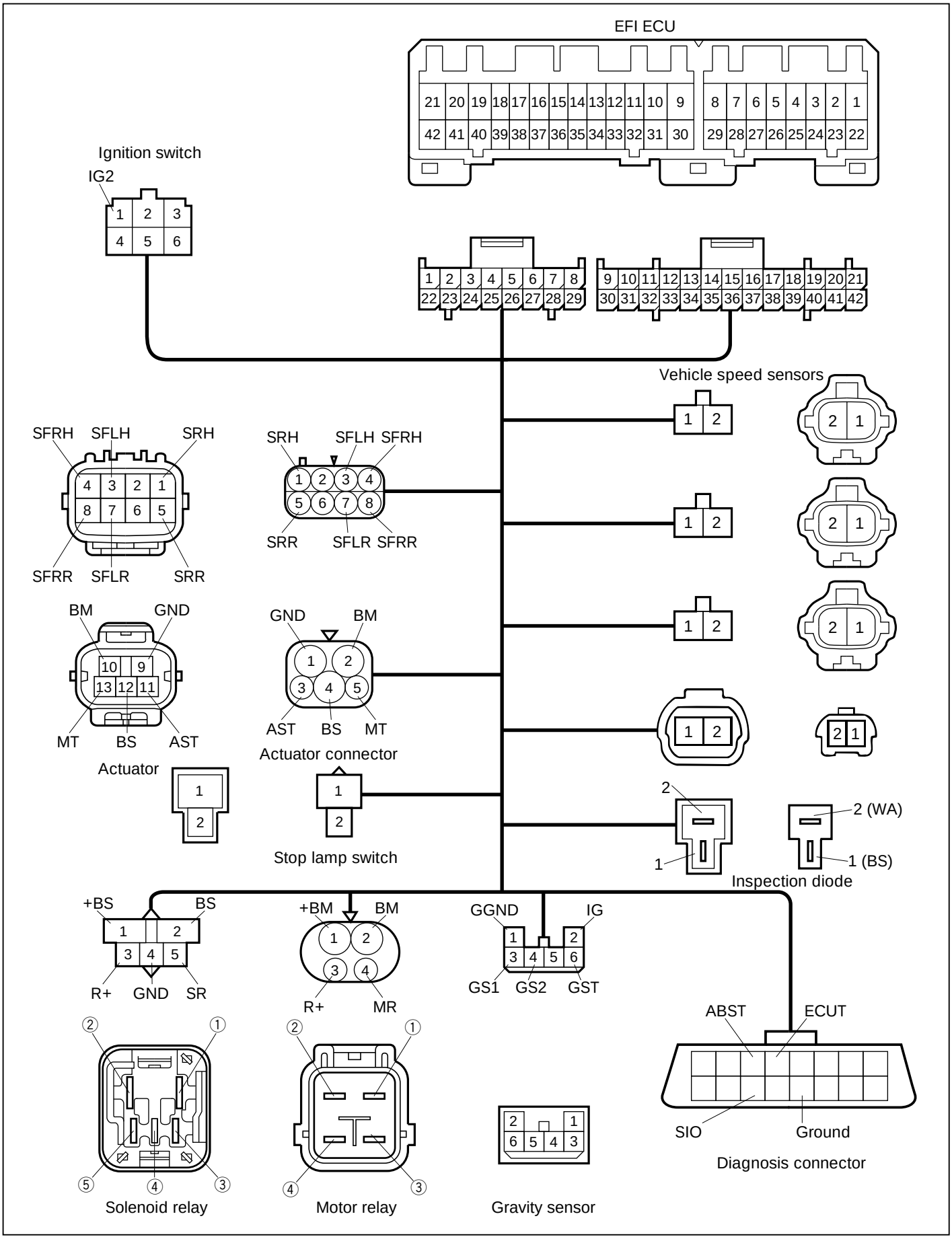
ABS RELATED CONNECTORS



ABS00004-00003

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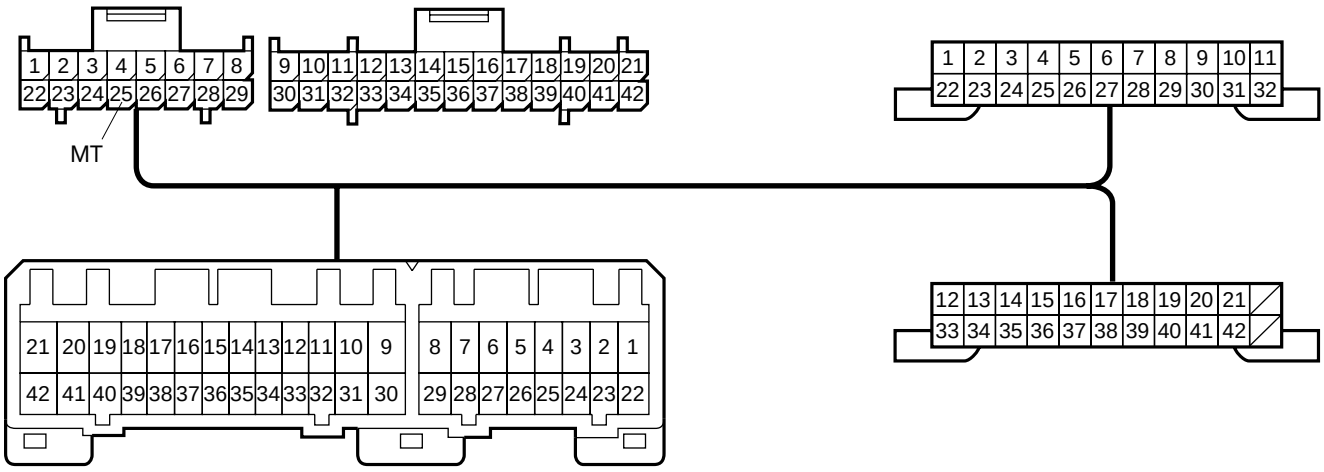
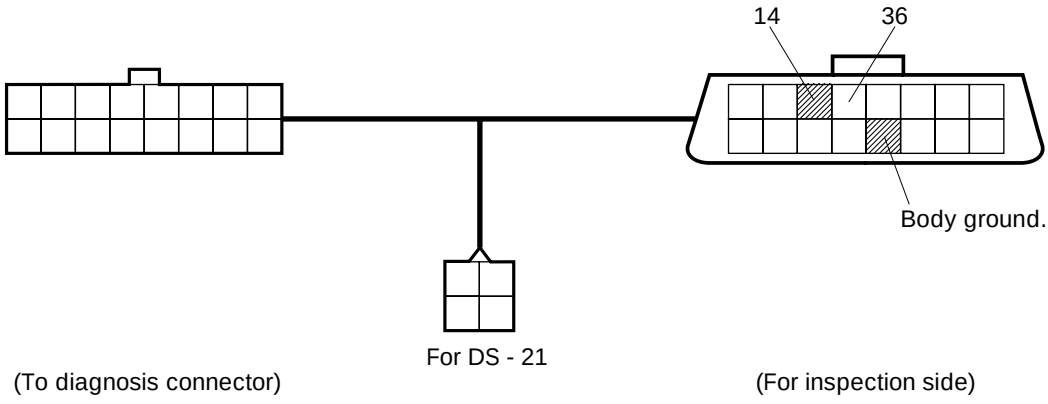
SST (Sub - harness)



SST (Diagnosis connector)



ABS00000-00004

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ABS CIRCUIT CONNECTION TABLE

ABS ECU SST (Sub-harness)		Terminal name	Terminal No.								
			ABS actuator								
				Gravity sensor							
					Solenoid relay						
						Motor relay					
							Speed sensor				
							Front		Rear		
No.	Terminal connected to						RH	LH	RH	LH	Others
1	SFLH terminal of actuator	SFLH	③								
2	SFLR terminal of actuator	SFLR	⑦								
3	R+ terminal of motor and solenoid relay	R+			③	③					
4	MR terminal of motor relay	MR				④					
5	SR terminal of solenoid relay	SR			⑤						
6	Front right speed sensor (+)	FR+					②				
7	Front right speed sensor (–)	FR–					①				
8	SFRH terminal of actuator	SFRH	④								
9	Rear left speed sensor (+)	RL+								①	
10	Rear left speed sensor (–)	RL–								②	
11	SIO terminal diagnosis connector	SIO									Diagnosis connector *1
12		NIL									
13	GST terminal of gravity sensor	GST		⑥							
14	ABST terminal of diagnosis connector	ABST									Diagnosis connector *1
15	GS2 terminal of gravity sensor	GS2		④							
16		NIL									
17		NIL									
18	Ignition switch (IG 2)	+B									Ignition switch (IG 2) *2
19	Body ground	GND									Body ground *3
20	*Internal check use only	D/G									Never touch !! *4
21		NIL									
22	SRH terminal of actuator	SRH	①								
23	SRR terminal of actuator	SRR	⑤								
24	AST terminal of actuator	AST	⑪								
25	MT terminal of actuator	MT	⑬								
26	Front left speed sensor (+)	FL+						②			
27	Front left speed sensor (–)	FL–						①			
28		NIL									
29	SFRR terminal of actuator	SFRR	⑧								
30		NIL									
31	Rear right speed sensor (+)	RR+							①		
32	Rear right speed sensor (–)	RR–							②		
33		NIL									
34	GGND terminal of gravity sensor	GGND		①							
35	GS1 terminal of gravity sensor	GS1		③							
36	ECUT terminal of diagnosis connector	ECUT									Diagnosis connector *1
37	Stop lamp switch	STP									Stop lamp switch *2

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ABS ECU SST (Sub-harness)		Terminal name	Terminal No.								
			ABS actuator								
				Gravity sensor							
					Solenoid relay						
						Motor relay					
							Speed sensor				
							Front		Rear		
No.	Terminal connected to						RH	LH	RH	LH	Others
38	Back-up fuse	BAT									Back-up fuse *3
39		NIL									
40	Body ground	GND									Body ground *3
41	ABS warning lamp	WA									Combination meter *2 Inspection diode
42		NIL									
–		BS	⑫		②						Inspection diode
–		BM	⑩			②					
–		GND	⑨								Body ground *3
–		+BS, +BM			①						ABS fuse *3
–		+B		②							ECU IG fuse *3
–		GND			④						Body ground *3

*1 : Refer to page ABS–3 and 4.

*2 : Refer to BE section.

*3 : Refer to HW section.

*4 : CAUTION:

- Never touch and connect anything to this terminal. Failure to observe this caution may lead to ABS ECU malfunction.

ABS00005-00000

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PRECAUTIONS

1. The ABS system has a self-diagnosis function. The ECU memorizes abnormality as diagnosis codes which are occurring at present or occurred in the past.
   Memorized diagnosis codes are erased when the power supply is disconnected. Therefore, be sure to read out diagnosis codes before starting any operations.
   CAUTION:
   - Be sure to read out diagnosis codes of the EFI system before disconnecting the power supply. Failure to observe this caution will erase memorized diagnosis codes.

2. The components of the ABS system are precise and delicate. Therefore, never apply any excessive impact during the removal, inspection and installation.
   CAUTION:
   - Never use components to which an impact is applied by dropping or hitting with other objects.

3. Never perform the inspection of the ABS system when the vehicle is wet, such as after running in rain or snow and after washing, in order to prevent water or dust, etc. from being admitted into the ABS and related connectors.
4. Never allow water and dust, etc. to enter into the ABS and related connectors.
5. Never allow water, etc. to come in contact with the ABS components installed in the cabin and their connectors.
6. Prevent water from coming in contact with the ABS related parts and connectors during washing.
7. Prior to replacing the ABS ECU, thoroughly perform the trouble shooting for possible items other than the ABS ECU. The ABS ECU is a reliable, but an expensive part.
   Even when the ABS ECU is replaced according to the check results of the trouble shooting and the relevant trouble has been remedied, be sure to reinstall the old ABS ECU so as to confirm that the malfunction was obviously caused by the faulty ABS ECU.
8. Never try to remove the ABS ECU cover and touch the screws on the ABS ECU proper.
9. Ensure that the components of the brake system are installed properly and so that no brake fluid leakage exists before performing the trouble shooting of the ABS.
10. Ensure that no excessive rattle exists on each of the wheel bearings before performing the trouble shooting of the ABS.
11. When installing a wireless installation (HAM, CB, Telephone, etc.) :
    The ABS ECU has been so designed that it is resistant to external influence.
    However, if a vehicle is equipped with a wireless installation, such as CB, HAM, telephone and so forth, (even if its output is only 10 W) it may affect the ABS ECU adversely. Therefore, observe the following precautions.
    - Install the antenna at a place as far away as possible from the ABS ECU and related harnesses.
    - The antenna cord should be kept at least 30 cm from the ABS ECU and its related harnesses.
    - The antenna cord should not be routed in parallel to ABS related harnesses.
    - Adjust the antenna output correctly.
    - Never install a wireless installation with a high output into the vehicle.
    - Never use or place a handy telephone near the components of the ABS and its related harnesses.
12. When disconnecting or connecting connectors:
    - Prevent dust, water and foreign material, etc. from being admitted into the ABS related connectors when disconnecting or connecting the connectors. Failure to observe this caution may cause serious malfunction, due to lowering the insulation of each terminal.
    - Never damage or lose the gasket or seal of connectors during disconnection or connection.
    - Be sure to confirm the shape of the lock and release the lock properly before disconnecting the connectors.
    - Never damage the rubber protector of connectors during disconnection or connection.

JABS00006-00000

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13. Circuit tester
    - For trouble shooting, use a volt/ohmmeter whose internal resistance is more than 10 k ohm, whose resolution is 0.1 V or more and 0.5 ohm or more, and whose accuracy is 0 ± 2 % or more.
      Use of a volt/ohmmeter which has lower specifications than those described above for trouble shooting may lead to wrong diagnosis or mis-judgement.
14. Never deform the terminals of connectors by applying an excessive force when checks are performed by attaching the probe electrodes of the volt/ohmmeter to the terminals.
    Prevent such damage by utilizing SSTs effectively.
15. Be sure to disconnect the ground cable from the negative terminal of the battery before disconnecting the connector of the wire harness from the ABS ECU. Failure to observe this caution may lead to ABS ECU damage.

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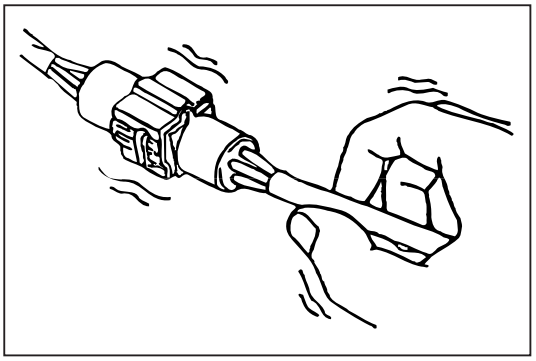
TROUBLE SHOOTING HINTS

1. Most of troubles related to the electrical system of the ABS are merely caused by poor connections.
   Ensure the following points carefully before and during the inspection.
   (1) Visually inspect that the terminals are not damaged or bent.
   (2) Ensure that connectors are securely connected and locked.
   (3) Ensure that the measured continuity or resistance will not be changed when light vibration is applied to the connector or the wire harness connected to the related circuit of presumable parts of trouble.



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HOW TO PROCEED TROUBLE SHOOTING

The trouble or malfunction of the brake system mainly originates in the mechanical systems, such as the brake pedal, brake booster, brake master cylinder, P valve, wheel cylinders and brake fluid line, or electrical systems, such as the ABS actuator, wheel speed sensors, gravity sensor, ABS ECU and ABS related wiring harness.
This manual describes mainly trouble shooting of the electrical system of the ABS control systems on the premise that the brake mechanical systems are functioning normally.
Hence, when the brake system is encountered with any trouble, make sure that the trouble does not originate in the mechanical systems of the brake systems.

To proceed the trouble shooting, first perform the diagnosis check. Then, if any of the diagnosis codes other than the normal codes is outputted, perform the trouble shooting according to the diagnosis codes.
When no diagnosis code is outputted even if malfunction phenomena exists, perform the trouble shooting according to the malfunction phenomena.

The following diagram shows the basic procedure for the trouble shooting.
Actual approach may differ if you have much experience on this system. However, it is recommended to perform the trouble shooting according to this procedure.

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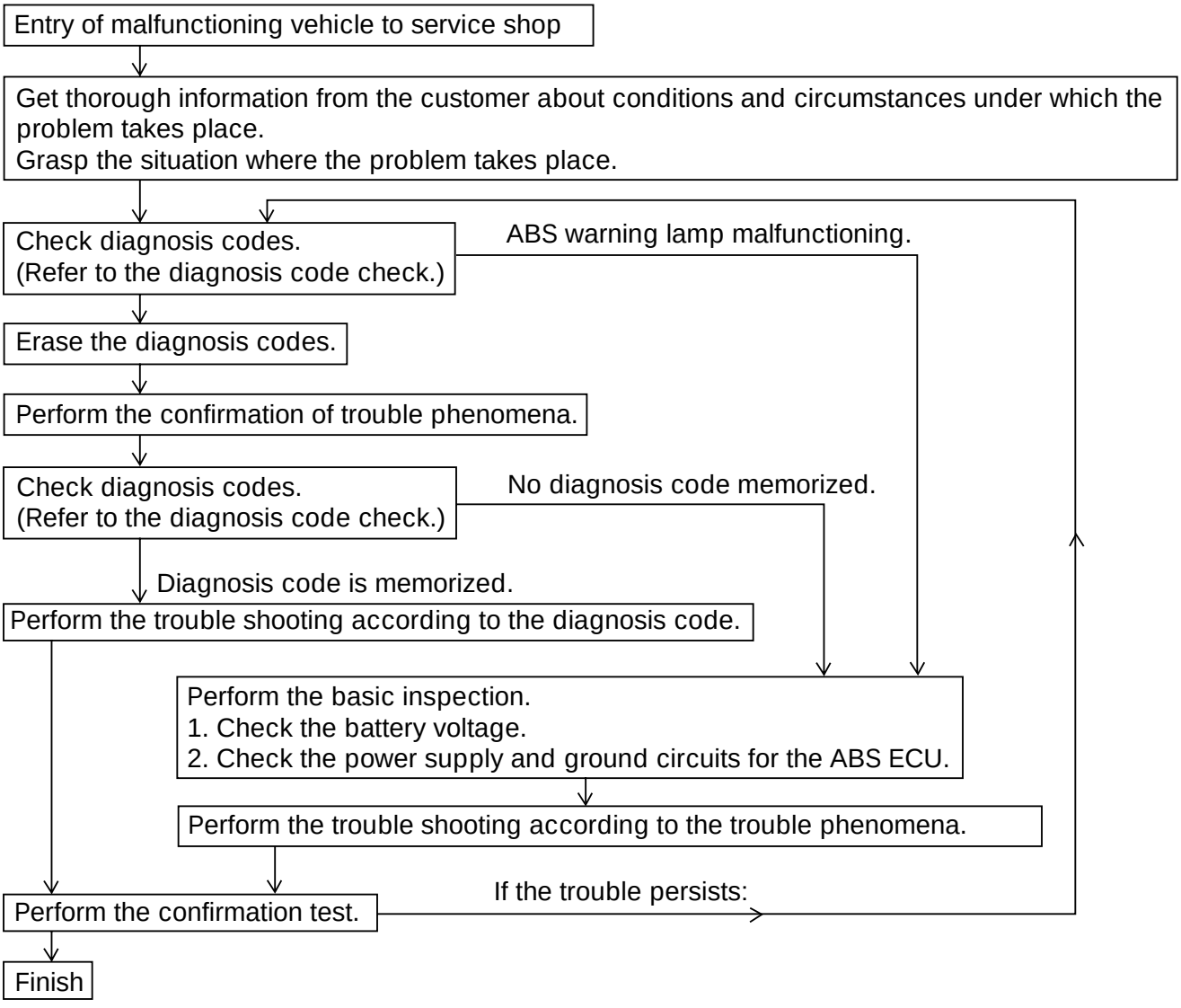

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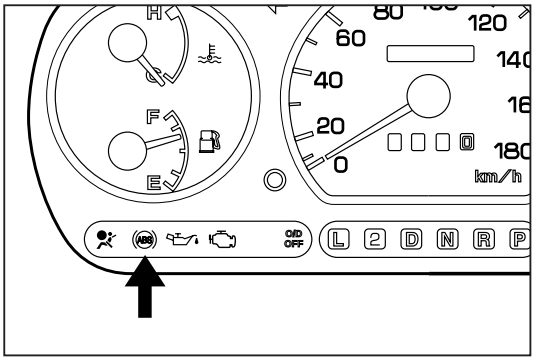
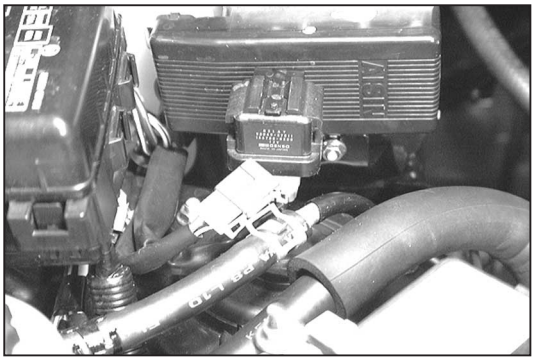
DIAGNOSIS CODE CHECK

1. Checking of ABS warning lamp
   (1) Ensure that the ABS warning lamp will glow for about three seconds after the ignition switch is turned ON, and, then, the warning lamp goes out.
   NOTE:
   • Proceed to trouble shooting according to the trouble phenomenon if the ABS warning lamp fails to meet the condition above.



JABS00011-00006

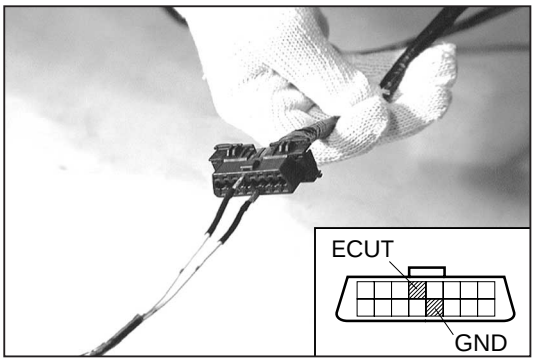
2. Output of diagnosis codes
   (1) Remove the inspection diode from the connector.


JABS00012-00007

   (2) Connect the following SST to the diagnosis connector.
   SST: 09991-87401-000

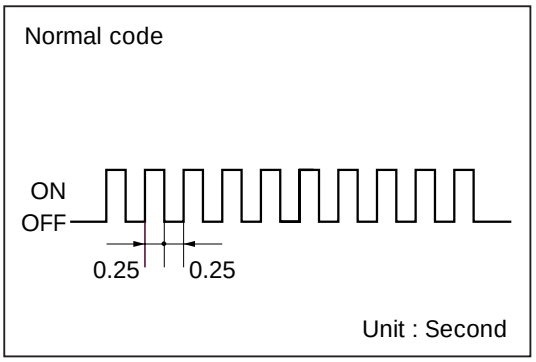
   (3) Connect the ECUT and GND terminals in the SST with the following SST.
   SST: 09991-87403-000

   CAUTION:
   • Never connect the terminal other than that specified. Even slight contact of the other terminals causes serius malfunction.



JABS00013-00008

   (4) Turn ON the ignition switch.
   (5) Read out the diagnosis code(s) by observing the number of blinking of the ABS waning lamp.
   NOTE:
   • When plural malfunctions codes are memorized, the code will be outputted starting from a smaller code number at intervals of 2.5 seconds.
   • After completion of one cycle, the same codes will be outputted again at intervals of 4 seconds.



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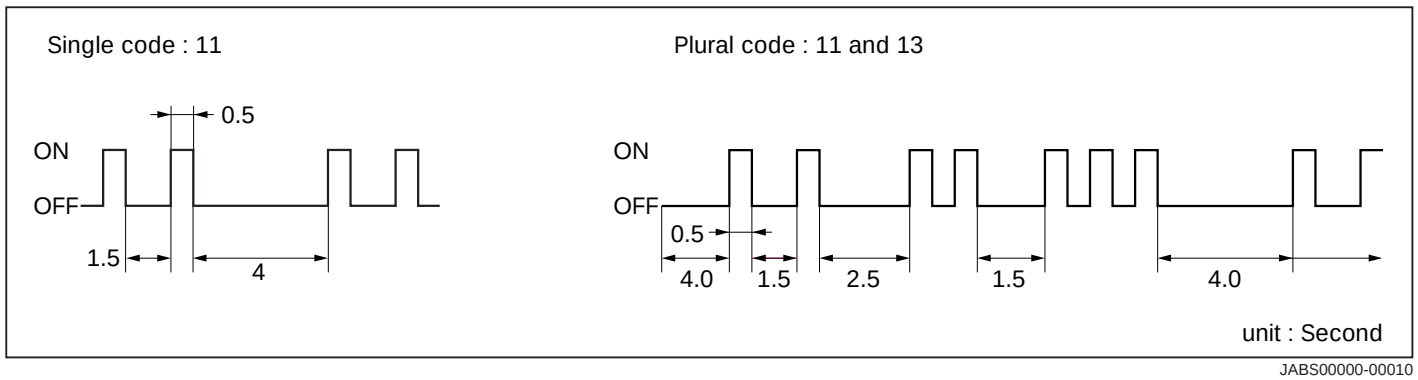

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DIAGNOSIS CODE TABLE

CODE NO.	Diagnosis items	Diagnosis contents	Timing of diagnosis	Presumable causes of trouble
11	Solenoid relay	Open wire	All time	• Solenoid relay • Solenoid relay-related harness
12	Solenoid relay	Short circuit	Immediately after ignition switch is turned ON.	
13	Motor relay	Open wire	Immediately after ignition switch is turned ON.	• Motor relay • Motor relay-related harness
14	Motor relay	Short circuit	All time	
21	Right front solenoid valve	Open wire or short circuit	All time	• Solenoid valve in actuator • Solenoid valve-related harness
22	Left front solenoid valve			
23	Rear solenoid valve			
31	Right front vehicle speed sensor	• Open wire or short circuit • speed sensor signal	All time	• Vehicle speed sensors • Vehicle speed sensor-related harness
32	Left front vehicle speed sensor			
33	Right rear vehicle speed sensor			
34	Left rear vehicle speed sensor			
37	Front vehicle speed sensor	Speed sensor signal	When running at 20 km/h or more after ignition switch is turned ON.	• Front vehicle speed sensors and related harness
41	Power supply voltage (Low)	When running	Low voltage (10 V or less)	• Battery • Alternator • Power supply-related harness
42	Power supply voltage (High)	All time	High voltage (18 V or less)	
43	Gravity sensor	When repeating stop and start.	Function	• Gravity sensor
44	Gravity sensor	All time	Open wire or short circuit	• Gravity sensor • Gravity sensor-related harness
49	Stop lamp switch	All time	Open wire	• Stop lamp • Stop lamp-related harness
51	Motor	Immediately after ignition switch is turned ON.	Function in voltage	• Motor in actuator • Motor-related harness

JABS00015-00000

Erasing procedure for diagnosis codes

CAUTION:

- There are four methods to erase diagnosis codes, as mentioned below. However, if the diagnosis codes are erased by the brake pedal method, normally diagnosis codes of the EFI system also will be erased when the power supply of the vehicle is shut off.
- Therefore, be sure to read out the diagnosis codes of the EFI system before disconnecting the power supply.
- Disconnection of the power supply is required when disconnecting the connector of the wire harness from the ABS ECU.

JABS00016-00000

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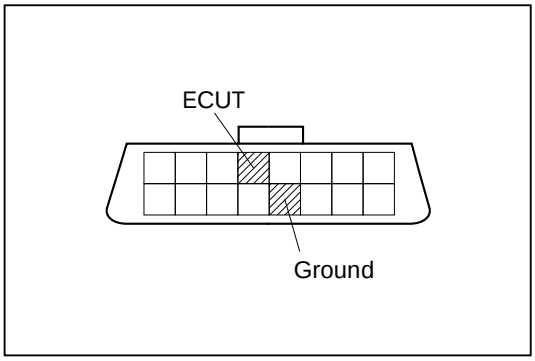
1. Erasing procedure by brake pedal
   (1) Connect the following SST to the diagnosis connector.
   SST: 09991-87401-000

   (2) Connect the ECUT and GND terminals in the SST terminal with the following SST.
   SST: 09991-87403-000

   CAUTION:
   - Never connect the terminals other than that specified, for even slight contact of other terminals may lead to serius malfunction or damage.

   (3) Turn ON the ignition switch.(Never start the engine.)
   (4) Depress the brake pedal more than 8 times within 5 seconds.
   (5) Ensure that the normal code is indicated by the ABS warning lamp.
   (6) Turn off the ignition switch.
   (7) Remove the SST (jump wire) from the SST(sub harness).
   (8) Turn on the ignition switch.
   (9) Ensure that the ABS warning lamp remains extinguished after a lapse of three seconds.
   If the ABS warning lamp remains illuminated, repeat the operation above again.
   (10) Turn off the ignition switch.
   (11) Remove the SST from the diagnosis connector.



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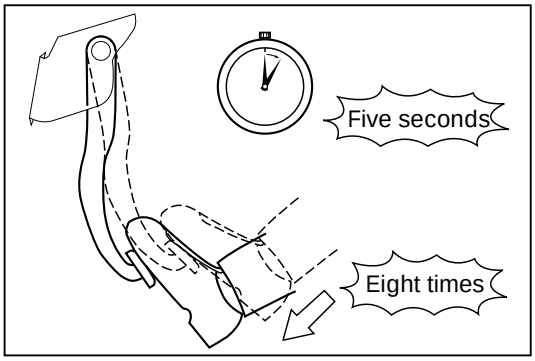


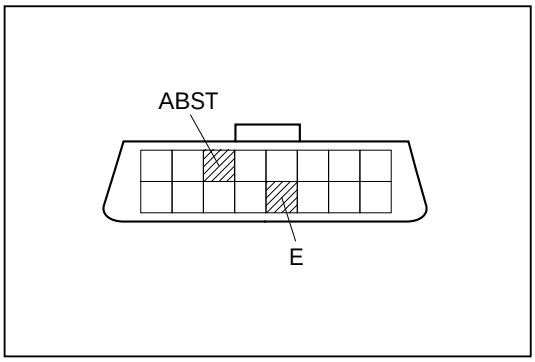
JABS00018-00012

2. Erasing diagnosis codes by utilizing the ABST terminal
   (1) Connect the following SST to the diagnosis connector.
   SST: 09991-87401-000

   (2) Turn ON the ignition switch.(Never start the engine.)
   (3) Repeat the connection and disconnection of ABST and GND terminals in the SST four times within eight seconds, using the following SST.
   SST: 09991-87403-000

   CAUTION:
   - Never connect the terminals other than that specified, for even slight contact of other terminals may lead to serius malfunction or damage.

   (4) Ensure that the ABS warning lamp remains extinguished.
   If the ABS warning lamp remains illuminated, repeat the operation above again.
   (5) Turn off the ignition switch.
   (6) Remove the SST (sub harness) from the diagnosis connector.



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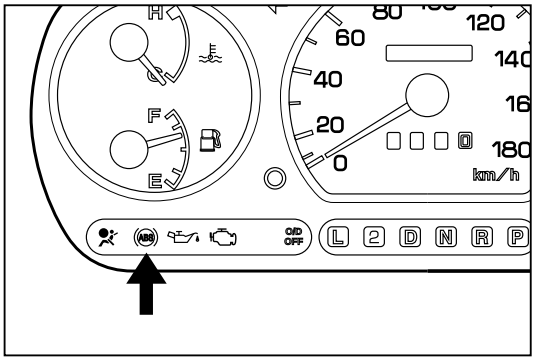

JABS00020-00014

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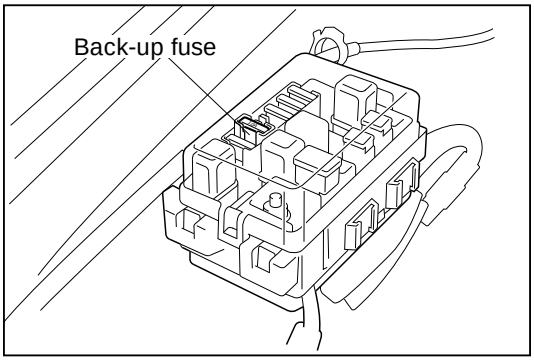
3. Erasing diagnosis codes by removing back-up fuse
   (1) Ensure that the ignition switch is turned OFF.
   (2) Remove the back-up fuse from the relay block, using the fuse puller, and install it again after a lapse of more than 10 seconds.

   CAUTION:
   - Be sure to read out diagnosis codes of the EFI system before disconnecting the back-up fuse.
   - When a radio, a cassette stereo, etc. are installed, it should be noted that it may take more than ten seconds to delete the diagnosis codes.

   (3) Turn on the ignition switch.
   (4) Ensure that the ABS warning lamp remains extinguished after a lapse of three seconds.
   If the ABS warning lamp remains illuminated, repeat the operation above again.
   (5) Turn off the ignition switch.



JABS00021-00015

4. Erasing diagnosis codes by disconnecting the negative terminal of battery ground cable from the battery negative terminal.
   (1) Ensure that the ignition switch is turned OFF.
   (2) Disconnect the negative terminal of the battery ground cable from the battery negative terminal for more than 10 seconds. Then, connect the negative terminal of the battery ground cable to the negative terminal.

   CAUTION:
   - Be sure to read out diagnosis codes of the EFI system before disconnecting the negative terminal of the ground cable from the battery negative terminal.

   (3) Turn on the ignition switch.
   (4) Ensure that the ABS warning lamp remains extinguished after a lapse of three seconds.
   If the ABS warning lamp remains illuminated, repeat the operation above again.
   (5) Turn off the ignition switch.

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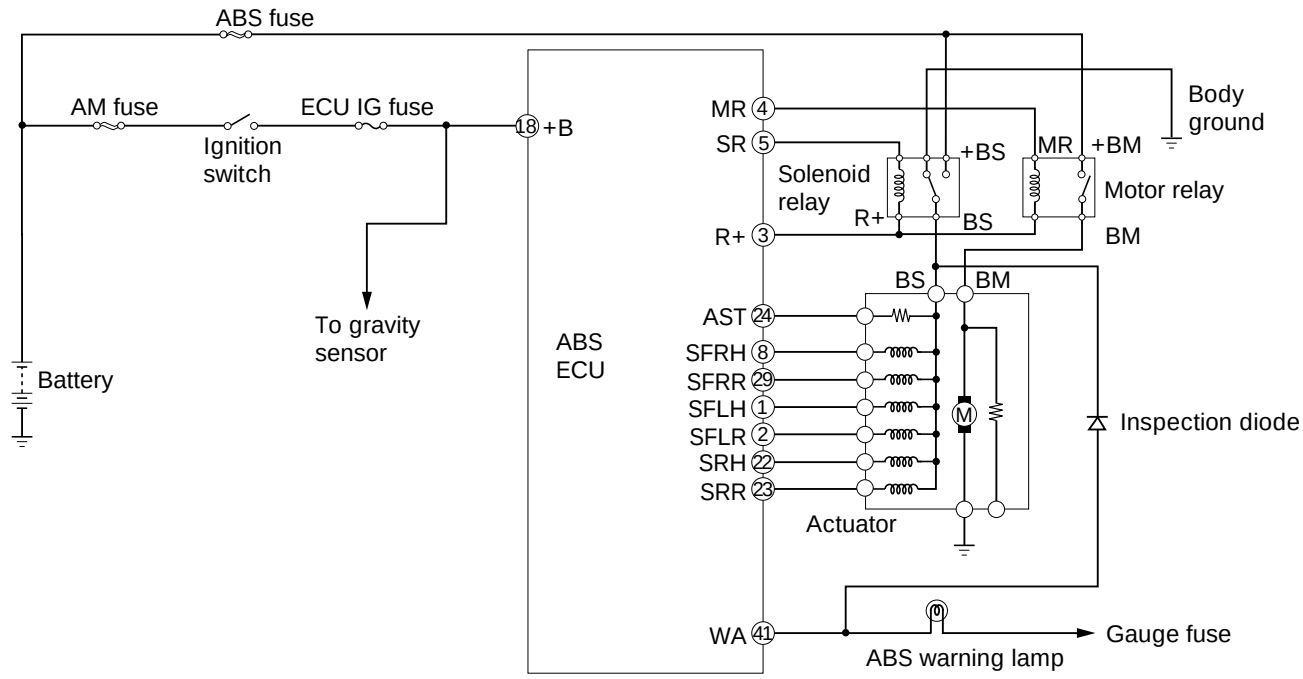
TROUBLE SHOOTING ACCORDING TO DIAGNOSIS CODES

TROUBLE SHOOTING ACCORDING TO DIAGNOSIS CODE

DIAGNOSIS CODE No.	11	JUDGMENT SOURCE: Comparing voltage being applied to across terminals +B and AST of ABS ECU between the ON condition and the OFF condition of solenoid relay
DIAGNOSIS ITEM	Solenoid relay	
DIAGNOSIS CONTENTS	Open wire	



JABS00023-00016

Checking points

1. Solenoid relay
2. ABS fusible link for open wire.
3. Wire harness between battery and terminal +BS of solenoid relay for open wire or short circuit.
4. Wire harness between battery and terminal +BM of motor relay for short circuit.
5. Wire harness between terminal BS of solenoid relay and terminal BS of actuator, including wire harness up to terminal BS of diode for open wire or short circuit.
6. Circuits in actuator for open wire or short circuit.
7. Wire harness between terminal AST of actuator and terminal AST of ABS ECU for open wire or short circuit.
8. Wire harness between SFRH, SFRR, SFLH, SFLR, SRH and SRR terminals of actuator and the same terminals of ABS ECU for short circuit.
9. Wire harness between terminal R+ of ABS ECU and terminal R+ of solenoid relay, between terminal SR of ABS ECU and terminal SR of solenoid relay, and between terminal R+ of ABS ECU and terminal R+ of motor relay for open wire or short circuit.
10. ABS ECU

JABS00024-00000

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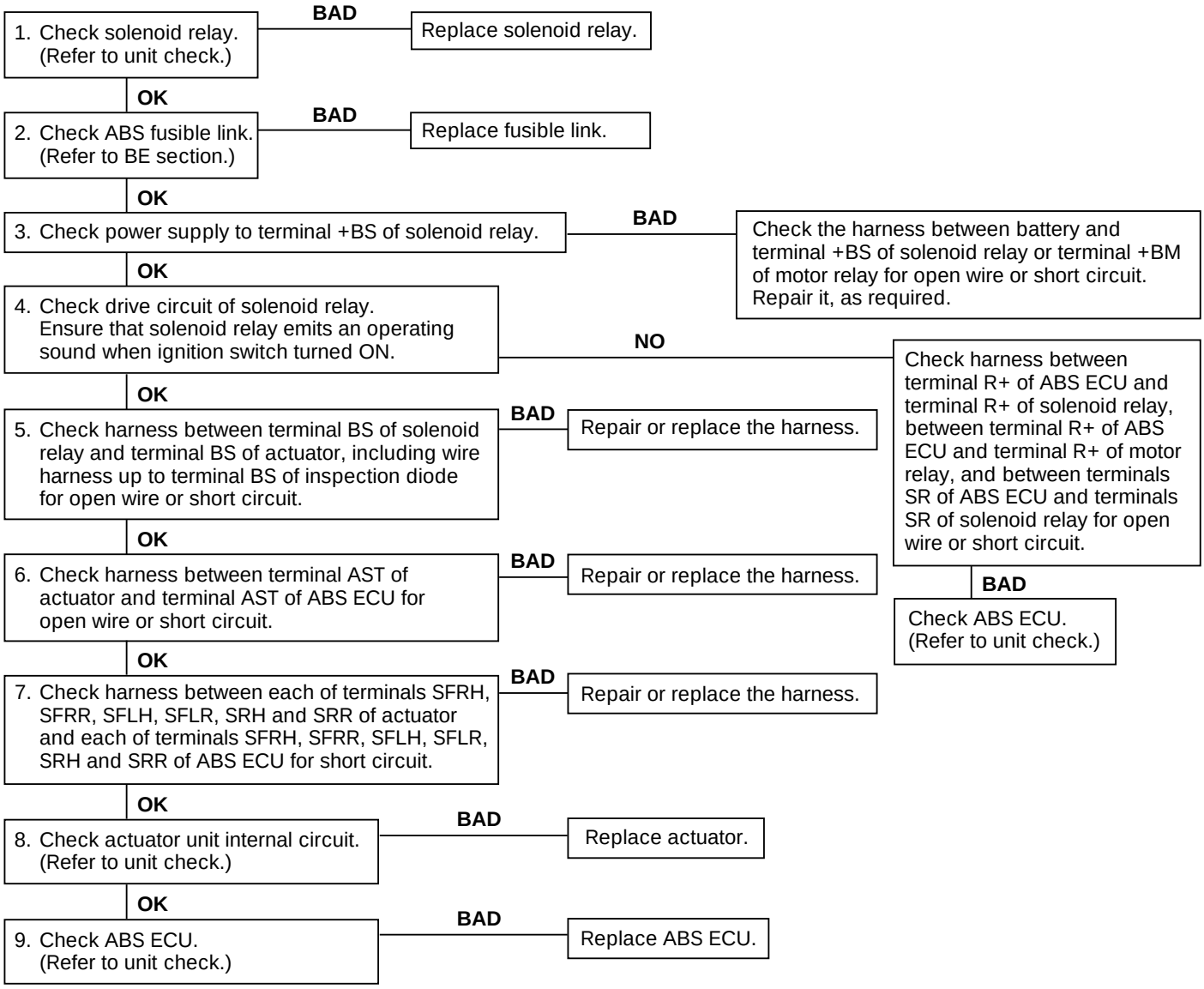
Checking procedure



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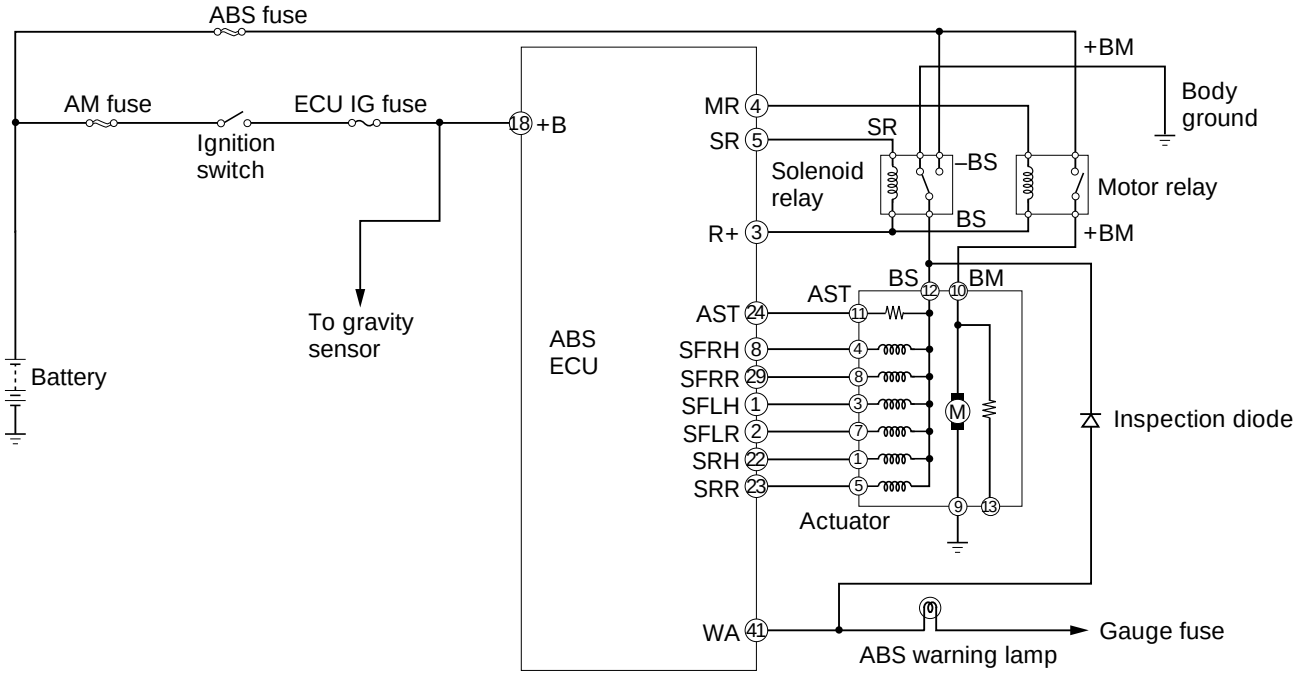
TROUBLE SHOOTING ACCORDING TO DIAGNOSIS CODE

DIAGNOSIS CODE No.	12	JUDGMENT SOURCE: Monitoring the voltage being applied to terminal AST of the ABS ECU when solenoid relay is turned off.
DIAGNOSIS ITEM	Solenoid relay	
DIAGNOSIS CONTENTS	Short circuit	



JABS00026-00017

Checking points

1. Solenoid relay
2. Wire harness between terminal GND of solenoid relay and body ground for open wire.
3. Wire harness between terminal AST of actuator and terminal AST of ABS ECU for short circuit with positive circuit.
4. Wire harness between terminal SR of solenoid relay and terminal SR of ABS ECU for short circuit with ground circuit.
5. ABS ECU

JABS00027-00000

Checking procedure

1. Check solenoid relay. (Refer to unit check.)
   - BAD → Replace solenoid relay.
   - OK ↓
2. Check circuit between terminal GND of solenoid relay and body ground for open wire.
   - BAD → Repair or replace the wire harness.
   - OK ↓
3. Check wire harness between terminal SR of solenoid relay and terminal SR of ABS ECU for short circuit with body ground.
   - BAD → Repair or replace the wire.
   - OK ↓
4. Check circuit between terminal AST of actuator and terminal AST of ABS ECU for short circuit with positive circuit.
   - BAD → Repair or replace the wire.
   - OK ↓
5. Check ABS ECU. (Refer to unit check.)
   - BAD → Replace ABS ECU.

JABS00028-00000

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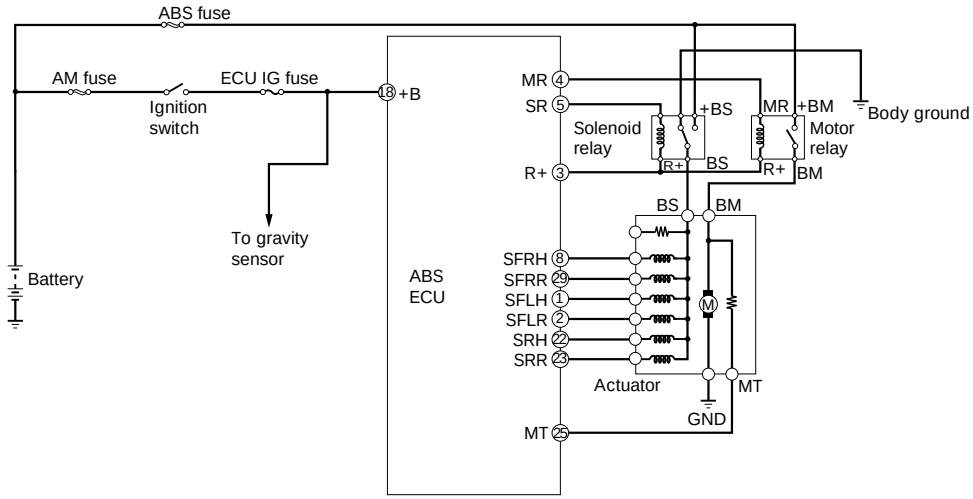
TROUBLE SHOOTING ACCORDING TO DIAGNOSIS CODE

DIAGNOSIS CODE No.	13	JUDGMENT SOURCE: Monitoring voltage being applied to across terminals +B and MT of ABS ECU with motor relay turned ON.
DIAGNOSIS ITEM	Motor relay	
DIAGNOSIS CONTENTS	Open wire	



JABS00029-00018

Checking points

1. Motor relay
2. ABS fusible link
3. Wire harness between battery and terminal +BM of motor relay for open wire or short circuit.
4. Wire harness between battery and terminal +BS of solenoid relay for short circuit with body ground.
5. Wire harness between terminal BM of motor relay and terminal BM of actuator for open wire or short circuit.
6. Circuits in actuator between terminal BM and terminal MT, and between terminal BM and terminal GND for open wire or short circuit.
7. Wire harness between terminal MT of actuator and terminal MT of ABS ECU for open wire or short circuit.
8. ABS ECU

JABS00030-00000

Checking procedure

1. Check motor relay. (Refer to unit check.)
   - BAD → Replace solenoid relay.
   - OK ↓
2. Check ABS fusible link.
   - BAD → Replace fusible link.
   - OK ↓
3. Check power supply to terminal +BM of motor relay.
   - BAD → Check the harness between battery and terminal +BM of motor relay or terminal +BS of solenoid relay for open wire or short circuit. Repair it, as required.
   - OK ↓
4. Check drive circuit of solenoid relay. Ensure that the motor relay emits an operating sound when ignition switch is turned ON.
   - NO → Check harness between terminal R+ of ABS ECU and terminal R+ of motor relay, and between terminal MR of motor relay and terminal MR of ABS ECU for open wire or short circuit.
     - OK ↓ Check ABS ECU. (Refer to unit check.)
   - OK ↓
5. Check harness between terminal BM of motor relay and terminal BM of actuator for open wire or short circuit.
   - BAD → Repair or replace the harness.
   - OK ↓
6. Check harness between terminal MT of actuator and terminal MT of ABS ECU for open wire or short circuit.
   - BAD → Repair or replace the harness.
   - OK ↓
7. Check actuator unit. (Refer to unit check.)
   - BAD → Replace actuator.
   - OK ↓
8. Check ABS ECU. (Refer to unit check.)
   - BAD → Replace ABS ECU.

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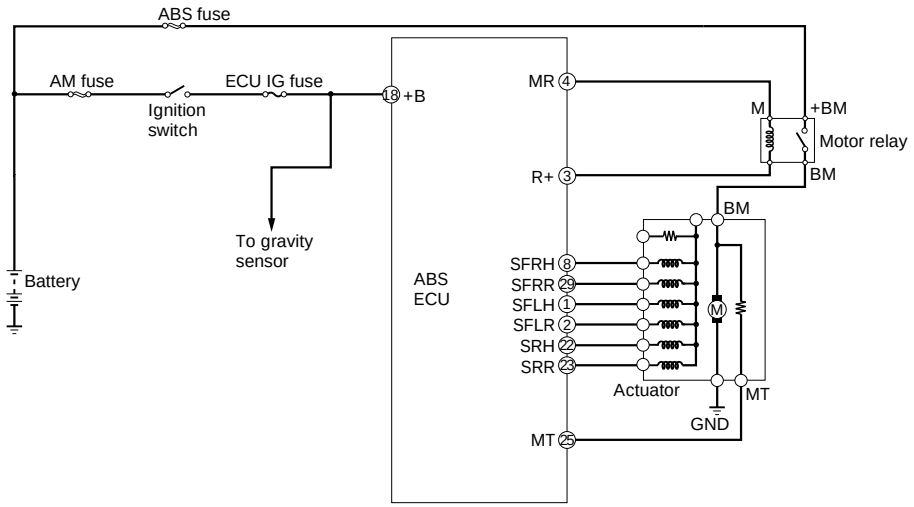
TROUBLE SHOOTING ACCORDING TO DIAGNOSIS CODE

DIAGNOSIS CODE No.	14	JUDGMENT SOURCE: Comparing voltage being applied to across +B and MT terminals of ABS ECU with motor relay turned OFF.
DIAGNOSIS ITEM	Motor relay	
DIAGNOSIS CONTENTS	Short circuit	



JABS00032-00019

Checking points

1. Motor relay
2. Wire harness between terminal MR of motor relay and terminal MR of ABS ECU for short circuit with body ground.
3. Wire harness between terminal BM of motor relay and terminal BM of motor for short circuit with positive circuit.
4. Wire harness between terminal MT of actuator and terminal MT of ABS ECU for short circuit with positive circuit.
5. Circuits in actuator between terminal BM and terminal MT or between terminal BM and terminal GND for short circuit with positive circuit.
6. ABS ECU

JABS00033-00000

Checking procedure

1. Check motor relay. (Refer to unit check.)
   - BAD → Replace solenoid relay.
   - OK ↓
2. Check wire harness between terminal MR of ABS ECU and terminal MR of motor relay for short circuit with body ground.
   - BAD → Check the harness between battery and terminal +BM of motor relay or terminal +BS of solenoid relay for open wire or short circuit. Repair it, as required.
   - OK ↓
3. Check drive circuit of solenoid relay. Ensure that the motor relay emits an operating sound when ignition switch is turned ON.
   - NO → Check harness between terminal MR of ABS ECU and terminal MR of motor relay for short circuit.
     - OK → Check ABS ECU. (Refer to unit check.)
   - OK ↓
4. Check harness between terminal BM of motor relay and terminal BM of actuator for short circuit with positive circuit.
   - BAD → Repair or replace the harness.
   - OK ↓
5. Check harness between terminal MT of actuator and terminal MT of ABS ECU for short circuit with positive terminal.
   - BAD → Repair or replace the harness.
   - OK ↓
6. Check actuator unit. (Refer to unit check.)
   - BAD → Replace actuator.
   - OK ↓
7. Check ABS ECU. (Refer to unit check.)
   - BAD → Replace ABS ECU

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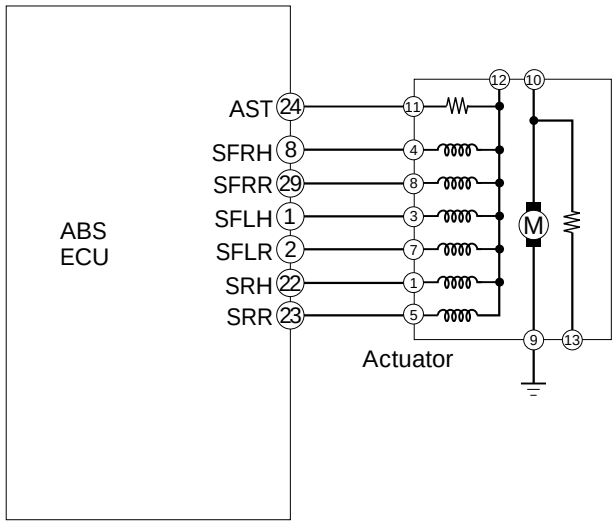
TROUBLE SHOOTING ACCORDING TO DIAGNOSIS CODE

DIAGNOSIS CODE No.	21, 22 and 23	JUDGMENT SOURCE: Monitoring the voltage being applied to ABS ECU through each of solenoid valves and standard resistance are identified with the prememorized value in the CPU of ABS ECU.
DIAGNOSIS ITEM	Solenoid valve	
DIAGNOSIS CONTENTS	Open wire or short circuit	



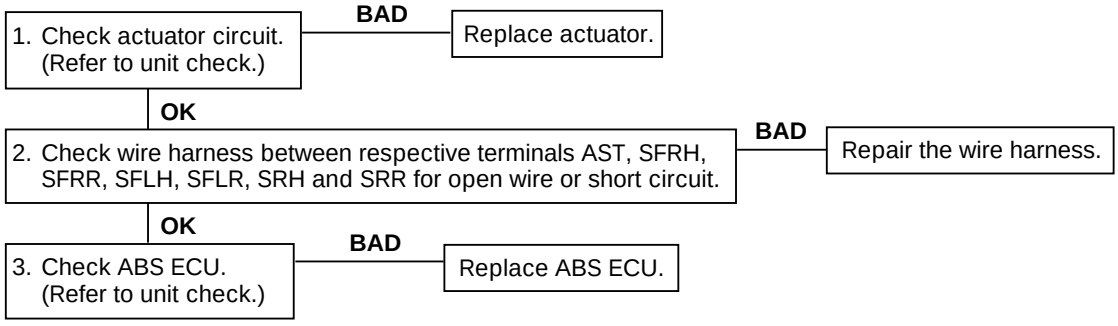
JABS00035-00020

Checking points

1. Solenoid valve circuit in actuator.
2. Wire harness between respective terminals AST, SFRH, SFRR, SFLH, SFLR, SRH and SRR of actuator ABS ECU for open wire or short circuit.
3. ABS ECU

JABS00036-00000

Checking procedure



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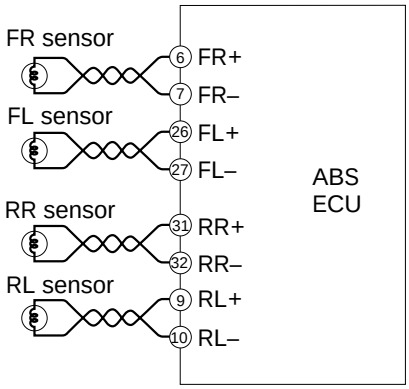
TROUBLE SHOOTING ACCORDING TO DIAGNOSIS CODE

DIAGNOSIS CODE No.	31	32	33	34	37	JUDGMENT SOURCE:
DIAGNOSIS ITEM	R	L	R	L	Both sides	• Monitoring sensor circuit voltage. • Monitoring difference of input signal from each sensor. • Monitoring missing of input signal from each sensor.
	Front		Rear		Front	
	Vehicle speed sensor					
DIAGNOSIS CONTENTS	• Open wire or short circuit • Abnormal input signal					



NOTE:
R: Right side
L: Left side

JABS00038-00021

Checking points

1. Speed sensors
2. Speed sensor rotor for damage
3. Wire harness of each speed sensor for open wire or short circuit with body ground.
4. Clearance between speed sensor and sensor rotor.
5. Excessive rattle of wheel bearings.
6. ABS ECU

JABS00039-00000

Checking procedure

1. Check speed sensor. (Refer to unit check.)
   - BAD → Clear or replace speed sensor.
   - OK ↓
2. Check speed sensor rotor. (Refer to unit check.)
   - BAD → Clear or replace speed sensor rotor.
   - OK ↓
3. Check wire harness between terminals FR + and -, between terminals FL + and -, between terminals RR + and -, and between terminals RL + and - of ABS ECU and each sensors for open or short circuit with body ground.
   - BAD → Replace wire harness.
   - OK ↓
4. Check clearance between speed sensor and sensor rotor. (Refer to unit check.)
   - BAD → Adjust clearance.
   - OK ↓
5. Check wheel bearing for excessive rattle.
   - BAD → Replace wheel bearing.
   - OK ↓
6. Check ABS ECU. (Refer to unit check.)
   - BAD → Replace ABS ECU.

JABS00040-00000

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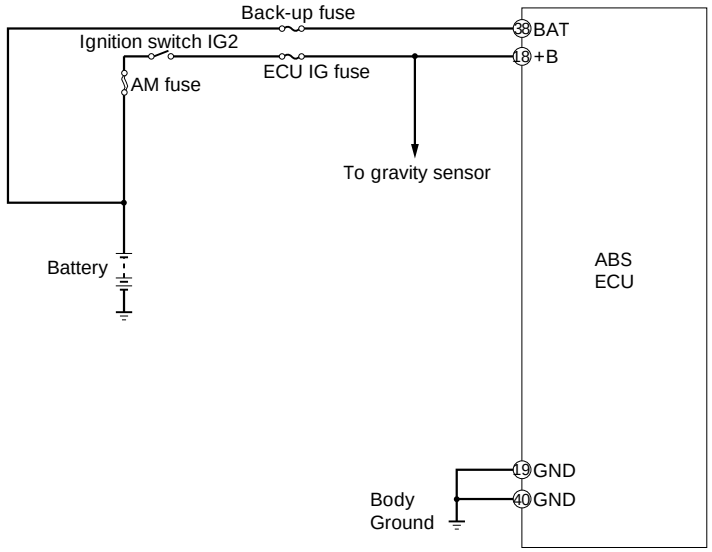
TROUBLE SHOOTING ACCORDING TO DIAGNOSIS CODE

DIAGNOSIS CODE No.	41 or 42	JUDGMENT SOURCE: When power supply voltage to terminal +B of the ABS ECU becomes 10 volts or less or 18 volts or more.
DIAGNOSIS ITEM	Power supply voltage	
DIAGNOSIS CONTENTS	Abnormal power supply voltage	



JABS00041-00022

Checking points

1. Battery
2. Charging system (Alternator with IC regulator)
3. AM fusible link
4. Ignition switch
5. ECU IG fuse
6. Following circuits
   - Battery to fusible link
   - Fusible link to ignition switch
   - Ignition switch to ECU IG fuse
   - ECU IG fuse to terminal +B of the ABS ECU
   - ECU IG fuse to terminal IG of the Gravity sensor
   - Battery to terminal +BS of solenoid relay and terminal +BM motor relay
7. ABS ECU

JABS00042-00000

Checking procedure

1. Check battery voltage. (Refer CH section in this service manual.)
   - BAD → Charge or replace the battery.
   - OK ↓
2. Check charging system. (Refer to CH section.)
   - BAD → Repair charging system.
   - OK ↓
3. Check the following parts or wire harnesses for open wire or short circuit.
   - Battery to fusible link
   - Fusible link to ignition switch
   - Ignition switch to ECU IG fuse
   - ECU IG fuse to terminal +B of the ABS ECU
   - ECU IG fuse to terminal IG of the Gravity sensor
   - Battery to terminal +BS of solenoid relay and terminal +BM of motor relay

   BAD → Repair or replace the wire harness

   OK ↓
4. Check ABS ECU. (Refer to unit check.)
   - BAD → Replace ABS ECU.

JABS00043-00000

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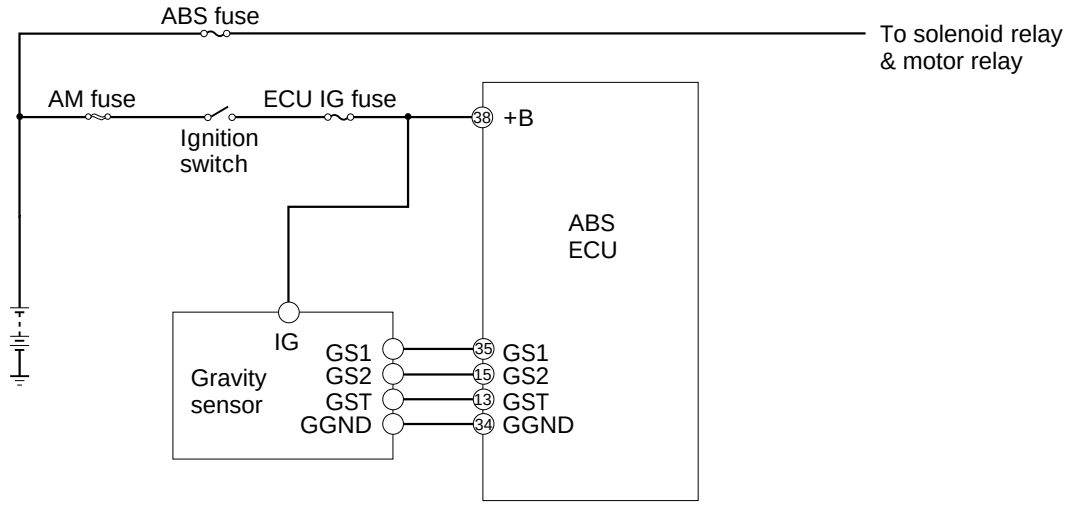
TROUBLE SHOOTING ACCORDING TO DIAGNOSIS CODE

DIAGNOSIS CODE No.	43	JUDGMENT SOURCE: • Monitoring if output signal of gravity sensor meets predetermined output form.
DIAGNOSIS ITEM	Gravity sensor	
DIAGNOSIS CONTENTS	Abnormal output signal	
DIAGNOSIS CODE No.	44	JUDGMENT SOURCE: • Monitoring if output signal of gravity sensor meets predetermined output form. • When wire harness between each of terminals GS1, GS2, GST and GGND of gravity sensor and ABS ECU becomes open of shorted.
DIAGNOSIS ITEM	Gravity sensor	
DIAGNOSIS CONTENTS	Open wire or short circuit	



JABS00044-00023

Checking points

1. Gravity sensor
2. Power supply to terminal IG of gravity sensor.
3. Wire harness between respective terminals GS1, GS2, GST and GGND terminals of gravity sensor and the same terminal of ABS ECU for short circuit or open wire.
4. ABS ECU

JABS00045-00000

Checking procedure

1. Check power supply to IG terminal of gravity sensor from ignition switch.
   - BAD → Check and repair the related part(s).
   - OK ↓
2. Check wire harness between each of terminals GS1, GS2, GST and GGND of gravity sensor and ABS ECU for open wire or short circuit.
   - BAD → Replace the wire harness.
   - OK ↓
3. Check gravity sensor function. (Refer to unit inspection.)
   - BAD → Replace gravity sensor.
   - OK ↓
4. Check ABS ECU. (Refer to unit check.)
   - BAD → Replace ABS ECU.

JABS00046-00000

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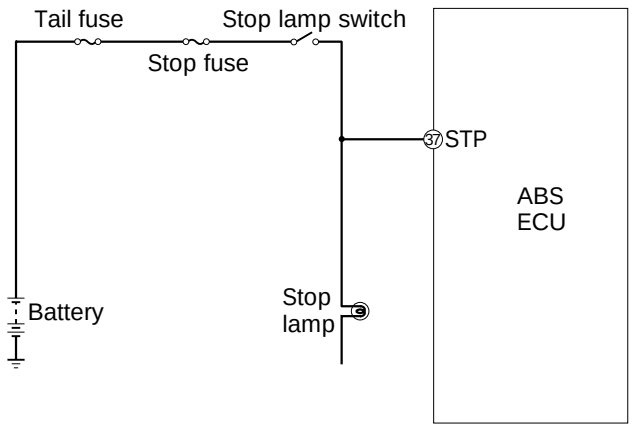
TROUBLE SHOOTING ACCORDING TO DIAGNOSIS CODE

DIAGNOSIS CODE No.	49	JUDGMENT SOURCE: • Monitoring brake lamp circuit
DIAGNOSIS ITEM	Stop lamp switch	
DIAGNOSIS CONTENTS	Open wire	



JABS00047-00024

Checking points

1. Stop lamp
2. Stop lamp circuit
3. ABS ECU

JABS00048-00000

Checking procedure

1. Check of stop lamp circuit
   Ensure that the stop lamp glows when brake pedal is depressed.
   - **NO** → Repair brake lamp circuit.
   - **OK** ↓
2. Check wire harness between stop lamp switch and terminal STP of ABS ECU for open wire or short circuit.
   - **BAD** → Repair or replace the wire harness.
   - **OK** ↓
3. Check ABS ECU.
   (Refer to unit check.)
   - **BAD** → Replace ABS ECU.

JABS00049-00000

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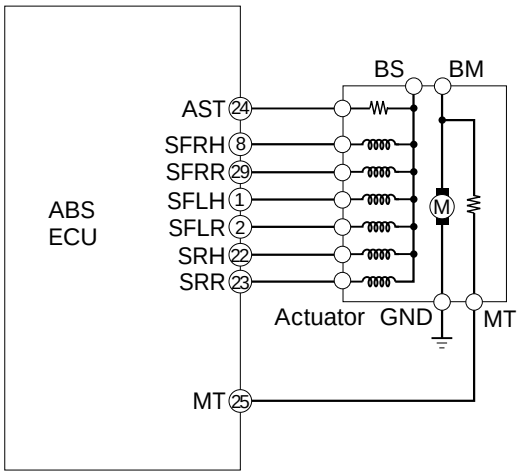
TROUBLE SHOOTING ACCORDING TO DIAGNOSIS CODE

DIAGNOSIS CODE No.	51	JUDGMENT SOURCE: • Monitoring voltage at terminal MT of actuator when actuator pump motor is turned OFF.
DIAGNOSIS ITEM	Actuator pump motor	
DIAGNOSIS CONTENTS	Operation	



JABS00050-00025

Checking points

1. Actuator pump motor circuit
2. Wire harness between terminal GND of actuator and body ground for open wire.
3. ABS ECU
4. Wire harness between terminal MT of actuator and terminal MT of ABS ECU.

JABS00051-00000

Checking procedure

1. Check wire harness between terminal GND of actuator and body ground for open wire.
   - BAD → Repair circuit or replace wire harness.
   - OK ↓
2. Check wire harness between terminal MT of actuator and terminal MT of ABS ECU for open wire or short circuit.
   - BAD → Repair circuit or replace wire harness.
   - OK ↓
3. Check resistance between terminal BM and terminal MT of actuator. Specified resistance 33 Ω (at 20 °C)
   - BAD → Replace actuator.
   - OK ↓
4. Check ABS ECU. (Refer to unit check.)
   - BAD → Replace ABS ECU.
   - OK ↓
5. Replace actuator.

JABS00052-00000

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TROUBLE SHOOTING ACCORDING TO TROUBLE PHENOMENA

TROUBLE SHOOTING ACCORDING TO TROUBLE PHENOMENON

TROUBLE PHENOMENA	Flow chart number
1. ABS warning lamp remains illuminated immediately after ignition switch is turned ON.	1
2. ABS warning lamp will not glow immediately after ignition switch is turned ON.	2
3. ABS warning lamp will start blinking immediately after ignition switch is turned ON.	3
4. ABS warning lamp is illuminated while driving.	4
5. Side pull of brake	4
6. Poor effectiveness	4
7. ABS operates under normal braking.	4
8. ABS operates just before vehicle stops under normal braking.	4
9. Brake pedal vibrates excessively.	4
10. Wheel locks frequently under ABS operation.	4
11. Starting of ABS operation is late.	5
12. Brake pedal working travel is too small.	6
13. Brake pedal working travel is too large. (Reserve travel is too small.)	7

JABS00053-00000

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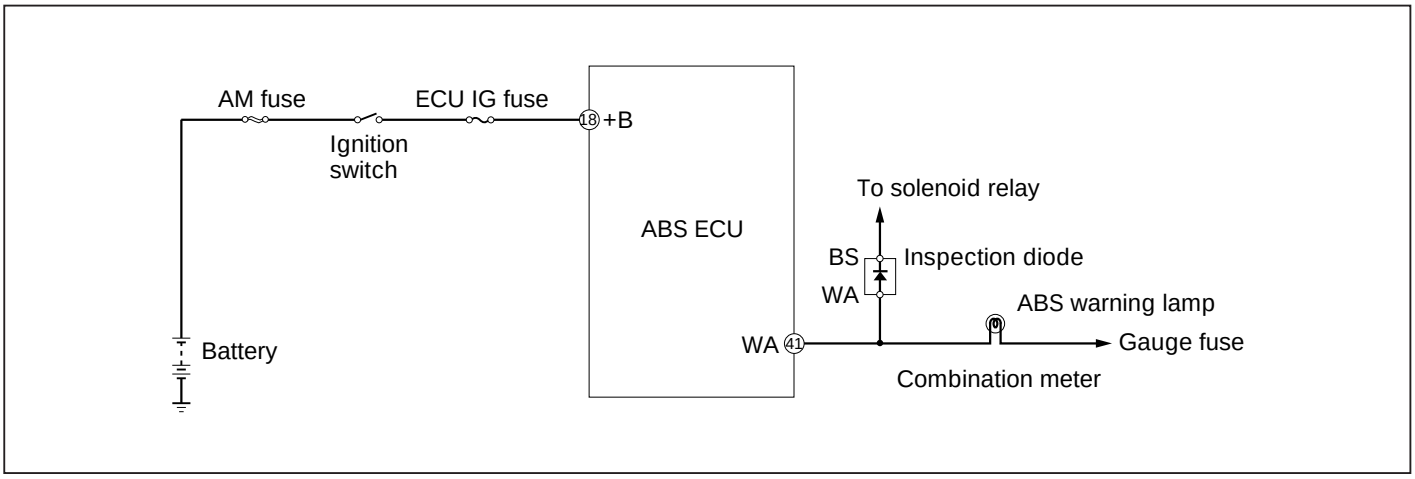
TROUBLE SHOOTING PROCEDURE FLOW CHART NUMBER 1

PHENOMENA: ABS warning lamp remains illuminated.



JABS00054-00026

Checking point

1. Abnormal input voltage to ABS ECU.
2. Wire harness between terminal WA of ABS ECU and ABS warning lamp for short circuit with body ground.
3. Wire harness between terminal WA of ABS ECU and diode for short circuit with body ground.
4. Solenoid relay
5. ABS ECU

1. Remove the inspection diode from inspection connector. (Refer to unit inspection.)

2. Ensure that the ABS warning lamp remains illuminated even three seconds after ignition switch is turned ON.
   - **NO** → Check solenoid relay and related circuit. (Refer to unit inspection.)
   - **Remain illuminated**

3. Check diagnosis code. (Refer to diagnosis code check.)
   - **Malfunction code** → Perform trouble shooting according to diagnosis code.
   - **Lamp remains illuminated.**

4. Connect the following SST between ABS ECU and connectors connected to ABS ECU. (Refer to unit check of ABS ECU section.)
   SST: 09842-87401-000

5. Start the engine.

6. Ensure that the voltage at terminal ⑱+B of the SST is within specified value when engine is started.
   Specified value: 10 - 17 volts
   - **BAD** → Check power supply to terminal +B of ABS ECU for following points.
     1. EFI IG fuse for burn-out
     2. Ignition switch
     3. Wire harness of related circuit for open wire or short circuit.
     4. Charging system.
   - **OK**

7. Turn Off the ignition switch.

8. Disconnect the SST connectors from the ABS ECU.

9. Check to see if ABS warning lamp goes on when ignition switch is turned ON.
   - **NO** → Check EFI ECU. (Refer to unit check.)
   - **Lamp remains illuminated.**

10. Check wire harness between ABS warning lamp and terminal WA of the ABS ECU or inspection diode connector for short circuit with body ground.
    - **BAD** → Repair or replace wire harness.

JABS00055-00000

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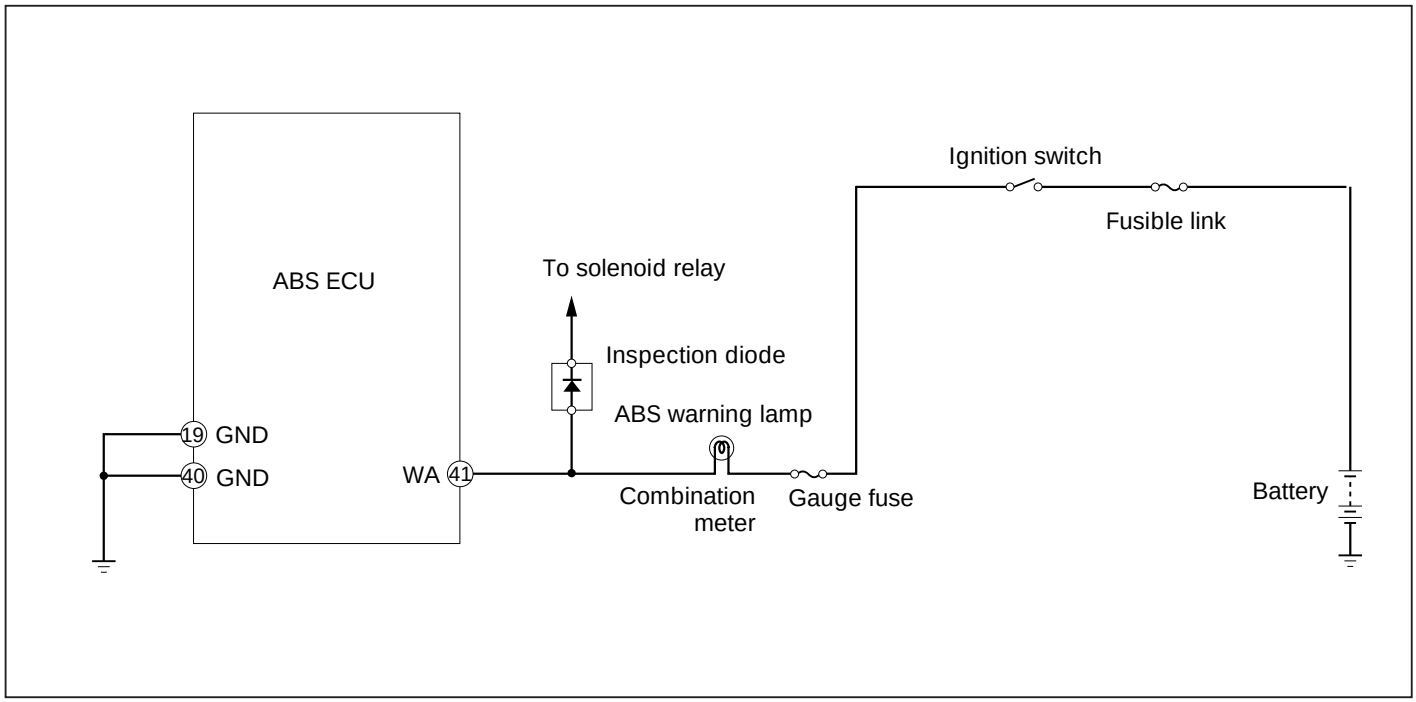
TROUBLE SHOOTING PROCEDURE FLOW CHART NUMBER 2

PHENOMENA: ABS warning lamp will not glow after ignition switch is turned ON.



JABS00056-00027

Presumable causes for trouble

1. ABS warning lamp bulb for burnout.
2. Gauge fuse burnout.
3. Circuit between battery and combination meter for open wire.
4. Circuit between combination meter and terminal WA of ABS ECU or inspection diode for open wire.
5. Warning lamp circuit in the combination meter for open for open wire.
6. Diode rapture

1. Remove the inspection diode.
2. Disconnect the connector of wire harness from the ABS ECU. (Refer to the unit inspection of the ABS ECU.)
3. Connect the following SST to disconnected connector of the ABS ECU. (Refer to the unit inspection of the ABS ECU.)
   SST: 09842-87401-000

   CAUTION:
   • Never connect the connector of SST to the ABS ECU.
4. Connect the terminals WA and GND of the SST.

5. Ensure that the ABS warning lamp is illuminated when the ignition switch is turned ON.

NO

Check and repair the following points.
1. Power supply to combination meter.
2. ABS warning lamp for burnout.
3. ABS warning lamp circuit in combination meter for open wire.
4. Wire harness between combination lamp and terminal WA of ABS ECU for open wire.

YES

6. Check inspection diode. (Refer to unit inspection.)

BAD

Replace check diode.

6. Check ABS ECU. (Refer to unit inspection.)

JABS00057-00000

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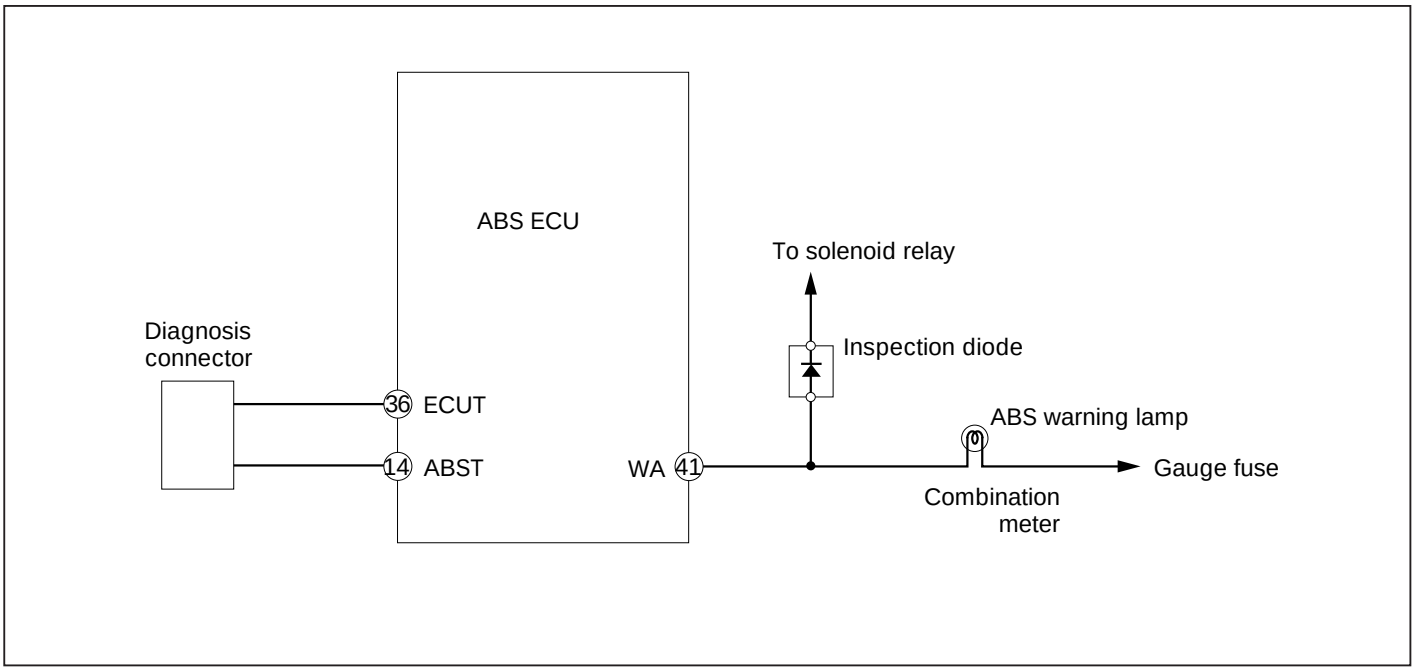
TROUBLE SHOOTING PROCEDURE FLOW CHART NUMBER 3

PHENOMENA: ABS warning lamp blinks immediately after ignition switch is turned ON.



JABS00058-00028

Checking point

- Wire harness between each of terminals ECUT ㊱ and ABST ⑭ of ABS ECU and diagnosis connector for short circuit with body ground.
- ABS ECU

1. Disconnect the connector of wire harness from the ABS ECU. (Refer to the unit inspection of the ABS ECU.)
2. Ensure that no continuity exists between terminals ECUT and ABST of diagnosis connector with body ground.
   - **NO** → Repair or replace wire harness.
   - **YES**
3. Check ABS ECU. (Refer to unit inspection.)

JABS00059-00000

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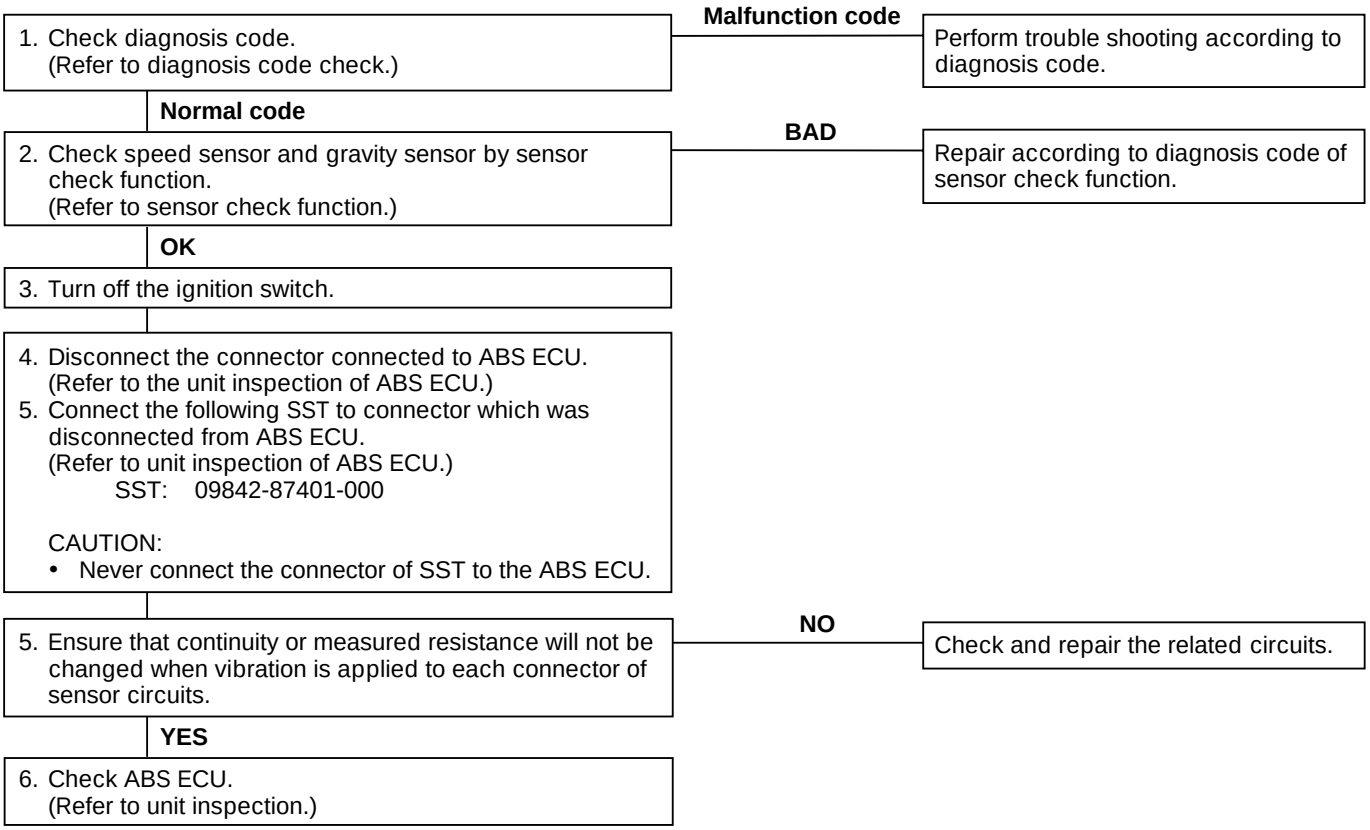
TROUBLE SHOOTING PROCEDURE FLOW CHART NUMBER 4

PHENOMENA: ABS warning lamp remains illuminated while driving.
Side pull of brake
Poor effectiveness
ABS operates under normal braking.
ABS operates just before vehicle stops under normal braking.
Brake pedal vibrates excessively.
Wheel locks frequently under ABS operation.

JABS00060-00000

Checking points

- Wheel speed sensors and related wire harness
- Gravity sensor and related wire harness
- ABS ECU



JABS00061-00000

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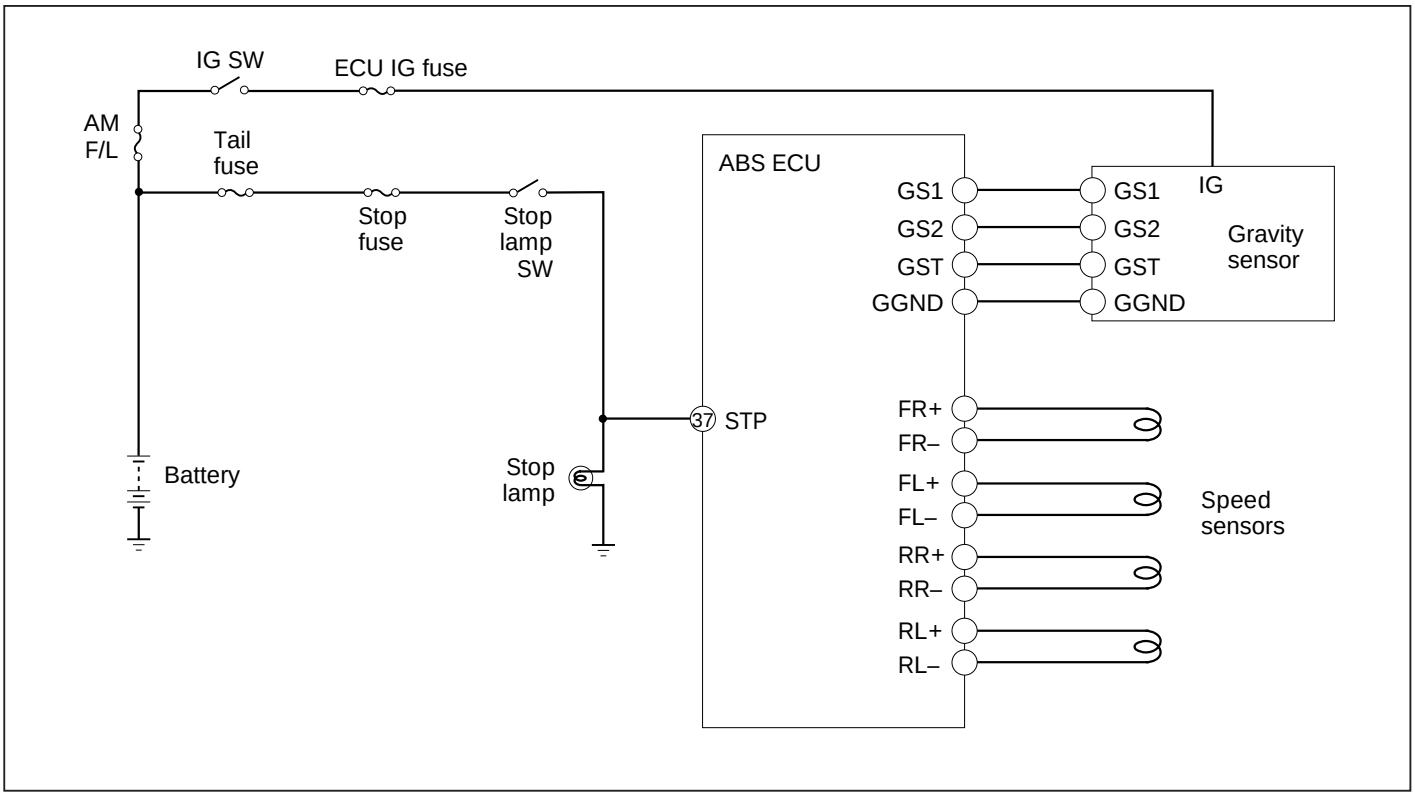
TROUBLE SHOOTING PROCEDURE FLOW CHART NUMBER 5

PHENOMENA: Starting of ABS operation is late.



JABS00062-00029

1. Check diagnosis code.
   (Refer to diagnosis code check.)

Malfunction code → Perform trouble shooting according to diagnosis code.

Normal code

2. Disconnect the connector connected to ABS ECU.
   (Refer to the unit inspection of ABS ECU.)
3. Connect the following SST to connector which was disconnected from ABS ECU.
   (Refer to unit inspection of ABS ECU.)
   SST: 09842-87401-000

   CAUTION:
   • Never connect the connector of SST to the ABS ECU.

4. Ensure that a voltage of 8 volts or more is applied to terminal STP of the ABS ECU when brake pedal is depressed.

NO → Check and repair the circuits between terminal STP and stop lamp switch.

OK

5. Check speed sensor by sensor check function.
   (Refer to sensor check function.)

BAD → Repair according to diagnosis code of sensor check function.

OK

5. Check ABS ECU.
   (Refer to unit inspection.)

JABS00063-00000

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TROUBLE SHOOTING PROCEDURE FLOW CHART NUMBER 6

PHENOMENA: Brake pedal working travel is too small

NOTE:

- No consideration has been taken for function of each wheel cylinder in this procedure.

1. Ensure that the ABS warning lamp is extinguished three seconds after ignition switch is turned ON.
   - **BAD** → Perform trouble shooting according to trouble phenomenon.
   - **YES**
2. Check diagnosis code. (Refer to diagnosis code check.)
   - **Malfunction code** → Perform trouble shooting according to diagnosis code.
   - **Normal code**
3. Ensure that the brake fluid will flow out from each wheel cylinder when the same operation as the air bleeding is performed. (Refer to air bleeding section.)
   - **OK** → Check abnormality in each wheel cylinder system.
   - **BAD**
4. Loosen the flare nuts of brake fluid inlet pipes of actuator connected to the master cylinder. (Refer to unit inspection.)
5. Ensure that the brake fluid will flow out when brake pedal is depressed. (Refer to unit inspection.)
   CAUTION:
   - Depress the brake pedal gradually, otherwise quite a large amount of the brake fluid will flow out. (Refer to caution in air bleeding section.)
   - **NO** → Check abnormality in brake pedal and master cylinder.
   - **OK**
6. Tighten the loosened brake fluid inlet pipes. (Refer to unit inspection.)
7. Loosen the flare nut of brake fluid pipes on actuator connected to each wheel cylinder. (Refer to unit inspection.)
   - **OK** → Check brake pipes and hoses between actuator and wheel cylinder, including P valve.
8. Ensure that the brake fluid will flow out flow each outlet pipe when brake pedal is depressed. (Refer to unit inspection.)
   CAUTION:
   - Depress the brake pedal gradually, otherwise quite a large amount of the brake fluid will flow out. (Refer to caution in air breeding section.)
   - **NO**
9. Replace the actuator with a new one.

JABS00064-00000

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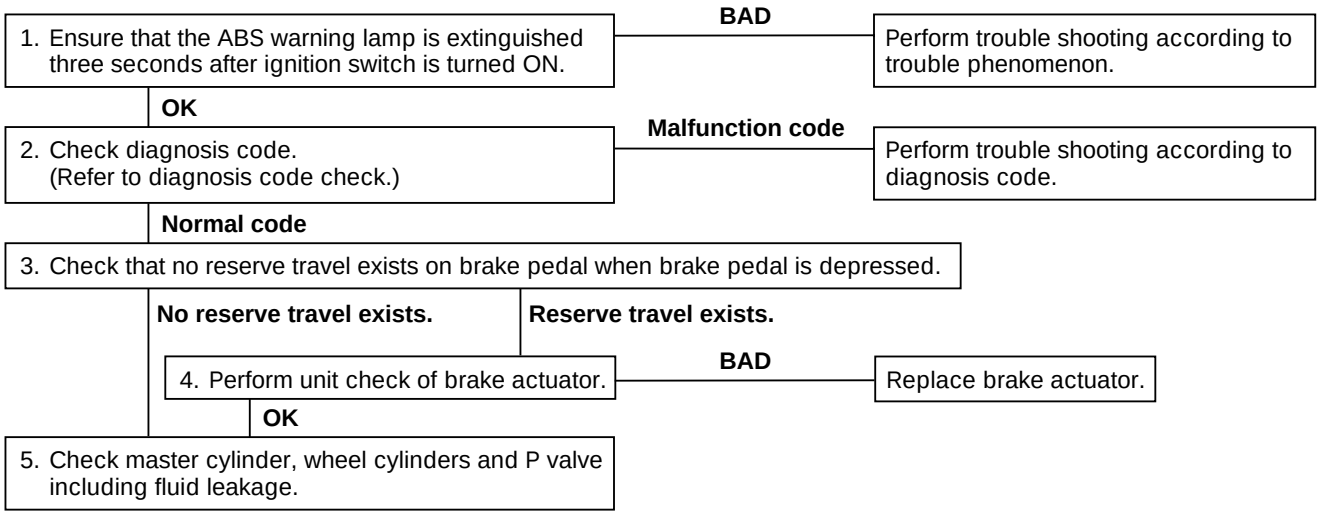
TROUBLE SHOOTING PROCEDURE FLOW CHART NUMBER 7

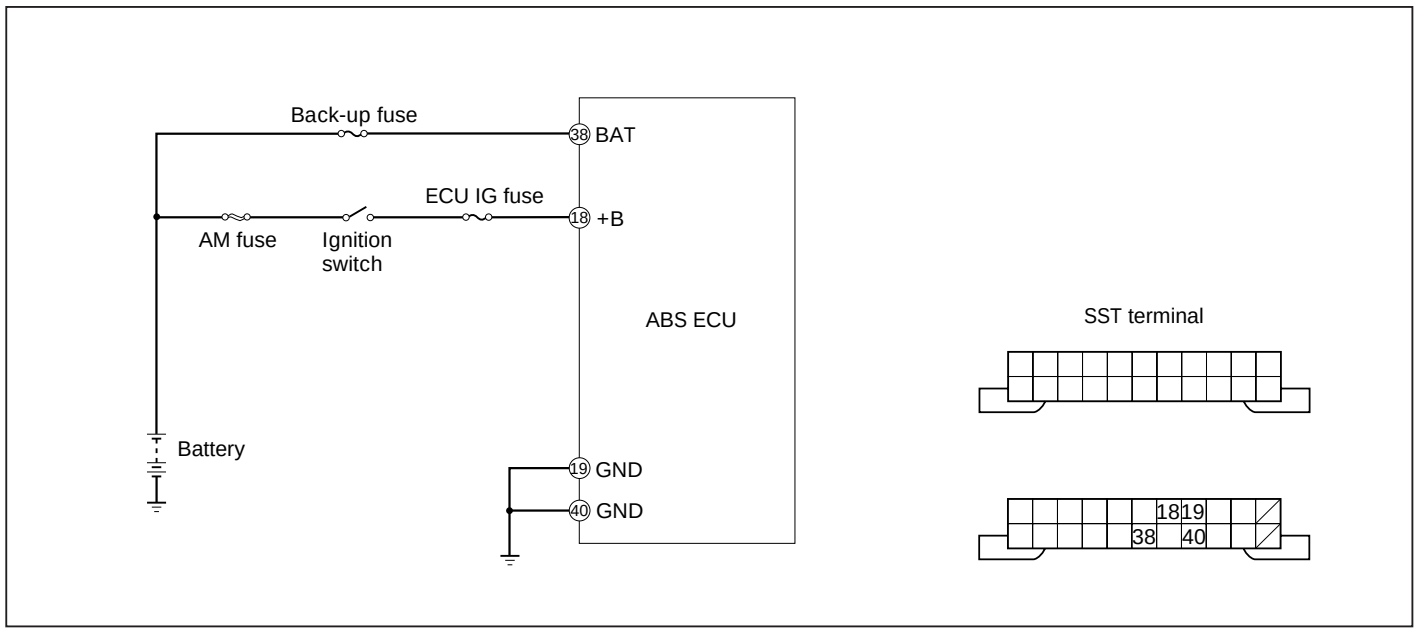
PHENOMENA: Brake pedal working travel is too large. (Reserve travel is too small.)



JABS00065-00000

BASIC CHECK

To perform the diagnosis properly, be sure to perform the basic check before carrying out the specified inspection to ensure whether the power supply circuit and ground circuit of the ABS ECU are proper or not.



JABS00066-00030

1. Ensure that the voltage applying to the ABS ECU is within the specified value, using a volt meter.
   Specified voltage: 10 - 18 volts

2. Connection of the SST
   (1) Disconnect the negative terminal of the ground cable from the battery negative terminal.
   CAUTION:
   - Be sure to read out the diagnosis code of the EFI system before disconnecting the negative terminal of the ground cable from the battery negative terminal.

JABS00067-00000

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(2) Remove the glove compartment box by removing the glove compartment hinge. (Refer to the BO section.)
(3) Disconnect the connector of the wire harness which is connected to the ABS ECU.
(4) Connect the following SST to the connectors of the wire harness disconnected from the ABS ECU.(Refer to the unit inspection of ABS ECU.)
SST: 09842-87401-000

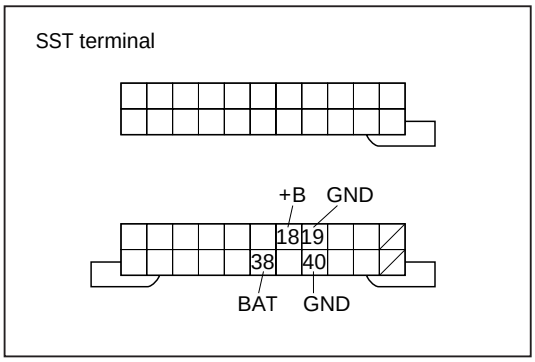
JABS00068-00031

CAUTION:
- Never connect the connectors of the SST to the ABS ECU proper.

3. Connect the negative terminal of the ground cable to the battery negative terminal.
4. Turn on the ignition switch.
NOTE:
- Never start the engine.

JABS00069-00032

5. Ensure that the battery voltage is applied between the terminal +B and the body ground, and between the terminal BAT and the body ground, using a specified circuit tester.
If the battery voltage is not applied, check the power supply circuit for open wire or short circuit.
6. Turn off the ignition switch.
7. Ensure that the battery voltage is applied between the terminal BAT of the SST and the body ground.
If no battery voltage applied, check the back-up power supply circuit for open wire or short circuit.
8. Ensure that continuity exists between each of the terminals GND of the SST and the body ground.
If no continuity exists, repair or replace the wire harness.
9. Disconnect the negative terminal of the ground cable from the battery negative terminal.
10. Disconnect the connector of the wire harness from the connector of the SST.
11. Connect the connector of the wire harness to the ABS ECU.
12. Connect the negative terminal of the ground cable to the battery negative terminal.



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UNIT INSPECTION & REPLACEMENT

NOTE:
- The inspection of each sensor circuit should be performed by reoffering to the ABS RELATED CONNECTORS and ABS CIRCUIT CONNECTION TABLE.
- Utilize the following SST effectively by reoffering to the unit inspection of the ABS ECU.
  SST: 09842-87401-000

- Never connect the connector of the SST to the ABS ECU during the inspection of continuity. Failure to observe this note may lead to wrong diagnosis results.

JABS00071-00000

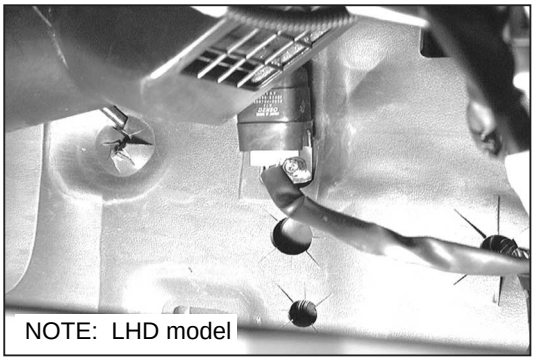
SOLENOID RELAY

1. Turn off the ignition switch.
2. Remove the solenoid relay from the dash panel by removing the attaching bolt.
3. Disconnect the connector of the wire harness connected to the solenoid relay.
   NOTE:
   - The solenoid relay is installed on the dash panel around the front center side of the front right seat.

JABS00072-00000

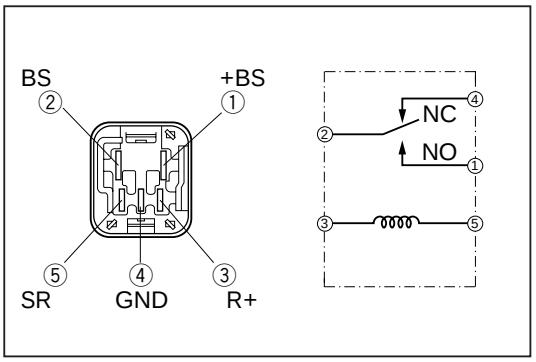
4. Ensure that continuity exists between the terminals BS and GND of the solenoid relay.
   If no continuity exists, replace the solenoid relay with a new one.
5. Ensure that the resistance between the terminals R+ and SR within the specified value.
   Specified resistance: 80 Ω (at 20 °C)

   If the measured resistance fails to meet the specified value, replace the solenoid relay with a new one.



JABS00073-00034

6. Ensure that continuity exists between the terminals +BS and BS when the battery voltage is applied across the terminals R+ and SR.
   If no continuity exists, replace the solenoid relay with a new one.
7. Install the solenoid relay to the dash panel with the attaching bolt.
8. Connect the connector of the wire harness to the solenoid relay.



JABS00074-00035

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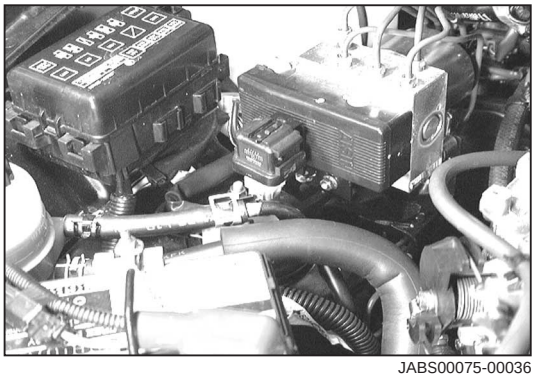
MOTOR RELAY

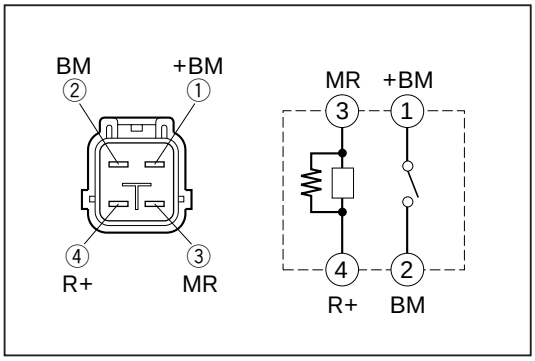
1. Turn off the ignition switch.
2. Remove the motor relay from its bracket while unlocking the lock provided on its bracket.
3. Disconnect the connector of the wire harness connected to the motor relay.
4. Ensure that the resistance between the terminals R+ and MR is within the specified value.
   Specified resistance: 62 ohm (at 20 °C)

   If the measured resistance fails to meet the specified value, replace the motor relay with a new one.

5. Ensure that continuity exists between the terminals +BM and BM of the motor relay when the battery voltage is applied across the terminals R+ and MR.
   If no continuity exists, replace the motor relay with a new one.
6. Connect the connector of the wire harness to the motor relay.
7. Install the motor relay to its bracket.



JABS00075-00036



JABS00076-00037

SENSOR CHECK BY SENSOR CHECK FUNCTION OF THE ABS ECU

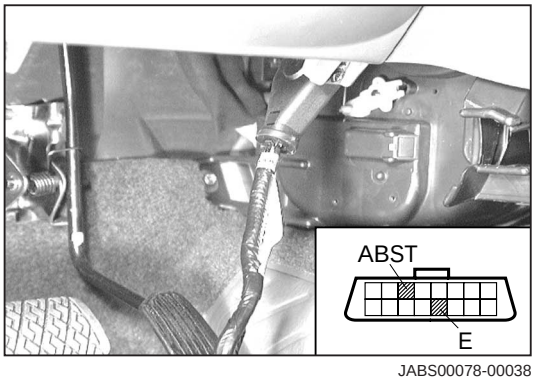
NOTE:
- The sensor check function of the ABS ECU checks the output signal (voltage) and its conditions of each speed sensor and gravity sensor.
- Therefore, you may judge whether sensors are proper or not by this function when the ABS ECU is functioning properly.
- Carefully follow the instructions mentioned below, in particular, the instructions regarding the operation of the ignition switch. Failure to observe this NOTE may lead to wrong diagnosis results.

JABS00077-00000

1. Ensure that the ignition switch is turned off.
2. Connect the following SST to the diagnosis connecter.
   SST: 09991-87401-000

3. Connect the terminal ABST with the ground terminal in the inspection connector of the SST, using the following SST.
   SST: 09991-87403-000

   CAUTION:
   - Never connect the connector other than that specified. Even slight contact of terminals other than that specified will lead to malfunction of the ABS, EFI and/or other systems.



JABS00078-00038

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4. Turn ON the ignition switch.
   CAUTION:
   - Never turn off the ignition switch until the sensor check by the sensor function is completed.

5. Ensure that the ABS warning lamp will indicate the ABS ECU code number once immediately after the ignition switch is turned on.
   NOTE:
   - There is no problem even if the ABS ECU code is not outputted.

6. Ensure that the ABS warning lamp blinks at intervals of 0.13 second.
   <Reference>
   This shows that the ABS ECU is in the test mode.

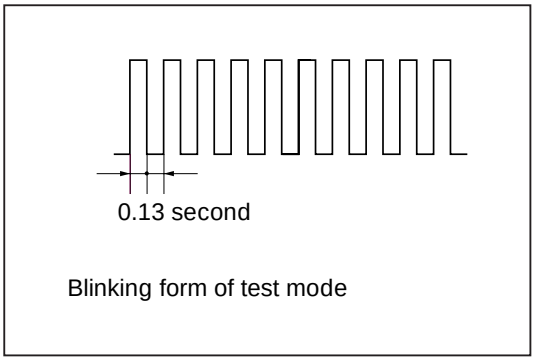
7. Drive the vehicle at a speed between 45 km/h and 80 km/h. Then, maintain the driving speed for one second or more.
   WARNING:
   - Be sure to perform the test driving in a safe place.

   CAUTION:
   - Keep the steering wheel in a straight-ahead direction at the time of starting and stopping.
   - Never made tire slipping during the test driving.
   - If phenomenon appears under the high speed driving, drive the vehicle at a speed of 80 km/h or more and keep the driving speed for one second or more after performing the test driving above.

8. Stop the vehicle.
   NOTE:
   - Never turn off the ignition switch.

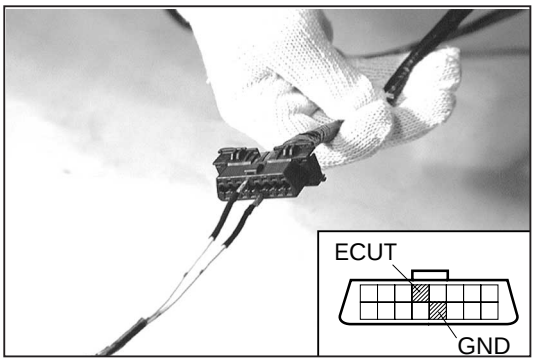
9. Connect the terminals ECUT and GND of the SST.
10. Read out the diagnosis code indicated by the blinking of the ABS warning lamp.
    NOTE:
    - The ABS warning lamp blinks at intervals of 0.25 second when the malfunction code is not memorized.
    - The ABS warning lamp indicates the malfunction code by blinking at intervals of 0.5 second. There is an interval of 1.5 seconds between the first digit and the second digit.
    - The ABS warning lamp blinks at intervals of the 2.5 seconds between codes when plural codes are memorized.
    - The ABS warning lamp repeats blinking at intervals of 4 seconds after all memorized malfunction codes are outputted.
    - When plural codes are memorized, the ABS warning lamp indicates diagnosis codes, starting from a smaller number.

JABS00079-00000



Blinking form of test mode

JABS00080-00039



JABS00081-00067

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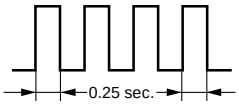
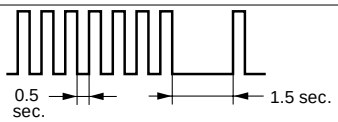
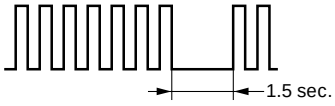
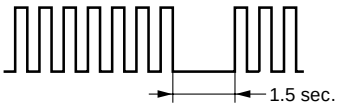
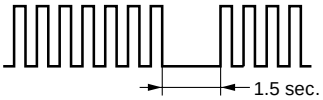
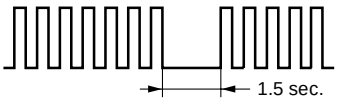
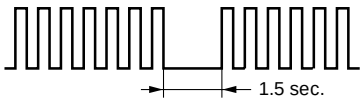
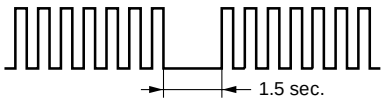
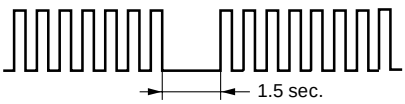
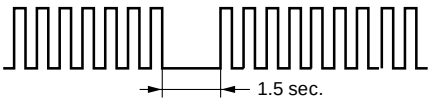
Diagnosis code table

NOTE:
- Be sure to perform trouble shooting including its related wire harness hand and connectors of presumable parts mentioned in the table above.

Code No.	Output from of diagnosis code	Diagnosis contents	Presumable causes
Nil		Normal	No trouble on sensor systems
71		Lack of output voltage of front right side speed sensor	Speed sensor Sensor rotor Clearance between sensor and sensor rotor Wheel bearing
72		Lack of output voltage of front left side speed sensor	Speed sensor Sensor rotor Clearance between sensor and sensor rotor Wheel bearing
73		Lack of output voltage of rear right side speed sensor	Speed sensor Sensor rotor Clearance between sensor and sensor rotor Wheel bearing
74		Lack of output voltage of rear left side speed sensor	Speed sensor Sensor rotor Clearance between sensor and sensor rotor Wheel bearing
75		Excessive variation of output voltage of front right side speed sensor	Speed sensor Sensor rotor Clearance between sensor and sensor rotor Deterioration of sensor tip and/or sensor rotor
76		Excessive variation of output voltage of front left side speed sensor	Speed sensor Sensor rotor Clearance between sensor and sensor rotor Deterioration of sensor tip and/or sensor rotor
77		Excessive variation of output voltage of rear right side speed sensor	Speed sensor Sensor rotor Clearance between sensor and sensor rotor Deterioration of sensor tip and/or sensor rotor
78		Excessive variation of output voltage of rear left side speed sensor	Speed sensor Sensor rotor Clearance between sensor and sensor rotor Deterioration of sensor tip and/or sensor rotor
79		Gravity sensor function	Gravity sensor

JABS00082-00000

11. Turn off the ignition switch.
12. Remove the SST (jump wire) from the SST (sub-harness.)
    NOTE:
    - All memorized codes will be erased when the ignition switch is turned off or the jump wire between the terminals ABST and the ground terminal is removed.

13. Remove the SST from the diagnosis connector.
14. Perform the unit inspection for parts mentioned in the table above as presumable cause and their related harnesses.

JABS00083-00000

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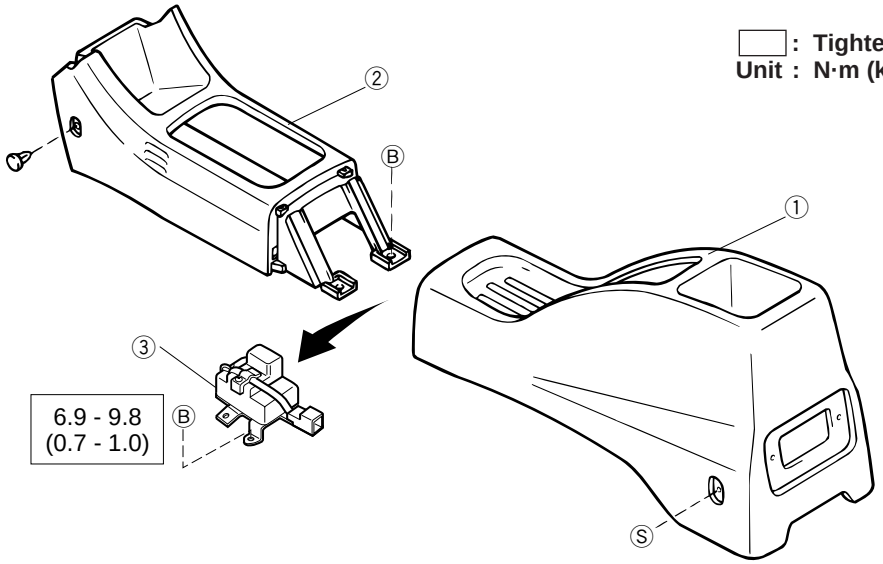
GRAVITY SENSOR



① Rear console box assembly
② Console panel
③ Gravity sensor

JABS00084-00040

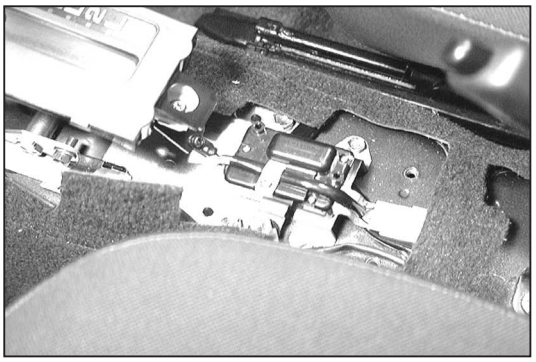
NOTE:
- The function check of the gravity sensor should be performed by the sensor check function. The following procedure applies only to the inspection of attaching conditions, removal and installation.

1. Removal of rear console box
   (1) Turn off the ignition switch.
   (2) Remove the console box by removing the two attaching bolts and screw grommets. (Refer to BO section.)

   NOTE:
   - Change the shift lever position while removing the center console box in the case of automatic transmission-equipped model.

JABS00085-00000

2. Inspection of gravity sensor for installation condition
   Check the gravity sensor for the following points.
   - Connector connecting condition.
   - Gravity sensor installing condition.
   - Ensure that the gravity sensor attaching bolts are tightened properly and the gravity sensor is seated on the floor panel properly.
     Also, check that the wire harness for the gravity sensor is not interfered with the gravity sensor.
     If any trouble exists, repair or replace the gravity sensor or the wire harness.



JABS00086-00041

3. Removal of gravity sensor
   (1) Remove the gravity sensor attaching bolts.
   (2) Disconnect the two wire harness clamps from the bracket of the gravity sensor.
   (3) Disconnect the connector from the gravity sensor.
4. Installation of gravity sensor
   (1) Connect the connector of the wire harness to the gravity sensor.
   (2) Connect the two wire harness clamps to the bracket of the gravity sensor.

JABS00087-00000

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(3) Install the gravity sensor to the floor panel with two attaching bolts in such a direction that the connector provided on the gravity sensor faces toward backward.

CAUTION:

- Never install the gravity sensor in a reverse direction. The gravity sensor can be installed in both directions. Failure to observe this caution may make the gravity sensor inoperative.
- Never pinch the wire harness of the gravity sensor at the front side of the gravity sensor during the installation.
- Be sure to clean the contacting surfaces of the gravity sensor and floor panel before installing the gravity sensor.

(2) Tighten the attaching bolts evenly in two or three stages to the specified tightening torque.
Tightening torque: 6.9 - 9.8 N·m (0.7 - 1.0 kgf-m)

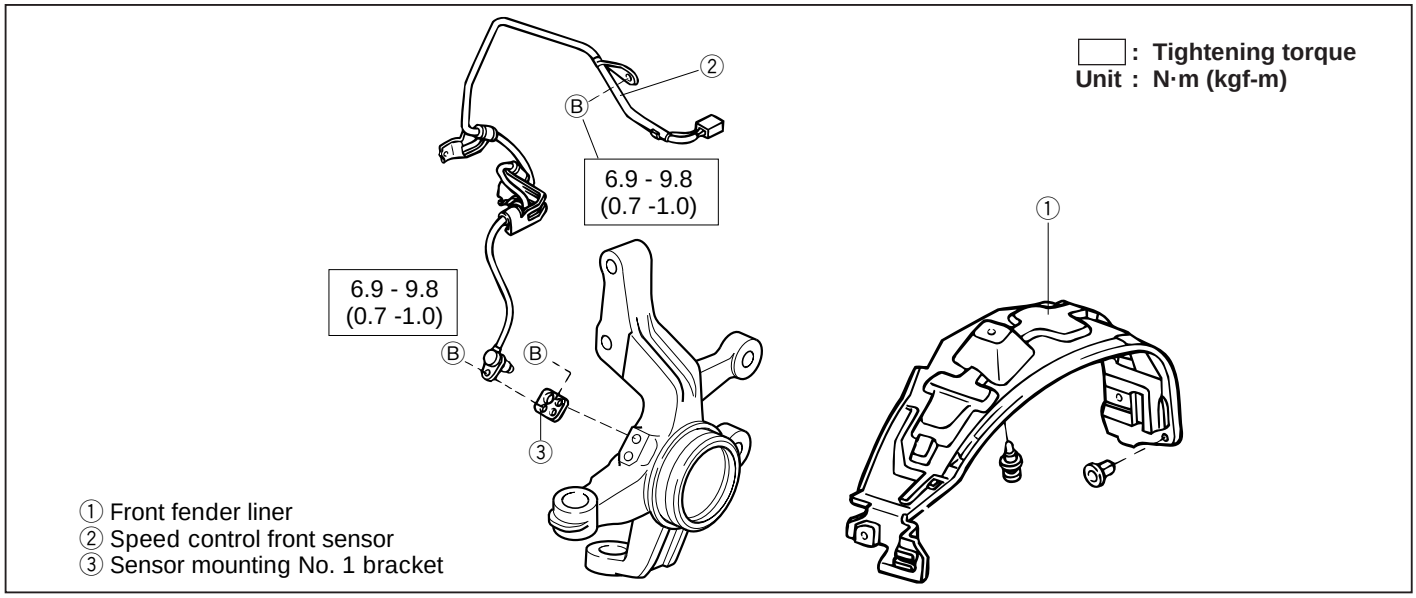
5 Install the center console boxes with two attaching bolts and screw grommets. (Refer to BO section.)

JABS00088-00000

FRONT SPEED SENSOR

NOTE:

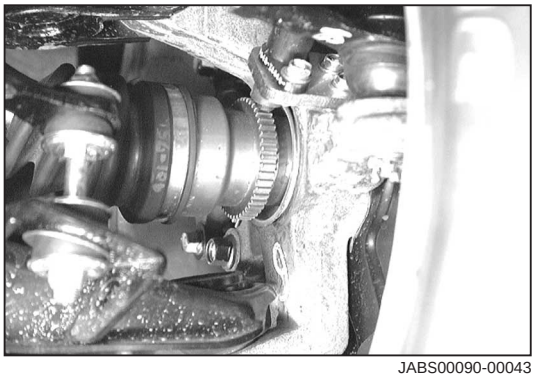
- The check of the speed sensor is basically carried out by the sensor check function.



JABS00089-00042

1. Checking of air gap
Ensure that the air gap between the sensor tip and the sensor rotor is within the specified value.
Air gap: 0.7 ± 0.5 mm

If the air gap fails to meet the specified air gap, replace the speed sensor, knuckle or sensor rotor(drive shaft), as required. (Refer to FS section.)



JABS00090-00043

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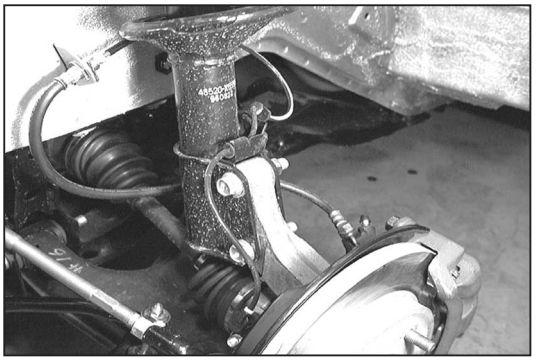
2. Checking of sensor rotor
   Inspect the sensor rotor for the following points.
   - Ensure that the sensor rotor is pressed in on the drive shaft properly, is free from damage and is not contaminated by foreign materials.
   - Ensure that the wheel bearing has no excessive play.

   If any trouble exists, clean, repair or replace the sensor rotor (drive shaft) or wheel bearing, as required. (Refer to FS section.)

3. Removal of front speed sensor
   (1) Remove the fender liner. (Refer to BO section.)
   (2) Disconnect the wire harness side connector from the sensor connector.
   (3) Remove the front speed sensor by removing the attaching bolts.

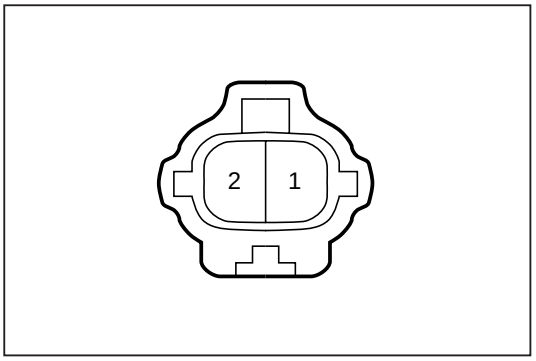
JABS00091-00000



JABS00092-00044

4. Inspection of speed sensor
   (1) Ensure that the front speed sensor resistance is within the specified value, using an ohmmeter.
   Specified resistance: 1.1 ± 0.2 k Ω (at 20°C)

   (2) Ensure that the tips of the speed sensors are free from damage or contamination with foreign materials.
   Clean the tips of the speed sensors, if they are contaminated.



JABS00093-00045

5. Installation of front speed sensor
   CAUTION:
   - Be sure to clean the contacting surfaces of the speed sensors and speed sensor before the installation.
   - Never twist the speed sensor harness during the installation and check that the checked line has not been twisted.

6. Install the speed sensor to the vehicle with the attaching bolts and tighten them to the specified tightening torque.
   Tightening torque:
   Speed sensor harness clamp to inner fender:
   6.9 - 9.8 N·m (0.7 - 1.0 kgf-m)
   Speed sensor to knuckle:
   6.9 - 9.8 N·m (0.7 - 1.0 kgf-m)

7. Install the fender liner. (Refer to BO section.)

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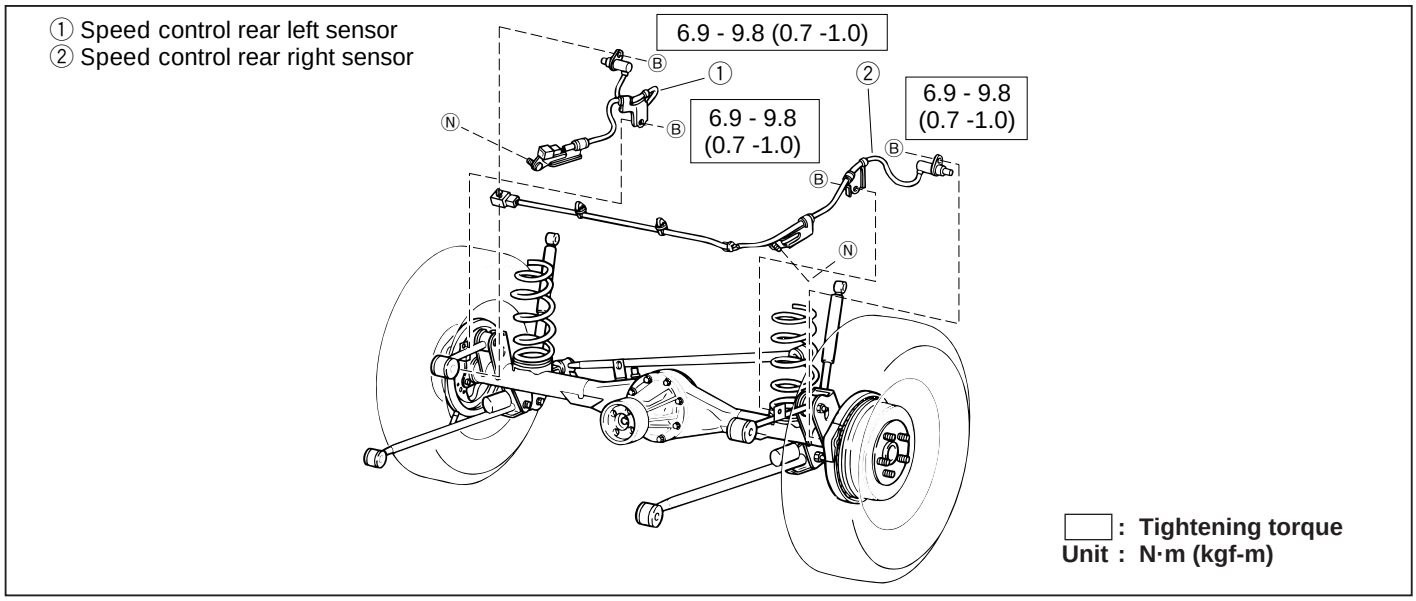
REAR SPEED SENSOR

NOTE:
- The check of the speed sensor is basically carried out by the sensor check function.



JABS00094-00046

1. Remove the rear wheels. (Refer to RS section.)
2. Checking of air gap.
   (1) Remove the rear wheel. (Refer to RS section)
   (2) Ensure that the air gap between the sensor tip and the sensor rotor (brake drum) is within the specified value.
   Air gap: 1.8 ± 1.0 mm

   If the air gap fails to meet the specified air gap, replace the speed sensor, brake backing plate (refer to RS section.) or sensor rotor (brake drum), as required.
   (3) Install the rear wheel. (Refer to RS section.)

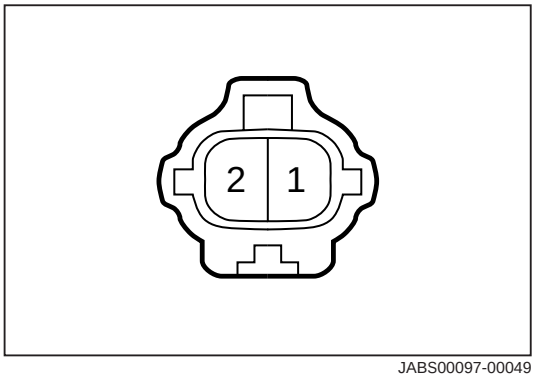
JABS00095-00047

3. Checking of sensor rotor (brake drum.)
   (1) Remove the rear wheel. (Refer to RS section.)
   (2) Ensure that the sensor rotor is free from damage and contamination with foreign materials. Also, check that no excessive free play exists on the wheel bearings.
   If any trouble exists, clean, repair or replace the sensor rotor(brake drum) or wheel bearing, as required.
   (3) Install the rear wheel. (Refer to RS section.)

JABS00096-00048

4. Inspection of speed sensor
   CAUTION:
   - Never remove the rear speed sensor from the vehicle, unless its replacement is required.
   - No spare part of the sensor wire clamp is available.

   (1) Disconnect the connector of the rear speed sensor from the connector of the wire harness.
   (2) Ensure that the rear speed sensor resistance is within the specified value, using an ohmmeter.
   Specified resistance: 1.1 ± 0.2 k Ω (at 20°C)



JABS00097-00049

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(3) Ensure that the tips of the speed sensors are free from damage or contamination with foreign materials.
Clean the tips of the speed sensors, if they are contaminated.
(4) Connect the connector of the rear speed sensor to the connector of the wire harness.

5. Removal of speed sensor
NOTE:
• Refer to the illustration shown in page BR–77.

(1) Turn off the ignition switch.
(2) Disconnect the connector of the speed sensor from the connector of the wire harness.
(3) Disconnect the sensor harness clamp by removing the attaching bolts.
(4) Disconnect the sensor harness clamp form the floor panel by retracting its lock sections, using a minor screwdriver or the like.
(5) Remove the speed sensor by removing the attaching bolt.

6. Installation of speed sensor
(1) Clean the attaching surface of the speed sensor and backing plate.
(2) Install the speed sensor with the attaching bolt and tightening it to the specified tightening torque.
Tightening torque: 6.9 - 9.8 N·m (0.7 - 1.0 kgf-m)

(3) Connect the sensor harness clamp to the floor panel and ensure that the locking section is properly engaged by pulling it lightly.
(4) Connect the sensor harness clamp with the attaching bolts and tighten them to the specified tightening torque.
Tightening torque: 6.9 - 9.8 N·m (0.7 - 1.0 kgf-m)

(5) Connect the connector of the speed sensor to the connector to the wire harness.
(6) Check the speed sensor by performing the sensor check function of the ABS.

JABS00098-00000

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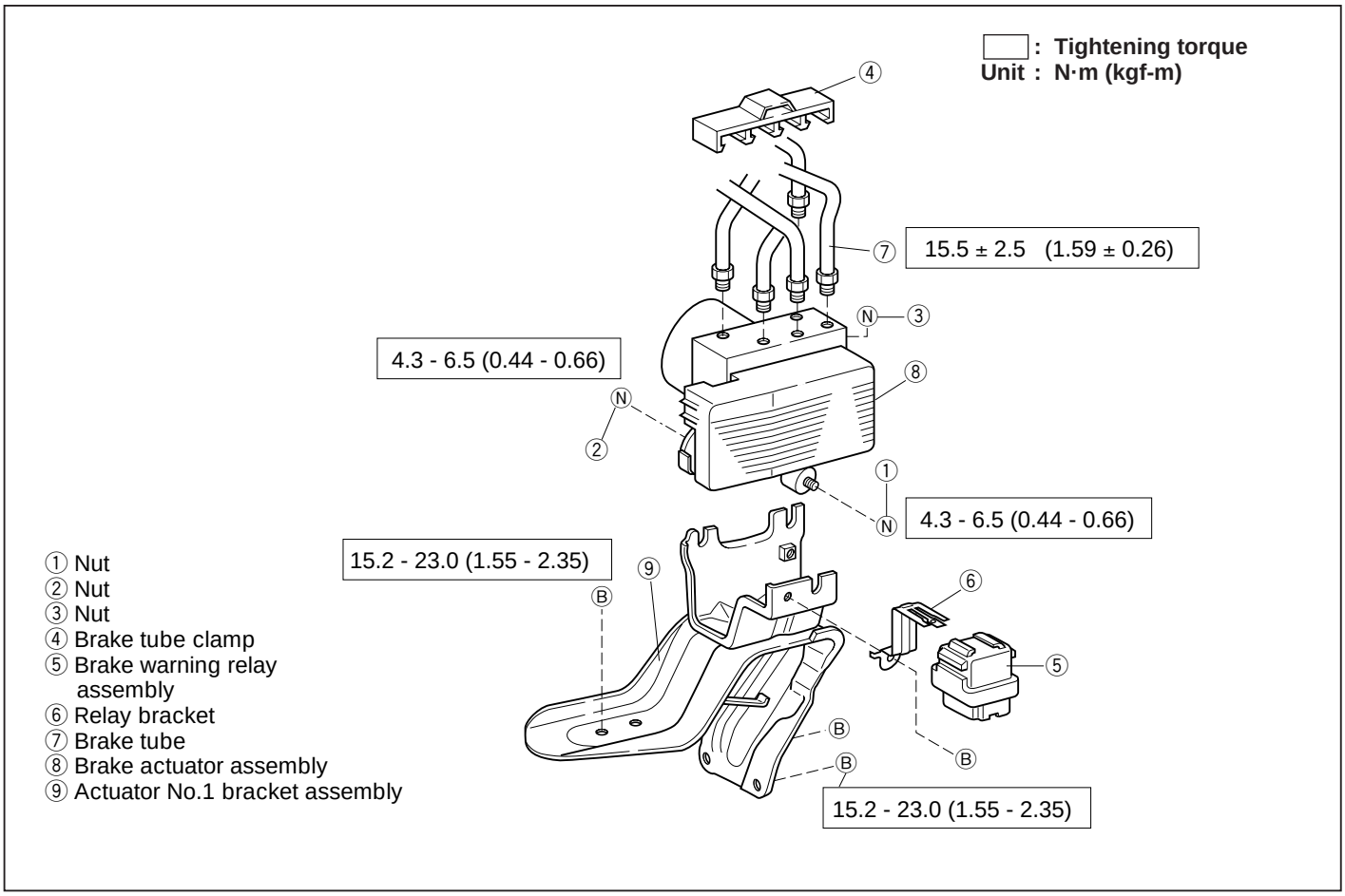
ABS ACTUATOR

WARNING:
- Be sure to prevent foreign substances from being admitted into the brake actuator. Failure to observe this warning may lead to serius brake malfunction.



JABS00099-00050

1. Check of continuity and resistance
   (1) Disconnect the negative terminal of the ground cable from the negative terminal of the battery.

   NOTE:
   - Be sure to read out the diagnosis code of the ABS and EFI before disconnecting the battery power supply.

   (2) Remove the glove compartment box by removing the glove compartment door hinge. (Refer to BO section.)
   (3) Disconnect the connector of the wire harness from the ABS ECU.
   (4) Connect the following SST to the connector of the wire harness which was connected to the ABS ECU.
   SST: 09842-87401-000

   NOTE:
   - Never connect the connector of the SST to the ABS ECU.

JABS00100-00051

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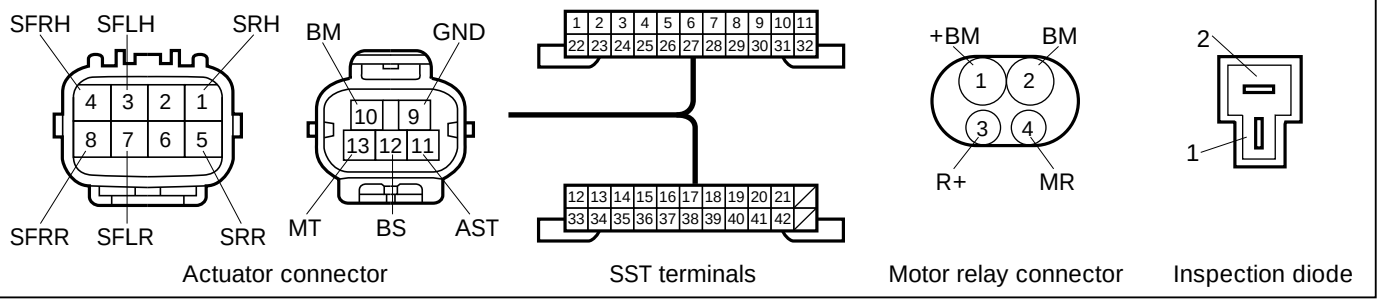
(5) Remove the inspection diode. (Refer to the inspection diode section)
(6) Remove the motor relay. (Refer to the motor relay section.)
(7) Ensure that the resistance or continuity between the respective terminals is within the specified value, as shown in the table below.

NOTE:
- Resistance values in the following table below denote values at an ambient temperature of 20°C. If any one of resistance or continuity fails to meet the specification in the following table, replace the actuator with a new one.

JABS00101-00000

Terminal table of SST and connector terminals



JABS00000-00052

	Terminal to be checked or measured											Resistance
Terminal No. (Actuator)	1	3	4	5	7	8	9	10	11	12	13	
Terminal to be checked	○									○		5 ± 0.25 Ω plus wiring resistance
		○								○		
			○							○		
				○						○		2.2 ± 0.2 Ω plus wiring resistance
					○					○		
						○				○		
									○	○		33 ± 0.2 Ω plus wiring resistance
								○			○	
							○	○				wiring resistance
SST terminal	22	1	8	23	2	29	19		24			
Motor relay								2				
Inspection diode										2		

If the measured resistance or continuity fails to meet the specified value, perform the unit inspection after the actuator is removed by referring to the table above, in order to clarify that the trouble originated in the wire harness or the actuator unit.

JABS00102-00000

(8) Install the motor relay. (Refer to the motor relay section.)
(9) Install the inspection diode. (Refer to the inspection diode section.)
(10) Remove the following SST from the connector of the wire harness which was connected to the ABS ECU.

NOTE:
- Never connect the connector of the SST to the ABS ECU.

(11) Connect the connector of the wire harness to the ABS ECU.
(12) Install the glove compartment box by installing the glove compartment box retainer. (Refer to BO section.)
(13) Connect the negative terminal of the ground cable from the negative terminal of the battery.

JABS00103-00000

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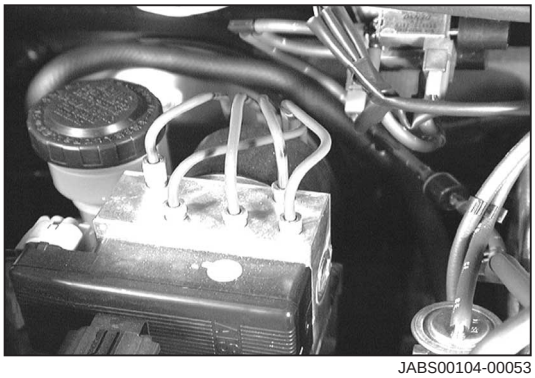
2. Check of fluid lines in actuator

CAUTION:

- Be sure to prevent the brake fluid from coming in contact with the painted surface and resin parts, using a piece of cloth or the like. If the brake fluid comes in contact with the painted surface and resin parts, immediately wipe off the brake fluid and wash with fresh water.

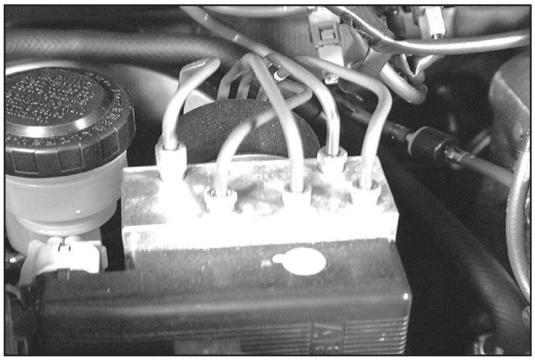


JABS00104-00053

(1) Loosen the brake pipes connected to the actuator from the master cylinder.
(2) Ensure that the brake fluid will flow out without resistance when the brake pedal is depressed.

CAUTION:

- Be sure to depress the brake pedal gradually, otherwise a quite large amount of brake fluid will splash out.
- If no brake fluid flows out, check the fluid leakage or internal leakage in the master cylinder.



JABS00105-00054

(3) Tighten the flare nuts to the specified tightening torque.
Tightening torque: 15.5 ± 2.5 N·m (1.59 ± 0.26 kgf-m)

(4) Loosen the brake pipes connected to the actuator from the wheel cylinders.
(5) Ensure that the brake fluid will flow out without resistance when the brake pedal is depressed.

CAUTION:

- Be sure to depress the brake pedal gradually, otherwise a quite large amount of brake fluid will splash out.

If no brake fluid flows out, replace the actuator with a new one, after inspecting the P valve for fluid continuity.

(6) Tighten the flare nuts to the specified tightening torque.
Tightening torque: 15.5 ± 2.5 N·m (1.59 ± 0.26 kgf-m)

JABS00106-00000

3. Function check of actuator

(1) Preparation before inspection
① Check the brake system, using a brake tester.
If any trouble exists, repair it, as required.
② Jack up the vehicle and support it with safety stands.
(Refer to GI section for supporting position of the safety stand.)
③ Release the parking brake.
④ Place the shift lever in the neutral position.
⑤ Ensure that the wheels turn properly.

LABS00107-00055

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⑥ Disconnect the negative terminal of the ground cable from the negative terminal of the battery.

NOTE:
- Be sure to read out the diagnosis code of the EFI system before disconnecting the power supply to the vehicle.

⑦ Disconnect the connector of the wire harness connected to the ABS ECU.
⑧ Connect the following SST to the connector of the wire harness disconnected from the ABS ECU.
SST: 09842-87401-000

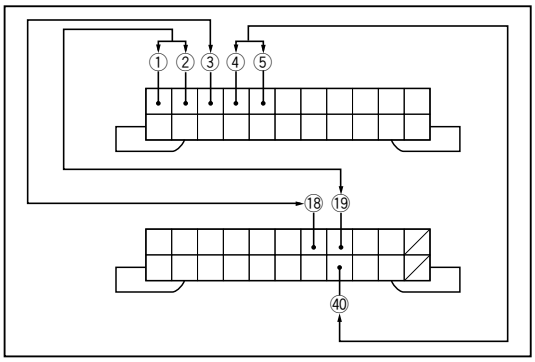
LABS000108-00056

NOTE:
- Never connect the connector of the SST to the ABS ECU.

⑨ Connect the negative terminal of the ground cable to the negative terminal of the battery.

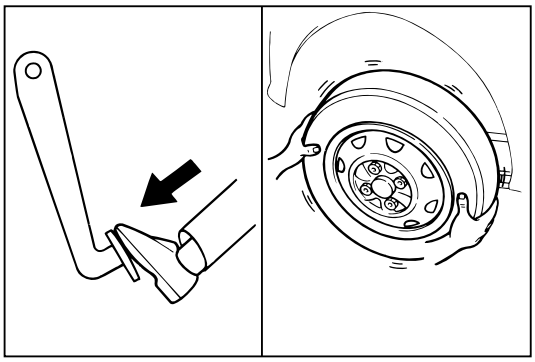
(2) Inspection of left side front wheel
CAUTION:
- Never connect the terminal to other terminals than that specified. Failure to observe this caution may lead to serius trouble including fire.

① Connect the terminals No. 1 and 2 to terminal No. 19.
② Connect the terminals No. 4 and 5 to terminals No. 40.
③ Connect the terminals No. 3 to terminals No. 18.

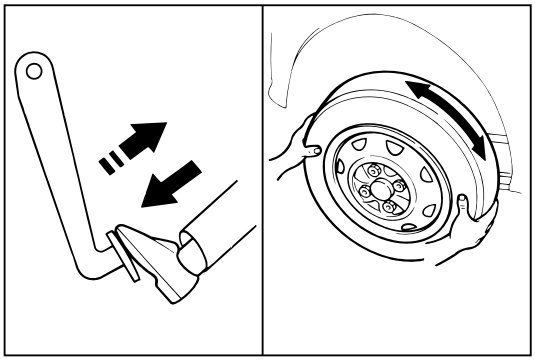


LABS00109-00057

④ Ensure that the front side left wheel will be locked when the brake pedal is depressed.


LABS00110-00058

⑤ Ensure that the locked state of the front side left wheel will be released and the wheel turns freely, also, ensure that the brake pedal will rise up slightly when the ignition switch is turned ON while depressing the brake pedal.
CAUTION:
- Never leave the ignition switch in the ON state for 15 seconds or more.
- Failure to observe this caution will make the actuator inoperative.


LABS00111-00059

⑥ Turn off the ignition switch immediately after the inspection.
If the actuator is not functioning as specified above, replace the actuator with a new one.

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⑥ Remove the jump wire in the SST terminals.

NOTE:

- Proceed to check the remaining right and rear wheels as mentioned in step (3).

⑦ Disconnect the negative terminal of the ground cable from the negative terminal of the battery.
⑧ Remove the SST from the connector of the wire harness.
⑨ Connect the connector of the wire harness to the ABS ECU.

10. Connect the negative terminal of the ground cable to the negative terminal of the battery.

LABS00112-00000

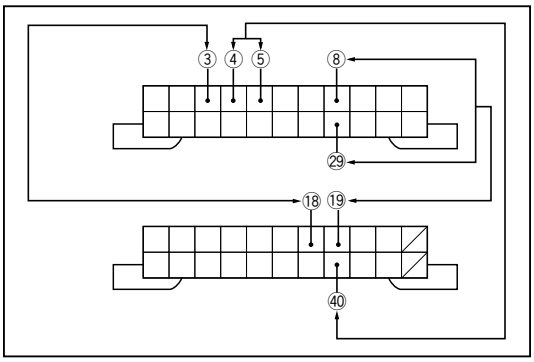
(3) Inspection of right side front wheel and rear wheels

CAUTION:

- The terminals of the SST shown in this step are to be connected for each inspection.
- However, the step-by-step procedure is not given in this step. The inspection procedure of the right side front wheel and rear wheels is the same as the left side front wheel, except terminals to be connected in the SST. Therefore, follow the procedure mentioned in “Inspection of left side front wheel”, except terminals in the SST to be connected.

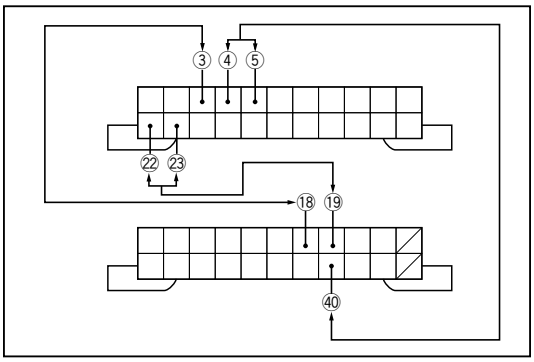
LABS00113-00000

① Right side front wheel
- Connect the terminals No. 8 and 29 to terminal 19.
- Connect the terminals No. 4 and 5 to terminal No. 40.
- Connect the terminals No. 3 and 18.



LABS00114-00060

② Rear wheels
- Connect the terminals No. 22 and 23 to terminal 19.
- Connect the terminals No. 4 and 5 to terminal No. 40.
- Connect the terminals No. 3 and 18.



LABS00115-00061

4. Function check of actuator using DS-21

(1) Preparation before inspection

① Check the brake system, using a brake tester.
② Jack up the vehicle and support it with safety stands.
(Refer to GI section for supporting position of the safety stand.)
③ Release the parking brake.
④ Place the shift lever to the neutral position.
⑤ Ensure that the wheels turn properly.

LABS00116-00000

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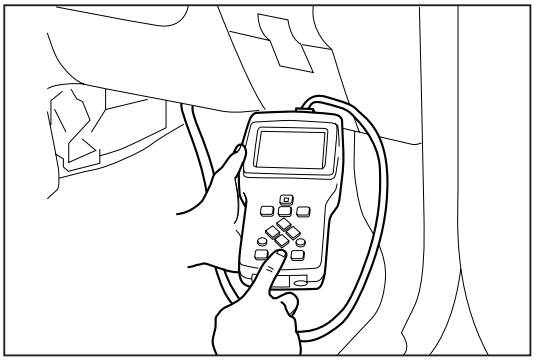
(2) Inspection
(Refer to the service manual of DS-21 for more details.)
① Connect the DS-21 to the diagnosis connector, using the following SST.
SST: 09991-87401-000



JABS00117-00062

② Select the function of the actuator drive.

NOTE:
- When selecting of the actuator drive, release the security function of DS-21.

③ Ensure that the wheels turn properly.
④ Ensure that the wheels will be locked when the brake pedal is depressed.
⑤ Ensure that the locked state of the front side left wheel will the released and the wheel turns freely. Also, ensure that the brake pedal will rise up slightly when the function of the front side left wheel actuator is performed by DS-21.
⑥ Perform the remaining inspection of the front side right wheel and rear wheels one by one, following the steps ① to ⑤ mentioned above.

JABS00118-00000

5. Removal of ABS actuator
NOTE:
- Refer to the illustration in page BR–79

(1) Removal of motor relay
① Disconnect the connectors of the wire harness from the motor relay.
② Remove the motor relay by unlocking the lock on its bracket.
③ Remove the motor relay bracket.
(2) Drain the brake fluid from the brake system.
(3) Remove the brake tube clamp.
(4) Disconnect the brake pipes from the actuator.
CAUTION:
- Prevent dust or other foreign substances from being admitted into the actuator and brake line.
- Failure to observe this caution may lead to serius brake problem.

(5) Remove the actuator by removing the attaching nuts.
CAUTION:
- Never deform the brake pipes during the removal of the actuator.

(6) Removal of ABS actuator bracket
① Disconnect the brake pipe from the brake pipe clamp.
② Disconnect the brake pipe (connected from the front inlet P valve to the actuator) from the P valve.
CAUTION:
- Prevent dust or other foreign substances from being admitted into the brake line.
- Failure to observe this caution may lead to serius brake problem.

③ Remove the ABS actuator bracket with the brake pipe by removing the attaching bolts.

JABS00119-00000

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6. Installation of ABS actuator

NOTE:

- The installation procedure is basically procedure in the reverse order of the removal procedure. Therefore, some illustrations are omitted from the installation procedure. Refer to the illustration in the removal procedure if any difficulty is encountered.

JABS00120-00000

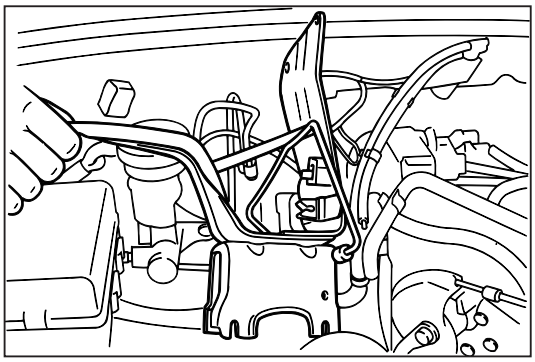
(1) Installation of ABS actuator bracket

① Insert the brake pipe (connected from the P valve to the front inlet of the actuator) in the brake actuator bracket as shown.

② Install the ABS actuator bracket by installing the attaching bolts and tighten the attaching bolts to the specified tightening torque evenly.

Tightening torque: 15.2 - 23.0 N·m (1.55 - 2.35 kgf-m)

③ Connect the brake pipe to the P valve temporarily by your hand.



JABS00121-00063

(2) Install the actuator with the attaching nuts and tighten them to the specified tightening torque.

Tightening torque: 4.3 - 6.5 N·m (0.44 - 0.66 kgf-m)

CAUTION:

- Never deform the brake pipes during the removal of the actuator.

(3) Connect the brake pipes to the actuator and tighten the flare nuts of the brake pipes which are connected to the actuator and P valve to the specified tightening torque.

Tightening torque: 15.5 ± 2.5 N·m (1.59 ± 0.26 kgf-m)

CAUTION:

- Prevent dust or other foreign substances from being admitted into the actuator and brake line.
- Failure to observe this caution may lead to serius brake problem.

(4) Fill the brake fluid to the brake system.

(5) Ensure that no brake fluid leakage exists.

(6) Installation of motor relay

① Install the motor relay bracket with the attaching bolts.

② Connect the motor relay to the motor relay bracket and ensure that the lock is properly engaged.

③ Connect the connectors of the wire harness to the motor relay.

JABS00122-00000

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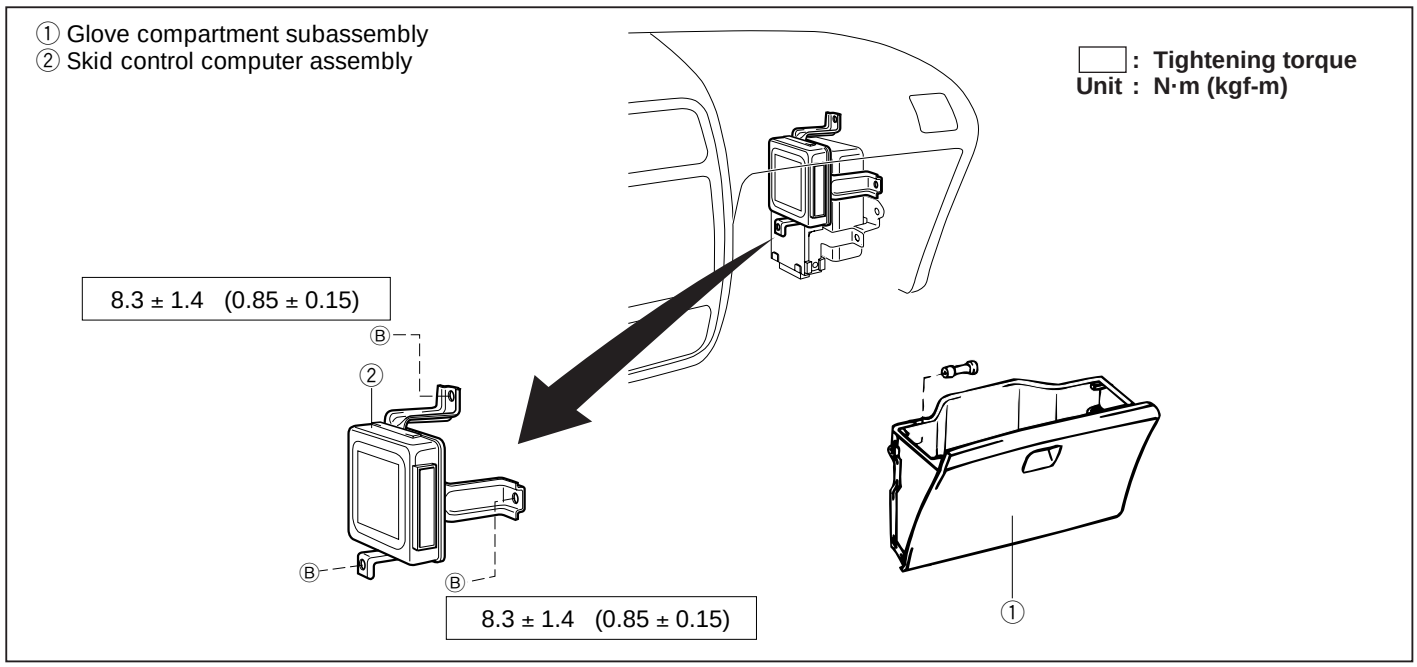
ABS ECU

COMPONENTS



JABS00123-00064

CAUTION:

- Be sure to read out the diagnosis code of the ABS and EFI systems before disconnecting the battery power supply. Failure to observe this caution will erase the memorized diagnosis codes.
- Be sure to perform the unit inspection of the ABS ECU at the battery voltage between 10 to 14 volts when the ignition switch is turned ON.
- Use correct measuring instrument for inspection. (Refer to BR–42.)

1. Disconnect the negative terminal of the ground cable from the negative terminal of the battery.
2. Remove the glove compartment box by removing the retainer. (Refer to BO section.)
3. Disconnect the connector of the wire harness from the ABS ECU.
4. Connect the following SST between the ABS ECU and the connector of the wire harness.
   SST: 09842-87401-000

JABS00124-00000

JABS00125-00065

5. Connect the negative terminal of the ground cable to the negative terminal of the battery.
6. Measure the voltages under the condition specified in the table below and perform the trouble shooting of the part(s) related to the wire harness and connection as mentioned in the table below.
   NOTE:
   - All specifications mentioned in the following table denote values at a temperature under 20-25 °C.
   - Be sure to perform the trouble shooting including its related wire harness and connectors of presumable parts mentioned in the following table.

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Terminal to be connected	Specified value	Measuring condition		Presumable cause
1 (SFLH) - 40 (GND)	Zero volt	Ignition switch OFF		Actuator Solenoid relay
	Battery voltage	Ignition switch ON	After ABS warning lamp is extinguished.	
2 (SFLR) - 40 (GND)	Zero volt	Ignition switch OFF		Actuator Solenoid relay
	Battery voltage	Ignition switch ON	After ABS warning lamp is extinguished.	
3 (R+) - 40 (GND)	Zero volt	Ignition switch OFF		Solenoid relay Motor relay
	Battery voltage	Ignition switch ON		
4 (MR) - 40 (GND)	Zero volt	Ignition switch OFF		Motor relay
	Battery voltage	Ignition switch ON	When motor relay is turned ON	
	Battery voltage	Ignition switch ON	When motor is operating, for example, short duration immediately after ignition switch is turned ON.	
5 (SR) - 40 (GND)	Zero volt	Ignition switch OFF		Solenoid relay
	Zero volt	Ignition switch ON	When solenoid relay is turned ON	
6 (FR+) - 40 (GND)	Zero volt	Ignition switch OFF		Front right speed sensor
	1.0 - 3.0 volts	Ignition switch ON		
7 (FR–) - 40 (GND)	Zero volt	Ignition switch OFF		
	1.0 - 3.0 volts	Ignition switch ON		
8 (SFRH) - 40 (GND)	Zero volt	Ignition switch OFF		Actuator Solenoid relay
	Battery voltage	Ignition switch ON	After ABS warning lamp is extinguished.	
8 (RL+) - 40 (GND)	Zero volt	Ignition switch OFF		Front left speed sensor
	1.0 - 3.0 volts	Ignition switch ON		
10 (RL–) - 40 (GND)	Zero volt	Ignition switch OFF		
	1.0 - 3.0 volts	Ignition switch ON		
13 (GST) - 40 (GND)	Zero volt	Ignition switch OFF		Gravity sensor
	Zero volt	Ignition switch ON		
14 (ABST) - 40 (GND)	Zero volt	Ignition switch OFF		Diagnosis connector
	Battery voltage	Ignition switch ON		
15 (GS2) - 40 (GND)	Zero volt	Ignition switch OFF		Gravity sensor
	1.0 - 3.0 volts	Ignition switch ON		
18 (IG2) - 40 (GND)	Zero volt	Ignition switch OFF		Ignition switch
	Battery voltage	Ignition switch ON		
19 (GND) - 40 (GND)	Zero volt	Ignition switch OFF		Body ground
	Zero volt	Ignition switch ON		
19 (GND) - Body ground	Continuity	Ignition switch OFF		
22 (SRH) - 40 (GND)	Zero volt	Ignition switch OFF		Actuator Solenoid relay
	Battery voltage	Ignition switch ON	After ABS warning lamp is extinguished.	
23 (SRR) - 40 (GND)	Zero volt	Ignition switch OFF		Actuator Solenoid relay
	Battery voltage	Ignition switch ON	After ABS warning lamp is extinguished.	
24 (AST) - 40 (GND)	Zero volt	Ignition switch OFF		Actuator Solenoid relay
	Battery voltage	Ignition switch ON		
25 (MT) - 40 (GND)	Zero volt	Ignition switch OFF		Actuator Motor relay
	Zero volt	Ignition switch ON		
	Battery voltage	Ignition switch ON	During motor relay is ON	

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Terminal to be connected	Specified value	Measuring condition		Presumable cause
26 (FL+) - 40 (GND)	Zero volt	Ignition switch OFF		Front left speed sensor
	1.0 - 3.0 volts	Ignition switch ON		
27 (FL–) - 40 (GND)	Zero volt	Ignition switch OFF		
	1.0 - 3.0 volts	Ignition switch ON		
29 (SFRR) - 40 (GND)	Zero volt	Ignition switch OFF		Actuator Motor relay
	Battery voltage	Ignition switch ON	After ABS warning lamp is extinguished.	
31 (RR+) - 40 (GND)	Zero volt	Ignition switch OFF		Rear right speed sensor
	1.0 - 3.0 volts	Ignition switch ON		
32 (RR–) - 40 (GND)	Zero volt	Ignition switch OFF		
	1.0 - 3.0 volts	Ignition switch ON		
34 (GGND) - 40 (GND)	Zero volt	Ignition switch OFF		Gravity sensor
	Zero volt	Ignition switch ON		
35 (GS1) - 40 (GND)	Zero volt	Ignition switch OFF		
	1.0 - 3.0 volts	Ignition switch ON		
36 (ECUT) - 40 (GND)	3.0 - 6.0 volts	Ignition switch OFF		Diagnosis connector
	Battery voltage	Ignition switch ON		
37 (STP) - 40 (GND)	Zero volt	Ignition switch OFF		Stop lamp switch Stop lamp
	Zero volt	Ignition switch ON		
	Battery voltage	When brake pedal is depressed		
38 (BAT) - 40 (GND)	Battery voltage	Ignition switch OFF		Back-up fuse
	Battery voltage	Ignition switch ON		
40 (GND) - Body ground	Zero volt	Ignition switch OFF		Body ground
	Zero volt	Ignition switch ON		
	Continuity	Ignition switch OFF		ABS warning lamp (Combination lamp)
41 (WA) - 40 (GND)	Zero volt	Ignition switch OFF		
	Battery voltage	Ignition switch ON	After ABS warning lamp is extinguished.	

JABS00126-00000

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7. Turn off the ignition switch.
8. Disconnect the negative terminal of the ground cable from the negative terminal of the battery.
9. Disconnect the SST connectors from the ABS ECU.
10. Measure resistance or continuity between the SST terminals specified in the table below and perform the trouble shooting for the part(s) related to the wire harness including the connectors mentioned in the table below.
    NOTE:
    - All specifications mentioned above denote values at a temperature of under 20 - 25°C.

Terminal to be connected	Specified value	Measuring condition	Presumable cause
㉖ (FL+) - ㉗ (FL–)	1.0 - 1.4 kΩ ± 20%	Ignition switch turned OFF.	Front left speed sensor
⑥ (FR+) - ⑦ (FR–)	1.0 - 1.4 kΩ ± 20%		Front right speed sensor
⑨ (RL+) - ⑩ (RL–)	1.0 - 1.4 kΩ ± 20%		Rear left speed sensor
㉛ (RR+) - ㉜ (RR–)	1.0 - 1.4 kΩ ± 20%		Rear right speed sensor
② (SFLR) - ㊵ (GND)	2.0 - 2.4 kΩ ± 20%		Front left fluid pressure retaining solenoid valve
㉙ (SFRR) - ㊵ (GND)	2.0 - 2.4 kΩ ± 20%		Front right fluid pressure retaining solenoid valve
㉓ (SRR) - ㊵ (GND)	2.0 - 2.4 kΩ ± 20%		Rear fluid pressure retaining solenoid valve
㉒ (SRH) - ㊵ (GND)	4.75 - 5.25 Ω ± 20%		Rear fluid pressure reducing solenoid valve
① (SFLH) - ㊵ (GND)	4.75 - 5.25 Ω ± 20%		Front left fluid pressure reducing solenoid valve
⑧ (SFRH) - ㊵ (GND)	4.75 - 5.25 Ω ± 20%		Front right fluid pressure reducing solenoid valve
⑤ (SR) - ③ (R+)	80 Ω ± 20%		Solenoid relay
④ (MR) - ③ (R+)	62 Ω ± 20%		Motor relay
㉔ (AST) - ㊵ (GND)	33 Ω ± 20%		Monitor resistance
㉕ (MT) - ㊵ (GND)	32 Ω ± 20%		Motor

JABS00127-00000

11. Disconnect the connectors of the wire harness from the SST.
12. Connect the connectors of the wire harness to the ABS ECU.
13. Install the glove compartment box. (Refer to BO section.)
14. Connect the negative terminal of the ground cable to the negative terminal of the battery.
15. Perform the final check, using a four-wheel brake tester or on the road test.
    WARNING:
    - The road test should be carried out at a safe place.

JABS00128-00000

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Replacement of ABS ECU

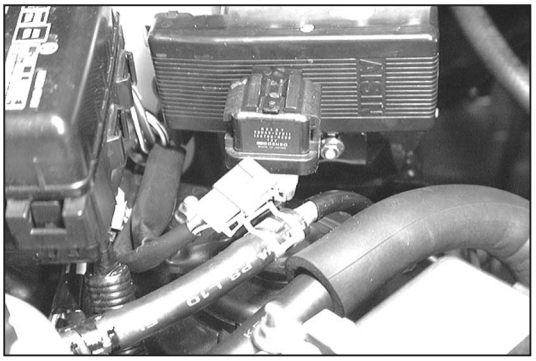
(Refer to the illustration in page BR–86.)

1. Disconnect the negative terminal of the ground cable from the negative terminal of the battery.
   CAUTION:
   - Be sure to read out the diagnosis code of the ABS and EFI systems before disconnecting the battery power supply.
2. Remove the glove compartment box by removing its retainer. (Refer to BO section.)
3. Disconnect the connector of the wire harness from the ABS ECU.
4. Disconnect the wire harness clamp from the ABS ECU bracket by retracting the mushroom section of the clamp.
5. Remove the ABS ECU by removing the two attaching bolts.
6. Install the ABS ECU with two attaching bolts.
7. Connect the wire harness clamp to the ABS ECU connector.
8. Connect the connectors of the wire harness to the ABS ECU.
9. Install the glove compartment box by installing its retainer. (Refer to BO section.)
10. Connect the negative terminal of the ground cable to the negative terminal of the battery.

JABS00129-00000

INSPECTION DIODE

1. Remove the check diode from the connector of the wire harness.



JABS00130-00066

2. Ensure that continuity exists between the terminals of the inspection diode. Also, ensure that no continuity exists between the terminals when the attaching order of the tester probes is reversed, using an ohmmeter. (Refer to the BR–38.)
   Replace the inspection diode if it fails to meet the specification.
   NOTE:
   - The current flow direction of the ohmmeter differs, depending on its design.
3. Install the inspection diode to the connector of the wire harness.

JABS00131-00000

STOP LAMP SWITCH

Check the stop lamp switch function.
(Refer to the BE section for inspection.)

JABS00132-00000

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TIGHTENING TORQUE

Tightening components	N·m	kgf-m
Brake pedal clevis	25.5 ± 2.9	2.6 ± 0.3
Bleeder plug	6.9 - 9.8	0.7 - 1.0
Piston stopper bolt × master cylinder	7.9 - 11.7	0.8 - 1.2
Master cylinder × brake booster	12.7 ± 2.5	1.3 ± 0.3
Brake pipe × master cylinder	12.7 - 17.7	1.3 - 1.8
Brake booster × dash panel	9.8 - 15.7	1.0 - 1.6
Disc brake cylinder mounting × disc rotor	90.2 - 135.3	9.2 - 13.8
Main and sub cylinder slide pins	19.6 - 29.4	2.0 - 3.0
Wheel cylinder × backing plate	7.5 - 11.5	0.8 - 1.2
Flare nut × wheel cylinder	12.7 - 17.6	1.3 - 1.8
Rear wheel hub nut	103.0 ± 14.7	10.5 ± 1.5
Parking brake cable clamp	5.8 - 8.8	0.6 - 0.9
Parking brake handle assembly × floor panel	14.7 - 21.6	0.15 - 0.2
Proportioning valve × body	5.9 - 9.8	0.6 - 1.0
Flare nut	12.7 - 17.6	1.3 - 1.8
Brake hose clamp bolt	6.9 - 15.7	0.7 - 1.6
Brake hose × disc brake cylinder assembly	26.5 - 34.3	2.7 - 3.5
Gravity sensor × floor panel	6.9 - 9.8	0.7- 1.0
Speed sensor harness clamp × inner fender	6.9 - 9.8	0.7 - 1.0
Speed sensor × knuckle	6.9 - 9.8	0.7 - 1.0
Speed sensor × fender epron	6.9 - 9.8	0.7 - 1.0
ABS actuator × ABS actuator bracket	4.3 - 6.5	0.44 - 0.66
Brake pipe × ABS actuator	15.5 ± 2.5	1.59 ± 0.26
ABS actuator bracket × fender epron	15.2 - 23.0	1.55 - 2.35
Flare nut	15.5 ± 2.5	1.59 ± 0.26
Skid control computer assembly × body	8.3 ± 1.4	0.85 ± 0.15

JABS00133-00000

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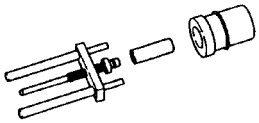
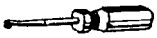
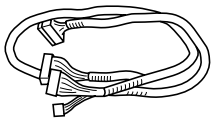
SSTs

Shape	Part name	Part name	Remarks
	09730-87401-000	Brake booster gauge set	
	09737-87003-000	(Gauge)	
	09733-87401-000	(O-ring)	
	09731-87401-000	(Attachment)	
	09732-87401-000	(Adapter)	
	09734-87401-000	(O-ring)	
	09735-87401-000	(O-ring)	
	09703-30010-000	Brake shoe return spring tool	
	09921-00010-000	Spring tension tool	
	09991-87401-000	Engine control system inspection wire	
	09842-87401-000	ABS computer check sub-harness	
	09991-87403-000	Diagnosis check wire	

JABS00134-00068

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DAIHATSU

TERIOS

J100

STEERING

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SR

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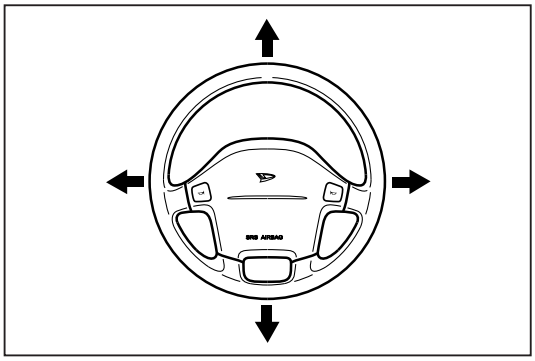
IN-VEHICLE INSPECTION

STEERING WHEEL

Check for rattle

Move the steering wheel in an axial direction and/or in a perpendicular direction so as to ensure that no looseness and/or excessive play is present.

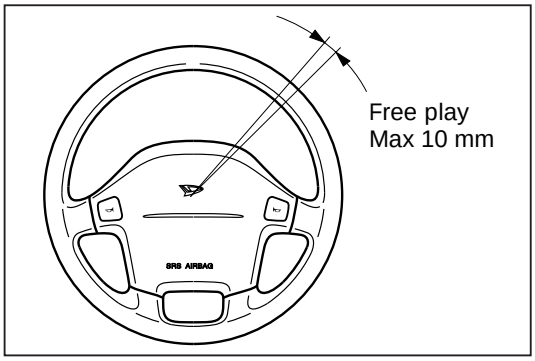
If any looseness and/or excessive play is present, check the steering wheel for improper installing condition. Repair any defective parts.



JSR00002-00001

Check for free play

1. Set the steering wheel to a straight- ahead state.
2. Turn the steering wheel clockwise and counterclockwise. Measure the steering wheel movement at the circumference of the steering wheel which is registered before the steering tires start to be steered. Ensure that this steering wheel play is not more than the specified value.
   Specified Value: 10 mm

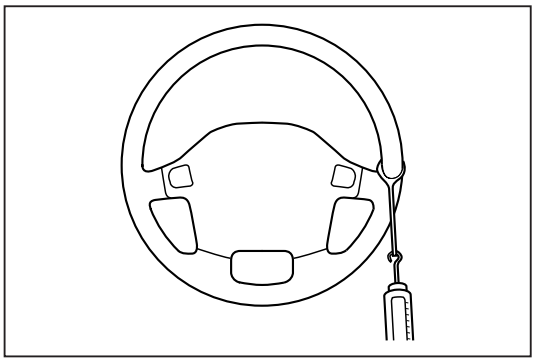


JSR00003-00002

If not, check each joint section for excessive play. If the joints are satisfactory, replace the steering gear assembly.
If the joint sections exhibit defects, such as excessive play, replace the defective parts.

Check of turning effort

Check of turning effort of steering wheel with vehicle in its stationary state
While the engine is idling and with the vehicle in its stationary state, measure the force required to turn the steering wheel from the straight-ahead position.
Specified Value: Not to exceed 5.4 N·m (0.55 kgf-m)



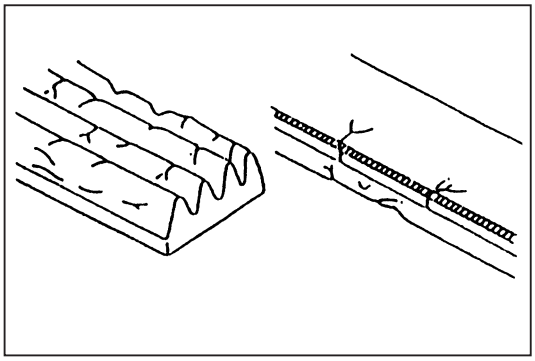
JSR00004-00003

If the turning effort is fails to meet with specified value, check tire pressure, quality of fluid etc., or check and overhaul the power steering systems as necessary.

POWER STEERING DRIVE BELT

Visual inspection

Inspect the drive belt for damage.
Visually check the belt for separation of the adhesive rubber above and below the core, core separation from the belt side, severed cord, separation of the rib from the adhesive rubber, cracks or separation of the ribs, torn ribs or cracks in the inner ridges of the ribs. Replace the drive belt, if necessary.



JSR00005-00004

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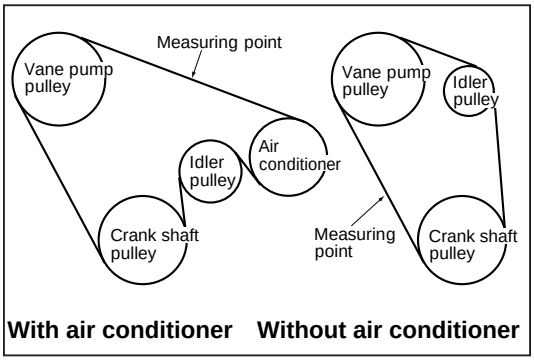
Check of drive belt tension

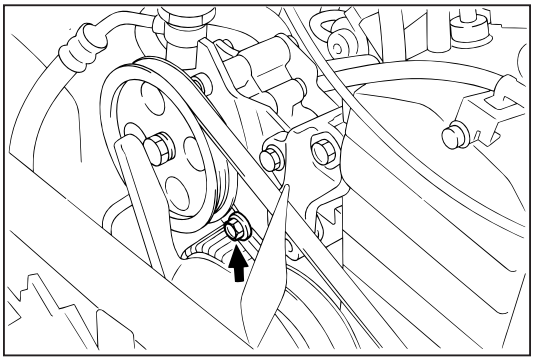
Ensure that the amount of the drive belt deflection within specified value, by depressing the midpoint of the drive belt between the vane pump and crank shaft pulley (vehicles equipped without air conditioner) or vane pump and air conditioner pulley (vehicles equipped with air conditioner) is pushed with a force of 98 N (10 kgf).

Specified Belt Deflection
New belt: 8 - 11 mm
Used belt: 11 - 14 mm



JSR00006-00005

Adjust the drive belt deflection by means of adjusting bolt, if the deflection is failes to meet with the specified value.



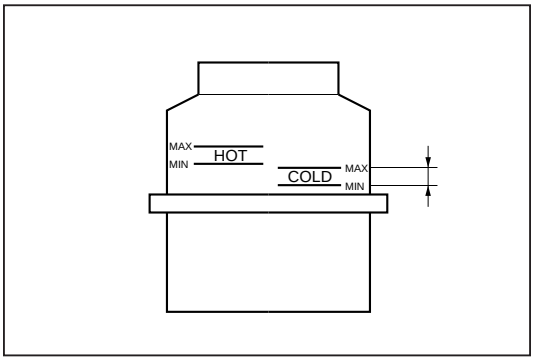
JSR00007-00006

NOTE:
- Prior to the check, ensure that the drive belt is applied correctly on the pulley.
- The new belt refers to that belt driven not more than five minutes on the engine.
- The used belt refer to that belt driven more than five minutes on the engine.

POWER STEERING FLUID

Check of fluid level

1. Park the vehicle on a level floor.
2. Stop the engine.
3. Ensure that the power steering fluid level within specified level at the reservoir tank.
   NOTE:
   - Hot range denotes that when the fluid temperature is between 40 to 80 degrades.
   - Cold range denotes that when the fluid temperature is between 0 to 40 degrades.
   - When the fluid level does not conform to the specification, check the fluid leakage or component parts for malfunction. Then, add the specified powersteering fluid to specified level as necessary.



JSR00008-00007

Check of fluid properties

1. While the vehicle is in its stationary state and the engine is idling, turn the steering wheel from lock to lock position in both right and left directions.
2. Visually inspect the fluid inside the reservoir tank.
   NOTE:
   - If the fluid is foamy or exhibits whitish cloudiness, most likely the fluid is lacking. Hence, perform air bleeding and adjust the fluid level.
   - If foreign matters, such as dirt, are mixed in the fluid, be certain to change the fluid.

JSR00009-00000

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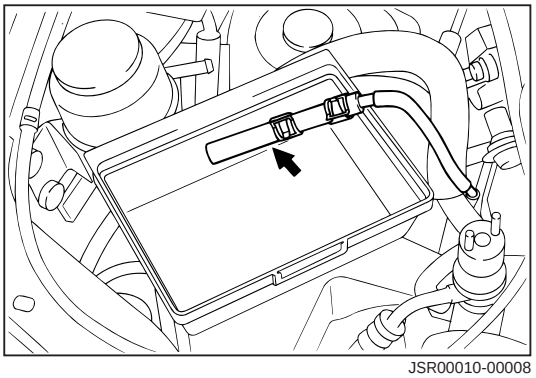
Fluid change

1. Jack up the vehicle and support it with the safety stands. (Refer to the GI section.)
2. Place the suitable container to under the return hose at reserve tank side.
3. Disconnect the return hose from the reservoir tank so as to allow the fluid to flow out.
4. Start the engine. (Never race the engine.)
5. Turn the steering wheel from lock to lock position in both the right and left directions.
   CAUTION:
   - To prevent vane pump seizure, be sure to drain the fluid as shortest as possible without raising the engine revolution speed.
6. Stop the engine.
7. Fill the reservoir tank with fluid.
   Power Steering Fluid: ATF DEXRON®II
8. Start the engine and run it idly. When the fluid starts to flow out from the return hose side, immediately stop the engine.
9. Repeat the steps 7 and 8 above, until air no longer injects from the return side.
10. Connect the return hose to the reservoir tank.
11. Jack down the vehicle.
12. Perform air bleeding for the power steering system. (Refer to step “Air bleeding for the power steering system” mentioned below.)

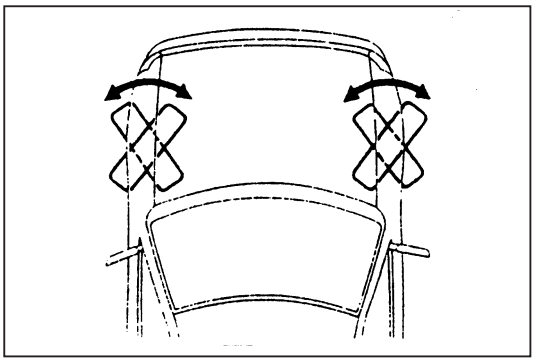


JSR00010-00008

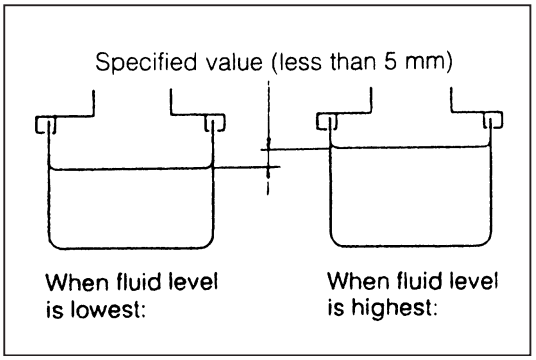
Air bleeding for the power steering system

1. Check the fluid level of the reservoir tank.
   NOTE:
   - If the fluid is lacking, add the specified fluid to the maximum level in the reservoir tank.
2. Run the engine at a speed below the fast idle speed. Turn the steering wheel up to the lock position in either the right or left direction. Hold this locked state for about two to three seconds. Next, turn the steering wheel up to the opposite lock position. Hold this locked state for about two to three seconds. Repeat this operation two to three times.
   NOTE:
   - Be certain to turn the steering wheel quickly.
   - If the fluid temperature is low, most likely the fluid remains foamy. Hence, prior to the bleeding operation, be certain to warm the fluid up to 40 to 70°C by turning the steering wheel repeatedly with the vehicle in its stationary state.
   - Check the fluid level of the reservoir tank during the bleeding operation. If the drop in fluid level is more than 5 mm, recheck the piping for fluid leakage.

JSR00011-00000



JSR00012-00009



JSR00000-00010

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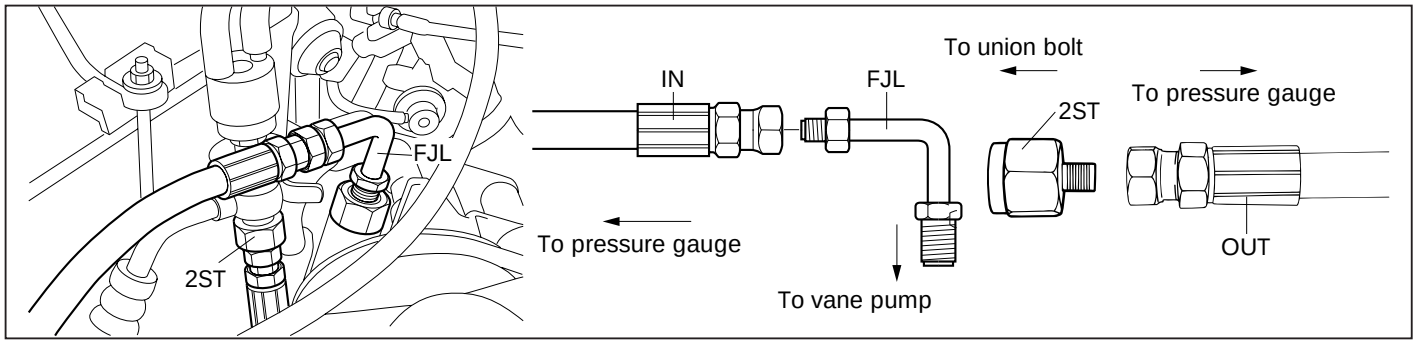
3. While turning the steering wheel with the vehicle in its stationary state, check that the power steering system is operating properly or it emits no abnormal noise, etc. Perform this check with the engine running at over 3000 rpm.
   NOTE:
   - If the following abnormalities are encountered during this check, check each part of the power steering system for sign of leakage. Again repeat the operations described in the step (2) afterward. If the trouble persists even these steps have been followed, replace faulty components of the power steering system.
   - The fluid exhibits whitish cloudiness when the engine revolution speed is rising quickly.
   - The steering operation is not smooth and also emitting abnormal noise.
   - The change in fluid level exceeds 5 mm between a time when the engine is running and a time when the engine is stopped or between a time when the power steering is operating and a time when the power steering is stopped.
   - The power steering system emits abnormal noise during the running (when the front wheels are turning).

JSR00013-00000

Check of power steering fluid pressure

1. Drain the fluid from the power steering system. (Refer to the “Fluid change” section.)
2. Disconnect the pressure feed hose with gasket from the vane pump by disconnecting the union bolt which is bolted in the air control valve. (Refer to the SR–36.)
3. Connect the two end of the following SST to vane pump.
   (1) Connect the one end of the SST to vane pump.
   (2) Connect the other end of the SST to pressure feed hose with gasket using the union bolt.
   SST: 09990-87704-000

(Use the attachments (PSG-FJL, 2ST) for connection of the oil pressure gauge to the vane pump and pressure feed hose as shown bellow.)



JSR00014-00011

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CAUTION:
- Never connect the “IN” and “OUT” side hoses of the oil pressure gauge in wrong way. Failure to observe this caution may lend to damaging the oil pressure gauge.
- Never bend or twist the hoses and tubes forcibly.
- Never close the valve of the oil pressure gauge at this moment.

4. Perform the filling of fluid (Refer to the “Fluid change” section.) and the air bleeding (Refer to the “Air bleeding for the power steering system” section.).
5. Warm up the power steering fluid, until its temperature rises above 50°C.
6. Measurement of hydraulic pressure generated by vane pump
   While the engine is idling, measure the hydraulic pressure generated by the vane pump by closing the valve of the oil pressure gauge fully.
   Specified Pressure: 5786 kPa (59 kgf/cm^2) or more

   If the hydraulic pressure is low, replace the vane pump assembly with new one.
   CAUTION:
   - Never close the valve of oil pressure gauge not more than 10 seconds during measurement.

7. Check of pressure difference under unloaded state
   (1) Open the pressure gauge valve fully.
   (2) Determine the difference in pressure between a time when the engine revolution speed is 1000 rpm and a time when it is 3000 rpm.
   Specified Value: Not to exceed 294 kPa (3 kgf/cm^2)

   NOTE:
   - If the difference in hydraulic pressure exceeds the specified value, replace the vane pump assembly.
   - Never operate the steering wheel during the measurement.

8. Measurement of hydraulic pressure at gear housing side
   (1) While the engine is idling, open the pressure gauge valve fully.
   (2) Ensure that the oil pressure gauge reading is more than that specified during steering wheel turns lock to lock positions from the steering wheel turns fully in right and left positions.
   Specified Value: 5.4 MPa $^{+0.5}_{0}$ (55 $^{+5}_{0}$ kgf/cm^2)

   If the hydraulic pressure is lower than that specified at either side of the right or the left, overhall the steering gear assembly.

9. Drain the fluid from the power steering system. (Refer to the “Fluid change” section.)
10. Remove the oil pressure gauge (SST).

JSR00015-00000

11. Connect the pressure feed hose to the vane pump, by union bolt with new gasket interposed.
12. Perform the filling of fluid (Refer to the “Fluid change” section.) and the air bleeding (Refer to the “Air bleeding for the power steering system” section.).
13. Ensure that no fluid leakage is exists from the fluid pipe connected sections of power steering systems under engine operated and when turning the steering wheel.

JSR00016-00000

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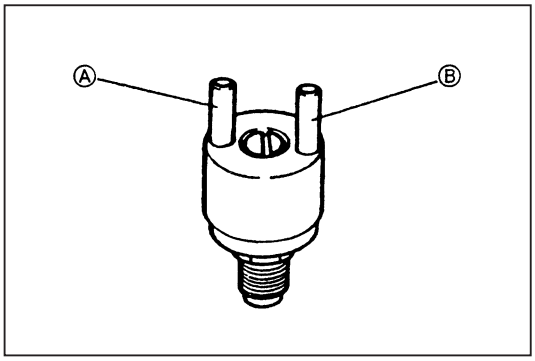
Check of air control valve

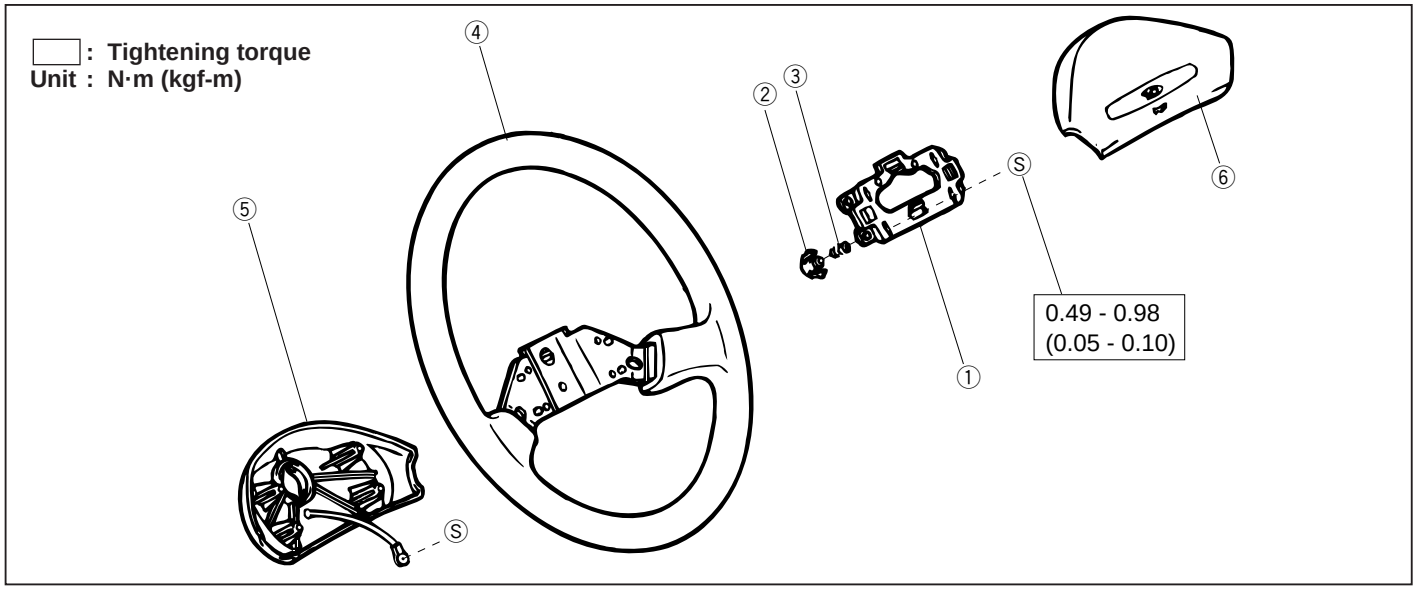
1. Ensure that there is no air continuity exists between port Ⓐ and port Ⓑ of the air control valve in the right figure when steering wheel not operated under engine at idling state.
2. Ensure that there is air continuity exists between port Ⓐ and port Ⓑ of the air control valve in the right figure when steering wheel turns fully in right or left direction under engine at idling state.
   NOTE:
   - Be sure to perform the above check with the air control valve in the vane pump assembly.



JSR00017-00012

STEERING WHEEL (PP TYPE)

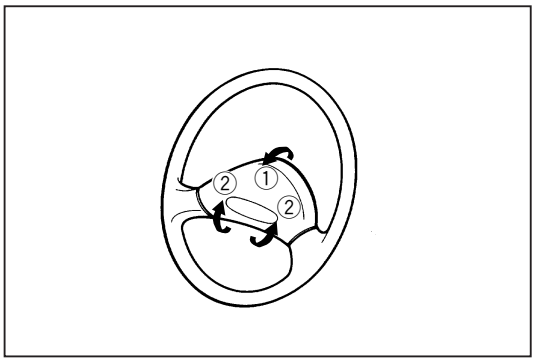
COMPONENTS



JSR00018-00013

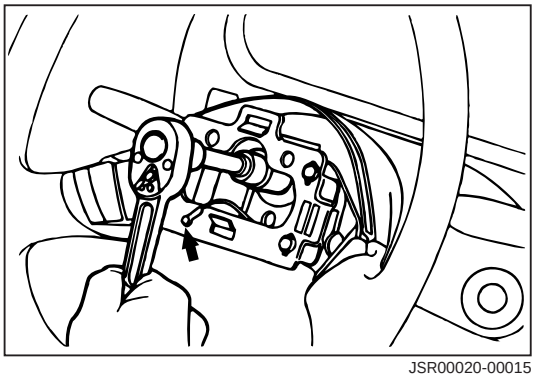
REMOVAL

1. Disconnect the battery ground cable terminal from the negative (–) terminal of the battery.
2. Hold the steering wheel pad sub-assembly at its lower end by your fingers. Then, detach the upper side of the steering wheel pad sub-assembly by pulling it toward your side.
   NOTE:
   - Be careful not to break the claw of the steering wheel pad by pulling it excessively.



JSR00019-00014

3. Remove the horn harness and lock nut.
4. Remove the steering wheel.
   CAUTION:
   - Never tap the shaft, using a hammer or the like, when removing the steering wheel from the shaft. If any difficulty is encountered in removing the steering wheel, use a steering wheel puller to remove it.


JSR00020-00015

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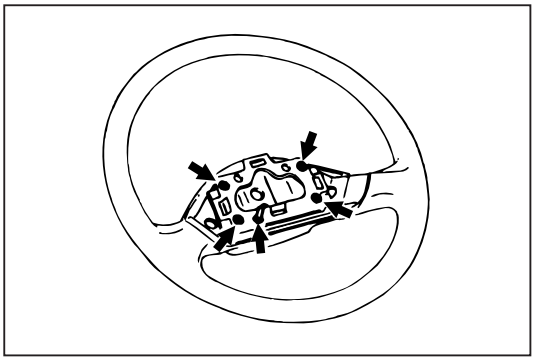
DISASSEMBLY

1. Remove the horn button contact plate.
2. Remove the steering wheel cover from the steering wheel.



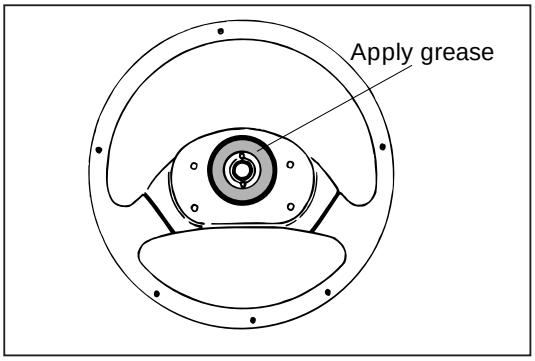
JSR00021-00016

ASSEMBLY

1. Install the steering wheel cover to the steering wheel.
2. Install the horn button contact plate to the steering wheel.

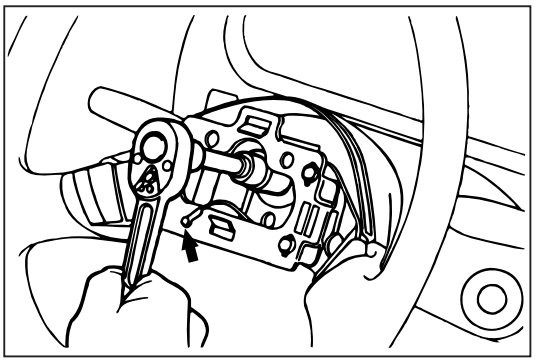
INSTALLATION

1. Install the steering wheel to the steering wheel cover.
2. Apply rubber grease on the indicated area in the right figure.



JSR00022-00017

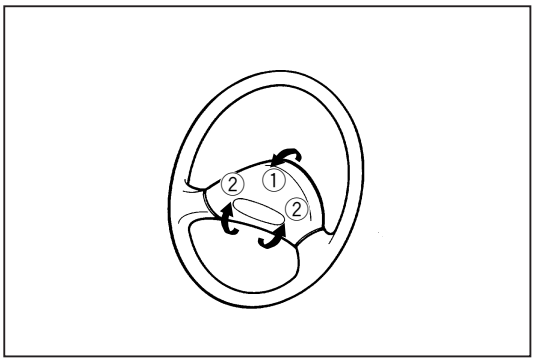
3. Ensure that the vehicle is in a straight-ahead state. Then, install the steering wheel assembly to the steering shaft.
   NOTE:
   - Make sure that the steering wheel is installed, making an angle of ±15° from the neutral position.
   - Never tap the shaft, using a hammer or the like, when installing the steering wheel to the shaft.



JSR00023-00018

4. Install and tighten the lock nut. Then, connect the horn harness.
   Tightening Torque: 27.5 - 41.2 N·m (2.8 - 4.2 kgf-m)

5. Install the steering wheel pad.
   NOTE:
   - Be careful not to break the claw at the back side of the steering wheel pad by pushing it excessively.



JSR00024-00019

6. Connect the battery ground cable to the negative terminal of the battery.

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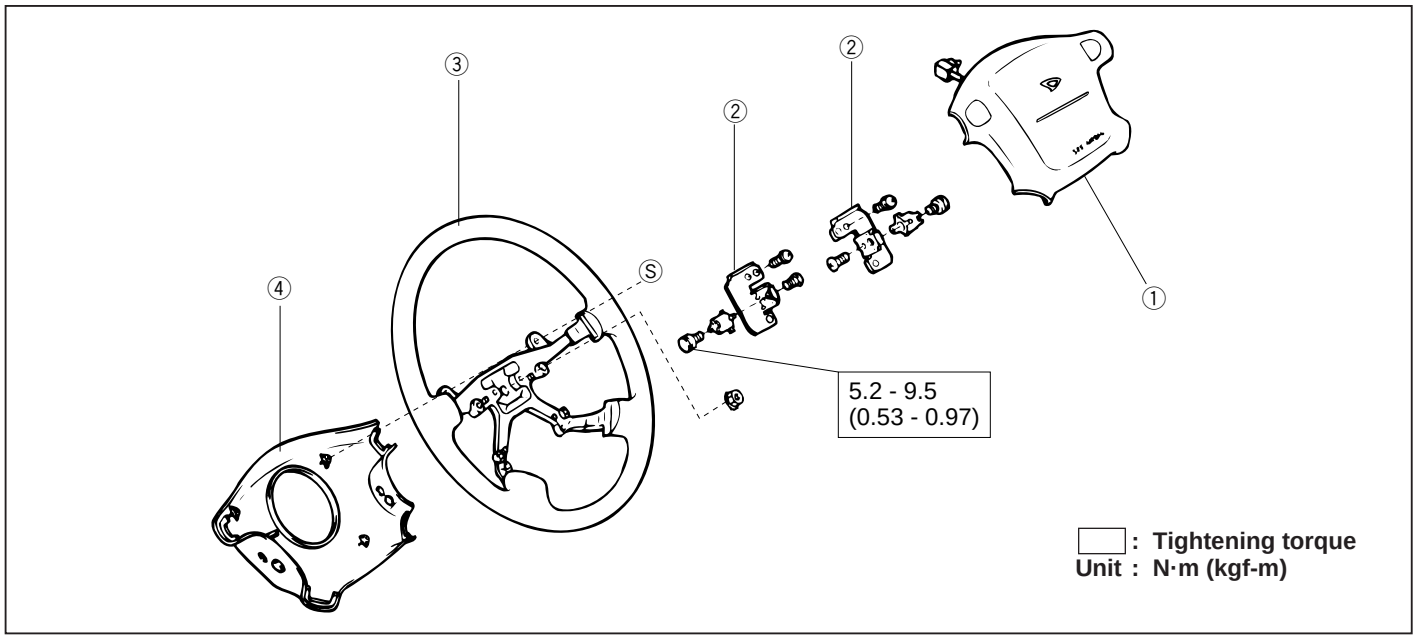
STEERING WHEEL(AIRBAG TYPE)

COMPONENTS



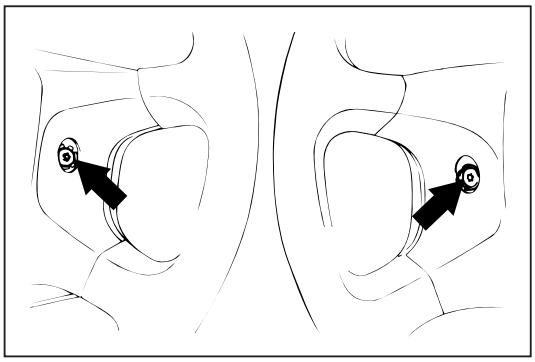
JSR00025-00020

REMOVAL

1. Turn OFF the ignition switch and disconnect the battery cable from the negative (–) terminal of the battery.
2. Set the steering wheel to a straight-ahead position.
   Remove the attaching bolts (TORX® bolt) at the right and left sides of the steering wheel cover side.
   WARNING:
   - Be sure to start the operation 60 seconds after the power supply is cut off. Failure to observe this warning may cause unexpected deployment of the airbag owing to impacts, etc. during the removal.
   - Never bring your face, arms and body to the front of the steering wheel during the removal.
   - If the pad assembly is dropped or damaged during the removal or the storage, be sure to dispose of the pad assembly according to the disposal procedure. Be sure to mount a new pad assembly to the vehicle.

   CAUTION:
   - It should be noted that, when the negative (–) terminal of the battery is disconnected, the memory of the ECU control of other systems will be erased at the same time.

JSR00026-00021



JSR00000-00022

3. Separate the pad and steering wheel from the top of the pad assembly. Disconnect the connector for the airbag and connector for the horn provided at the reverse side of the pad assembly.
   WARNING:
   - Never resume the operation within 60 seconds after the power supply has been cut off, during which the backup condenser is discharged.

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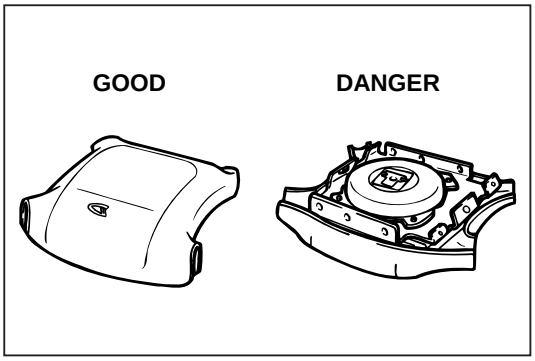
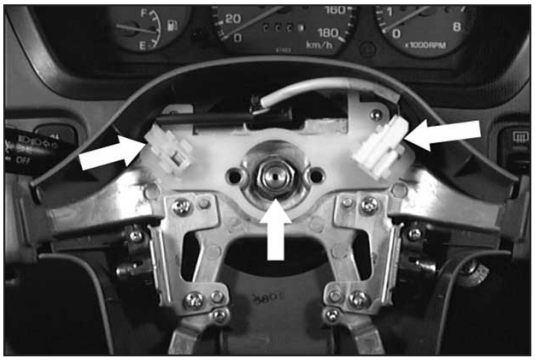
4. After the connector is disconnected, remove the pad assembly from the steering wheel.
   WARNING:
   - Be sure to place the removed pad assembly with the pad surface facing upward. The pad assembly placed with the pad surface facing downward is potentially hazard. Failure to observe this caution may cause unexpected deployment of the airbag, resulting in scattered pad assembly. Furthermore, store the pad assembly at a low place close to the ground level where no heat source (100°C or less) exists in close proximity.



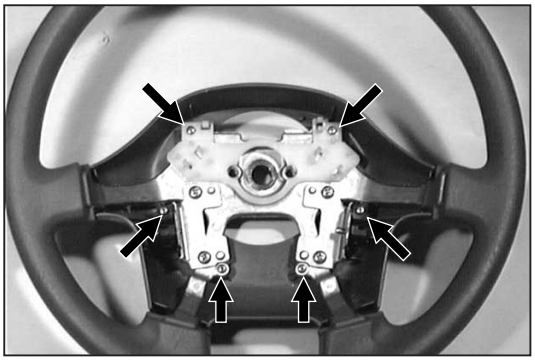
JSR00027-00023

5. Ensure that the steering wheel is set to a straight-ahead position.
6. Remove the lock nut.
7. Detach the connector from the clamp.
8. Remove the steering wheel.
   CAUTION:
   - Care must be exercised so that the connector may not be caught in when removing the steering wheel.


JSR00028-00024

DISASSEMBLY

Remove the steering wheel cover by removing the attaching screws.


JSR00029-00025

ASSEMBLY

Install the steering wheel cover by installing the attaching screws.

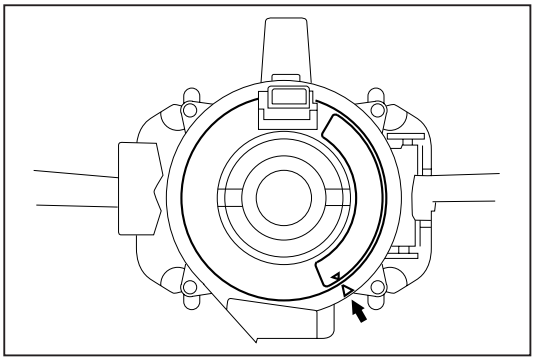
INSTALLATION

PRECAUTION:
- It should be noted that wrong installation of the steering roll connector may pose potential hazard, for it may break the wire and also prevent proper turning of the steering wheel.

1. Ensure that the front wheels are set to the straight-ahead position.

JSR00030-00000

2. Turn the steering roll connector clockwise, until it is locked.
   CAUTION:
   - The steering roll connector makes five turns at the maximum. Hence, when the steering roll connector is connected to the steering wheel, be sure to set the steering roll connector to the midpoint of the rotation.


JSR00031-00026

3. Back off the steering roll connector about 2.5 turns counterclockwise from the locked position. Align the center mark. Temporarily secure the steering roll connector, using a tape, so that it may not move.

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4. Ensure that the vehicle is in a straight-ahead state. Then, install the steering wheel assembly to the steering shaft.
   CAUTION:
   - Make sure that the steering wheel is installed, making an angle of ±15° from the neutral position.

5. Turn the steering wheel about 60° in a right-and-left direction two or three times so as to positively fit the cancellation pin of the multi-use lever switch to the cutout section of the steering wheel boss section.
6. Install and tighten the lock nut.
   Tightening Torque: 27.5 - 41.2 N·m (2.8 - 4.2 kgf-m)

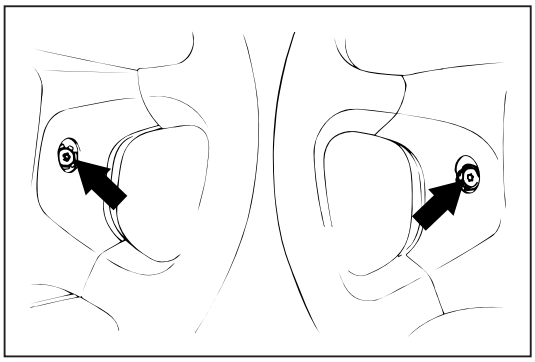
7. Installation of steering wheel pad assembly
   (1) Ensure that the ignition switch is set to the OFF or ACC position.
   (2) Set the horn connector at the roll connector side to the connector holder of the steering wheel.
   (3) Join the horn connector at the pad assembly side to the connector that has been set in Step (2).
   (4) Join the connectors for the squib at the roll connector side and pad assembly side together so as to make double locking.
   (5) With the double locking side of the connector for the squib which has been set in Step (4) facing downward, set the connector for the squib to the connector holder of the steering wheel while sliding it.
   (6) Set the harness for the squib leading to the roll connector to the lower part of the connector holder.
8. Temporarily install the pad assembly to the steering wheel, making sure that it exhibits no excessive rattle.
9. Tighten the TORX® bolts (at two points) provided at the side of the steering wheel proper to the specified tightening torque.
   Tightening Torque: 5.2 - 9.5 N·m (0.53 - 0.97 kgf-m)

CHECK AFTER INSTALLATION

1. Ensure that steering wheel operates smoothly with out any pulling and abnormal resistance by turning the steering wheel to the right and left sides, respectively, as far as it will go.
2. Connect the negative (–) terminal of the battery ground cable to the negative terminal of the battery terminal.
3. Ensure that the horn is set off by pushing the horn button.
4. Ensure that the airbag warning lamp illuminates for six seconds immediately after turn ON the ignition switch.

JSR00032-00027

JSR00033-00028



JSR00034-00029

JSR00035-00000

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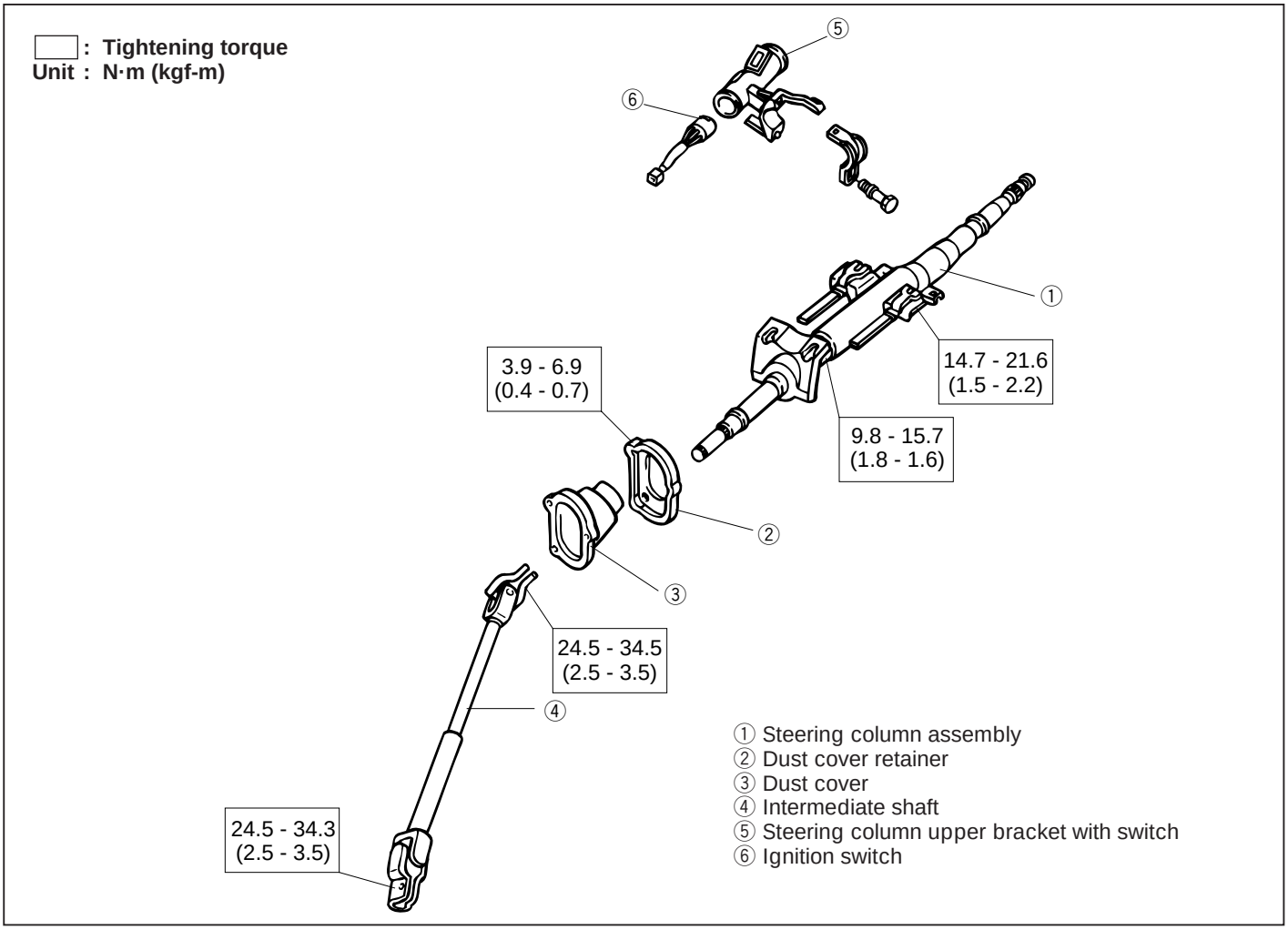
STEERING COLUMN & INTERMEDIATE SHAFT

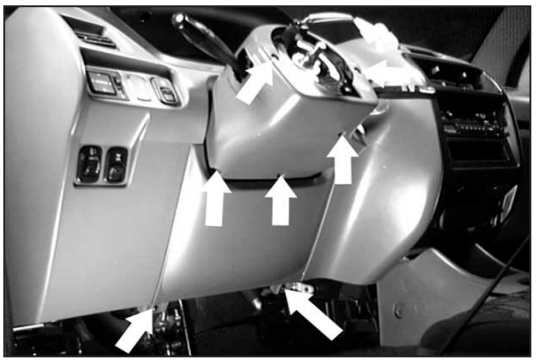
COMPONENTS



JSR00036-00030

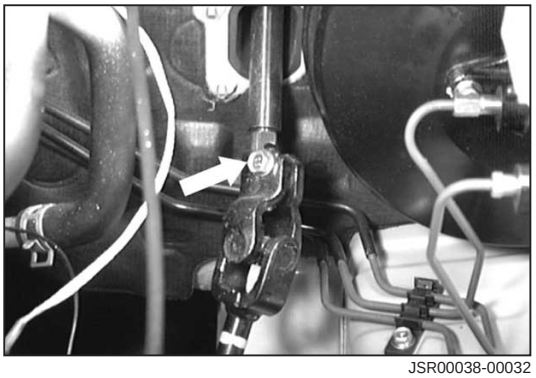
REMOVAL

1. Disconnect the negative (–) terminal of the battery ground cable from the negative (–) terminal of the battery.
2. Remove the steering wheel.
   (Refer to the “STEERING WHEEL” section.)
3. Remove the instrument panel lower finish panel.
4. Remove the steering column lower cover.



JSR00037-00031

5. Remove the intermediate shaft and steering column connecting bolt.



JSR00038-00032

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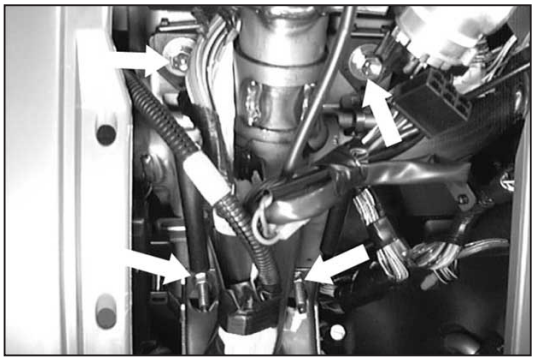
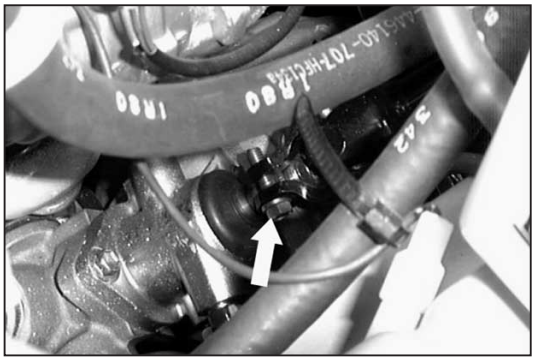
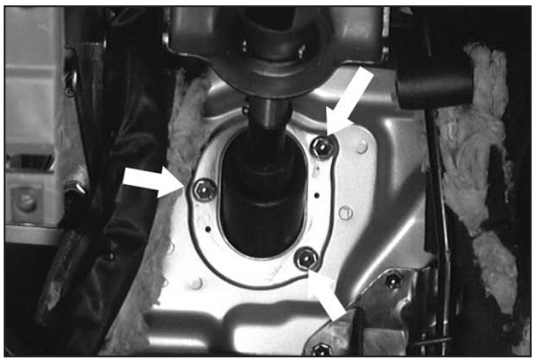
6. Disconnect the connector for the ignition switch.
7. Remove the steering column attaching bolts and nuts.
8. Remove the steering column upper cover.
9. Disconnect the connector for the multi-use lever switch, air bag (if equipped) and immobilizer (if equipped).
10. Remove the steering column by removing the attaching bolt.
    CAUTION:
    - Be very careful not to scratch the dust cover when removing the steering column.


JSR00039-00033

11. Removal of intermediate shaft
    (1) L.H.D. vehicle
    Remove the air intake duct from the air cleaner case.
    R.H.D. vehicle
    Remove the battery and battery carrier.
    (2) Remove the intermediate shaft and steering gear pinion connecting bolt.
    (3) Remove the intermediate shaft from the steering gear.

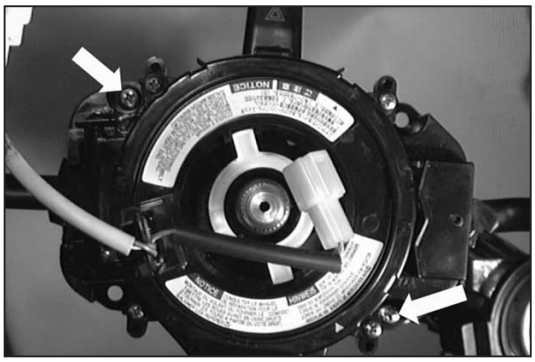

JSR00040-00034

12. Remove the dust cover retainer and dust cover from the dash panel by removing attaching bolts.


JSR00041-00035

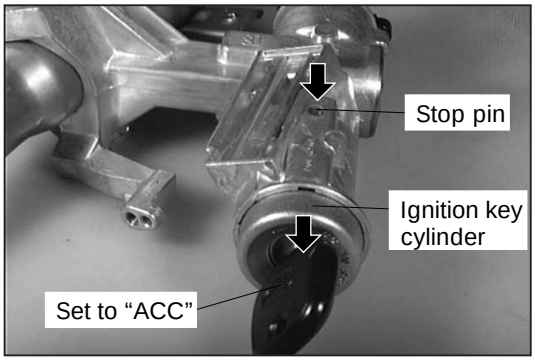
DISASSEMBLY

1. Remove the multi-use lever switch assembly by loosening the two attaching screws.
   NOTE:
   - On airbag-equipped vehicles, the multi-use lever switch should be removed with the roll connector attached.


JSR00042-00036

2. Remove the antenna coil.(If equipped.)
   NOTE:
   - For the replacement of the antenna coil on immobilizer-equipped vehicles, refer to the BE section.

3. Remove the ignition key cylinder from the steering column upper bracket with the switch.
   NOTE:
   - Set the ignition key to the ACC position and push the stop pin. Then, draw out the cylinder.
     This operation can be performed on the vehicle if the steering column cover is removed beforehand.



JSR00043-00037

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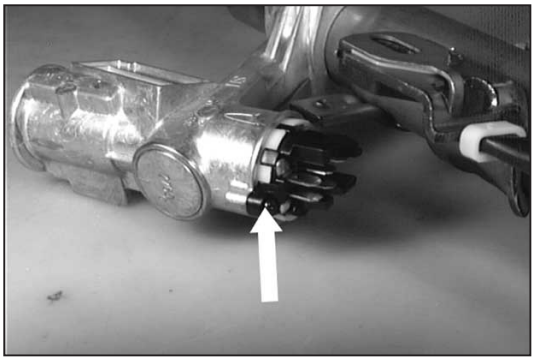
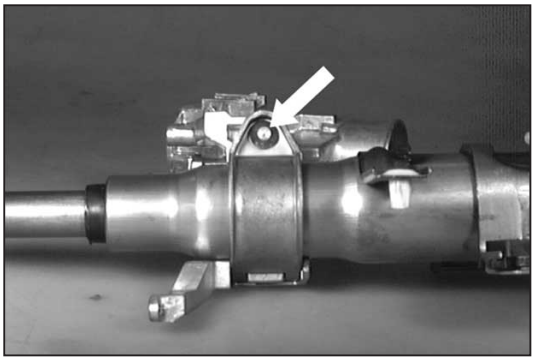
4. Remove the ignition switch from the steering column upper bracket by removing the attaching screw.
   NOTE:
   • This operation can be performed also on the vehicle.



JSR00044-00038

5. Removal of the steering column upper bracket.
   NOTE:
   • Perform this operation only when it becomes necessary to replace the steering column upper bracket alone.

   (1) Remove the steering column upper bracket by remove the head section of the attaching bolt, using a drill.
   (2) Remove the upper bracket from the steering column tube.
   (3) Screw-out the thread part of the attaching bolt from the steering column upper bracket.



JSR00045-00039

INSPECTION

Steering column dust cover and retainer

Ensure that the steering column dust cover and dust cover retainer free from cracks, deterioration, aging, deformation and other damage.

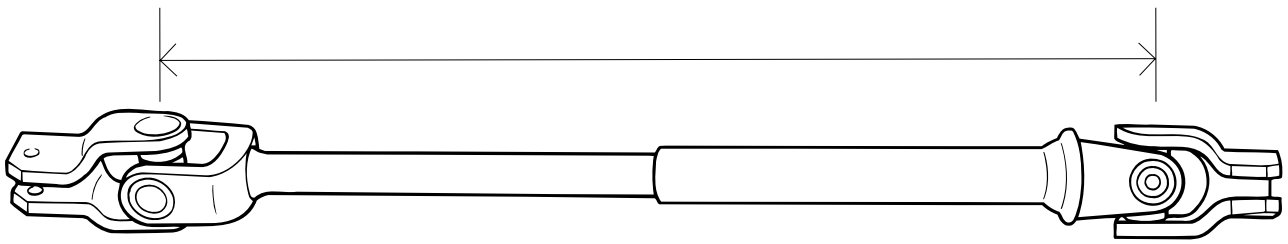
If any damage is exists, replace the damaged part with new one

JSR00046-00040

Intermediate shaft (collapsible type and rigid type)

Measure the length of intermediate shaft.
If the length is shorter than the specified length excessively, replace it with a new one.
Ensure that the intermediate shaft exhibits no defect, such as excessive play or rattle at the spline section and excessive play or rattle at the joint section of the universal joint.

CAUTION:
• Never drop the collapsible type intermediate shaft nor apply strong impacts to it. Failure to observe this caution may lead to loss of the impact-absorbing function.



Specified Length:
L.H.D. 368 mm R.H.D 363 mm

JSR00047-00041

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Steering column assembly

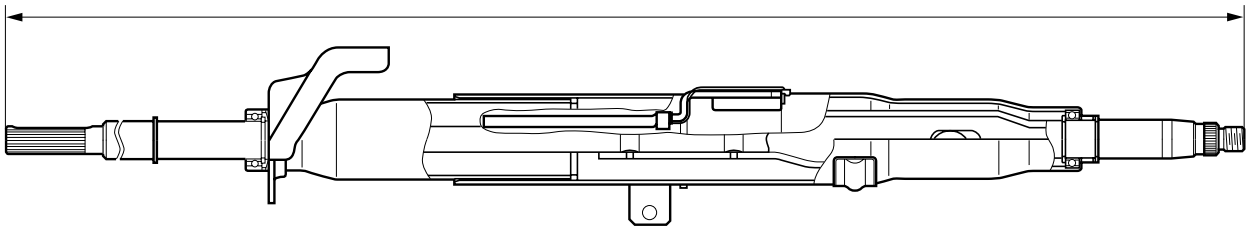
Ensure that the length of the steering column assembly is not less than specified value by measuring the its length.

If the length is shorter than the specified length excessively, replace it with a new one.

Ensure that the steering column assembly exhibits no defect, such as excessive play at the spline section.

CAUTION:

- Never drop the collapsible type steering column assembly nor apply strong impacts to it. Failure to observe this caution may lead to loss of the impact-absorbing function.



Specified Length:

Rigid type 708.6 mm Collapsible type 701 mm

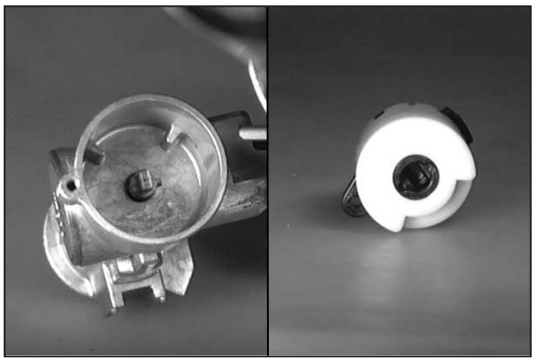
JSR00048-00042

ASSEMBLY

1. Install the steering column upper bracket to the steering column tube with new attaching bolt and tighten it until it with break off.
2. Install the ignition switch to the steering column upper bracket with attaching screws.

   NOTE:

   - Before installing the ignition switch, set the protrusion of steering column upper bracket with the groove inside the ignition switch each other.

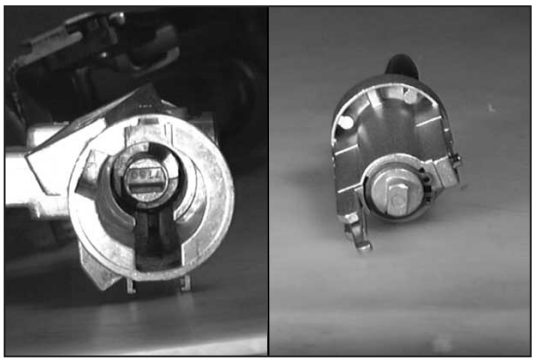


JSR00049-00043

3. Install the ignition key cylinder to the steering column upper bracket. Then, ensure that the stop pin of the ignition key cylinder is hooked at the hole of the column upper bracket.

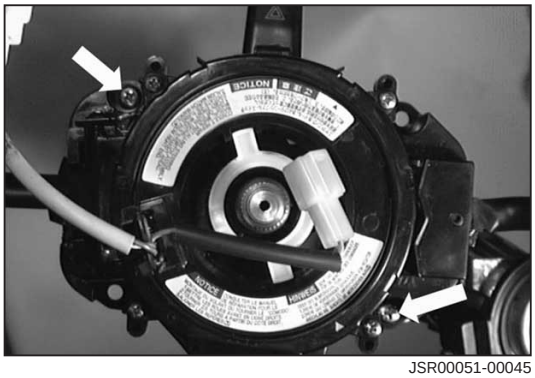
   NOTE:

   - Before installing the ignition key cylinder, set the ignition key position to the ACC. Then, set the pawl groove inside the steering column upper bracket with the protrusion of ignition key cylinder.



JSR00050-00044

4. Install the multi-use lever switch assembly to the steering column with the attaching screw.



JSR00051-00045

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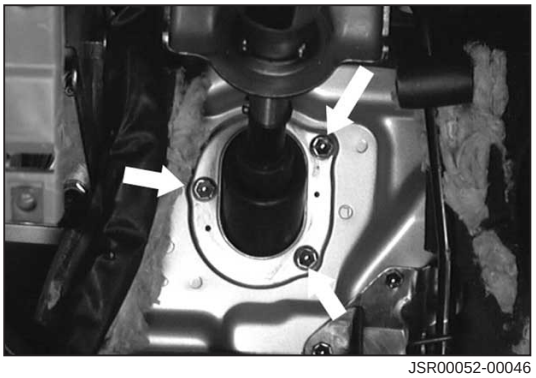
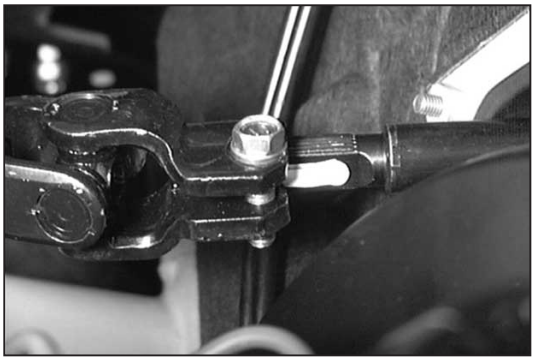
INSTALLATION

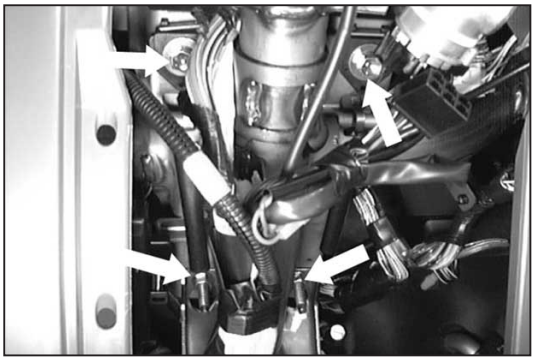
1. Install the dust cover to the retainer.
2. Install the dust cover retainer to the dash panel with the attaching bolts.
   Tightening Torque: 3.6 - 6.9 N·m (0.4 - 0.7 kgf-m)
3. Insert the steering column to the dust cover hole.
4. Attaching the steering column upper cover on the steering column.
5. Install the steering column temporarily with the attaching bolts and nuts.
6. Connect the intermediate shaft between the steering column shaft and steering gear pinion while aligning the tooth less section of the steering column shaft and universal joint of the intermediate shaft during the assembly. Then, tighten the attaching bolts to the specified tightening torque.
   Tightening Torque: 24.5 - 34.3 N·m (2.5 - 3.5 kgf-m)
7. Tighten the steering column attaching bolts and nuts.
   Tightening Torque:
   Bolt: 14.7 - 21.6 N·m (1.5 - 2.2 kgf-m)
   Nut: 9.8 - 15.7 N·m (1.0 - 1.6 kgf-m)
8. Connect the connectors.
9. Install the steering column lower cover.
10. Install the instrument panel lower finish panel.
11. Install the steering wheel.(Refer to the STEERING WHEEL section.)
12. Connect the battery ground cable terminal to the negative terminal of the battery.



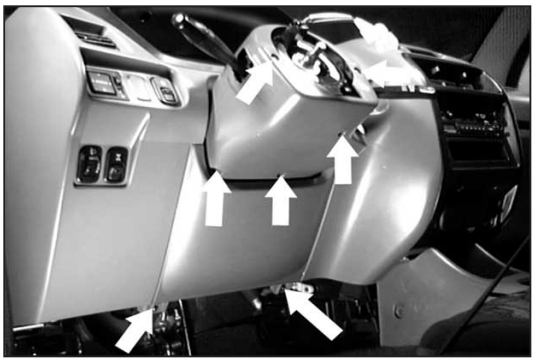
JSR00052-00046



JSR00053-00047



JSR00054-00048



JSR00055-00049

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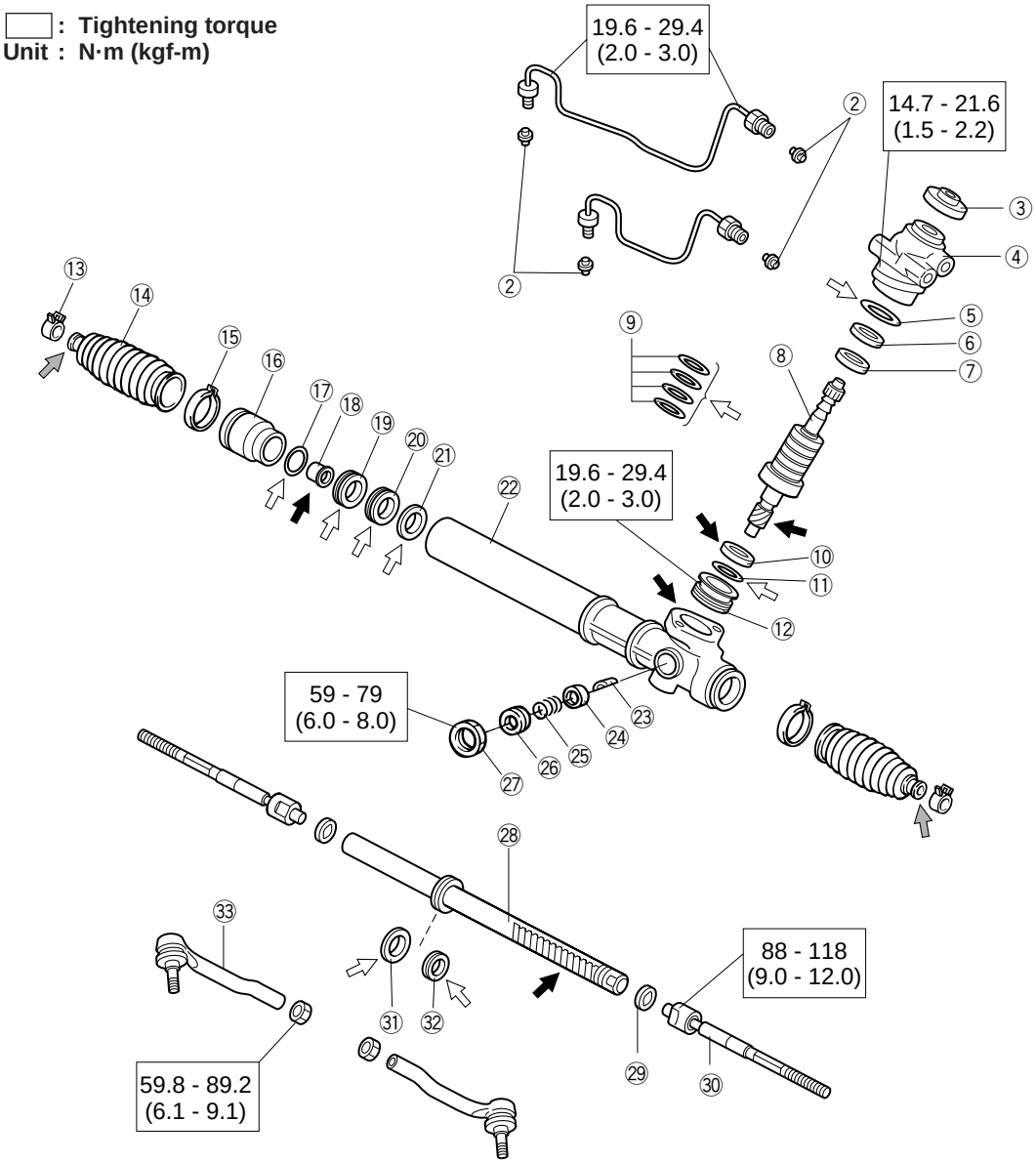
STEERING GEAR

COMPONENTS

: Tightening torque
Unit : N·m (kgf-m)



Apply Molybdenum Disulphide Lithium Base Grease
Apply Power Steering Fluid
Apply Silicone Grease

① Turn pressure tube
② Union seat
③ Dust cover
④ Control valve housing
⑤ O-ring
⑥ Oil seal
⑦ Bearing
⑧ Control valve
⑨ Ring
⑩ Oil seal
⑪ O-ring
⑫ Bearing guide nut
⑬ Clip
⑭ Rack boot
⑮ Boot band
⑯ Cylinder end stopper
⑰ O-ring
⑱ Bush
⑲ Oil seal
⑳ Oil seal
㉑ Spacer
㉒ Rack housing
㉓ Rack guide seat
㉔ Rack guide
㉕ Spring
㉖ Rack guide spring cap
㉗ Lock nut
㉘ Steering rack
㉙ Claw washer
㉚ Rack end
㉛ Seal ring
㉜ O-ring
㉝ Tie rod end

JSR00056-00050

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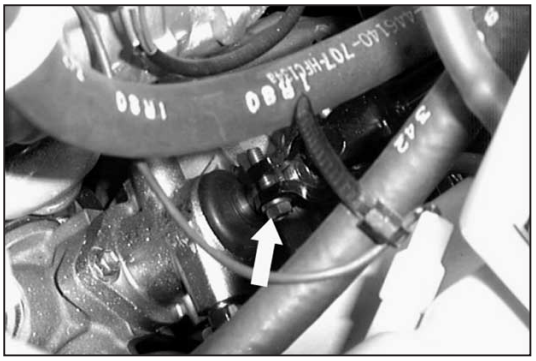
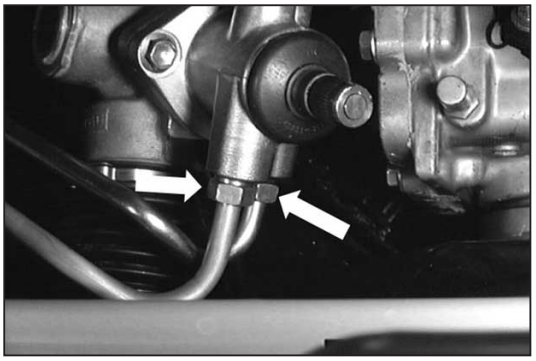
REMOVAL

1. Drainage of power steering fluid
   (See page SR–4, Fluid change.)
2. Remove the intermediate shaft. (See page SR–12.)
3. Affix a tape or the like to the pinion section of the steering gear so as to prevent the body, etc., from being damaged during the removal of the steering gear assembly.



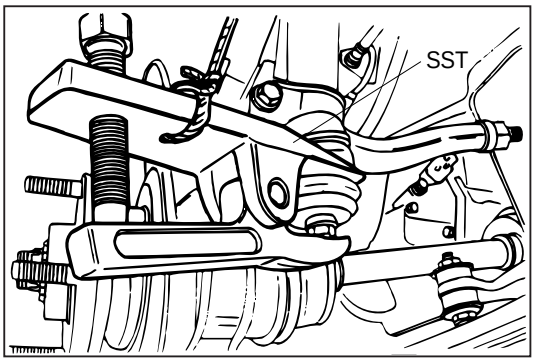
JSR00057-00051

4. Disconnect the return tube and pressure feed hose at the union section of the steering gear assembly.



JSR00058-00052

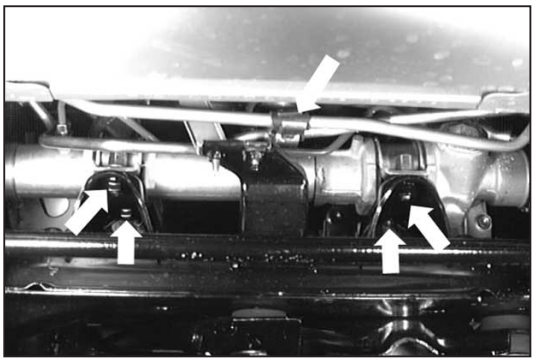
5. Jack up the vehicle and support it with safety stands. (Refer to the GI section.)
6. Remove the engine undercover.
7. Remove the front wheels.
8. Separation of tie-rod end
   (1) Remove the clip, then remove the castle nut from the tie-rod end.
   (2) Separate the tie-rod end from the steering knuckle, using the following SST.
   SST: 09611-87701-000



JSR00059-00053

   CAUTION:
   - Never made damage to boot and threaded portion during disconnection by the SST.

9. Remove the bracket retaining the pressure feed hose and return tube.
10. Remove the steering gear assembly mounting bolts.
11. Take out the power steering gear assembly from the vehicle.
    NOTE:
    - Remove the tape which was affixed in Step 3.



JSR00060-00054

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DISASSEMBLY

PRECAUTION

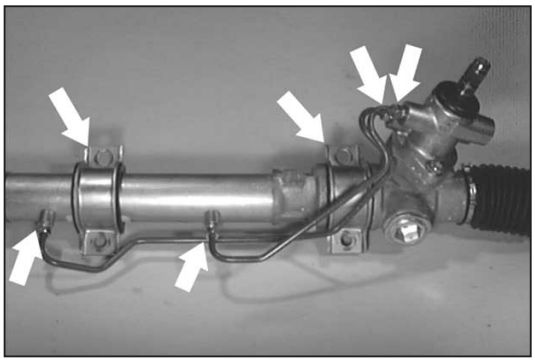
- Never reuse non-reusable parts. (Failure to observe this caution may cause serious accidents.)
- Prior to the disassembly, be sure to wipe off any sand or mud adhering to the outside of the power steering gear assembly so that they may not get into the inside during the disassembly and assembly.
- When disassembling and assembling, do not use gloves. These operations should be performed by bare hands.
- Be sure to always arrange the disassembled parts in order and protect them from dust, etc.
- Prior to the assembling of each part, be sure to wash the part completely and dry it. Then, apply the ATF DEXRON®II. As for aluminum and rubber sections, never wash them with alkaline chemicals. Also, never wash rubber parts, such as O-rings and oil seals, with cleaning solvent (white gasoline, etc.).
- Liberally apply the ATF DEXRON®II to sliding surfaces and rotating sections before assembling them.
- When securing a part in a vice, be sure to interpose aluminum plates.
- Be very careful not to scratch oil seals, O-rings and so forth during the installation.
- Prior to the application of seal agents, be sure to wipe off thoroughly the old seal agent remaining at the seal section. Then, wash the seal section with white gasoline and dry it.
- When using compressed air, be sure to wear protective goggles.

JSR00061-00000

1. Removal of turn pressure tube
   Remove the turn pressure tubes from the rack housing assembly, using the following SST.
   SST: 09633-00020-000

   CAUTION:
   - If the steering rack is moved with the turn pressure tube removed, residual fluid may splash.
     Therefore, care must be exercised so that no fluid may get to your eyes.

   NOTE:
   - Be very careful not to scratch the spool section during the removal of the tube.



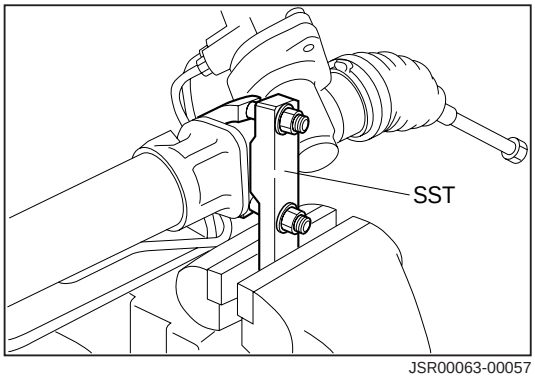
JSR00062-00055

2. Remove the union seats from the cylinder tube side turn pressure tube attaching hole.

JSR00000-00056

3. Remove the bracket and grommet from the steering gear housing.
4. Secure the power steering gear assembly with a vice, using the following SST.
   SST: 09612-00012-000

   NOTE:
   - When the SST is installed to the power steering gear assembly, a gap will be formed. At this time, be very careful not to damage the rack housing by excessively tightening the attaching nuts of the SST.
   - Be sure to evenly tighten the attaching nuts of the SST.



JSR00063-00057

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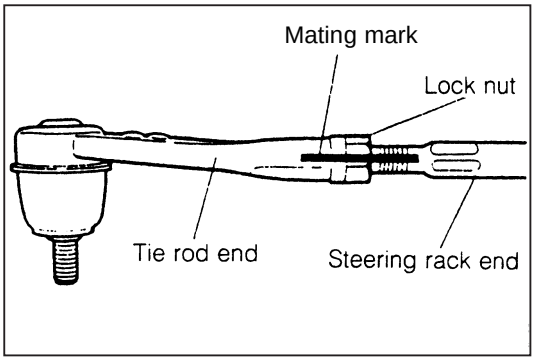
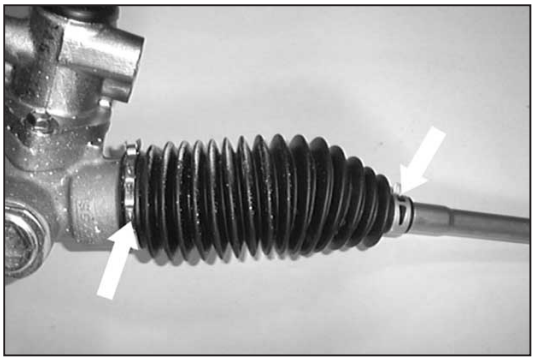
5. Removal of tie rod end
   (1) Put a mating mark on the tie rod end and steering rack end.
   (2) Remove the tie rod end by loosening the lock nut.



JSR00064-00058

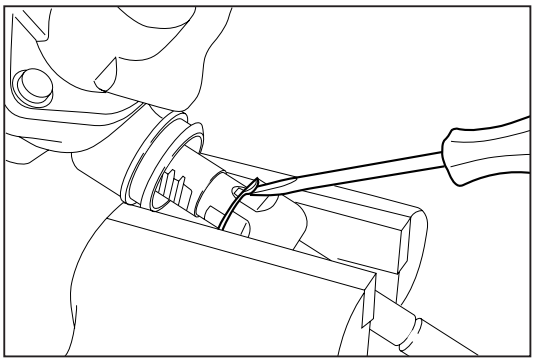
6. Removal of steering rack boots
   (1) Remove the steering rack boot bands.
   NOTE:
   • Never reuse the removed steering rack boot bands. Be very careful not to damage the boots during the removal of the steering rack boot bands.

   (2) Remove the clips by means of a pair of pliers.
   (3) Remove the steering rack boots from the steering rack end sub-assemblies while compressing the boots by means of a screwdriver or the like.
   NOTE:
   • When removing the steering rack boots, care must be exercised so that no overstroke and so forth may take place due to the steering rack's displacement.
   • When removing the steering rack boots, be very careful not to apply impacts to the boots.


JSR00065-00059

7. Removal of steering rack end sub-assemblies
   (1) Secure the ball joint section of the steering rack end with a vice.
   (2) Release the staked part of the claw washer, using a chisel.
   NOTE:
   • Be very careful not to damage the steering rack.
   • Never reuse the removed claw washer.
   • When removing the claw washer, be very careful not to apply impacts to the steering rack.

JSR00066-00000


JSR00067-00060

   (3) Remove the steering rack end sub-assemblies from the steering rack, using the following SST and a wrench.
   SST: 09922-10010-000 (Width across flats: 30 mm)

   NOTE:
   • After removing the tooth side steering rack end, put the turning-preventing cutout section provided at the tooth side of the rack in a vice. Then, remove the steering rack end at the opposite side.

8. Remove the claw washer from the removed steering rack end sub-assembly.

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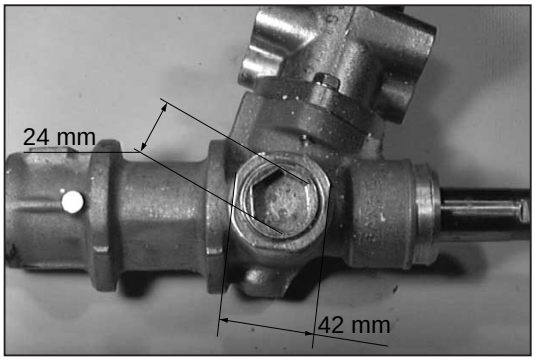
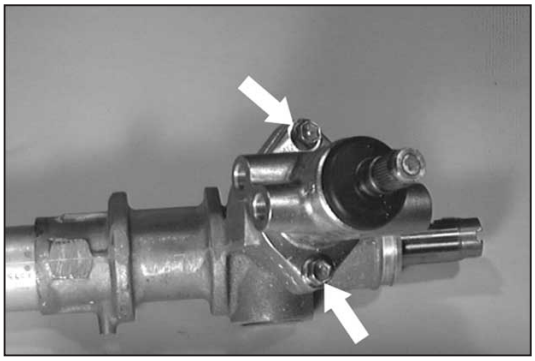
9. Remove the lock nut for the rack guide spring cap, using the following SST.
   SST: 09922-10010-000
   (Width across flats: 42 mm)

10. Remove the rack guide spring cap, using the following SST.
    SST: 09612-10020-000
    (Width across flats: 24 mm)

11. Remove the rack guide spring, rack guide and rack guide seat.
12. Put a mating mark on the control valve housing and rack housing.
13. Remove the control valve housing by removing attaching bolts.
14. Remove the O-ring from the valve housing.

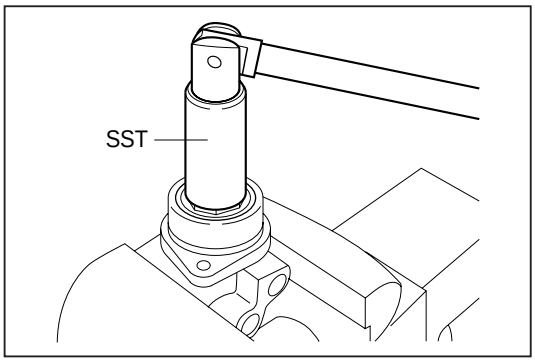


JSR00068-00062


JSR00069-00063

15. Removal of control valve
    (1) Put the control valve housing in a vice.
    (2) Affix a tape or the like to the pinion section of the steering gear so as to prevent the pinion section from being damaged.
    (3) Remove the bearing guide nut, using the following SST.
    SST: 09631-20060-000

    (4) Remove the O-ring from the bearing guide nut.

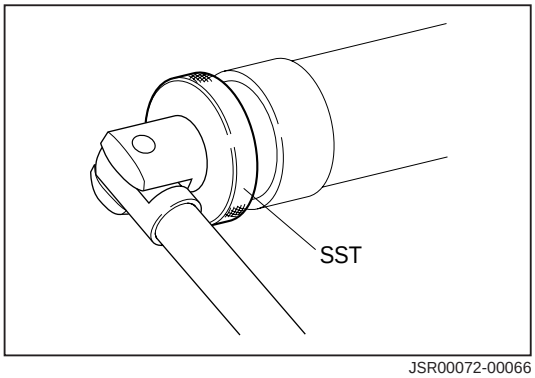


JSR00070-00064

16. Remove the dust cover.
17. Remove the control valve by tapping it, using a plastic hammer or the like.

JSR00071-00065

18. Remove the cylinder end stopper, using the following SST.
    SST: 09631-20090-000



JSR00072-00066

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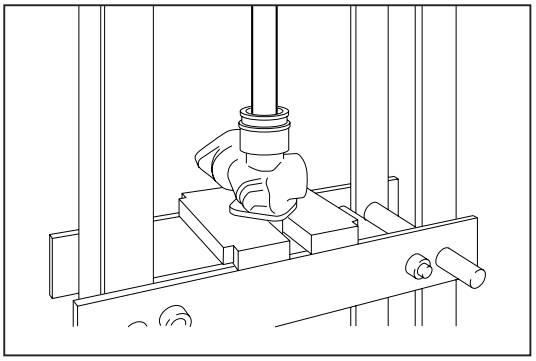
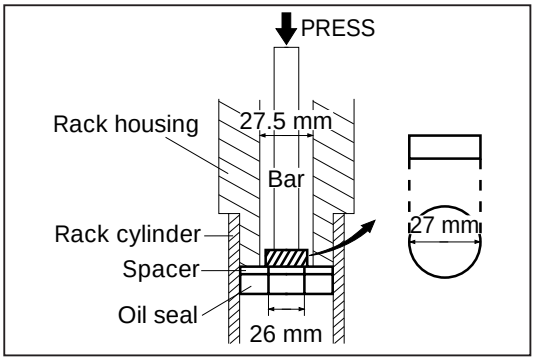
19. Removal of rack and cylinder side rack oil seal
    (1) Insert a 20 mm-dia. bar or a suitable tool from the rack housing side. Remove the cylinder side rack oil seal and rack together, using a press.
    (2) Remove the oil seal from the rack.



JSR00073-00067

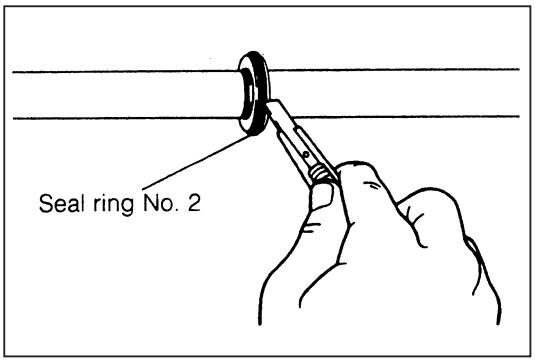
20. Removal of the rack housing side rack oil seal
    (1) Insert a 27 mm-dia. remover or a suitable tool from the rack housing side. Remove the rack oil seal and spacer at the rack housing side, using a press.



JSR00074-00068

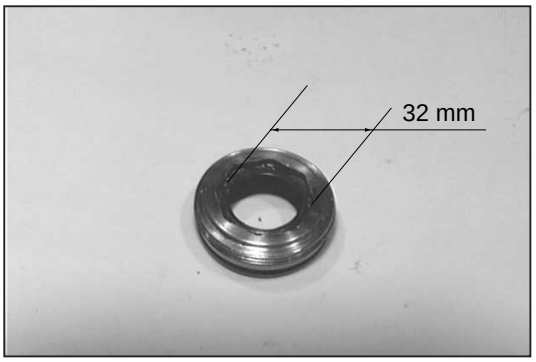
21. Removal of steering rack oil seal ring and O-ring
    (1) Cut off the seal ring No. 2 from the rack sub-assembly by means of a cutter or the like.
    NOTE:
    • When cutting off the seal ring No. 2, be very careful not to scratch the ring groove and side surface.

    (2) Remove the O-ring from the rack sub-assembly by means of a small screwdriver or the like.
    NOTE:
    • Never reuse the removed O-ring.



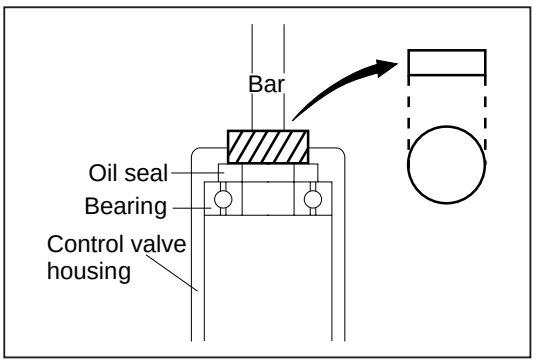
JSR00075-00069

22. Remove the bearing guide nut oil seal, using a 32 mm-dia. remover or a suitable tool (e.g. 22 mm socket wrench) in combination with a press.



JSR00076-00070

23. Remove the control valve housing oil seal and bearing, using a 27 mm-dia. remover or a suitable tool in combination with a press.



JSR00077-00071

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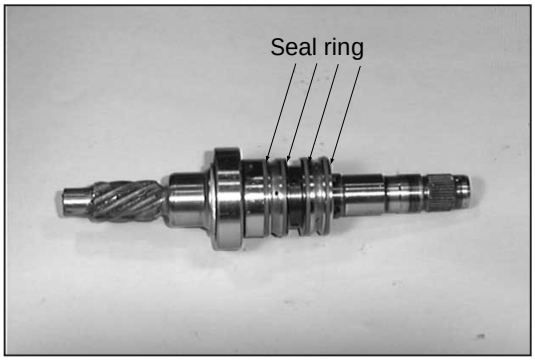
24. Remove the seal rings of the power steering control valve sub-assembly by cutting them by means of a cutter or the like.
    NOTE:
    • When cutting the seal rings, be very careful not to scratch the seal ring grooves and side surface.



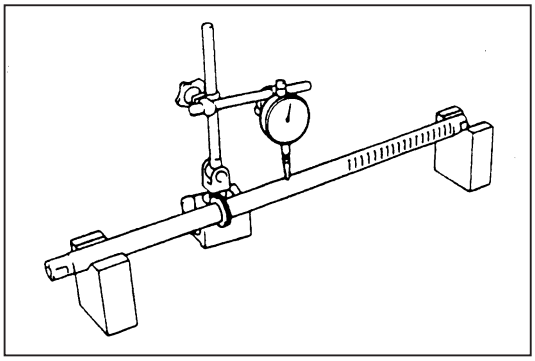
JSR00078-00072

INSPECTION

Power steering rack

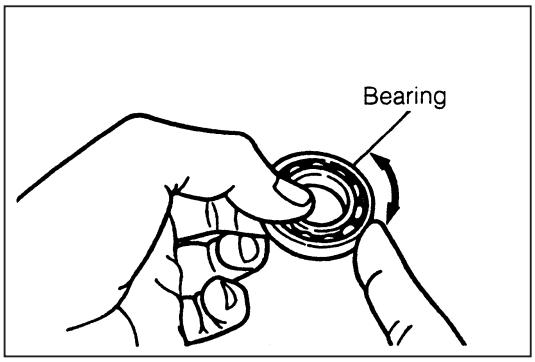
1. Check the tooth surface for wear and damage.
2. Ensure that the bend of the rack is within the specified value, using V-blocks and a dial gauge.
   Bend: 0.15 mm

   NOTE:
   • The bend should be measured at the center of the rack.


JSR00079-00073

Radial ball bearing of control valve housing

Turn the bearing by your hands. At this time, ensure that the bearing exhibits no binding and emits no abnormal noise.
Also, check to see if the bearing rotates smoothly.



JSR00080-00074

Control valve

Turn the bearing by your hands. At this time, ensure that the bearing exhibits no binding and emits no abnormal noise.
Also, check to see if the bearing rotates smoothly.
Check that the gear section and serration section have no scores.

If any damage is exists, replace the damaged part with new one.

JSR00081-00075

Control valve housing

Check to see if the turn pressure tube attaching hole is not clogged or scored.
Check that the control valve housing inner section has no scores.

If any damage is exists, replace the damaged part with new one.

JSR00082-00076

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Rack housing assembly
Check to see if the turn pressure tube attaching hole is not clogged or scored.
Check that the external and inner sections exhibit no major scores and dents.

If any damage is exists, replace the damaged part with new one.

JSR00083-00077

Cylinder end stopper
Check that the external and inner sections exhibit no major scores and dents.

If any damage is exists, replace the damaged part with new one.

JSR00084-00078

Boot
Check the boot for rapture, deformation and major scores.

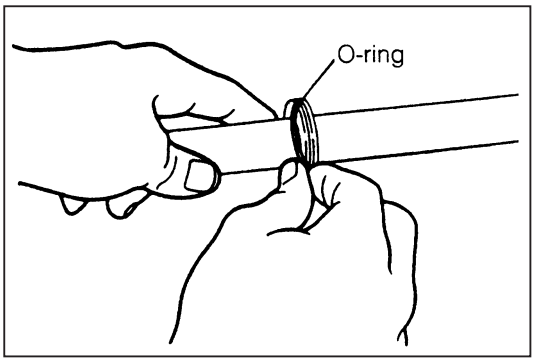
If any damage is exists, replace the damaged part with new one.

JSR00085-00079

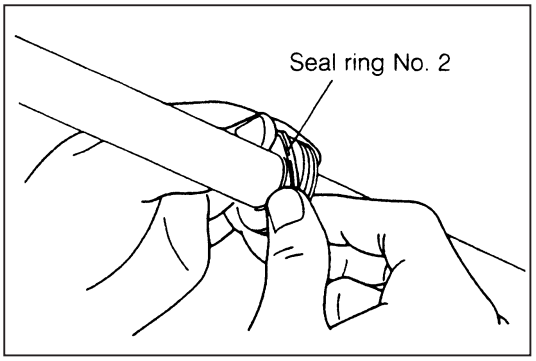
ASSEMBLY

1. Assembly of power steering rack sub-assembly
   (1) Attach a new O-ring to the ring groove of the rack sub-assembly.
   NOTE:
   - Do not expand the O-ring excessively.
   - When attaching the O-ring, apply power steering fluid to the O-ring.
   - Care must be exercised so that the O-ring may not be twisted during the installation. Also, be very careful not to scratch the O-ring.

   (2) Lightly rub a new seal ring No. 2 with your fingers so as to expand the ring. Then, attach the ring to the ring groove of the rack sub-assembly.



JSR00086-00080



JSR00087-00081

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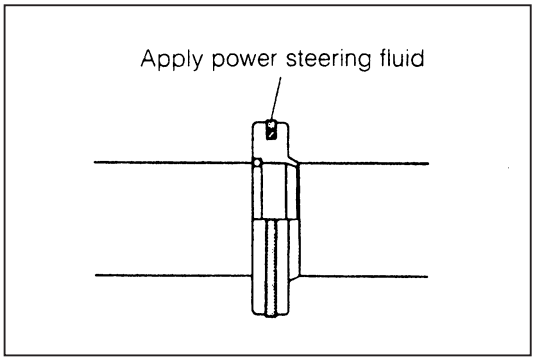
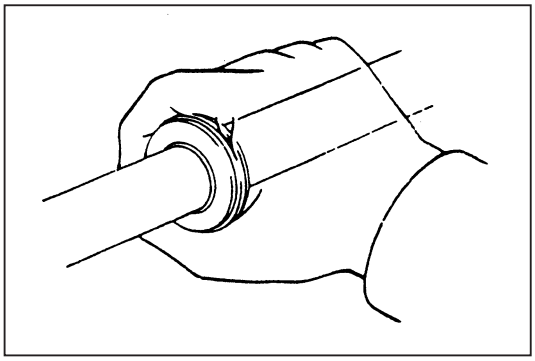
NOTE:
- Do not expand the seal ring excessively.
  When attaching the ring, apply power steering fluid to the seal ring.
  Be very careful not to twist the seal ring during the installation. Also, at most care must be exercised so as not to scratch the ring by your finger nails during the installation.
  After completion of the installation, be sure to apply power steering fluid to the ring groove again.

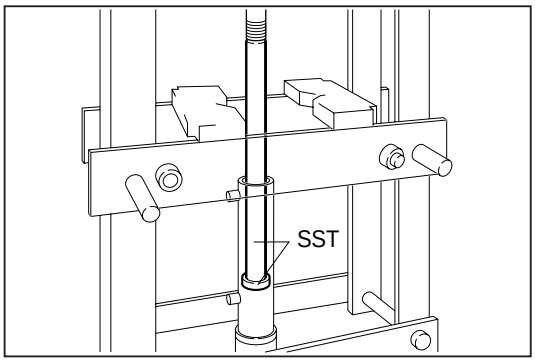


JSR00088-00082

(3) Hold the expanded seal ring by your hand and contract it so that the ring may be bedded in.


JSR00089-00083

2. Installation of rack housing side rack oil seal
   Insert the spacer and oil seal in this order from the cylinder tube side, using the following SSTs in combination with a press.
   SST: 09631-00020-000
   09631-12020-000

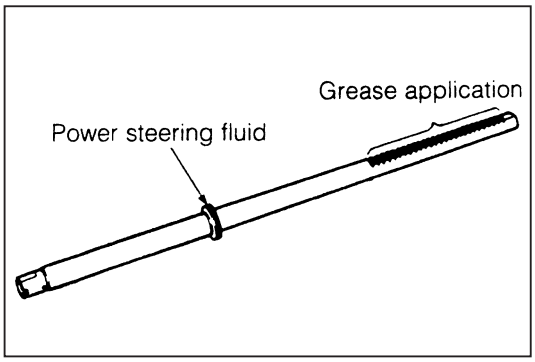


JSR00090-00084

3. Installation of rack cover tube to power steering rack subassembly
   (1) Pack lithium base grease to the bottom land of the steering rack tooth.

NOTE:
- Care must be exercised so that the ventilation hole of the steering rack may not be restricted with grease.

(2) Apply power steering fluid to the steering seal ring No. 2.



JSR00091-00085

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(3) Installation of rack cover tube
Rack Cover Tube (SST): 09612-87101-000

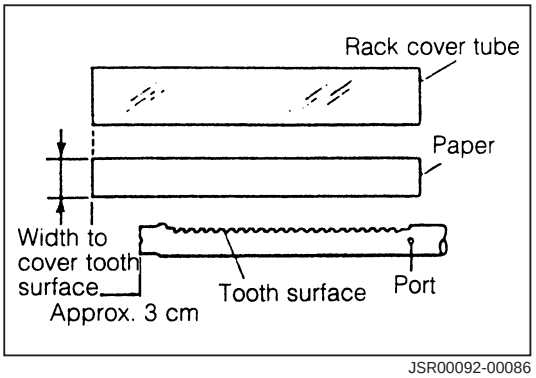
① Prepare the rack cover tube and a sheet of paper.

NOTE:
- The rack cover tube is used to protect the oil seal. Any damage on the tube surface will cause oil leakage. Therefore, prior to use, be sure to check that no burr nor cracks are present at the tube surface before it is contracted.

② Cut the rack cover tube (SST) 3 cm greater than the length that covers the power steering rack tooth surface and port.

③ Cut a sheet of paper having thickness virtually the same as that of a newspaper in such a way that the width may cover the tooth surface and the length may become equal to that of the rack cover tube.

NOTE:
- Paper is used to prevent the tooth pattern of the rack from remaining on the rack cover tube when it is contracted.

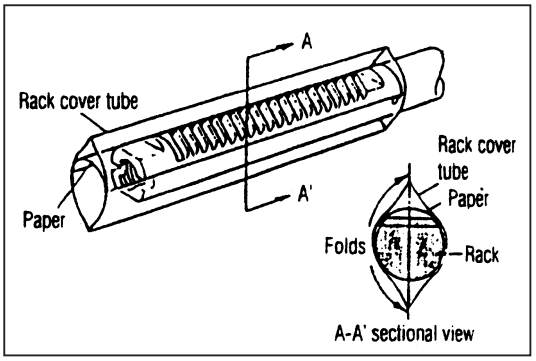


JSR00092-00086

④ Install the paper in such a way that it covers the tooth surface of the power steering rack sub-assembly.

⑤ Install the rack cover tube on the power steering rack sub-assembly in such a way that the folds of the rack cover tube come at points indicated in the right figure.

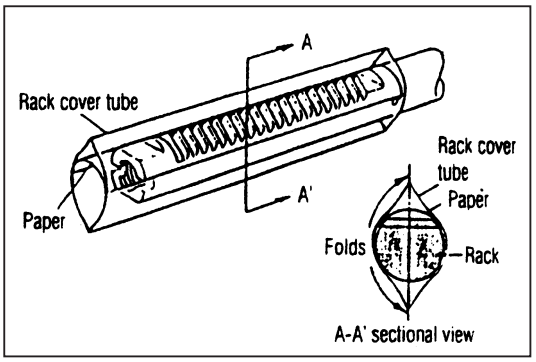
JSR00093-00000



JSR00094-00087

⑥ Contract the rack cover tube by blowing air with a dryer or the like. At this time, blow air from the section Ⓐ toward section Ⓑ at the back of the rack tooth surface of the rack cover tube which is installed to the power steering rack sub-assembly. In this way, ensure that air inside the rack cover tube flows into the side Ⓑ.

NOTE:
- Be sure to contract the back side of the tooth surface. If the tooth surface side of the power steering rack should be contracted, the tooth pattern at the tube will make the tube removal difficult.



JSR00095-00088

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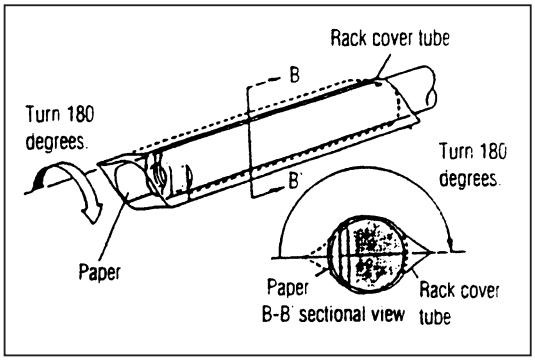
⑦ Turn the rack cover tube 180 degrees.
⑧ Contract the rack cover tube at the back side of the tooth with a dryer in the same manner with the operation above.
⑨ Pull out the paper installed to the power steering rack sub-assembly.

NOTE:
- If the paper breaks, pull out the tube once and remove the paper. Install the tube again to the power steering rack sub-assembly.



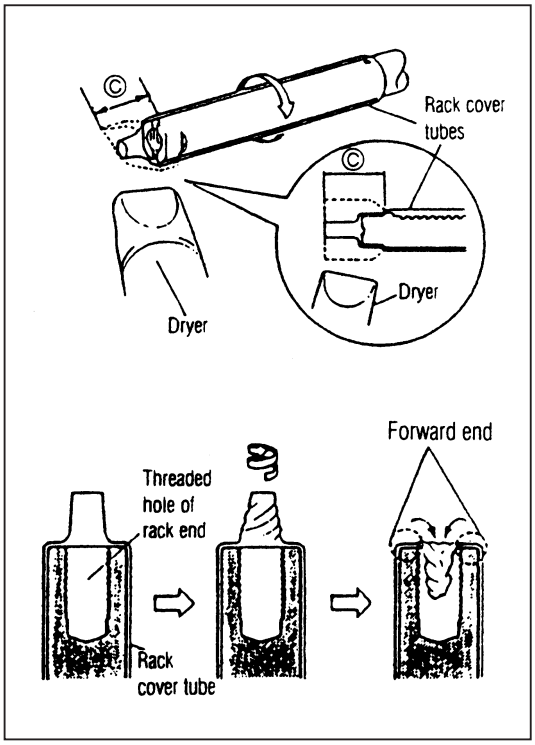
JSR00096-00089

⑩ Fully warm up the forward end of the power steering rack only with a dryer. After warming-up, immediately push the forward end into the threaded hole of the rack end while twisting the tube.

NOTE:
- Do not contract the rack cover tube at the tooth surface of the power steering rack sub-assembly.

⑪ Ensure that the rack cover tube surface exhibits no protrusion or edge.

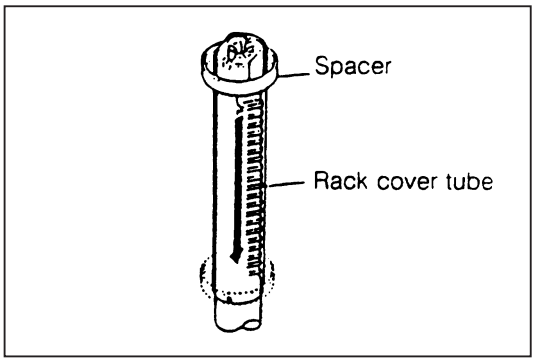
NOTE:
- If any protrusion or edge exists, remove it by warming up the tube by means of a dryer, etc. and contracting it.
- Do not contract the rack cover tube at the tooth surface of the power steering rack sub-assembly.



JSR00097-00090

⑫ Ensure that the power steering cylinder tube oil seal spacer can be passed smoothly without any binding.

NOTE:
- Prior to this check, ensure that no burr exists at the inner periphery of the spacer.
- This check is performed so as to confirm that the inner side of the spacer will not scrape the rack cover tube surface during the assembly of the power steering rack sub-assembly.



JSR00098-00091

⑬ Ensure that no damage, such as scratch, exists on the rack cover tube surface.

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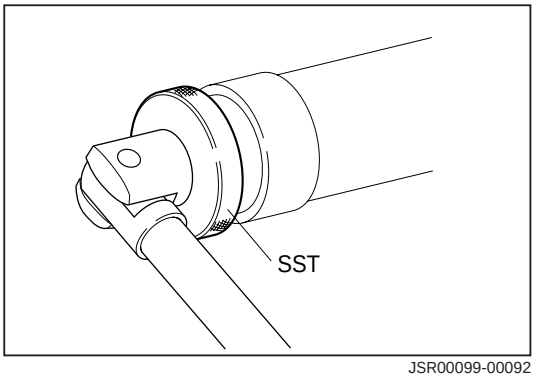
4. Install the rack into the cylinder.
5. Installation of cylinder tube side rack oil seal
   (1) Put the rack housing in a vice, using the following SST.
   SST: 09612-00012-000

   (2) Install the cylinder tube side oil seal to the rack.
   (3) Install a new O-ring to the cylinder end stopper.
   (4) Insert the cylinder end stopper while pushing the oil seal, using the following SST.
   SST: 09631-20090-000

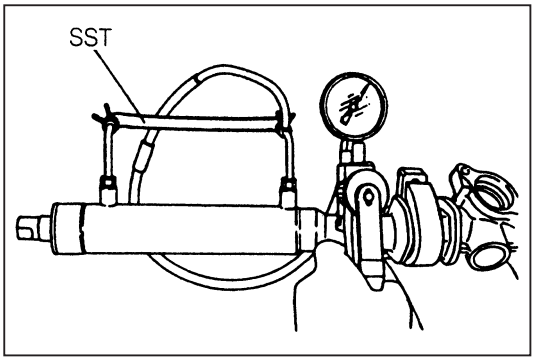


JSR00099-00092

6. Remove the rack cover tube installed to the power steering rack sub-assembly.
7. Air tightness test
   (1) Install the SST to the union section of the steering rack housing assembly.
   SST: 09631-12071-000

   NOTE:
   • Install the SST with a packing interposed.

   (2) Connect a MityVac to the SST.
   Apply a negative pressure of about 52 kPa (0.53 kgf/cm^2) and keep it for about 30 seconds.
   Ensure that the reading of the MityVac will not change.
   NOTE:
   • If any air leakage exists, replace the oil seals.

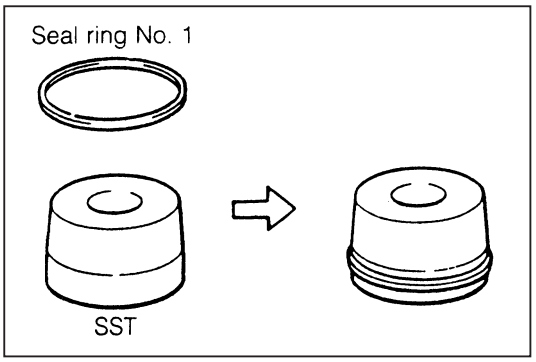


JSR00100-00093

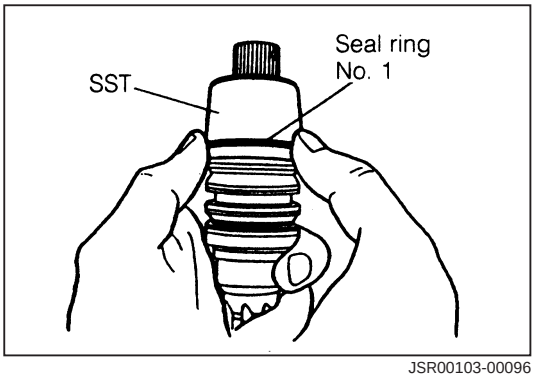
8. Assembly of power steering control valve
   (1) Apply power steering fluid to a new seal ring No. 1.
   Push the ring from the smaller-diameter side to the center of the larger-diameter side so as to expand the ring.
   SST: 09631-20070-000

   NOTE:
   • Thoroughly wash the SST. Make sure that the SST is not scratched. Also, make sure that no dust adheres to the SST.
   • Do not expand the ring unnecessarily.
   • Be sure to expand evenly the entire periphery of the ring.
   • Be very careful not to scratch the ring.

   (2) With the seal ring attached to the SST, insert the SST into the control valve sub-assembly from the direction indicated in the right figure. Attach the expanded seal rings to the seal ring grooves of the control valve sub-assembly.



JSR00102-00095



JSR00103-00096

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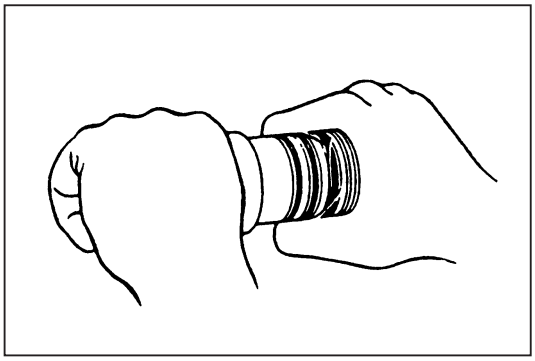
(3) Hold the seal rings attached to the control valve sub-assembly with your fingers and contract it so that the rings may be bedded in.

NOTE:

- Be very careful not to scratch the edge surface and outer periphery of the ring by your finger nails.

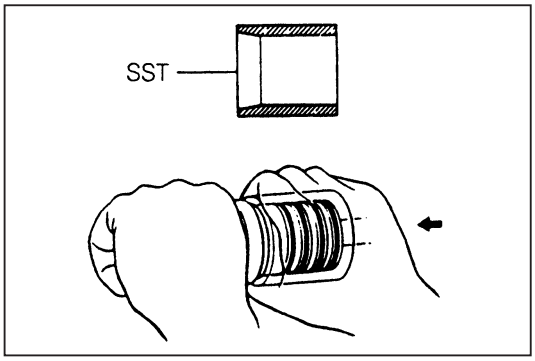


JSR00104-00097

(4) Apply power steering fluid to the seal rings again. Contract the rings further, using the following SST, while settling the ring in place.
SST: 09631-20081-000

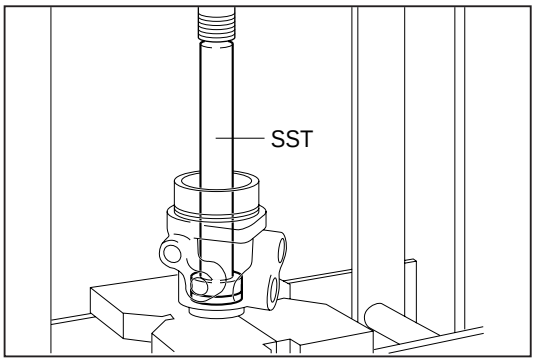
NOTE:

- Thoroughly wash the SST. Make sure that the SST is not scratched. Also, make sure that no dust adheres to the SST.
- Apply power steering fluid to the inside of the SST.

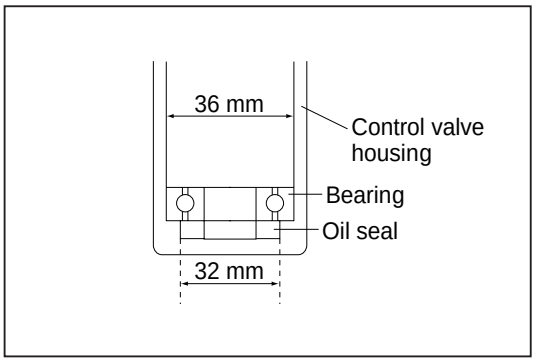


JSR00105-00098

9. Assembly of control valve housing
(1) Install the oil seal, using the following SST or a 32 mm-dia. remover or a suitable tool in combination with a press.
(2) Install the bearing, using the following SST or a 34 mm-dia. remover or a suitable tool in combination with a press.
SST: 09608-30012-000 (Part No. of set)
09608-04020-000 (Bar)
09630-24013-000 (Part No. of set)
09620-24030-000 (Spacer)

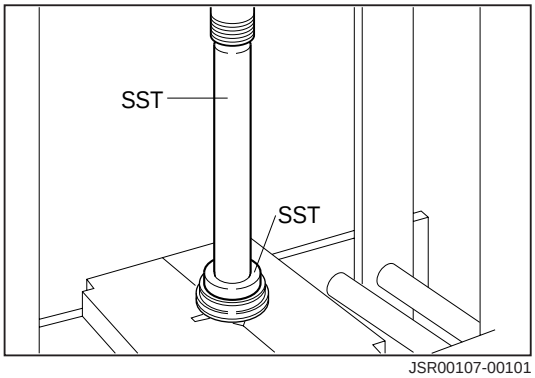


JSR00106-00099



JSR00000-00100

(3) Install the oil seal to the bearing guide nut, using the following SST in combination with a press.
(4) Install a new O-ring to the bearing guide nut.
SST: 09608-30012-000 (Part No. of set)
09608-04020-000 (Bar)
09631-22070-000 (Replacer)



JSR00107-00101

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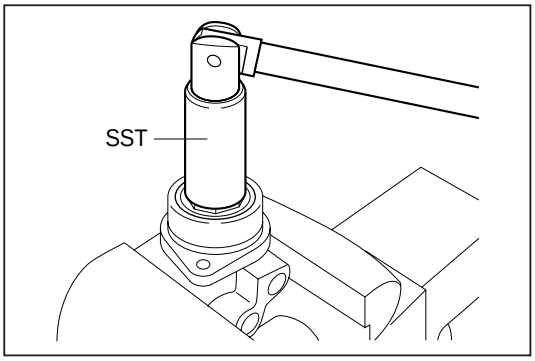
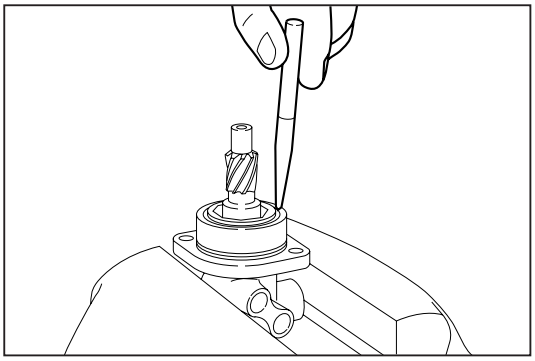
(5) Insert the control valve to the control valve housing.
NOTE:
- To prevent the oil seal damage, wind a vinyl tape on the serration part of the control valve shaft.

(6) Install the oil seal to the control valve shaft.
(7) Install the bearing guide nut, using the following SST.
SST: 09631-20060-000
Tightening Torque: 19.6 - 29.4 N·m (2.0 - 3.0 kgf-m)

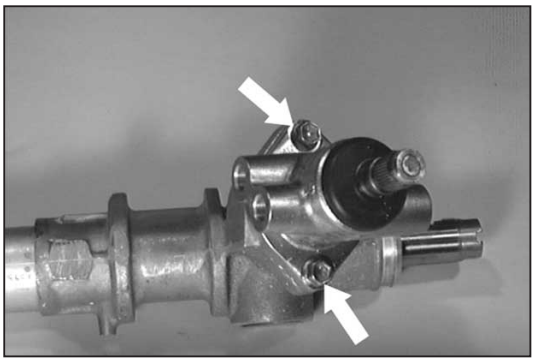


JSR00108-00102

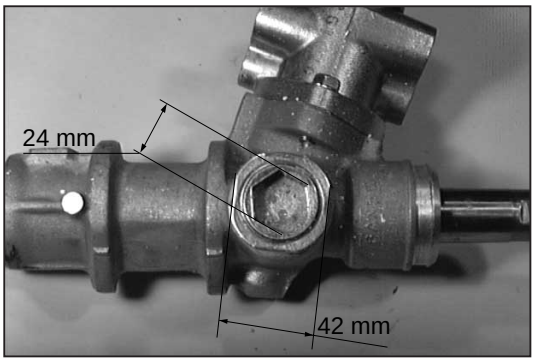
(8) Stake the guide nut.
(9) Install a new O-ring to the control valve housing.
(10) Install the dust cover to the control valve housing.


JSR00109-00103

10. Installation of power steering control valve housing
(1) Apply power steering fluid to the ring section of the power steering control valve.
(2) Assemble the power steering control valve sub-assembly to the steering rack housing.
NOTE:
- During this assembling, make sure that the steering rack is engaged with the pinion of the control valve by turning the control shaft in a right-&-left direction, using the following SST.
SST: 09616-00010-000
Tightening Torque: 14.7 - 21.6 N·m (1.5 - 2.2 kgf-m)


JSR00110-00104

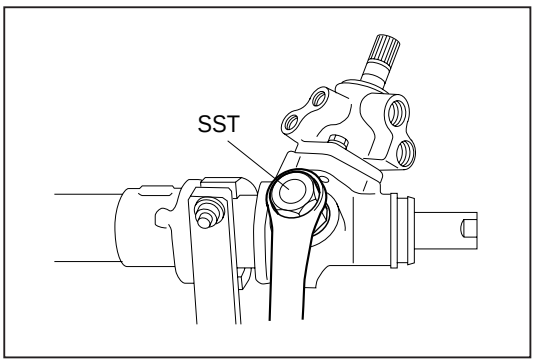
11. Assemble the rack guide seat to the rack guide.
12. Install the rack guide with the rack guide seat to the steering gear housing.
13. Install the rack guide spring.
14. Temporarily tighten the rack guide spring cap.



JSR00111-00105

15. Adjustment of total pre-load
(1) Tighten the rack guide spring cap to the specified torque, using the following SST.
SST: 09922-10010-000
Tightening Torque: 14.5 N·m (1.5 kgf-m)

(2) From the condition (1), back off the rack guide spring cap about 12 degrees.



JSR00112-00106

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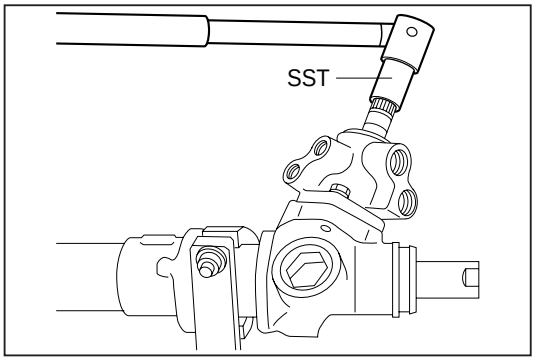
(3) Move the steering rack one or two times in the full stroke by turning the control valve shaft, using the following SST, so that steering rack may be bedded in.
SST: 09616-00010-000

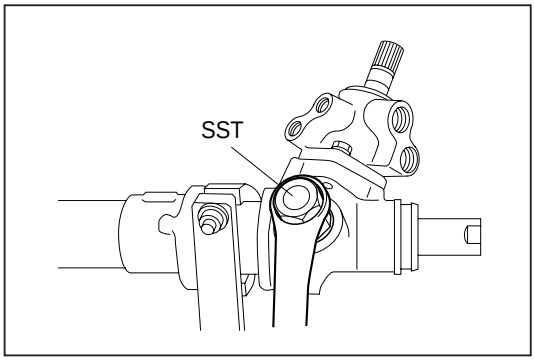
NOTE:
- Make sure that the rack end surface will not enter into each end surface of the rack housing sub-assembly.
- Care must be exercised so that no overstroke takes place.



JSR00113-00107

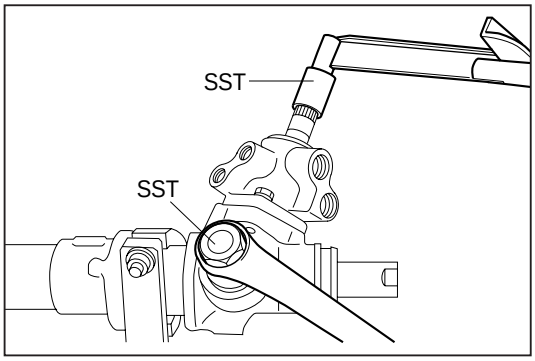
(4) Loosen the steering rack guide spring cap, using the following SST, until the rack guide spring no longer operates.
SST: 09612-10020-000

NOTE:
- Loosen the cap to the extent that the steering rack end surface moves smoothly when pushing it by your hand.



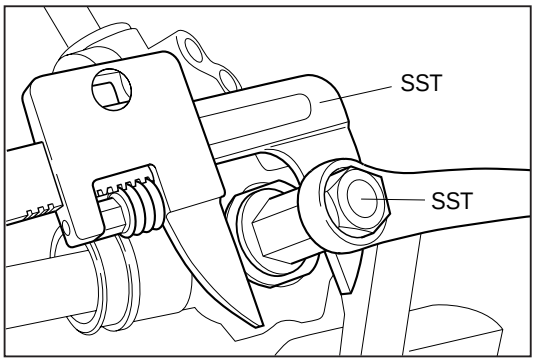
JSR00114-00108

(5) Tighten the steering rack guide spring cap progressively, until the pre-load may become the specified value when the control valve shaft is being turned, using the following SSTs.
SSTs: 09616-00010-000 (Steering gear pinion)
09612-10020-000 (Rack guide spring cap)
Specified Pre-load: 0.78 - 1.54 N·m
(0.08 - 0.16 kgf-m)/during turning



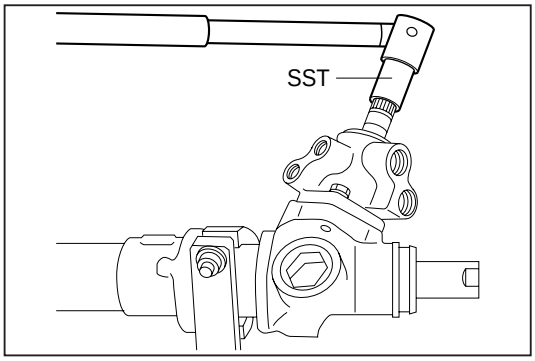
JSR00115-00109

(6) Apply Three Bond 1141 to the threaded portion of the lock nut (for rack guide spring cap) and to the end surface of the rack housing side.
Tighten it to the specified torque, using the following SSTs.
SSTs: 09922-10010-000 (Width across flats: 42 mm)
09612-10020-000 (Rack guide spring cap)
Tightening Torque: 59 - 79 N·m
(6.0 - 8.0 kgf-m)



JSR00116-00110

(7) Turn the control valve shaft, using the following SST. Ensure that the pre-load during turning comes within the specified range.
SST: 09616-10020-000
Specified Pre-load: 0.78 - 1.54 N·m
(0.08 - 0.16 kgf-m)/during turning



JSR00117-00111

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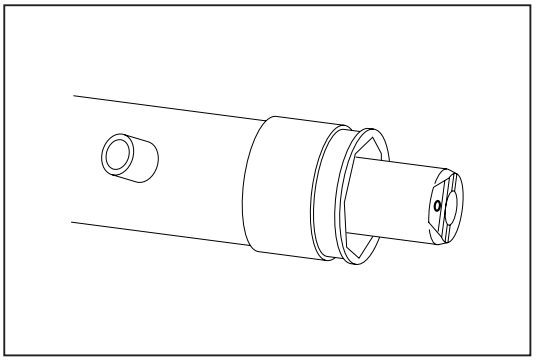
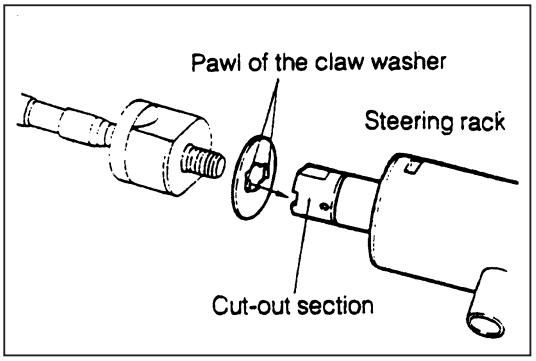
16. Check the rack hole.



JSR00118-00112

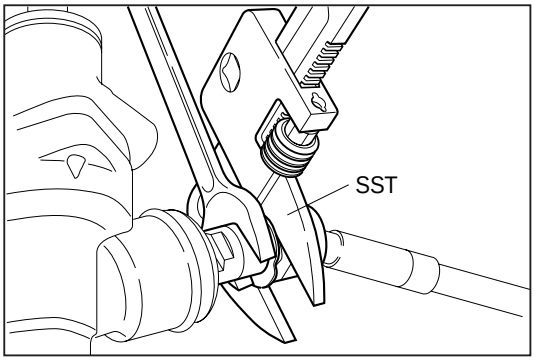
17. Attach a new claw washer to the steering rack in the direction indicated in the right figure.
    NOTE:
    - Be sure to align the pawl of the claw washer with the cut-out section of the steering rack.



JSR00119-00113

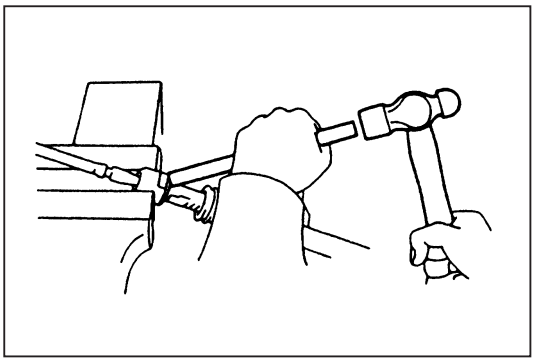
18. Install the steering rack end sub-assembly to the steering rack assembly. Tighten it to the specified torque.
    SSTs: 09922-10010-000 (Width across flats: 30 mm)
    Tightening Torque: 88 - 118 N·m (9.0 - 12.0 kgf-m)

    NOTE:
    - Be very careful not to twist the steering rack during tightening.



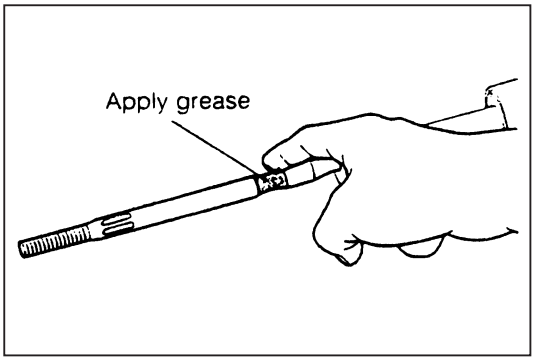
JSR00120-00114

19. Secure the ball joint section of the steering rack end sub-assembly with a vice. Stake the claw washer, using a hammer in combination with a brass bar or the like.
    NOTE:
    - Positively stake the two points of the claw washer.
    - Be very careful not to apply impacts to the steering rack.
    - Be very careful not to tighten the ball joint section excessively. Failure to observe this caution may cause deformation of the ball joint section.



JSR00121-00115

20. Apply silicone grease into the rack boot groove of the steering rack end sub-assembly.
    Specified Grease: Silicone grease
    (Three Bond® TB–1855)



JSR00122-00116

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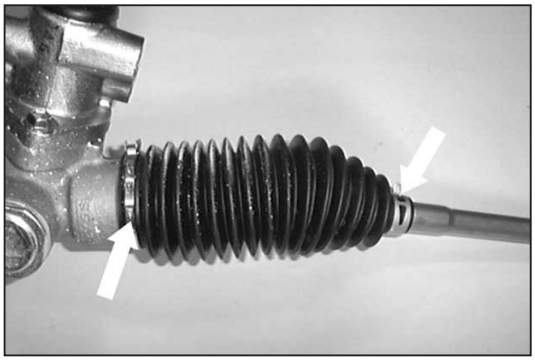
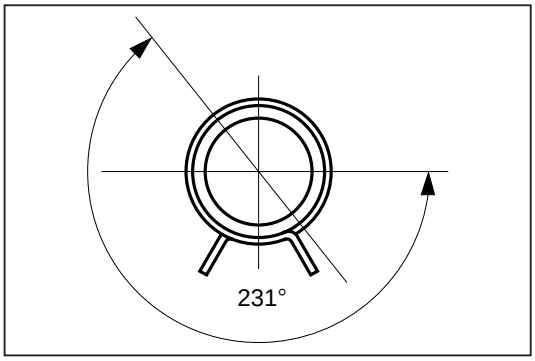
21. Install new steering rack boot bands to the steering rack housing sub-assembly.
22. Install the steering rack boots to the steering rack end sub-assembly.
23. Stake the installed steering rack boot bands.



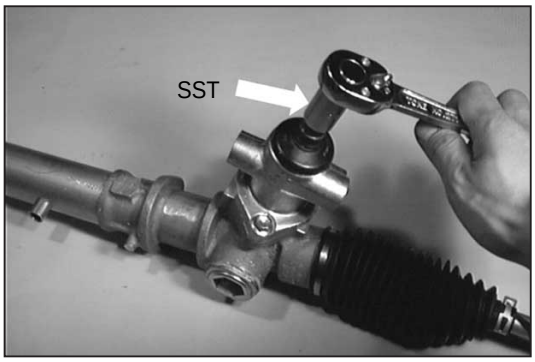
JSR00123-00117

24. Install the clips to the steering rack end sub-assembly.
    CAUTION:
    - Make sure that the knob of the clip comes in the range indicated in the figure when installing the clip.



JSR00124-00118

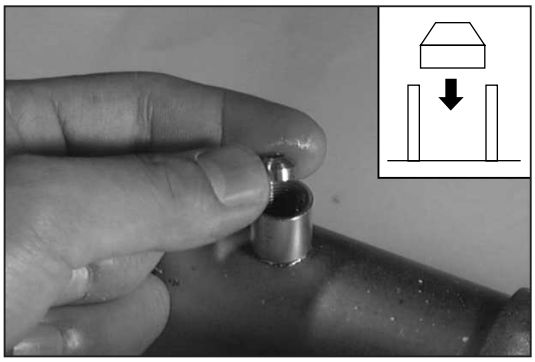
25. After the steering rack boots have been installed, move the steering rack in the full stroke several times using the following SST. Ensure that the boots exhibit no abnormal dent or bulge.
    Also, ensure that the boots are not caught-in.
    SST: 09616-00010-000



JSR00125-00119

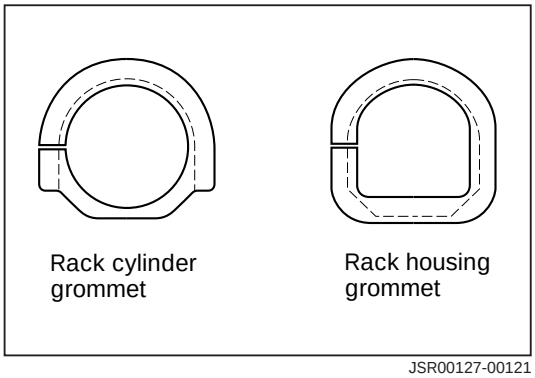
26. Install the union seats into the rack housing tube.
    NOTE:
    - Be very careful not to insert the union seat in a wrong direction.

27. Install the right and left turn pressure tubes to the rack housing cylinder, using the following SST.
    SST: 09633-00020-000
    Tightening Torque: 19.6 - 29.4 N·m (2.0 - 3.0 kgf-m)



JSR00126-00120

28. Install the grommet to the steering rack housing.
29. Install the bracket to the grommet.
    NOTE:
    - The rack housing and rack cylinder grommets differ in shape.
    - Hence, be sure to assemble the grommets correctly.



JSR00127-00121

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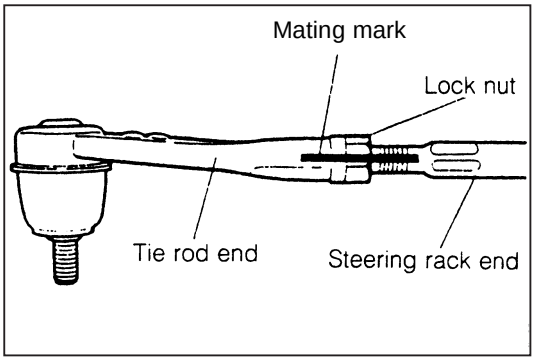
30. Install the tie rod ends to the steering rack ends according to the mating marks that were put during the removal, except for the installation of a new part.
Tighten the nut to the specified torque.
Tightening Torque: 59.8 - 89.2 N·m (6.1 - 9.1 kgf-m)

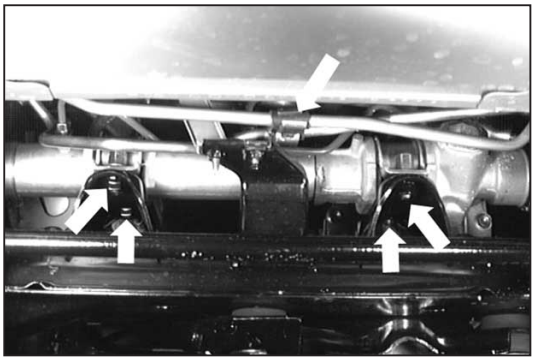
NOTE:
- Make sure that the tie rod end is installed in the correct direction.



JSR00128-00122

INSTALLATION

1. Attach the power steering gear assembly to the front suspension cross member sub-assembly from the right.
(On left-hand drive vehicles, attach the power steering gear assembly from the left side.)
Tightening Torque: 53.9 - 81.4 N·m (5.5 - 8.3 kgf-m)


JSR00129-00123

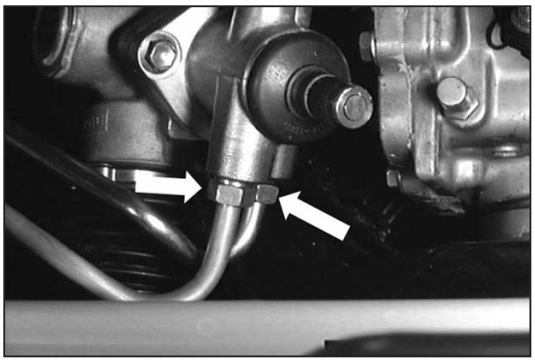
2. Install the bracket retaining the pressure feed hose and return tube.
Tightening Torque: 4.4 - 10.3 N·m (0.45 - 1.05 kgf-m)

3. Attach the tie-rod end to the steering knuckle and tighten the nut.
Tightening Torque: 39.2 - 53.9 N·m (4.0 - 5.5 kgf-m)

JSR00130-00124

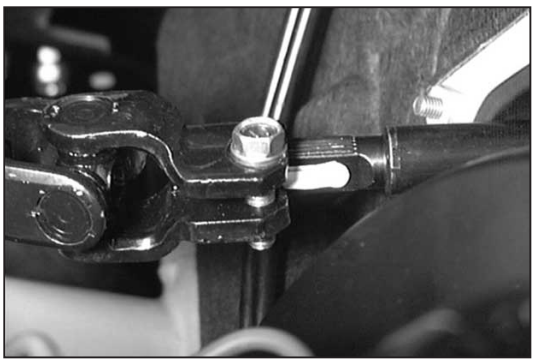
4. Install the clip.

5. Install the engine undercover.
6. Install the front wheel.
7. Jack down the vehicle.
8. Connect the return tube and pressure feed hose at the union section of the steering gear assembly.
Tightening Torque: 39.2 - 49.0 N·m (4.0 - 5.0 kgf-m)


JSR00131-00125

9. Connect the intermediate shaft between the steering column shaft and the steering gear pinion.
Tightening Torque: 24.5 - 34.3 N·m (2.5 - 3.5 kgf-m)

NOTE:
- Make sure that the non-spline section of the steering column shaft is aligned with the opening section of the universal joint of the intermediate shaft during the assembly.


JSR00132-00126

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10. Fill the power steering fluid. (See page SR–3.)
11. Perform the air bleeding. (See page SR–4.)
12. Adjust the wheel alignment. (Refer to the FS section.)

JSR00133-00000

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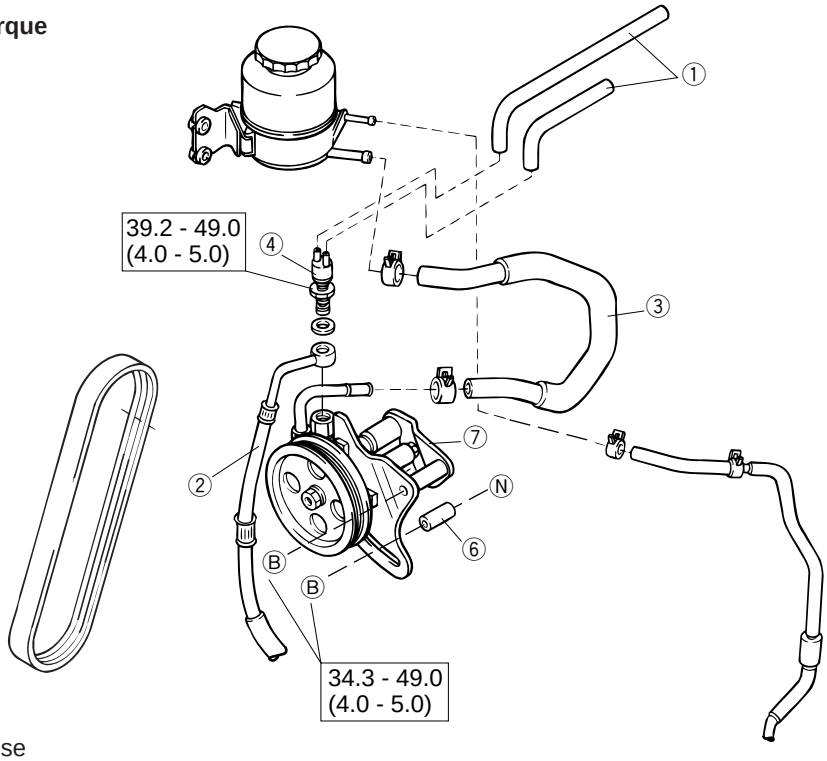
VANE PUMP

COMPONENTS

: Tightening torque
Unit : N·m (kgf-m)

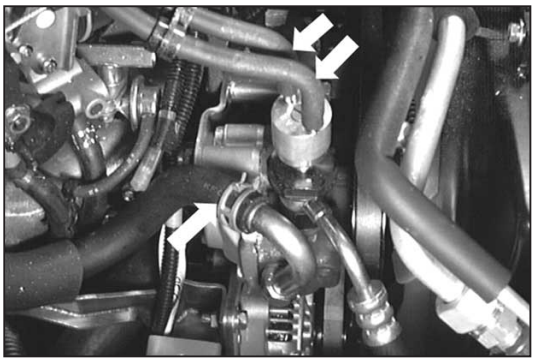


① Vacuum hose
② Pressure feed hose
③ Return tube
④ Air control valve
⑤ Drive belt
⑥ Collar
⑦ Vane pump assembly

JSR00134-00127

REMOVAL

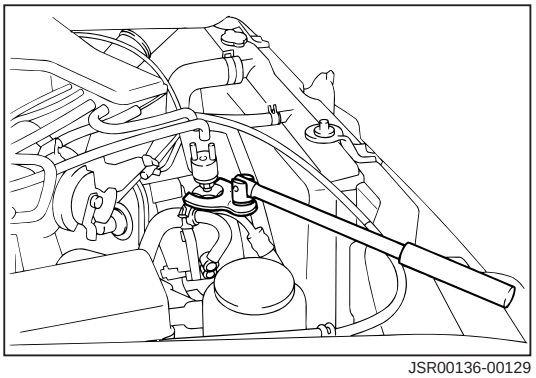
1. Drain the power steering fluid. (See page SR–3.)
2. Disconnect the return tube from the suction pipe.
3. Disconnect the vacuum hose from the air control valve.



JSR00135-00128

4. Remove the union bolt with the air control valve from the vane pump, using the following SST.
   SST: 09617-22030-000

5. Remove the pressure feed hose.



JSR00136-00129

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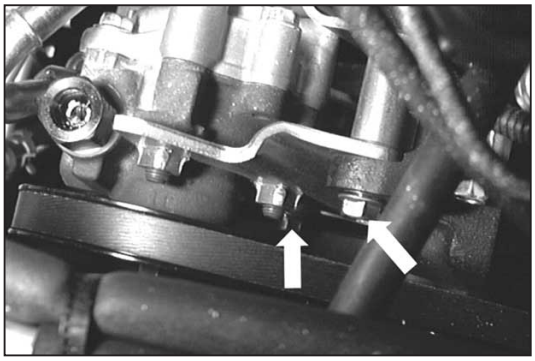
6. Remove the adjusting bolt, collar and plate nut.
   NOTE:
   - While removing the adjusting bolt, be very careful not to drop the spacer and the plate nut on the floor.

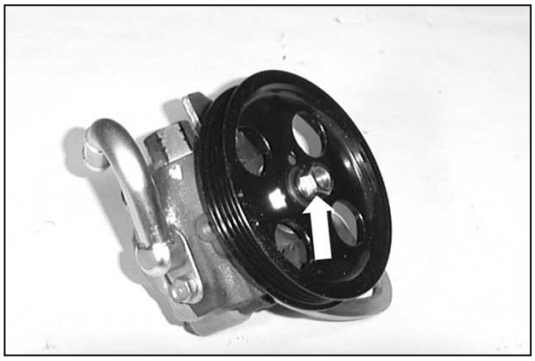
7. Remove the vane pump mounting bolt.
8. Remove the vane pump drive belt.
9. Remove the vane pump.



JSR00137-00130

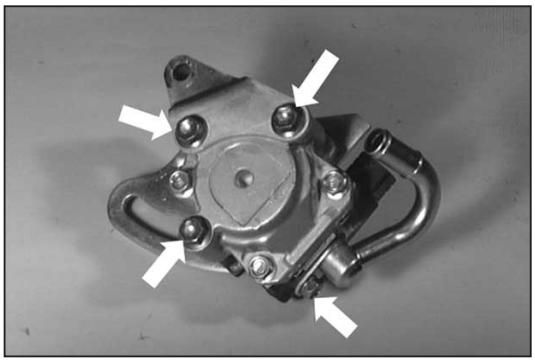
DISASSEMBLY

1. Remove the pulley from the vane pump.



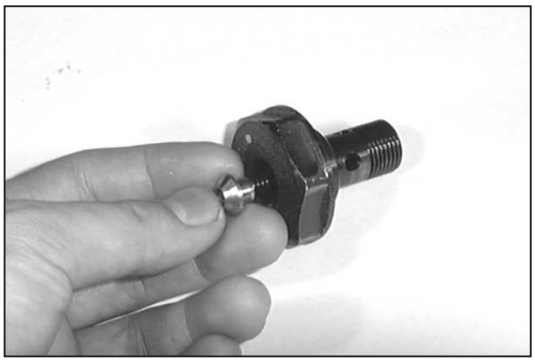
JSR00138-00131

2. Remove the bracket from the vane pump.
3. Remove the suction pipe from the vane pump.
4. Remove the O-ring from the suction pipe.



JSR00139-00132

5. Remove the air control valve from the union bolt.
6. Remove the union seat from the union bolt.



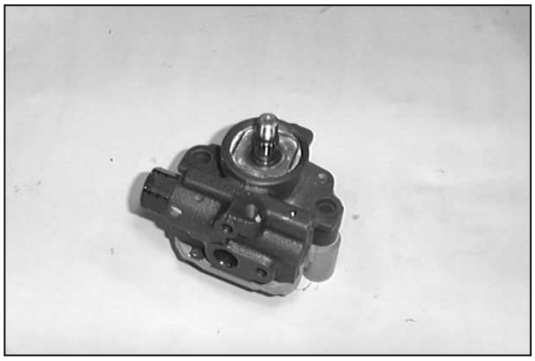
JSR00140-00133

INSPECTION

VANE PUMP

Check that the external section exhibits no major scores and dents.
Check that no oil leakage is present.

If any damage is exists, replace the damage part with now one.



JSR00141-00134

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AIR CONTROL VALVE

Check that the external section exhibits no major scores and dents.
For operation check, see page SR–7.

If any damage is exists, replace the damage part with new one.

JSR00142-00135

VANE PUMP PULLEY

Check that the external section exhibits no major scores and dents.

If any damage is exists, replace the damage part with new one.

JSR00143-00136

SUCTION PIPE

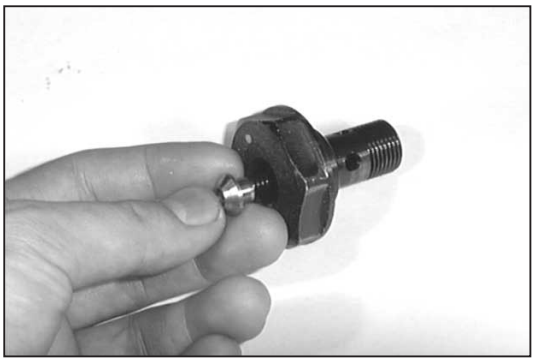
Check the suction pipe for scores and rapture.

If any damage is exists, replace the damage part with new one.

JSR00144-0000137

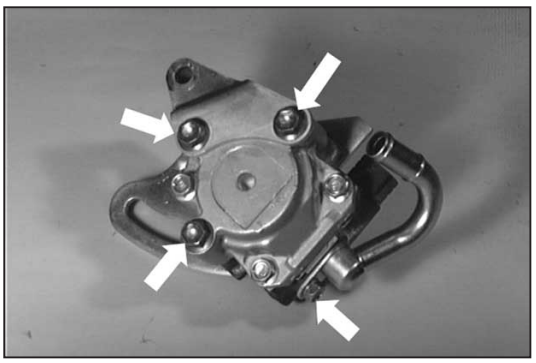
ASSEMBLY

1. Install the union seat to the union bolt.
   NOTE:
   - Make sure that the union seat be installed in a correct direction.



JSR00145-00138

2. Install the air control valve to the union bolt.
   Tightening Torque : 32 - 42 N·m (3.2 - 4.2 kgf-m)
3. Install the O-ring to the suction pipe.
4. Install the suction pipe to the vane pump.
   Tightening Torque: 10 - 16 N·m (1.0 - 1.6 kgf-m)
5. Install the bracket to the vane pump.
   Tightening Torque: 34 - 52 N·m (3.52 - 5.28 kgf-m)



JSR00146-00139

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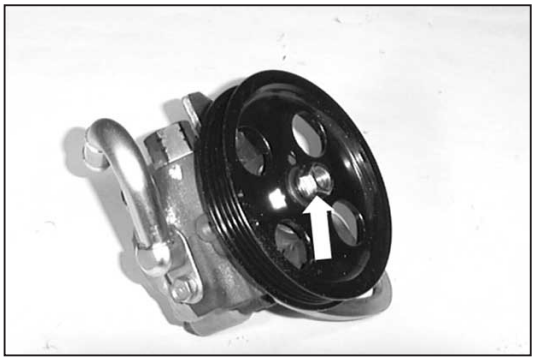
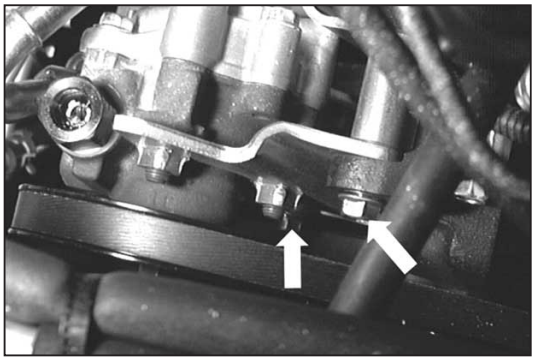
6. Install the pulley to the vane pump.
   Tightening Torque: 33 - 53 N·m (3.4 - 5.4 kgf-m)



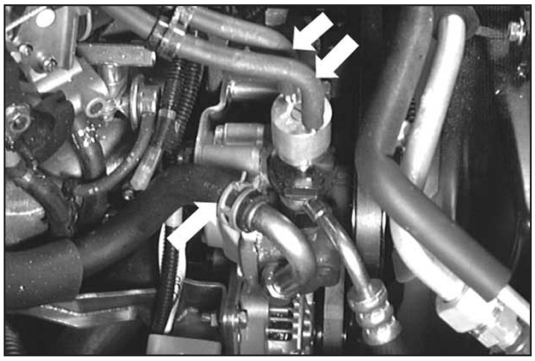
JSR00147-00140

7. Temporarily install the vane pump with the vane pump mounting bolt.
8. Install the vane pump drive belt. (Refer to the SR–2.)
9. Temporarily tighten the adjusting bolt.
10. Adjust the belt tension. Then, tighten the adjusting bolt and vane pump mounting bolt.
    (For the adjusting method of the belt tension, see page SR–3.)
    Tightening Torque:
    Adjusting bolt: 34.3 - 49.0 N·m (3.5 - 5.0 kgf-m)
    Mounting bolt: 34.3 - 49.0 N·m (3.5 - 5.0 kgf-m)



JSR00148-00141

11. Connect the return tube to the suction pipe.
12. Connect the pressure feed hose by means of the union bolt with the air control valve, using the following SST.
    SST: 09617-22030-000
    Tightening Torque: 39.2 - 49.0 N·m (4.0 - 5.0 kgf-m)
13. Connect the vacuum hose to the air control valve.



JSR00149-00142

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SERVICE SPECIFICATIONS

Item		Specified value	Remarks
Vane pump drive belt tension	When new belt is used:	8 - 11 mm	When pushed with a force of 98 N
	When used belt is used:	11 - 14 mm	
Oil pressure	Hydraulic pressure generated by vane pump	$5.4^{+0.5}_{0}$ MPa (55^{+5}_{0} kgf/cm^2) at 500 rpm	With oil pressure gauge valve closed
	Difference in pressure under unloaded state	Within 490 kPa (5 kgf/cm^2)	Pressure difference that occurs between 1000 rpm and 3000 rpm of engine speed
	Hydraulic pressure at gear housing	$5.4^{+0.5}_{0}$ MPa (55^{+5}_{0} kgf/cm^2) at 500 rpm	With steering gear in fully-locked state
Turning effort of steering wheel with vehicle in stationary state		Not to exceed 5.4 N·m (0.55 kgf-m)	
Pre-load of steering gear input shaft		0.78 - 1.57 N·m (8 - 16 kgf-cm)	While rotating:

JSR00150-00000

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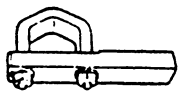
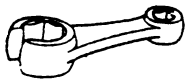
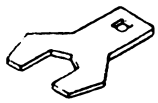
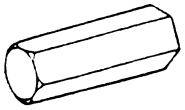
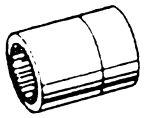
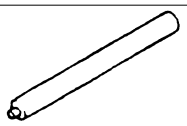
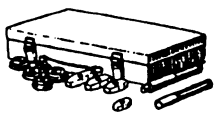
SSTs

Shape	Part No.	Part name
	09611-87701-000	Tie-rod end puller
	09990-87704-000	P/S pressure gauge
	09612-00012-000	Rack and pinion steering rack housing stand
	09633-00020-000	Power steering hose nut wrench
	09922-10010-000	Steering rack end wrench
	09617-22030-000	Worm bearing adjusting screw lock nut wrench
	09612-10020-000	Hexagon wrench
	09616-00010-000	Steering pinion bearing adjusting socket
	09631-12020-000	Handle
	09631-20090-000	Cylinder end stopper nut wrench
	09608-30012-000	Front hub and drive pinion bearing set
	09608-0420-000	Handle
	09631-00020-000	Handle

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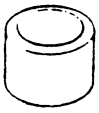
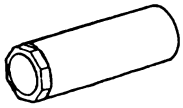
Shape	Part No.	Part name
	09630-24013-000	Steering rack oil seal tool set
	09620-24030-000	Valve cap bearing replacer
	09631-20070-000	Seal ring guide
	09631-20081-000	Seal ring tool
	09631-20060-000	Bearing guide nut wrench
	09631-22070-000	Oil seal replacer
	09631-12071-000	Steering rack oil seal test tool
	09612-87101-000	Rack tube cover

JSR00151-00143

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TIGHTENING TORQUE

Components	N·m	kgf-m
Steering wheel × Steering shaft	25.7 - 41.2	2.8 - 4.2
Steering Wheel × Steering wheel pad (Air bag type)	5.2 - 9.5	0.53 - 0.97
Steering column × Instrument panel reinforthment (bolt)	14.7 - 21.6	1.5 - 2.2
Steering column × Instrument panel reinforthment (Nut)	9.8 - 15.7	1.8 - 1.6
Dust cover retainer × Dash panel	3.9 - 6.9	0.4 - 0.7
Steering column × Intermediate shaft	24.5 - 34.3	2.5 - 3.5
Inter mediate shaft × Steering gear	24.5 - 34.3	2.5 - 3.5
Steering rack housing × Control valve housing	14.7 - 21.6	1.5 - 2.2
Turn pressure tube × Control valve housing	19.6 - 29.4	2.0 - 3.0
Turn pressure tube × Steering rack cylinder	19.6 - 29.4	2.0 - 3.0
Rack guide housing × Lock nut	59 - 79	6.0 - 8.0
Pressure feed hose × Control valve housing	39.2 - 49.0	4.0 - 5.0
Control valve housing × Bearing guide nut	19.6 - 29.4	2.0 - 3.0
Steering rack × Rack end	88 - 118	9.0 - 12.0
Rack end × Tie rod end	59.8 - 89.2	6.1 - 9.1
Tie-rod end × Steering knuckle	39.2 - 53.9	4.0 - 5.5
Vane pump × Pump stay	34 - 52	3.52 - 5.28
Vane pump × Pulley	33 - 53	3.4 - 5.4
Vane pump × Air control valve	39.2 -49.0	4.0 - 5.0
Air control valve × Union bolt	32 - 42	3.2 - 4.2
Vane pump bracket × Engine	34.3 - 49.0	3.5 - 5.0
Drive belt adjusting bolt	34.3 - 49.0	3.5 - 5.0
Steering gear assembly × Front suspension cross member sub-assembly	53.9 - 81.4	5.5 - 8.3

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BODY

ALIGNMENT ADJUSTMENTS ..... BO– 2
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REAR BUMPER BO–13
FENDER LINER BO–16
HOOD & HOOD LOCK CONTROL CABLE BO–18
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EXHAUST PIPE BO–93
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JBO00001-00000

BO

NOTE:
- When the tightening torque values are not given, refer to the tightening torque table for general standard bolts to find the required tightening torque values.

NO. 9710-JE

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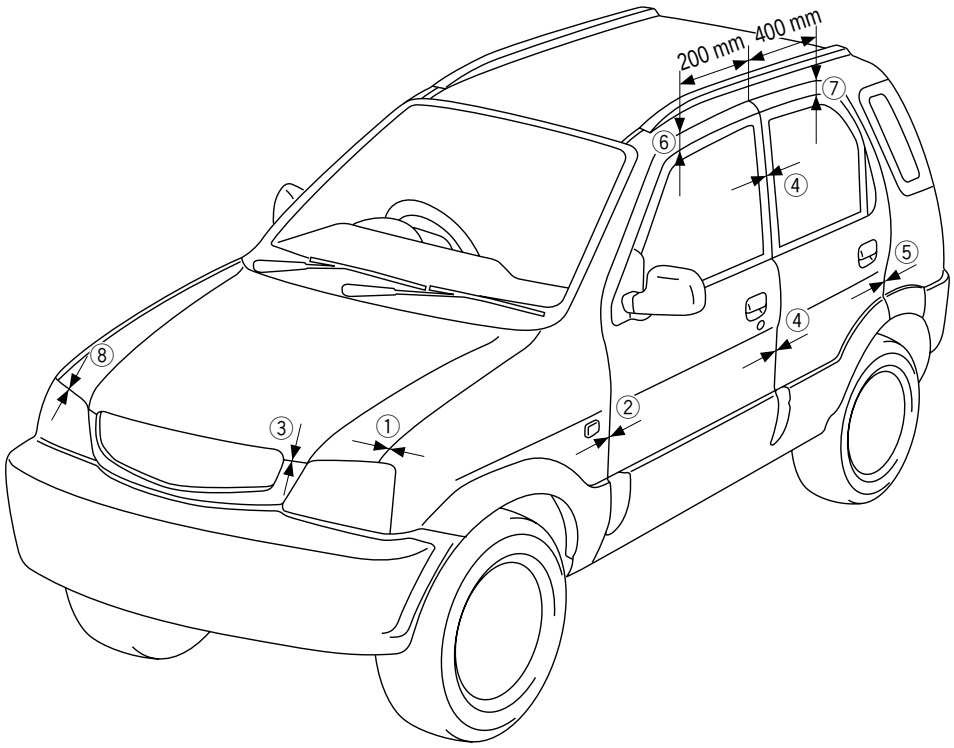
ALIGNMENT ADJUSTMENTS



① Specified value
Gap: 4.4 ± 1.5 mm
Lateral deviation: Not to exceed 1.5 mm
Difference between right and left sides:
Not to exceed 1.5 mm

② Specified value
Gap: 4.7 ± 1.5 mm
Lateral deviation: Not to exceed 1.5 mm
Difference in height: 0 ± 1.5 mm

③ Specified value
Gap: 7.6 ± 1.5 mm
Difference between right and left sides:
Not to exceed 2.0 mm
Difference in height: 2.9 ± 1.5 mm

④ Specified value
Gap: 5.5 ± 1.5 mm
Lateral deviation: Not to exceed 1.5 mm
Difference in height: 0 ±1.5 mm

⑤ Specified value
Gap: 4.7 ± 1.5 mm
Lateral deviation: Not to exceed 1.5 mm
Difference in height: 0 ± 1.5 mm

⑥ Specified value
Gap: 5.2 ± 1.5 mm
Lateral deviation: Not to exceed 1.5 mm
Difference in height: 5.9 ± 1.5 mm

⑦ Specified value
Gap: 5.2 ± 1.5 mm
Lateral deviation: Not to exceed 1.5 mm
Difference in height: 7.2 ± 1.5 mm

⑧ Specified value
Gap: 7.8 ± 1.5 mm
Difference between right and left sides:
Not to exceed 2.0 mm
Difference in height: 5.2 ± 1.5 mm

JBO00002-00001

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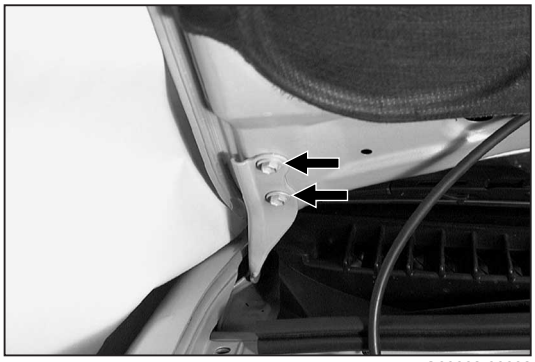
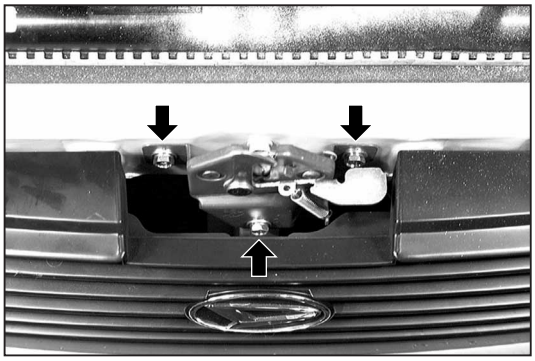
1. Gap adjustment
   Engine hood
   (1) Loosen the bolts attaching the engine hood to the engine hood hinge and adjust the engine hood alignment to the specified value mentioned below.
   Specified Value:
   Gap: 4.4 ± 1.5 mm
   Difference Between Right and Left Sides:
   Not to exceed 1.5 mm
   Lateral Deviation: Not to exceed 1.5 mm


JBO00003-00002

   (2) Tighten the engine hood attaching bolts properly.

2. Adjustment of difference in height
   (1) Loosen the bolts attaching the hood lock to the radiator supports.
   (2) Adjust the hood lock attaching position to adjust the difference in height to the specified value.
   At the same time adjust the height of the hood cushion rubber so that the clearance between the engine hood and the cushion rubbers may become zero and the height at the right and left sides may become the same.
   Specified Value of Difference in Height:
   Not more than 1.5 mm


JBO00004-00003

ADJUSTMENT OF FRONT DOOR AND REAR DOOR

1. Gap adjustment
   (1) Front door
   ① Loosen the attaching bolts of the door hinges, using the following SST.
   SST: 09812-00010-000

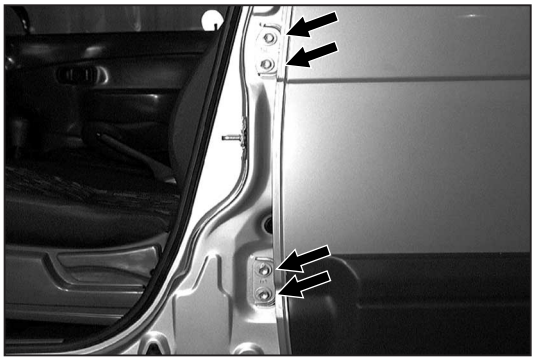
JBO00005-00004

   CAUTION:
   • Never scratch the painted surface of the body during the operation.

   ② Perform the adjustment by changing the attaching position of the front door hinges to the body.
   ③ Tighten the attaching bolts of the door hinge, using the following SST.
   SST: 09812-00010-000

   ④ Adjust the door lock striker, as required.

   (2) Rear door
   ① Loosen the attaching bolts of the door hinge.
   ② Perform the adjustment by changing the attaching position of the rear door hinges to the body.
   ③ Tighten the attaching bolts of the door hinge.
   ④ Adjust the door lock striker, as required.


JBO00006-00005

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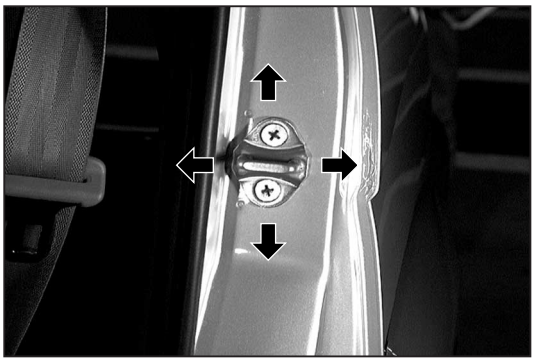
2. Adjustment of difference in height
   (1) Front/Rear door hinge side.
      ① Loosen the bolts attaching the door to the door hinges.
      ② Perform the adjustment by changing the attaching position of the front door to the door hinges.
      ③ Tighten the bolts attaching the door to the door hinge.

JBO00007-00006

JBO00000-00007

   (2) Front/Rear door lock striker side.
      ① Loosen the screws of the lock striker.
      ② Perform the adjustment of the lock striker by tapping it lightly with a hammer to change the attaching position of the lock striker.
      ③ Tighten the attaching bolts of the lock striker.


JBO00008-00008

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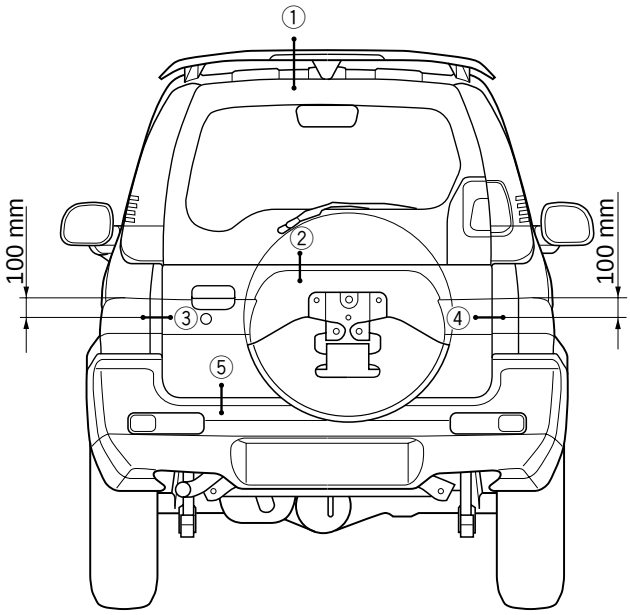
ADJUSTMENT OF BACK DOOR ALIGNMENT



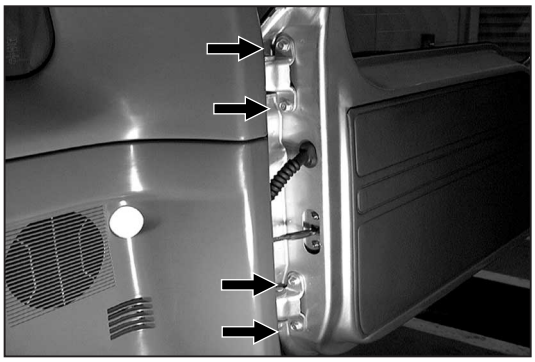
① Specified value
Gap: Door hinge section 10.4 ± 2.0 mm
Lateral deviation: Not to exceed 2.0 mm
Difference in height: 1.8 ± 2.0 mm
② Specified value
Gap: 2.0 ± 1.5 mm
Lateral deviation: Not to exceed 1.5 mm
Difference in height: 1.5 ± 1.5 mm
③ Gap: 6.8 ± 1.5 mm
Lateral deviation: Not to exceed 1.5 mm
Difference in height: 0 ± 1.5 mm
④ Gap: 6.8 ± 1.5 mm
Lateral deviation: Not to exceed 1.5 mm
Difference in height: 0 ± 1.5 mm
⑤ Gap: 7.3 ± 2.0 mm
Lateral deviation: Not to exceed 2.0 mm

JBO00009-00009

1. Gap Adjustment
   (1) Loosen the attaching bolts of the hinge to the back door.
   (2) Perform the adjustment by changing the attaching position of the door panel.
   If any difficulty is encountered in adjusting the attaching position of the back door due to lack of adjusting allowance, perform the adjustment by loosening the nuts attaching the back door hinge to the vehicle shell after the three grommets of the roof head lining are removed.

   NOTE:
   • Be very careful not soil or bend the roof head lining during the loosening of the nuts attaching the hinge to the vehicle shell.

   (3) Tighten the attaching bolts of the hinge to the back door.



JBO00010-00010

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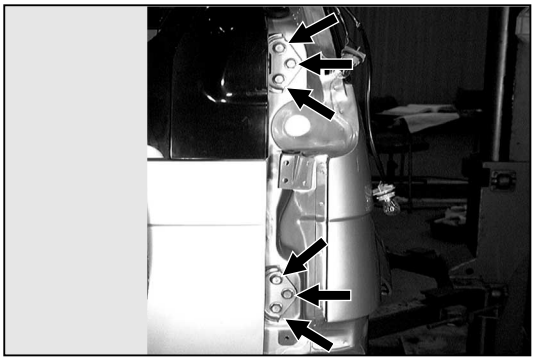
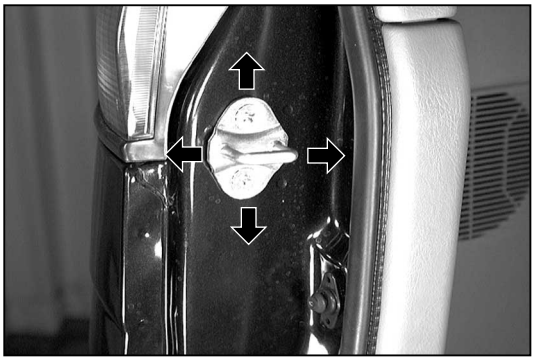
2. Adjustment of difference in height
   (1) Remove the rear bumper.
   (Refer to the rear bumper section.)
   (2) Remove the right hand side rear combination lamp.

   (3) Remove the rear bumper filler by removing the attaching bolts.
   (4) Loosen the attaching bolts of the back door lock striker.
   (5) Adjust the difference in height by changing the attaching position of the back door lock striker.
   (6) Tighten the attaching bolts of the back door lock striker.


JBO00011-00011

3. Back door lock striker side
   (1) Loosen the screws of the lock striker.
   (2) Perform the adjustment of the lock striker by tapping it lightly with a hammer to change the attaching position of the striker.
   (3) Tighten the attaching bolts of the striker.


JBO00012-00012

4. Adjustment of back door lower female stopper
   (1) Loosen the attaching bolts of the back door lower female stopper to just only move the back door lower female stopper.
   (2) Close the back door slowly.
   (3) Open the back door slowly.
   (4) Tighten the attaching bolts of the back door down female stopper.
   (5) Ensure that the back door down female stopper is not interfered with the down male stopper by repeating the opening and closing operations of the back door.

JBO00013-00013

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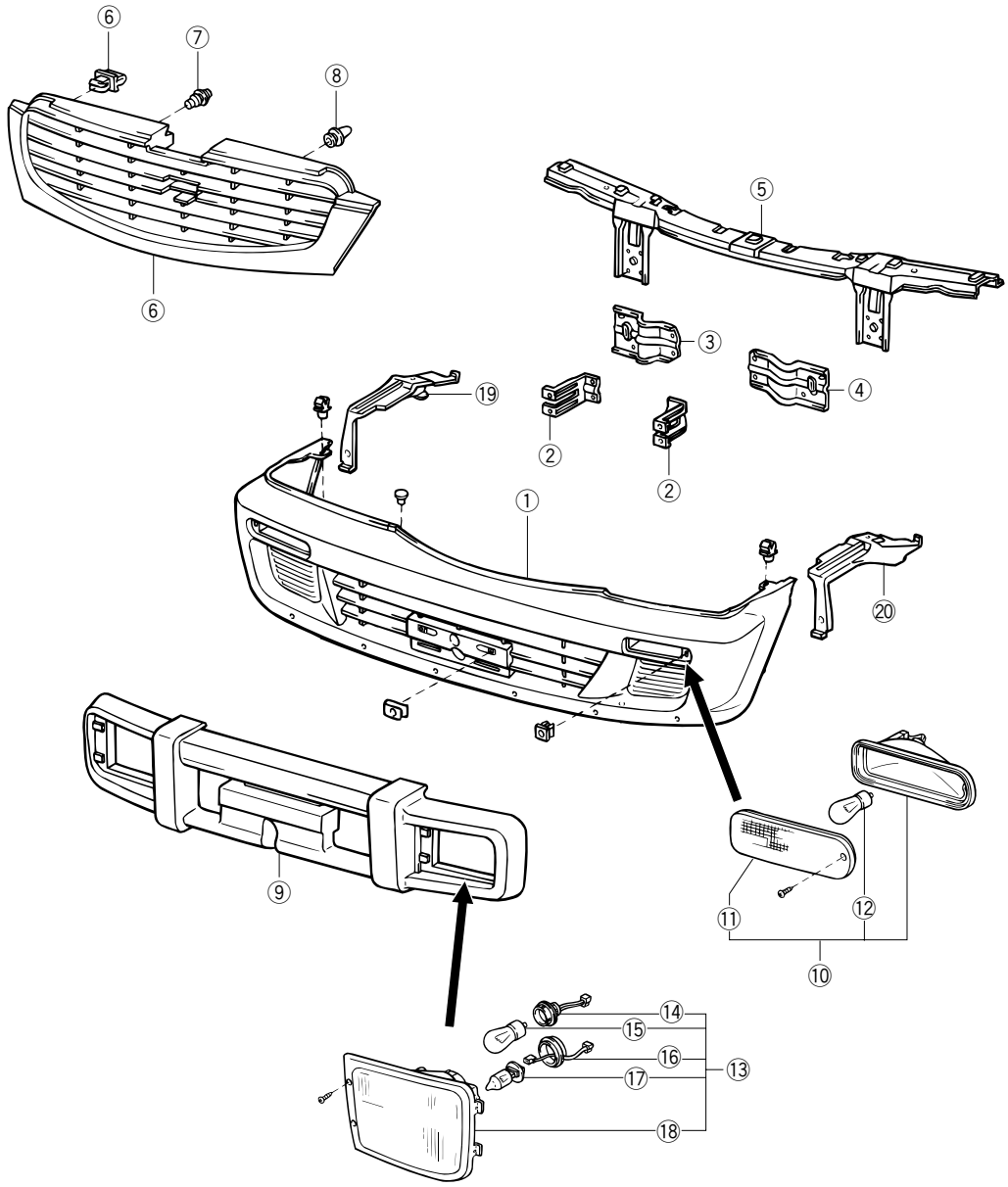
FRONT BUMPER

COMPONENTS



① Front bumper cover
② Front bumper guard base No. 1 bracket
③ Front bumper guard right bracket
④ Front bumper guard left bracket
⑤ No. 1 clip
⑥ Radiator grill assembly
⑦ Retainer
⑧ Grill retainer
⑨ Front bumper guard garnish subassembly
⑩ Front turn signal lamp assembly
⑪ Front turn signal lamp lens
⑫ Bulb
⑬ Front fog & turn lamp assembly
⑭ Turn cord
⑮ Bulb
⑯ Fog cord
⑰ Bulb
⑱ Front fog & turn lamp lens
⑲ Front bumper right bracket
⑳ Front bumper left bracket

JBO00014-00014

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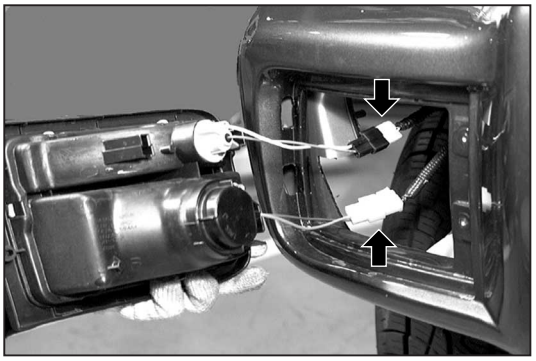
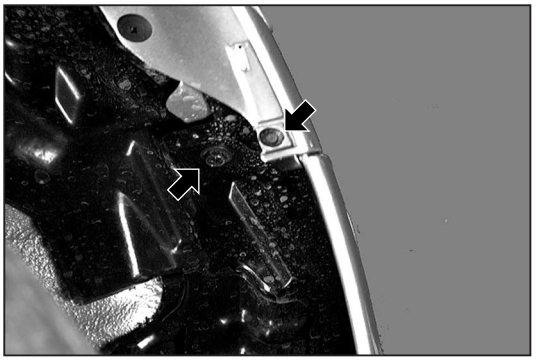
REMOVAL

1. Removal of front fog & turn signal lamp assembly (Only for front bumper guard garnish equipped model.)
   (1) Remove the fog lamp attaching screws.
   (2) Remove the fog lamps by disconnecting its connectors.



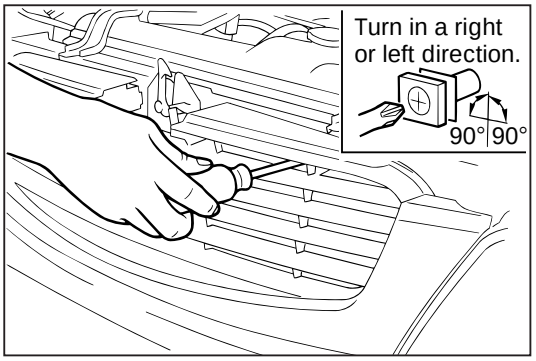
JBO00015-00015

2. Remove the under fender bracket by removing the attaching tapping screw and clip. (Both sides)



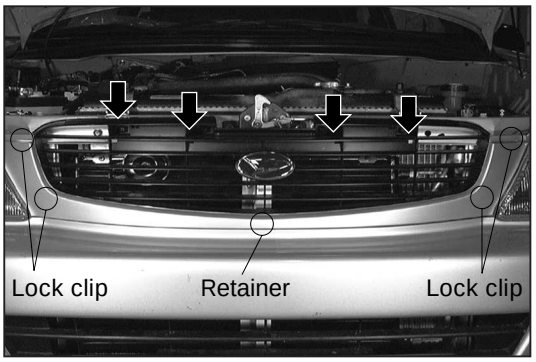
JBO00016-00016

3. Removal of radiator grill
   (1) Turn the clips 90 degrees, using a phillips screwdriver. (Four clips at the upper side of the radiator grill.)



JBO00017-00017

   (2) Remove the radiator grill assembly while unlocking the locking section of the four clips and one retainer.



JBO00018-00018

4. Removal of front turn signal lamps (On model without front bumper guard garnish.)
   (1) Remove the attaching screw of the front turn signal lamps.
   CAUTION:
   • Be very careful not to scratch the lamps during the removal and installation.

   (2) Remove the front turn signal lamp by disconnecting the connector.

JBO00019-00019

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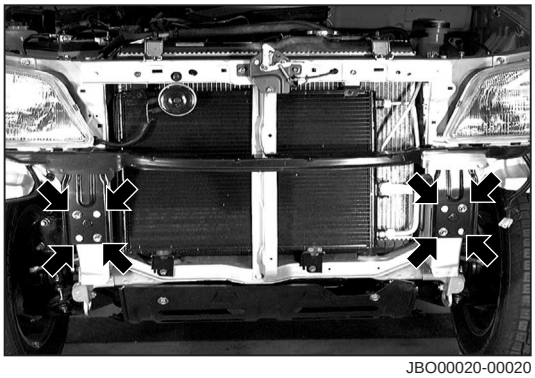
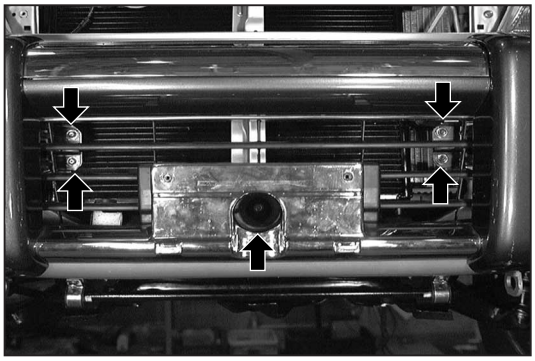
5. Remove the attaching bolts of the front bumper cover. (On model without the front bumper guard garnish.)
6. Remove the front bumper cover. (On model without the front bumper guard garnish.)
7. Remove the front bumper bar reinforcement by removing the attaching bolts. (On model without the front bumper guard garnish.)



JBO00020-00020

8. Remove the front bumper cover by removing the five attaching bolts. (Only model equipped with the front bumper guard garnish.)



JBO00021-00021

9. Remove the front bumper guard garnish by removing the attaching screws. (On model with the front bumper guard garnish.)
10. Remove the front bumper guard base bracket by removing the attaching bolts. (On model with the front bumper guard garnish.)

JBO00022-00022

INSTALLATION

NOTE:

- Basically the installation procedure is reverse to the removal procedure. Therefore, illustrations are not given in this installation procedure. Refer to the illustrations in the removal procedure in cases where any difficulty is encountered.

1. Install the front bumper guard base brackets with the attaching bolts. (On model with the front bumper guard garnish.)
2. Install the front bumper guard garnish to the front bumper cover with the attaching screws. (On model with the front bumper guard garnish.)
3. Install the front bumper cover with the five attaching bolts. (Only model equipped with the front bumper guard garnish.)
4. Install the front bumper bar reinforcement with the attaching bolts. (Only model without the front bumper guard garnish.)
5. Install the front bumper cover with the attaching bolts. (Only model without the front bumper guard garnish.)
6. Installation of front turn signal lamps (Only model without the front bumper guard garnish.)
   (1) Connect the connector of the front turn signal lamps.
   (2) Install the attaching screw of the front turn signal lamps.

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7. Installation of radiator grill
   (1) Ensure that the clips and retainer are installed properly. Also, ensure that no damage exists.
   If any damage exists or the clip or retainer is missing, replace the clips or retainer with a new one.
   (2) Install the radiator grill by connecting the retainer and four clips.
   (3) Lock the clips by turning the head section of the clip, using a phillips screwdriver. (Four portions)
8. Install the under fender bracket by installing the attaching tapping screw and grommet. (Both sides)
9. Installation of front fog & turn signal lamp (Only model equipped with the front bumper guard garnish.)
   (1) Connect the connectors of the wire harness to the fog lamps.
   (2) Install the fog lamp with the attaching screws.

JBO00023-00000

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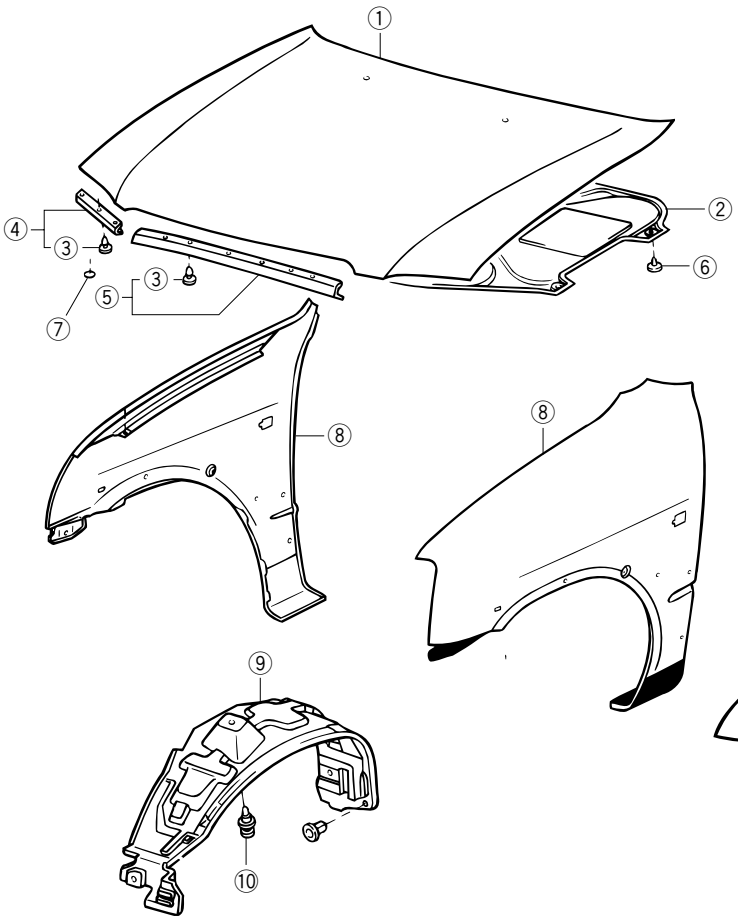
FRONT FENDER

COMPONENTS

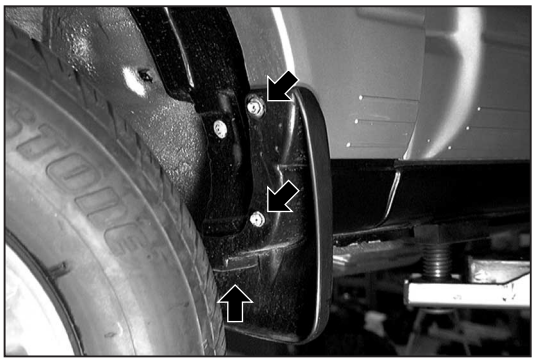


① Hood subassembly
② Hood silencer
③ Clip
④ Headlamp cover to hood seal (R, L)
⑤ Clip
⑥ Hood to front end panel seal
⑦ Hood front protector
⑧ Front fender subassembly (R, L)
⑨ Front fender liner
⑩ Clip
⑪ Over fender

JBO00024-00023

REMOVAL

1. Remove the front bumper cover.
   (Refer to the front bumper section.)
2. Remove the front mudguard by removing the three attaching bolts.
3. Remove the front fender liner attaching screw grommets.
   (Refer to the front fender liner section.)



JBO00025-00024

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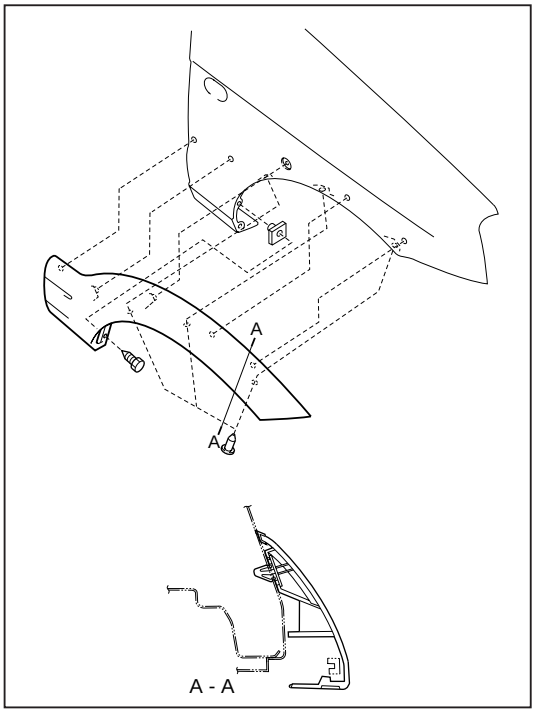
4. Remove the over fender from the fender panel by disconnecting the retainers while retracting the lock section, using a nosepliers or the like.
5. Remove the side turn signal lamp.

6. Remove the front fender subassembly by removing the five attaching bolts.



JBO00026-00025

INSTALLATION

NOTE:
- Basically the installation procedure is reverse to the removal procedure. Therefore, illustrations are not given in this installation procedure. Refer to the illustrations in the removal procedure in cases where any difficulty is encountered.

1. Install the front fender subassembly with the attaching bolts and tighten them properly.
2. Install the side turn signal lamp.

3. Installation of over fender
   (1) Ensure that the retainers are installed properly and there is no damage.
   If any damage exists, replace the retainer with a new one.
   (2) Install the over fender to the front fender by connecting the retainers on the over fender to the front fender.
   (3) Ensure that the retainers are locked properly.
4. Install the front fender liner. (Refer to the fender liner section.)
5. Install the front mudguard with the three attaching bolts.
6. Install the front bumper. (Refer to the front bumper section.)

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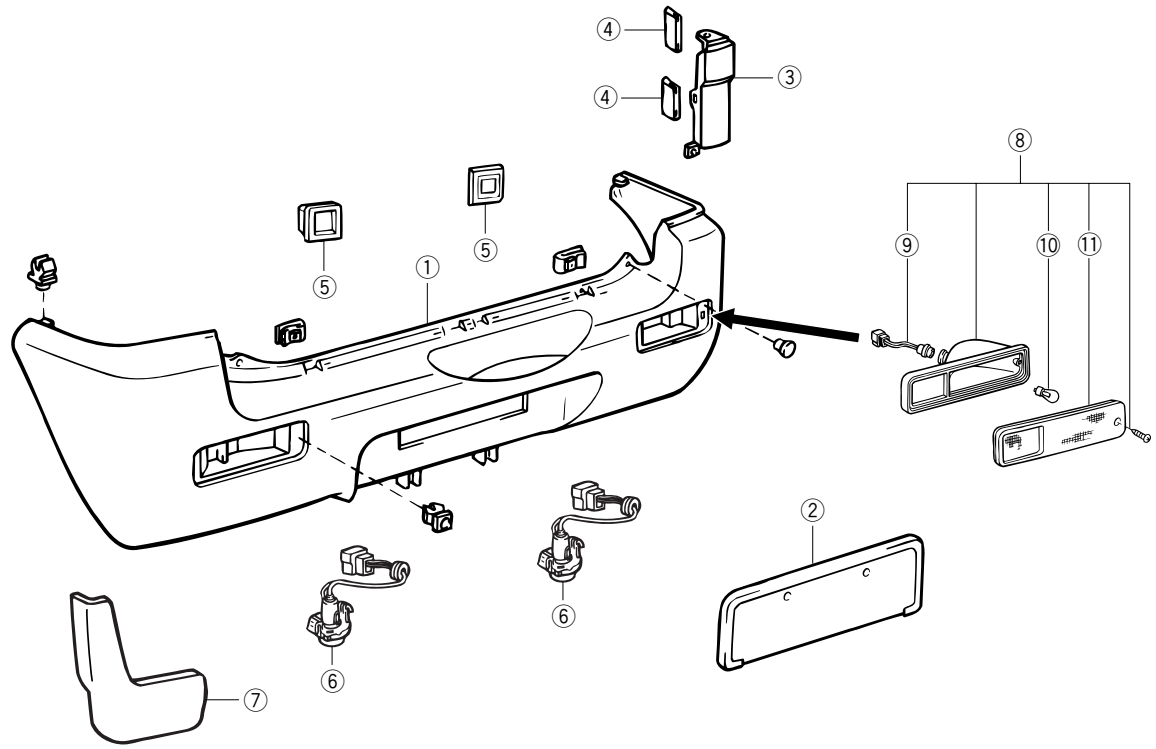
REAR BUMPER

COMPONENTS



① Rear bumper cover
② License plate bracket base
③ Rear bumper filler
④ Rear bumper right protector
⑤ Lower back panel cover
⑥ License plate lamp assembly
⑦ Quarter panel mudguard subassembly
⑧ Back-up lamp and/or rear fog lamp
⑨ Rear combination lamp socket
⑩ Bulb
⑪ Rear lamp lens

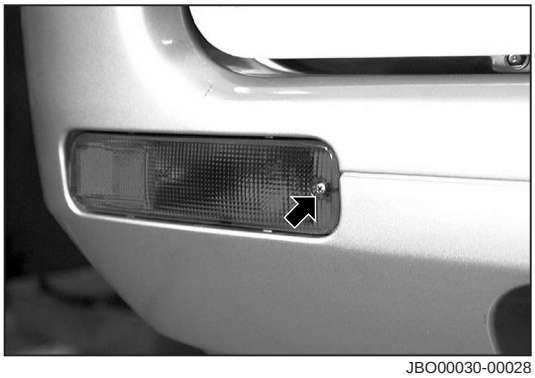
JBO00028-00026

REMOVAL

1. Remove the rear bumper filler and quarter panel mudguard (when equipped) by removing the attaching screw grommets.
2. Remove the rear bumper cover attaching bolt. (Both sids)

JBO00029-00027

3. Removal of back-up lamp(s) and rear fog lamp (when equipped)
   (1) Remove the attaching screw.
   (2) Remove the back-up lamp assembly(s) and rear fog lamp (when equipped) by disconnecting their connector.



JBO00030-00028

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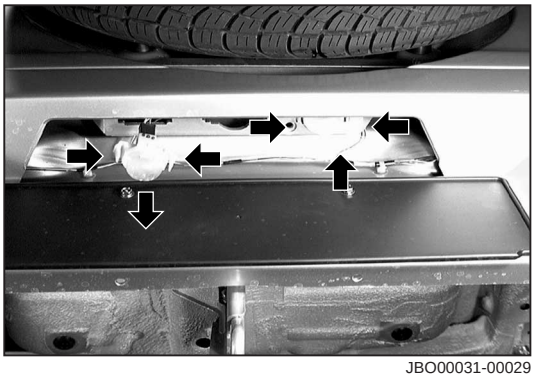
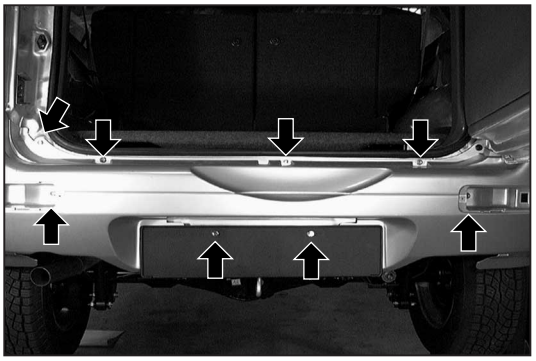
4. Remove the license plate lamps by retracting the lock sections of the license plate lamps from the rear bumper cover.
5. Disconnect the license plate lamps from the connectors.



JBO00031-00029

6. Remove the rear bumper cover and license plate bracket base (when equipped) by removing the eight attaching bolts.



JBO00032-00030

7. Remove the lower back panel cover and air vent. (If necessary.)

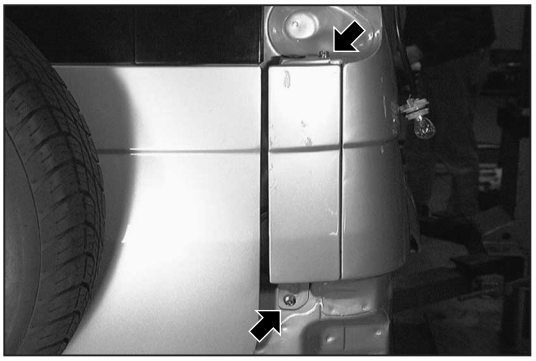
JBO00033-00031

8. Removal of rear combination lamp

   (1) Remove the two attaching bolts and one screw.
   (2) Remove the rear combination lamp by disconnect the connector of the wire harness.

JBO00034-00032

9. Remove the rear bumper filler by removing the two attaching bolts.



JBO00035-00033

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INSTALLATION

NOTE:

- Basically the installation procedure is reverse to the removal procedure. Therefore, illustrations are not given in this installation procedure. Refer to the illustrations in the removal procedure in cases where any difficulty is encountered.

1. Install the rear bumper filler with the two attaching bolts.
2. Installation of rear combination lamp
   (1) Connect the connector of the wire harness to the rear combination lamp.
   (2) Install the two attaching bolts and one screw.
3. Install the lower back panel cover and air vent. (If it has been removed.)
4. Install the rear bumper cover and license plate bracket base (when equipped) with the eight attaching bolts.
5. Install the rear bumper cover attaching screws to the fender covers and body panel at both sides.
6. Connect the license plate lamps to the connectors.
7. Install the license plate lamp(s) to the rear bumper cover and ensure that the lock section of the license plate lamps is engaged to the rear bumper cover.
8. Install the back-up lamp(s) and rear fog lamp.
   (1) Connect the connector of the wire harness to the back-up lamp(s) and fog lamp (when equipped).
   (2) Install the back-up lamp(s) and fog lamp (when equipped) with the attaching screw.
9. Install the rear bumper filler and quarter panel mudguard with the attaching screw grommets.

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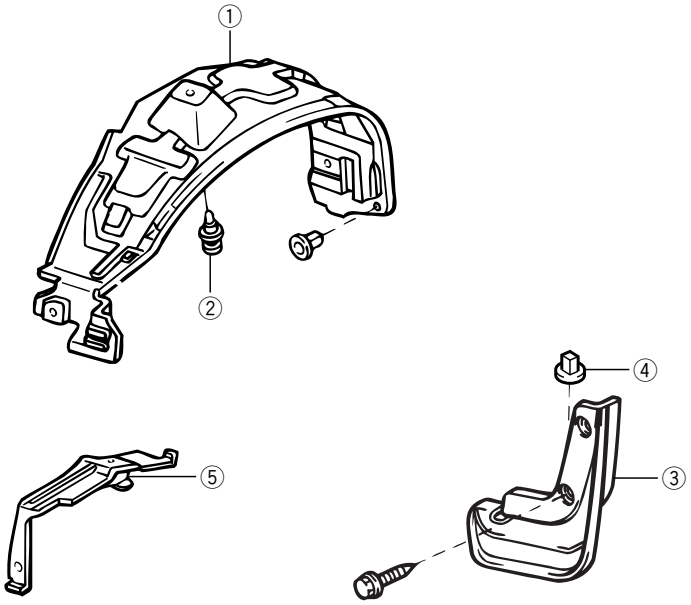
FENDER LINER

COMPONENTS

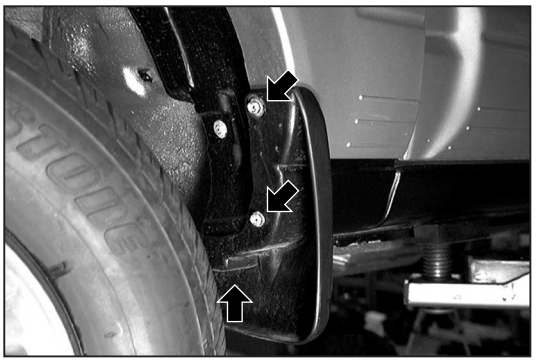


① Front fender liner
② Clip
③ Front fender mudguard subassembly
④ Grommet
⑤ Front bumper bracket

JBO00037-00034

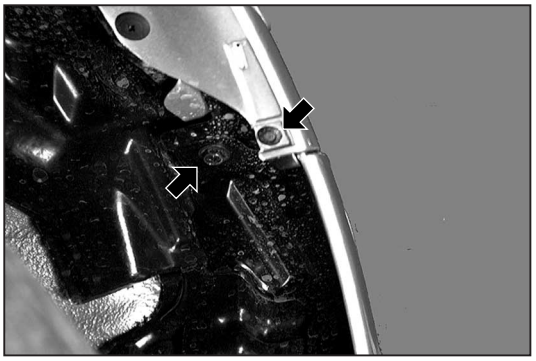
REMOVAL

1. Remove the front fender mudguard subassembly by removing the three attaching bolts.



JBO00038-00035

2. Remove the under fender bracket by removing the grommet and tapping bolt.



JBO00039-00036

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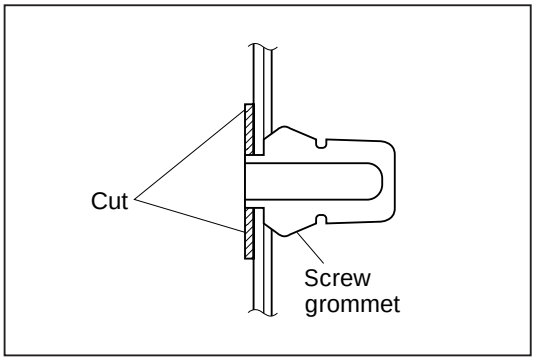
3. Remove the screw grommet for the tapping bolts by cutting off the hem section of the grommet as shown.



JBO00040-00037

4. Remove the ten screw type grommets by screwing them out.
5. Remove the front fender liner.

JBO00041-00038

INSTALLATION

NOTE:

- Basically the installation procedure is reverse to the removal procedure. Therefore, illustrations are not given in this installation procedure. Refer to the illustrations in the removal procedure in cases where any difficulty is encountered.

1. Install the front fender liner with the ten screw grommets.
   NOTE:
   - Insert the fender liner into between the fender panel and the over fender at the three screw grommet installing positions.
   - Install the three screw grommets for tapping bolts to the lower side of the fender liner.
2. Install the under fender bracket with the attaching grommet and tapping screw.
3. Install the front fender mudguard with the three attaching bolts.

JBO00042-00000

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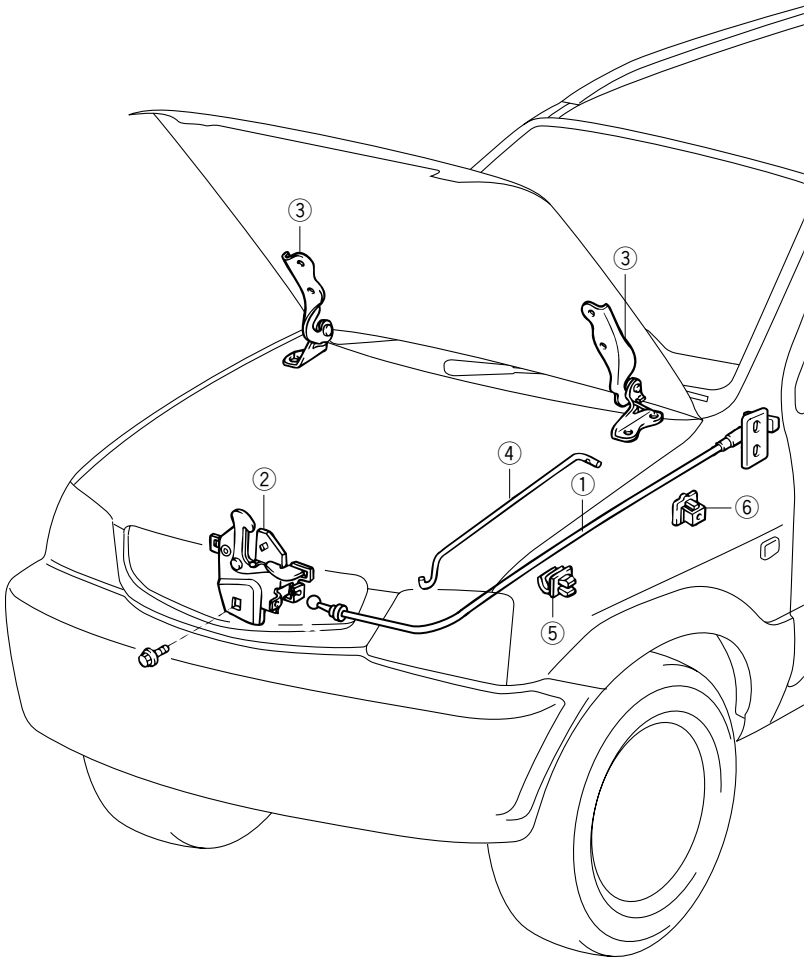
HOOD & HOOD LOCK CONTROL CABLE

COMPONENTS

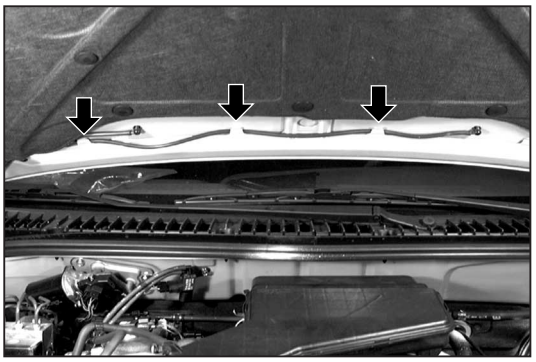


① Hood lock control cable assembly
② Hood lock assembly
③ Hood hinge assembly (R, L)
④ Hood support rod
⑤ Hood support clamp
⑥ Clip

JBO00043-00039

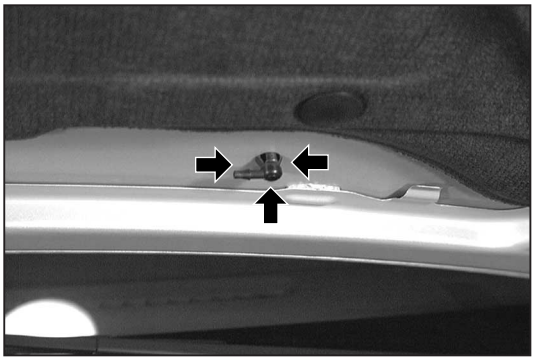
Removal of engine hood

1. Disconnect the window washer hose from the window washer nozzle(s), clamps of the engine hood and clamp.



JBO00044-00040

2. Remove the window washer nozzles from the engine hood by retracting the lock sections of the window washer nozzles.



JBO00045-00041

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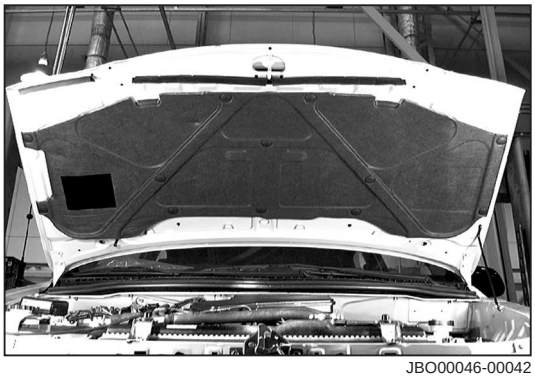
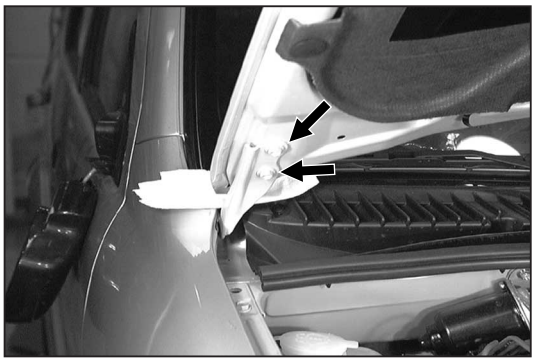
3. Remove the insulator, the hood-to-front end panel seal and the head lamp cover-to-hood seal by removing the attaching retainers.



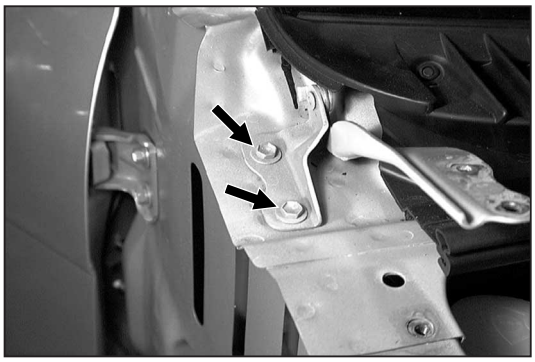
JBO00046-00042

4. Place cloths under the engine hood in order to prevent the painted surface from being damaged.
5. Loosen the attaching bolts of the engine hood which are connected to the hood hinges.
6. Remove the engine hood by removing the attaching bolts while supporting the engine hood securely.



JBO00047-00043

7. Removal of engine hood hinge
   (1) Remove the front fender.
   (Refer to the front fender section.)
   (2) Remove the engine hood hinge by removing the attaching bolts.



JBO00048-00044

Installation of the engine hood

NOTE:

- Basically the installation procedure is reverse to the removal procedure. Therefore, illustrations are not given in this installation procedure. Refer to the illustrations in the removal procedure in cases where any difficulty is encountered.

1. Installation of engine hood hinge
   (1) Install the engine hood hinge with the attaching bolts.
   (2) Install the front fender. (Refer to the front fender section.)
2. Place a piece of cloth under the engine hood in order to prevent the painted surface from being damaged.
3. Install the engine hood with the attaching bolts while supporting the engine hood securely.
4. Tighten the bolts attaching the engine hood to the hood hinges temporarily.
5. Remove the cloth.
6. Perform the adjustment of the engine hood alignment.
7. Install the insulator, the hood-to-front end panel seal and the head lamp cover-to-hood seal with the attaching clips.
8. Install the window washer nozzles to the engine hood.
9. Install the window washer hoses to the engine hood.
10. Connect the window washer hoses to the window washer nozzle. Tighten the attaching bolts of the engine hood which are connected to the hood hinges.

JBO00049-00000

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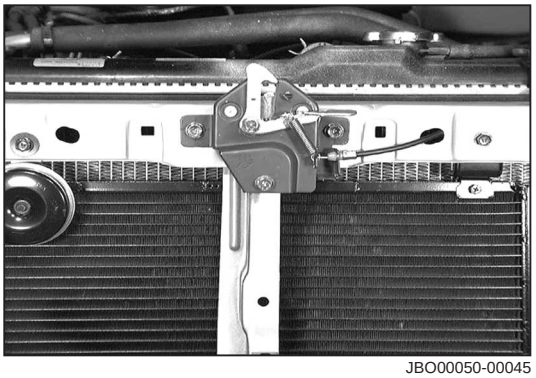
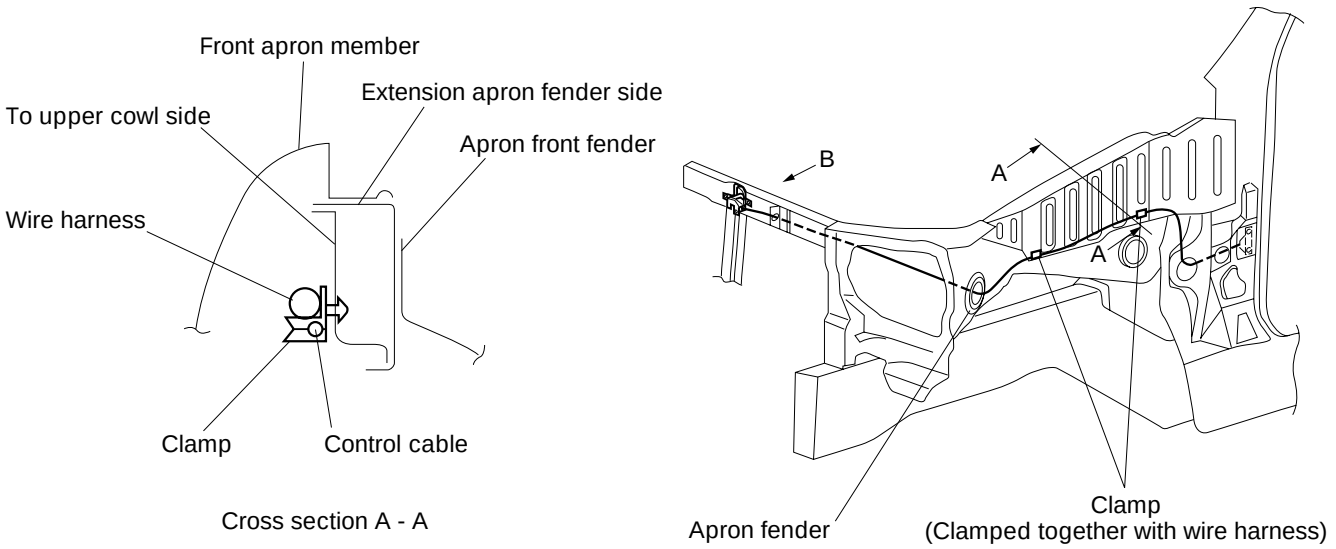
Removal of hood lock and hood lock control cable

1. Remove the radiator grill.
   (Refer to the front bumper section.)
2. Remove the front fender liner.
   (Refer to the front fender liner section.)
3. Removal of hood lock assembly
   (1) Remove the three attaching bolts of the hood lock assembly.
   (2) Remove the hood lock assembly by disconnecting the hood control cable.



JBO00050-00045

4. Remove the cowl side trim board assembly.
   (Refer to the trim & garnish section.)
5. Release the control cable from the clamps.



JBO00051-00046

6. Remove the two attaching bolts of the hood lock control handle bracket.
7. Remove the cowl side trim board subassembly. (Refer to the BO section.)
8. Remove the hood lock control cable assembly from the vehicle.
   NOTE:
   - For easier operation to reinstall the hood lock control cable, connect a suitable string to the end of the hood lock control cable before the removal.

JBO00052-00000

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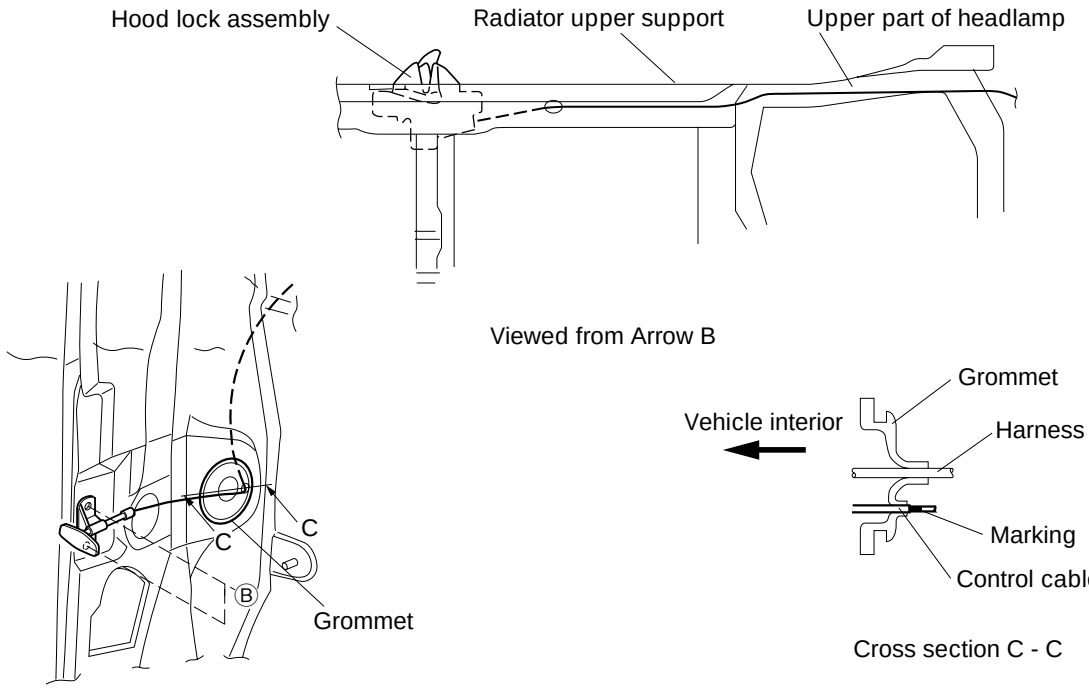
Installation of hood lock and hood lock control cable

NOTE:

- Basically the installation procedure is reverse to the removal procedure. Therefore, illustrations are not given in this installation procedure. Refer to the illustrations in the removal procedure in cases where any difficulty is encountered.

1. Insert the hood lock control cable assembly to the front fender side from the cabin and route it as shown.
2. Install the hood lock control cable handle with the attaching bolts and tighten them properly.
3. Install the cowl side trim board assembly. (Refer to the trim & garnish section.)
4. Connect the hood lock control cable to the clamps provided in the fender liner as shown.
5. Connect the hood lock control cable to the hood lock assembly.
6. Install the hood lock assembly with the three attaching bolts.
7. Perform the adjustment of the engine hood alignment.
   (Refer to the engine hood alignment.)
8. Install the front fender liner.
   (Refer to the front fender liner section.)
9. Install the radiator grill.
   (Refer to the front bumper section.)



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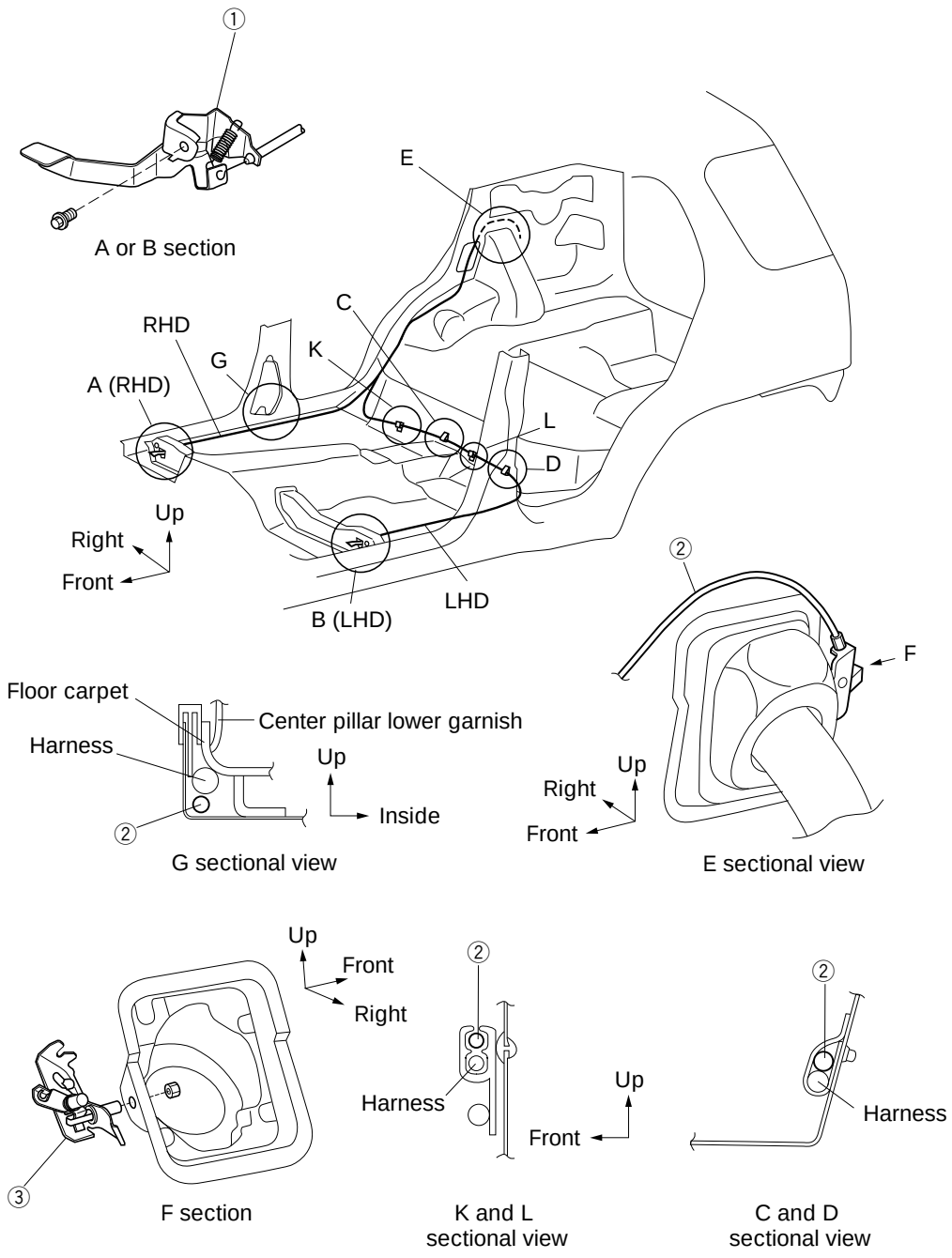
FUEL LID OPENER

COMPONENTS



① Back door lock open lever subassembly
② Fuel lid lock control cable subassembly
③ Fuel filler opening lid lock subassembly

JBO00054-00049

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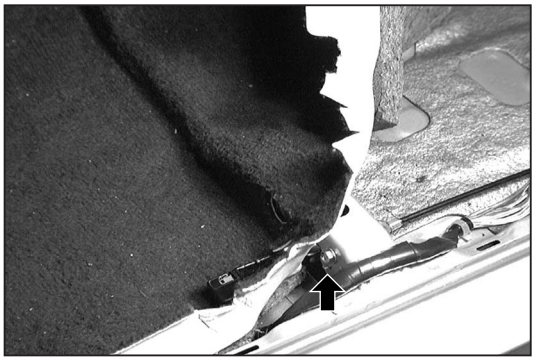
REMOVAL

1. Remove the front driver's seat. (Refer to the front seat section.)
2. Remove the rear seat. (Refer to the rear seat section.) (Left hand drive vehicle only.)
3. Remove the right side rear door scuff plate assembly. (Refer to the trim & garnish section.)
4. Remove the right side deck side trim. (Refer to the trim & garnish section.)
5. Turn over the floor carpet.
6. Remove the back door lock open lever subassembly by removing the attaching bolt.
7. Disconnect the fuel lid lock control cable from the back door lock open lever subassembly.
8. Remove the fuel filler opening lid lock subassembly from the fuel inlet box by removing the attaching nut.
9. Disconnect the fuel lid lock control cable from the fuel filler opening lid lock subassembly.
10. Remove the fuel lid control cable from the vehicle.



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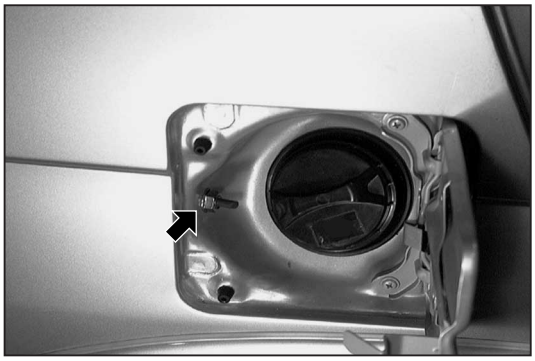

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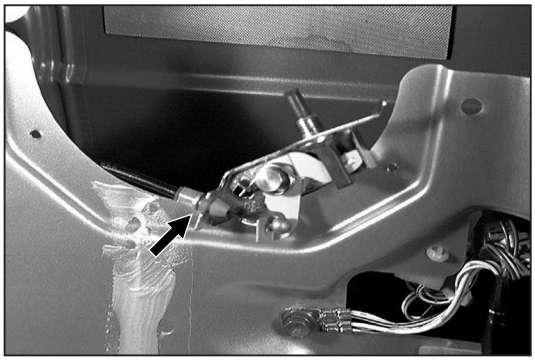

JBO00057-00052

INSTALLATION

NOTE:

- Basically the installation procedure is reverse to the removal procedure. Therefore, illustrations are not given in this installation procedure. Refer to the illustrations in the removal procedure in cases where any difficulty is encountered.

1. Route the fuel lid lock control cable in the vehicle.
2. Connect the fuel lid lock control cable to the fuel filler opening lid lock subassembly.
3. Install the fuel filler opening lid lock subassembly to the fuel inlet box with the attaching nut.
4. Connect the fuel lid lock control cable to the back door lock open lever subassembly.
5. Install the back door lock open lever subassembly with the attaching bolts.
6. Place the floor carpet on the floor. (Refer to the trim & garnish section.)
7. Install the right side deck side trim. (Refer to the trim & garnish section.)
8. Install the right side rear door scuff plate. (Refer to the trim & garnish section.)
9. Install the rear seat. (Refer to the rear seat section.)
10. Install the front driver's seat. (Refer to the front seat section.)

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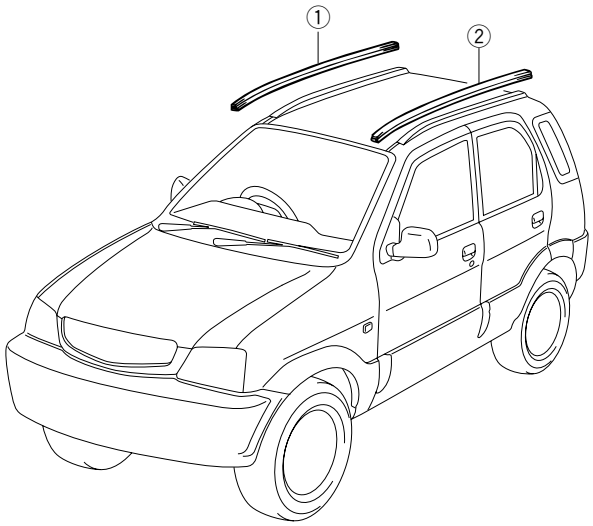
ROOF DRIP MOLDING

COMPONENTS



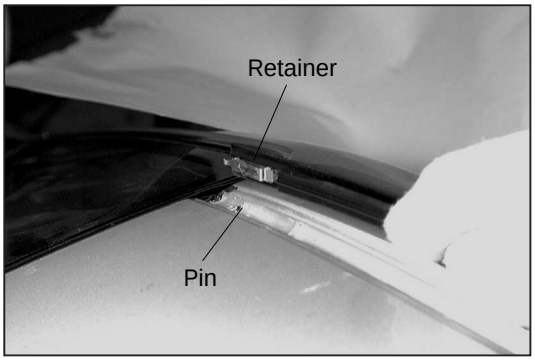
① Roof drip side finish right molding
② Roof drip side finish left molding

JBO00059-00053

REMOVAL

1. Remove the rear combination lamp.

2. Removal of roof drip molding
   Pull up the roof drip molding from the rear side gradually. Then remove the molding by pulling it backward to disengage the retainer on the molding from the pin on the roof panel.
   NOTE:
   • Do not reuse the removed roof drip molding.



JBO00060-00054

INSTALLATION

NOTE:
• Do not reuse the removed roof drip molding.

1. Connect the retainer on the roof drip molding to the pin on the roof panel and insert the front end of the roof drip molding into the weatherstrip of the front windshield glass.
2. Insert the roof drip molding by push it to the groove on the roof panel.
3. Install the rear combination lamp assembly.

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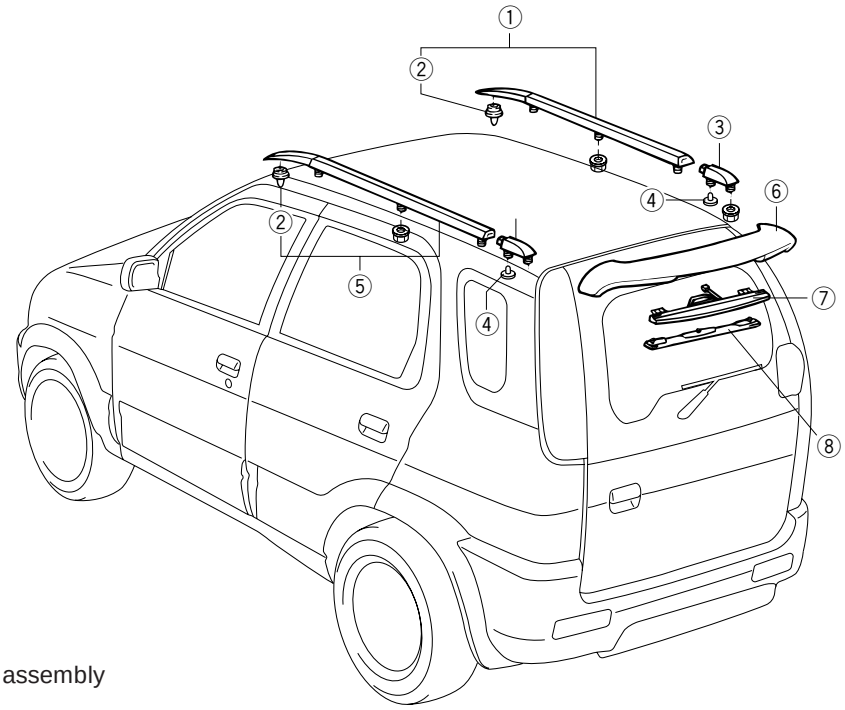
ROOF RAIL & ROOF END SPOILER

COMPONENTS

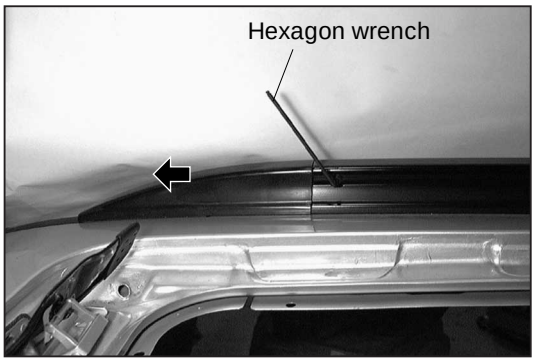


① Right roof rack assembly
② Clip
③ Rear right roof rack assembly
④ Clip
⑤ Left roof rack assembly
⑥ Rear spoiler subassembly
⑦ Stop center lamp assembly
⑧ Rear spoiler No. 1 cover

JBO00062-00055

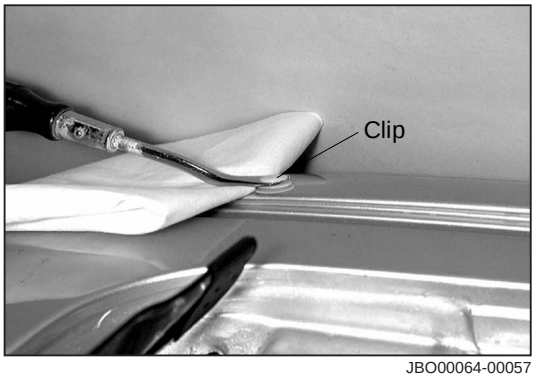
REMOVAL

1. Remove the attaching screw of the front roof rack covers by a hexagon wrench.
2. Pull out the front roof rack covers.



JBO00063-00056

3. Remove the clip, using a clip remover.
   CAUTION:
   - Be sure to prevent the painted surface of the roof panel from being scratched by inserting a piece of cloth into between the clip remover and the roof panel as shown.



JBO00064-00057

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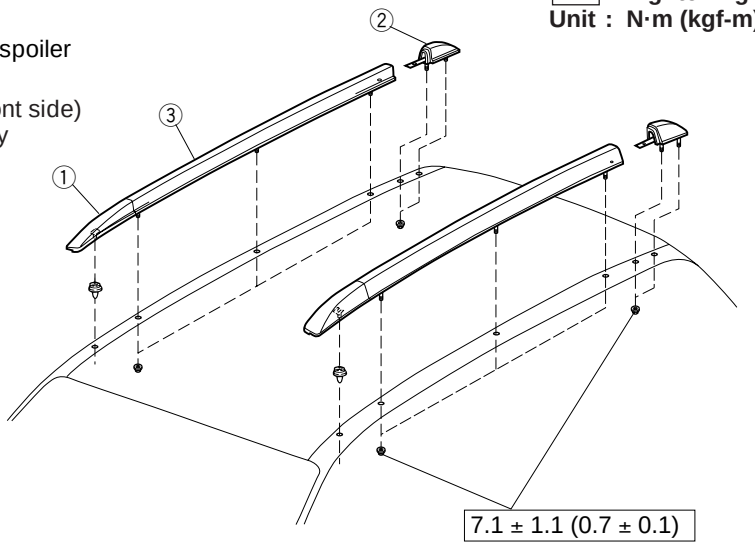
: Tightening torque
Unit : N·m (kgf-m)

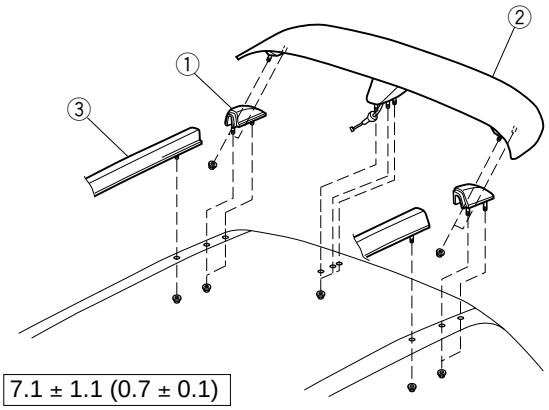
Vehicles not equipped with roof end spoiler

① Roof rack subassembly (front side)
② Roof rear rack subassembly
③ Roof rack assembly



Vehicles equipped with roof end spoiler

① Roof rear rack subassembly
② Rear spoiler subassembly
③ Roof rack assembly



JBO00000-00058

4. Remove the roof lining.
   (Refer to the trim & garnish section.)
5. Remove the six bolts attaching the rear spoiler and roof rear rack. (Model equipped with rear spoiler.)
6. Disconnect the retainer on the rear spoiler from the roof panel. (Model equipped with rear spoiler.)
7. Gradually lift up the rear spoiler. Then disconnect the connector of the wire harness from the connector of the high mount stop lamp. (Model equipped with high mount stop lamp.)
8. Remove the rear spoiler with the roof rear racks from the roof panel. (Model equipped with rear spoiler.)
9. Remove the roof rack assembly at each side by removing the three of the five attaching nuts of the roof rack assembly.
10. Remove the roof rear rack from the rear spoiler subassembly by removing the attaching nuts. (Model equipped with rear spoiler.)
    NOTE:
    - Do not damage the harness of the high mount stop lamp during the removal.
11. Remove the high mount stop lamp from the rear spoiler by removing the attaching screws. (Model equipped with rear spoiler and high mount stop lamp.)
12. Separate the roof rack from roof rear rack. (Model equipped with roof rack without rear spoiler.)
13. Remove the clips from the rear spoiler subassembly. (Model equipped with rear spoiler.)

JBO00065-00000

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INSTALLATION

NOTE:

- Basically the installation procedure is reverse to the removal procedure. Therefore, illustrations are not given in this installation procedure. Refer to the illustrations in the removal procedure in cases where any difficulty is encountered.

1. Install the three clips to the rear spoiler subassembly. (Model equipped with rear spoiler.)
2. Install the high mount stop lamp to the rear spoiler with the attaching screws. (Model equipped with rear spoiler and high mount stop lamp.)
3. Install the roof rear racks to the rear spoiler subassembly with the attaching nut. (Model equipped with rear spoiler.)
4. Install the each side of roof rack assembly with the five or three attaching nuts.
5. Install the rear spoiler with the roof racks to the roof panel with the attaching nuts. (Model equipped with with rear spoiler.)

   NOTE:

   - Be sure to connect the connector of the wire harness to the connector of the high mount stop lamp. (Model equipped with high mount stop lamp.)
   - Ensure that the retainer is connected to the roof panel properly.

6. Install the roof lining. (Refer to the trim & garnish section.)
7. Install the clip for the front roof rack covers to the roof panel.
8. Insert the front roof rack cover from the front side. Ensure that the front roof rack cover is engaged with the clip properly.
9. Install the attaching screw of the front roof rack cover, using a hexagon wrench.

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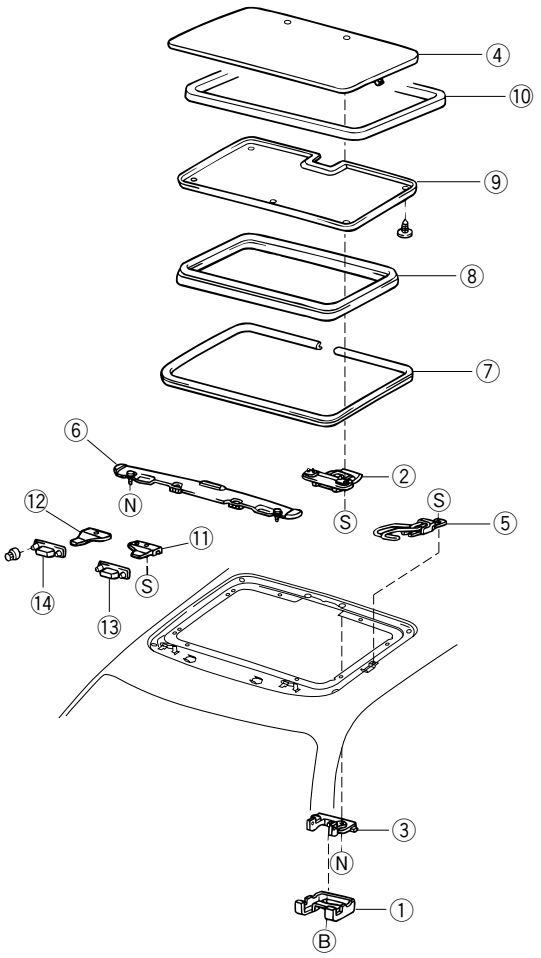
REMOVABLE ROOF

COMPONENTS



① Removable roof rock garnish
② Removable roof rock handle assembly
③ Removable roof rock base assembly
④ Removable roof panel assembly
⑤ Removable roof auxiliary left director catch assembly
⑥ Roof window deflector panel assembly
⑦ Sunroof opening trim molding
⑧ Removable roof inner weatherstrip
⑨ Removable roof trim
⑩ Removable roof outer weatherstrip
⑪ Removable roof left hinge
⑫ Removable roof right hinge
⑬ Removable roof hinge left case
⑭ Removable roof hinge right case

JBO00067-00059

REMOVAL

1. Remove the removable sunroof. (Refer to the owner's manual.)
2. Remove the removable roof lock garnish by removing the two attaching bolts.
3. Remove the removable roof lock handle assembly by removing the attaching screws.
4. Remove the removable roof lock base assembly from the removable roof panel by removing the attaching nuts.
5. Remove the removable roof trim by removing the retainers.
6. Remove the removable roof hinges from the removable roof panel by removing the attaching screws.
7. Remove the removable roof outer weather strip from the roof panel.
8. Remove the sunroof opening trim molding and removable roof inner weatherstrip.
9. Remove the roof headlining. (Refer to the trim & garnish section.)
10. Remove the roof window deflector panel assembly by removing the two attaching nuts.
11. Remove the removable roof hinge case by removing the attaching screws.

JBO00068-00000

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INSTALLATION

NOTE:

- Basically the installation procedure is reverse to the removal procedure. Therefore, illustrations are not given in this installation procedure. Refer to the illustrations in the removal procedure in cases where any difficulty is encountered.

1. Install the removable roof hinge case with the attaching screws.
2. Install the roof window deflector panel assembly with the two attaching nuts.
3. Install the roof headlining. (Refer to the trim & garnish section.)
4. Install the sunroof opening trim molding and removable roof inner weatherstrip.
5. Install the removable roof outer weatherstrip to the roof panel.
6. Install the removable roof hinges to the removable roof panel with the attaching screws.
7. Install the removable roof trim with the retainers.
8. Install the removable roof lock base assembly to the removable roof panel with the attaching nuts.
9. Install the removable roof lock handle assembly with the attaching screws.
10. Install the removable roof lock garnish with the two attaching bolts.
11. Install the removable sunroof. (Refer to the owner's manual.)

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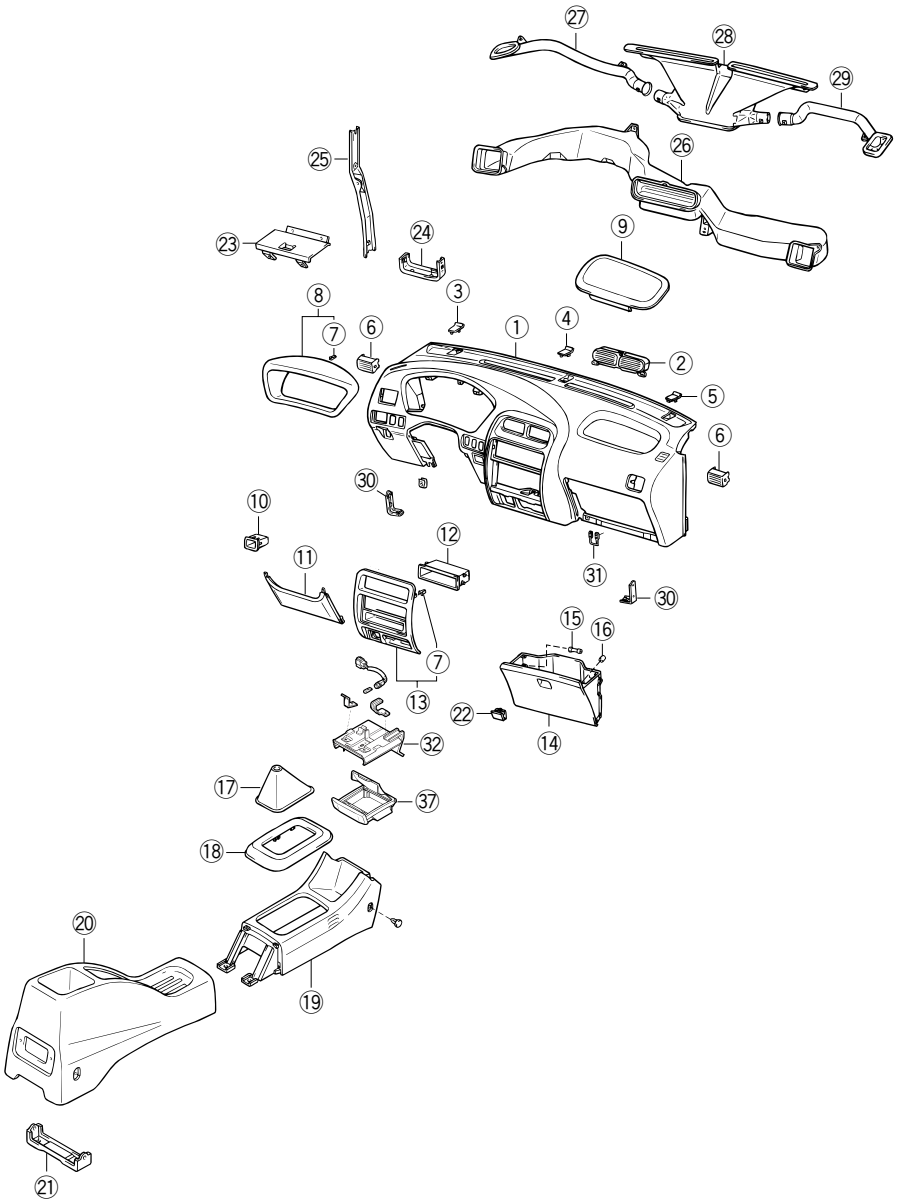
INSTRUMENT PANEL

COMPONENTS



① Instrument panel subassembly
② Instrument panel center register assembly
③ Instrument panel hole No. 3 cover
④ Instrument panel hole No. 2 cover
⑤ Instrument panel hole No. 1 cover
⑥ Instrument panel No. 2 register assembly
⑦ Clip
⑧ Instrument cluster finish panel subassembly
⑨ Air bag assembly (Passenger)
⑩ Cash box
⑪ Instrument panel finish lower panel
⑫ Radio tuner opening cover
⑬ Instrument cluster finish center panel assembly
⑭ Glove compartment subassembly
⑮ Glove compartment door hinge
⑯ Glove compartment cushion
⑰ Shifting hole cover
⑱ Shifting hole flame
⑲ Console panel
⑳ Rear console box assembly
㉑ Rear console box support bracket
㉒ Glove compartment door lock subassembly
㉓ Instrument panel mounting bracket subassembly
㉔ Instrument panel to floor bracket
㉕ Instrument panel No. 1 brace subassembly
㉖ Heater to register center duct subassembly
㉗ Side ventilator right duct subassembly
㉘ Defroster nozzle assembly
㉙ Side ventilator left duct subassembly
㉚ Bracket
㉛ Glove compartment door striker
㉜ Front ash receptacle retainer subassembly
㉝ Front ash receptacle box

JBO00070-00060

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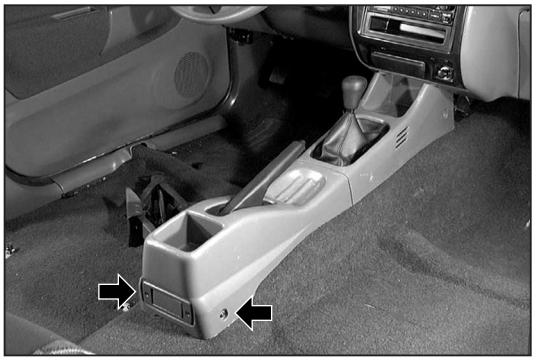
REMOVAL

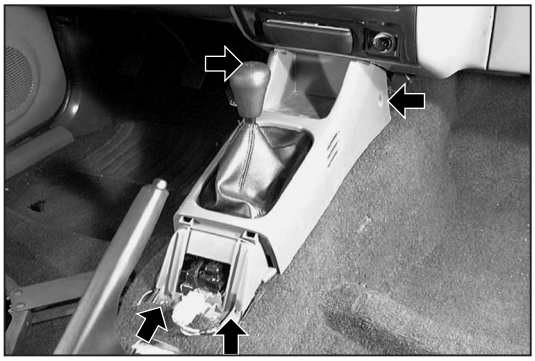
1. Disconnect the battery ground cable terminal from the negative terminal of the battery.
2. Remove the front seats. (Refer to the front seat section.)
3. Removal of console box assembly
   (1) Remove the rear console box assembly by removing the two attaching screws.



JBO00071-00061

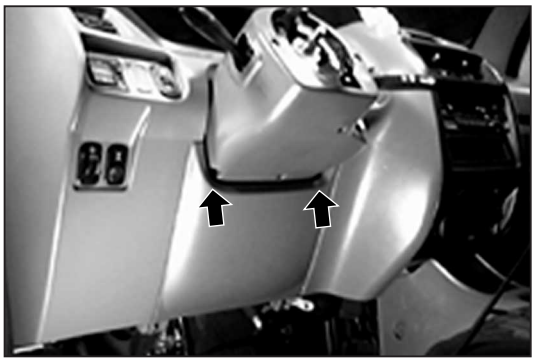
   (2) Remove the shift lever knob from the shift lever. (Only for manual transmission vehicle.

   (3) Remove the console panel by removing the two attaching bolts and two clips.



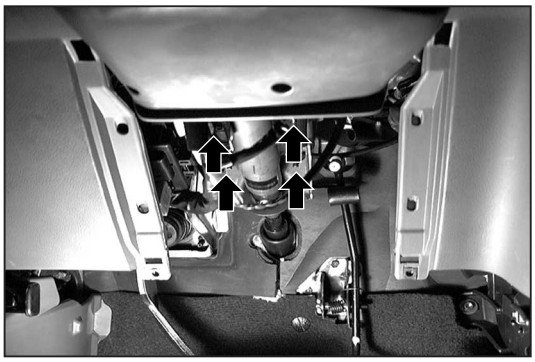
JBO00072-00062

4. Remove the instrument panel finish lower panel by removing the two attaching screws. Then unlock the lock on the instrument panel finish lower panel by pulling it out while holding the instrument panel.



JBO00073-00063

5. Remove the steering column assembly.
   (Refer to the SR section for more details of the removal and installation of the column assembly.)
   (1) Disconnect the steering column assembly-related connectors.
   (2) Remove the four attaching bolts of the steering column assembly.



JBO00074-00064

6. Remove the two attaching screws of the instrument cluster finish panel subassembly.
7. Pull out the instrument cluster finish panel subassembly from the instrument panel to disengage the locks provided on the instrument cluster finish panel subassembly.
8. Remove the instrument cluster finish panel subassembly.
9. Removal of various switches
   (1) Push out the various switches from the inside of the instrument panel.
   (2) Disconnect the switches from the connector.
   (3) Put the switch connectors into the inside of the instrument panel.

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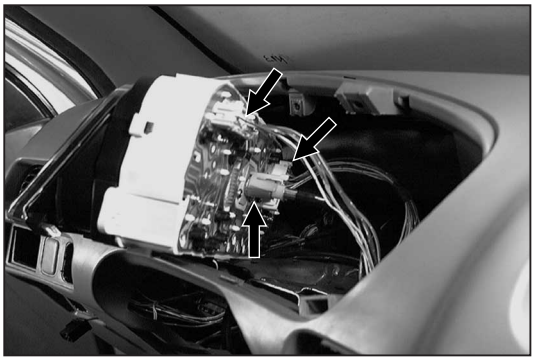
10. Removal of combination meter assembly
    (1) Remove the three attaching bolts.

JBO00076-00066

    (2) Gradually raise the combination meter assembly.
    (3) Disconnect the connectors and speedometer cable from the combination meter assembly.

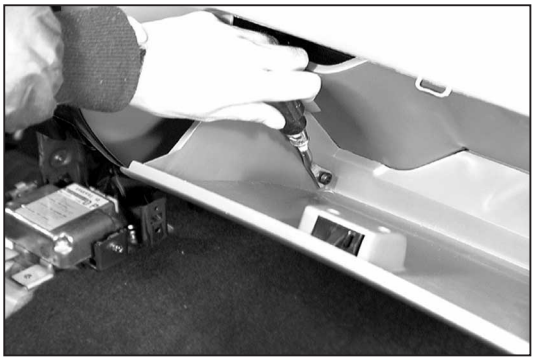
    NOTE:
    • Refer to the BE section for more details.

    (4) Remove the combination meter.



JBO00077-00067

11. Remove the glove compartment subassembly by removing the glove compartment door hinge, using a clip remover.

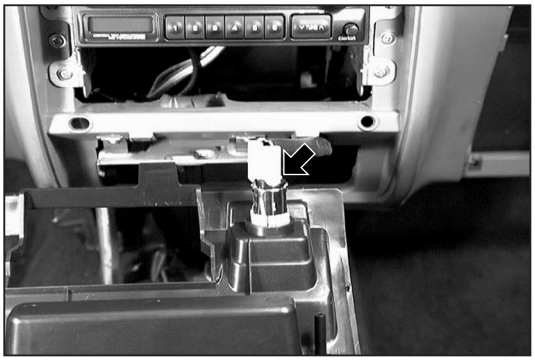


JBO00078-00068

12. Removal of instrument cluster finish center panel assembly
    (1) Pull out the cigarette lighter heater.
    (2) Remove the two attaching screws of the instrument cluster finish center panel.
    (3) Remove the front ash receptacle box from the front ash receptacle retainer subassembly.
    (4) Unlock the two locks provided on the instrument cluster finish center panel assembly. Then, remove the instrument cluster finish center panel assembly.

JBO00079-00069

    (5) Disconnect the cigarette lighter connector.
    (Refer to the BE section for removal of the cigarette lighter.)



JBO00080-00070

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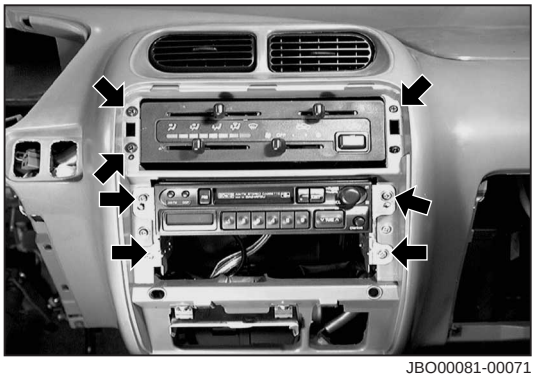
13. Remove the three attaching screws of the heater control panel assembly.
14. Disconnect the connector of the wire harness from the radio tuner or cassette player.
15. Disconnect the antenna cable from the radio tuner.
16. Remove the radio tuner opening cover, radio tuner or cassette player by removing the attaching screws.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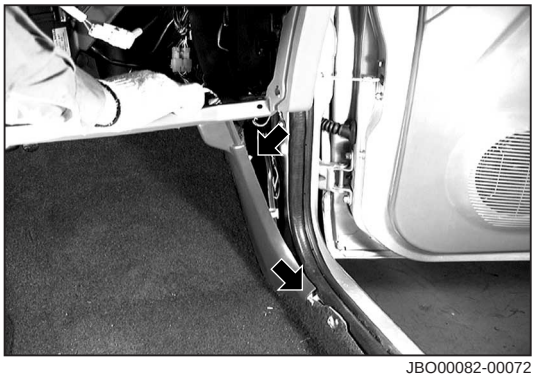
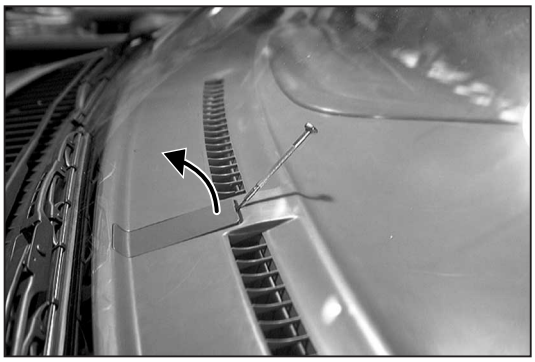
17. Removal of cowl side trim board assembly (Both sides) (Refer to the trim and garnish section.)


JBO00082-00072

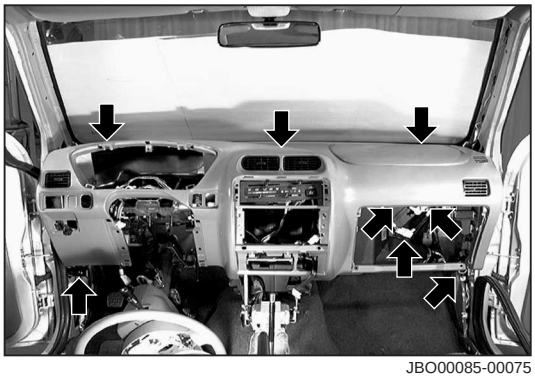
18. Removal of front door pillar garnish (Both sides)
    (1) Remove the front door opening molding.
    (2) Disconnect the door trim retainers provided on the front door pillar garnish by disengaging the retainers, using a clip remover or the like.
    (3) Remove the front pillar garnish from the front pillar.

JBO00083-00073

19. Remove the instrument panel hole covers No. 1, No. 2 and No. 3 from the instrument panel, using a minor screwdriver or the like.
    CAUTION:
    • Be very careful not to scratch the instrument panel and hole covers No. 1, No. 2 and No. 3 during the removal.


JBO00084-00074

20. Disconnect the connector of the wire harness from the connector of the airbag. (For front passenger airbag equipped model only. Refer to the BE section for the correct manner of disconnection.)
    CAUTION:
    • Be sure to disconnect this connector by referring to the BE section. Failure to observe this caution may lead to serious malfunction.


JBO00085-00075

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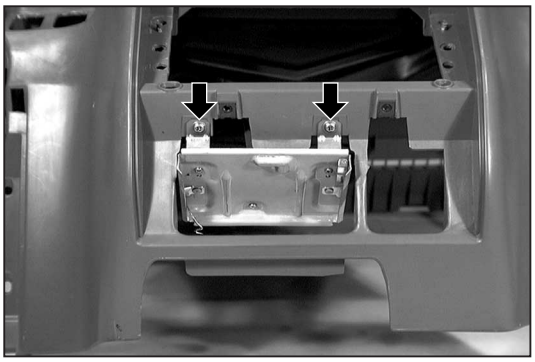
21. Remove the instrument panel subassembly by removing the attaching bolts.
    If any difficulty is encountered in removing the attaching bolt of the rear hood lock control handle attaching bracket of the instrument panel, prior to the removal of the instrument panel, remove the hood lock control handle bracket by removing the two attaching bolts.
    CAUTION:
    - Be sure to remove the two attaching bolts of passenger side airbag, if model equipped with passenger side airbag.

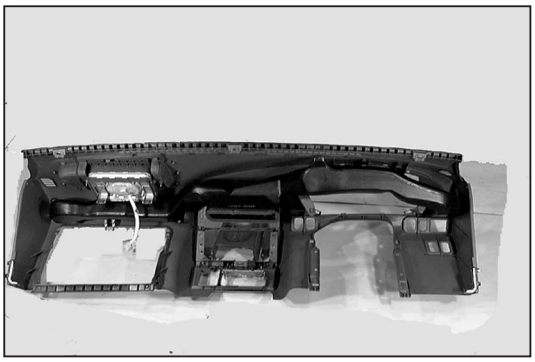
JBO00086-00000



JBO00087-00076

22. Remove the front ash receptacle retainer by removing the attaching screws.

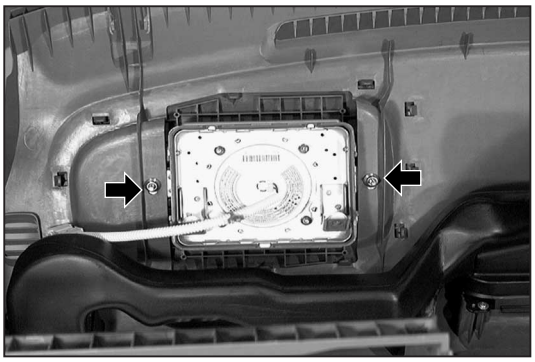
23. Remove the heater-to-register center duct subassembly by removing the five attaching screws.



JBO00088-00077

24. Removal of airbag at front passenger seat side
    (Only for model equipped with front passenger seat side airbag)
    WARNING:
    - Be sure to follow the instruction mentioned in the airbag section in the BE section of the service manual before performing the removal of the front passenger seat airbag.

    (1) Remove the two attaching nuts of the front passenger seat airbag assembly.
    (2) Remove the front passenger seat airbag assembly from the instrument panel by unlocking the locks provided on the airbag assembly.



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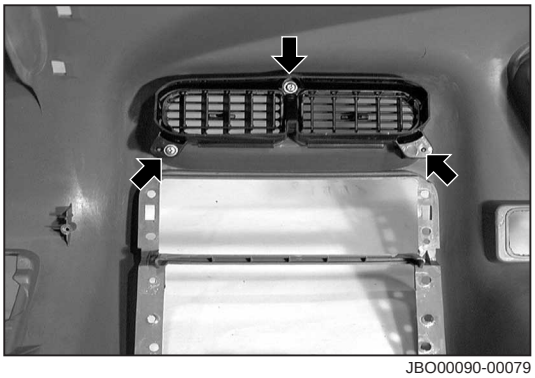

JBO00090-00079

25. Removal of instrument panel center register assembly by removing the attaching screws.

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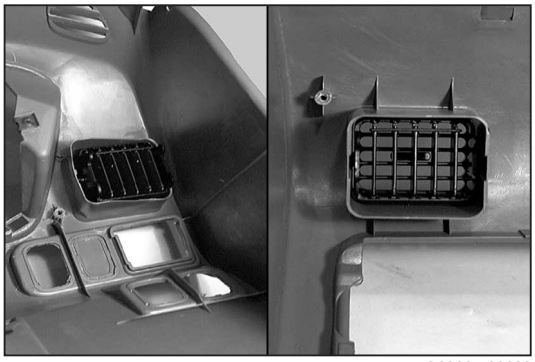
26. Remove the register assembly No. 2 of the instrument panel by unlocking the lock section on the instrument panel assembly.
    CAUTION:
    - Do not enlarge the attaching portion of the instrument panel more than necessary to remove the register.

27. Remove the defroster nozzle assembly and side defroster duct subassembly (right and left) from the cowl panel and bracket by removing the attaching screws and bolt.
28. Removal of instrument panel reinforcement assembly (Only when equipped)
    (1) Disconnect the relay box from the bracket by removing attaching bolt, while unlocking the lock of the relay box.
    Disconnect the wire clamps and antenna cable from the reinforcement.
    (2) Remove the instrument panel reinforcement assembly by removing the attaching bolts and nut.



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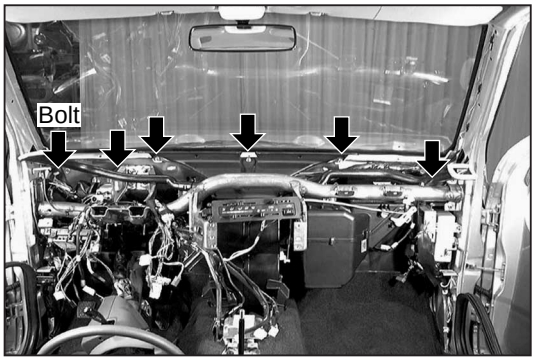

JBO00092-00081

INSTALLATION

NOTE:
- Basically the installation procedure is reverse to the removal procedure. Therefore, illustrations are not given in this installation procedure. Refer to the illustration in the removal procedure in cases where any difficulty is encountered.

1. Installation of instrument panel reinforcement assembly (Only when equipped)
   (1) Install the instrument panel reinforcement assembly with the attaching bolts and nuts.
   (2) Install the relay box to its bracket.
2. Install the defroster nozzle assembly and side defroster duct subassembly with the attaching screws (right and left) to the cowl panel and bracket.
3. Install the register assembly No. 2 of the instrument panel to the instrument panel subassembly.
   CAUTION:
   - Do not enlarge the instrument panel more than necessary.

4. Install the instrument panel center register assembly to the instrument panel subassembly with the attaching screws .
5. Installation of front passenger seat side airbag
   WARNING:
   - Be sure to refer to the handling instruction mentioned in the BE section before performing the installation of the front passenger seat side airbag. Failure to observe this warning may lead to serious trouble or malfunction.

   (1) Install the front passenger seat side airbag assembly to the instrument panel and ensure that the locks on the front passenger seat side airbag assembly are locked to the instrument panel properly.
   (2) Install the two attaching nuts of the front passenger seat side airbag and tighten them securely.
6. Install the heater-to-register center duct subassembly with the attaching screws.
7. Install the front ash receptacle retainer with the attaching screws.
8. Install the instrument panel subassembly with the attaching bolts.
   CAUTION:
   - Be sure to tighten the attaching bolts of passenger side airbag to the specified tightening torque, if model equipped with passenger side airbag.
     Tightening Torque: 6.7 ± 1.6 N·m (0.7 ± 0.2 kgf-m)

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9. Connect the connector of the wire harness to the connector of the front passenger airbag.
   WARNING:
   • Be sure to refer to the instruction in the BE section. Failure to observe this warning may lead to serious trouble or malfunction.

10. Install the instrument panel hole covers No. 1, No. 2 and No. 3 to the instrument panel.
11. Installation of front door pillar garnish (Both sides)
    (1) Ensure that the clips of the front pillar garnish are installed properly.
    (2) Insert the protrusion section of the front pillar garnish provided at its lower side to the pillar hole.
    (3) Insert the locator on the front pillar garnish into the front pillar.
    (4) Push in the front pillar garnish to engage the retainers with the front pillar.
    (5) Install the front door opening trim.
12. Install the cowl side trim board assembly. (Both sides) (Refer to the trim and garnish section.)
13. Install the radio tuner or cassette player by installing the attaching screws.
14. Connect the antenna cable to the radio tuner.
15. Connect the connector of the wire harness to the radio tuner or the cassette player.
16. Connect the heater control panel assembly and install it to the instrument panel by installing the attaching screws.
17. Installation of instrument cluster panel assembly
    (1) Connect the cigarette lighter connector to the cigarette lighter.
    NOTE:
    • Refer to the BE section for installation of the cigarette lighter.
    • Prior to the installation, ensure that the retainer clips are installed on the instrument cluster assembly.

    (2) Insert the instrument cluster panel assembly into the instrument panel and ensure that the retainers are locked properly.
    (3) Insert the cigarette lighter heater.
18. Install the front ash receptacle box to the ash receptacle retainer subassembly.
19. Install the glove compartment subassembly with the clip, using a clip remover.
20. Installation of combination meter assembly
    (1) Connect the connectors and speedometer cable to the combination meter assembly.
    NOTE:
    • Refer to the BE section for more details.

    (2) Install the combination meter into the instrument panel.
    (3) Install and tighten the three attaching bolts.
21. Installation of various switches
    (1) Pull out the switch connectors from each switch attaching hole of the instrument panel.

    •

    (2) Connect the switches to the connector securely.
    (3) Install the various switches to the instrument panel.
22. Install the steering wheel with the steering column tube subassembly by means of the four attaching bolts securely. (Refer to the SR section.)
23. Install the instrument panel finish lower panel and secure it with the two attaching screws.
24. Installation of console box assembly
    (1) Install the console panel with the two attaching bolts and two clips.
    (2) Install the shift lever knob to the shift lever. (Only for manual transmission vehicle.)

    (3) Install the rear console box assembly with the two attaching screws.
25. Install the front seat. (Refer to the front seat section.)
26. Connect the negative terminal of the battery ground cable to the negative terminal of the battery.
27. Ensure that the all switchs are functioning properly and no abnormal noise is emitted.

JBO00093-00000

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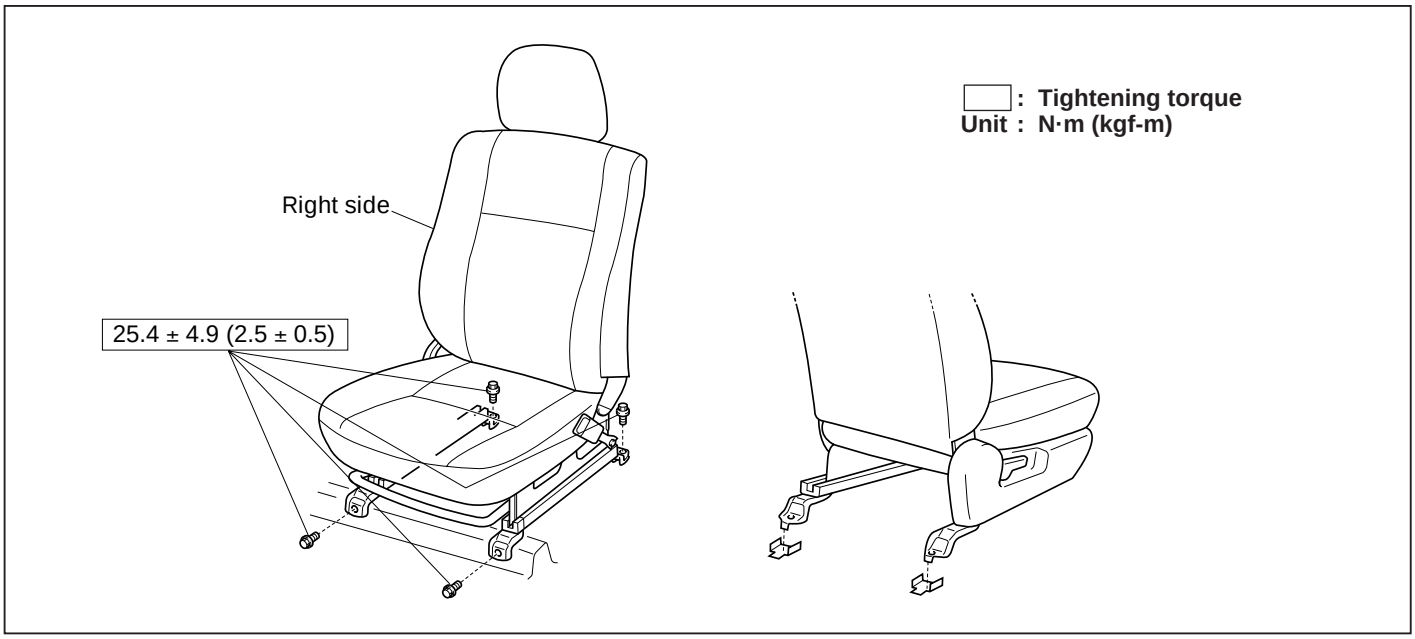
FRONT SEAT

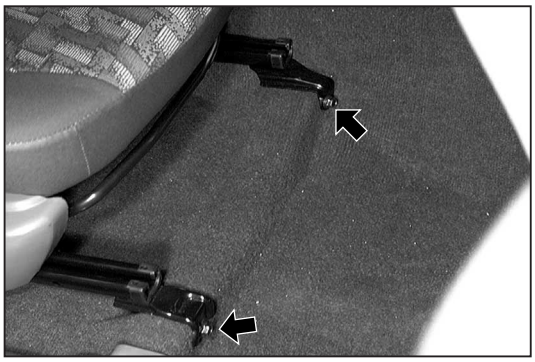
COMPONENTS



JBO00094-00082

REMOVAL

1. Disconnect the seat belt warning light switch connector. (Only for seat belt warning-equipped vehicle)
2. Move the front seat to the most rearward position.
3. Remove the attaching bolts of the front seat.



JBO00095-00083

4. Move the front seat to the most forward position.
5. Remove the attaching bolts of the front seat.
6. Remove the front seat assembly from the vehicle.
   CAUTION:
   - Care must be exercised so that the front seat assembly may not be interfered with other parts.

JBO00096-00084

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INSTALLATION

1. Place the front seat on the attaching surface on the floor while aligning the protrusions of the front seat with the holes on the floor panel.
2. Install the attaching bolts temporarily.
3. Move the front seat to the most forward position and tighten the attaching bolts temporarily.
   CAUTION:
   - Make sure that the both inner and outer tracks are locked properly before tightening the attaching bolts.

4. Move the front seat to the most rearward position.
   CAUTION:
   - Make sure that the both inner and outer tracks are locked properly before tightening the attaching bolts.

5. Tighten the inner side attaching bolts to the specified tightening torque.
   Tightening Torque: 25.4 ± 4.9 N·m (2.6 ± 0.5 kgf-m)

6. Tighten the inner side attaching bolts to the specified tightening torque.
   Tightening Torque: 25.4 ± 4.9 N·m (2.6 ± 0.5 kgf-m)

7. Move the front seat to the most forward position.
8. Tighten the inner side attaching bolts to the specified tightening torque.
   Tightening Torque: 25.4 ± 4.9 N·m (2.6 ± 0.5 kgf-m)

9. Tighten the outer side attaching bolts to the specified tightening torque.
   Tightening Torque: 25.4 ± 4.9 N·m (2.6 ± 0.5 kgf-m)

10. Connect the seat belt warning light switch connector.
    (Only for seat belt warning-equipped vehicle)
11. Ensure that the seat slide locks are properly engaged with both rails by sliding the front seat in a forward direction with a force of 98 N (10 kgf) and in a rearward direction with a force of 49 N·m (5 kgf-m). If the seat slide locks are not engaged properly, repair the seat slide lock or reinstall the rear seat, as required.

JBO00097-00000

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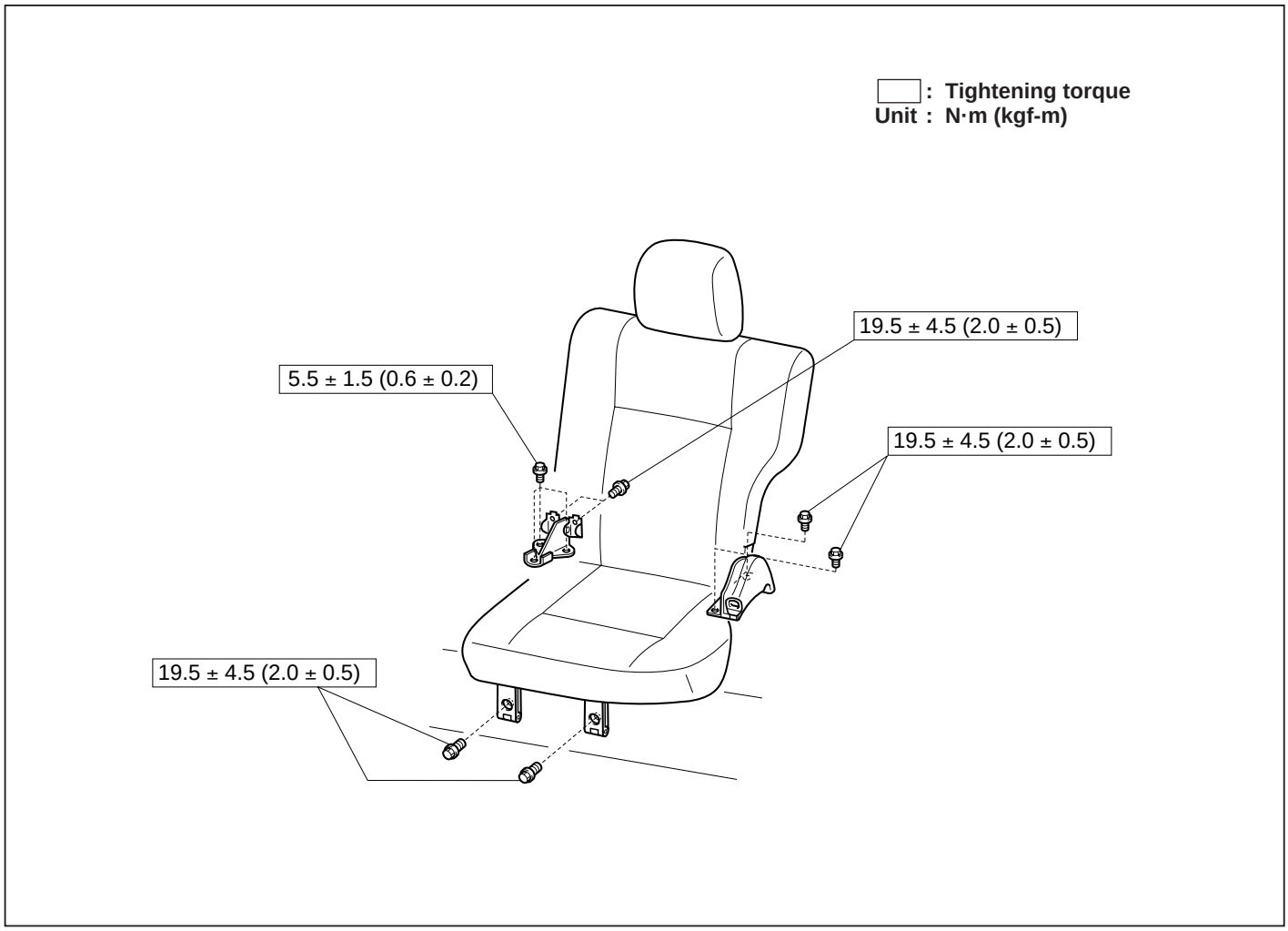
REAR SEAT

COMPONENTS



JBO00098-00085

REMOVAL

1. Remove the rear seat cushion by removing the two attaching bolts.
2. Separate the deck board carpet from the rear seat by disconnecting the velcro-tape sections.
3. Remove the rear seatback by removing the three attaching bolts.
4. Remove the rear seatback center hinge by removing the three attaching bolts.

JBO00099-00000

INSTALLATION

1. Install the rear seatback center hinge with the attaching bolts and tightening them to the specified tightening torque.
   Tightening Torque: 5.5 ± 1.5 N·m (0.56 ± 0.15 kgf-m)

2. Install the rear seatback with the three attaching bolts and tighten the attaching bolts to the specified tightening torque.
   Tightening Torque: 19.5 ± 4.5 N·m (2.0 ± 0.46 kgf-m)

3. Install the rear seat cushion with the two attaching bolts and tightening them to the specified tightening torque.
   Tightening Torque: 19.5 ± 4.5 N·m (2.0 ± 0.46 kgf-m)

4. Fold the rear seat.
5. Ensure that the mechanism of the rear seat operates properly.

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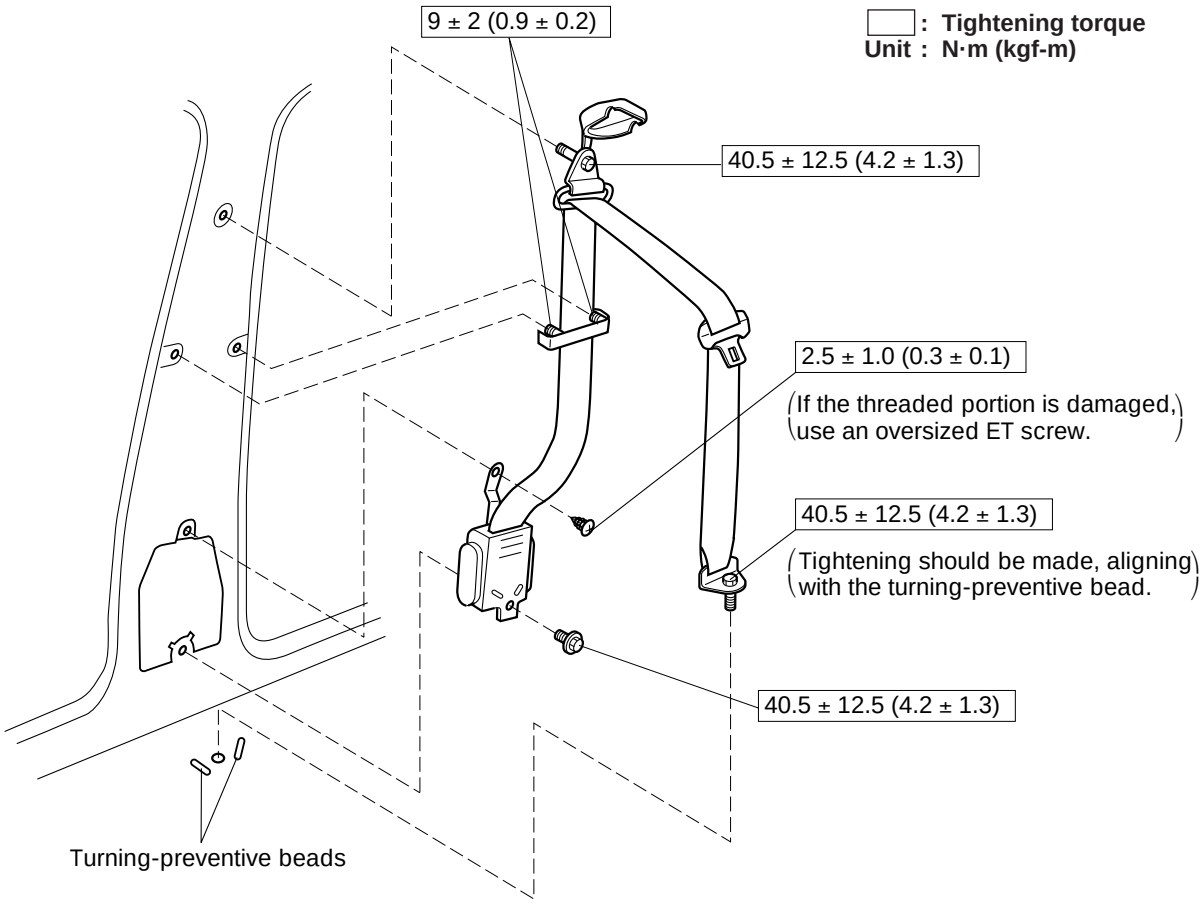
SEAT BELT

FRONT SEAT BELT



JBO00101-00086

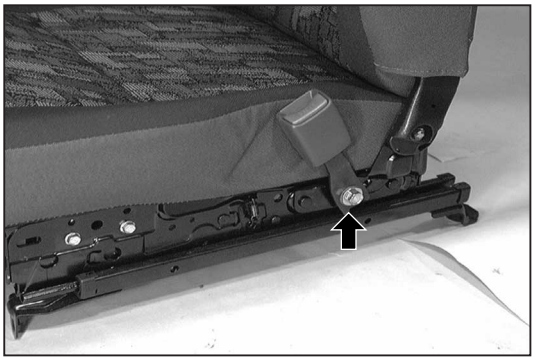
FRONT SEAT BELT

REMOVAL

1. Remove the center pillar lower garnish. (Refer to the trim & garnish section.)
2. Open the seat belt attaching bolt cover.
3. Remove the front seat belt shoulder belt guide by removing the attaching bolts.
4. Remove the seat belt anchor attaching bolts
5. Remove the seat belt retractor by removing the attaching bolt and screw.

JBO00102-00087

6. Removal of inner seat belt
   (1) Remove the front seat. (Refer to the front seat section.)
   (2) Remove the inner seat belt by removing its attaching bolts.



JBO00103-00088

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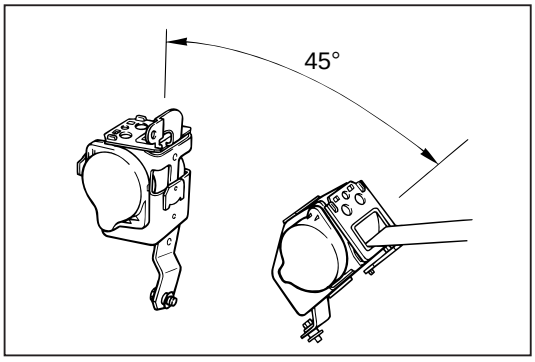
INSPECTION

1. Ensure that the seat belt will not be locked until the seat belt retractor is tilted more than 15 degrees in all directions from the installed angle.
   Also, ensure that the locked state is retained when the retractor is tilted 45 degrees or more.
2. Ensure that the seat belt will be locked when the seat belt is pulled out quickly.
3. Ensure that no scratch, wear or any other damage exists on the seat belts.
   If any damage is found, replace the seat belt with a new one.
   CAUTION:
   - Never attempt to disassemble the retractor.
   - After the anchor bolts have been tightened, make sure that each anchor can move in a circumferential direction of the bolt.
   - Ensure that the belt in the installed state can be pulled out smoothly and also it can be retracted smoothly in position.



JBO00104-00089

INSTALLATION

1. Installation of inner seat belt
   (1) Install the inner seat belt with the attaching bolt and tighten the attaching bolt to the specified tightening torque.
   Tightening Torque: 40.5 ± 12.5 N·m (4.1 ± 1.3 kgf-m)

   (2) Install the front seat. (Refer to the front seat section.)
2. Install the front seat retractor with the attaching screw.
3. Install the front seat retractor attaching bolt and tighten the attaching bolt to the specified tightening torque.
   Tightening Torque: 40.5 ± 12.5 N·m (4.1 ± 1.3 kgf-m)

4. Install the seat belt anchor with the attaching bolts and tighten the attaching bolts to the specified tightening torque.
   Tightening Torque: 40.5 ± 12.5 N·m (4.1 ± 1.3 kgf-m)

   CAUTION:
   - Be sure to install the seat belt end anchor while aligning it with the locating embossed mark on the floor panel.

5. Install the front seat belt guide with the attaching screws.
6. Close the upper seat belt anchor bolt cover.
7. Install the center pillar lower garnish. (Refer to the trim & garnish section.)

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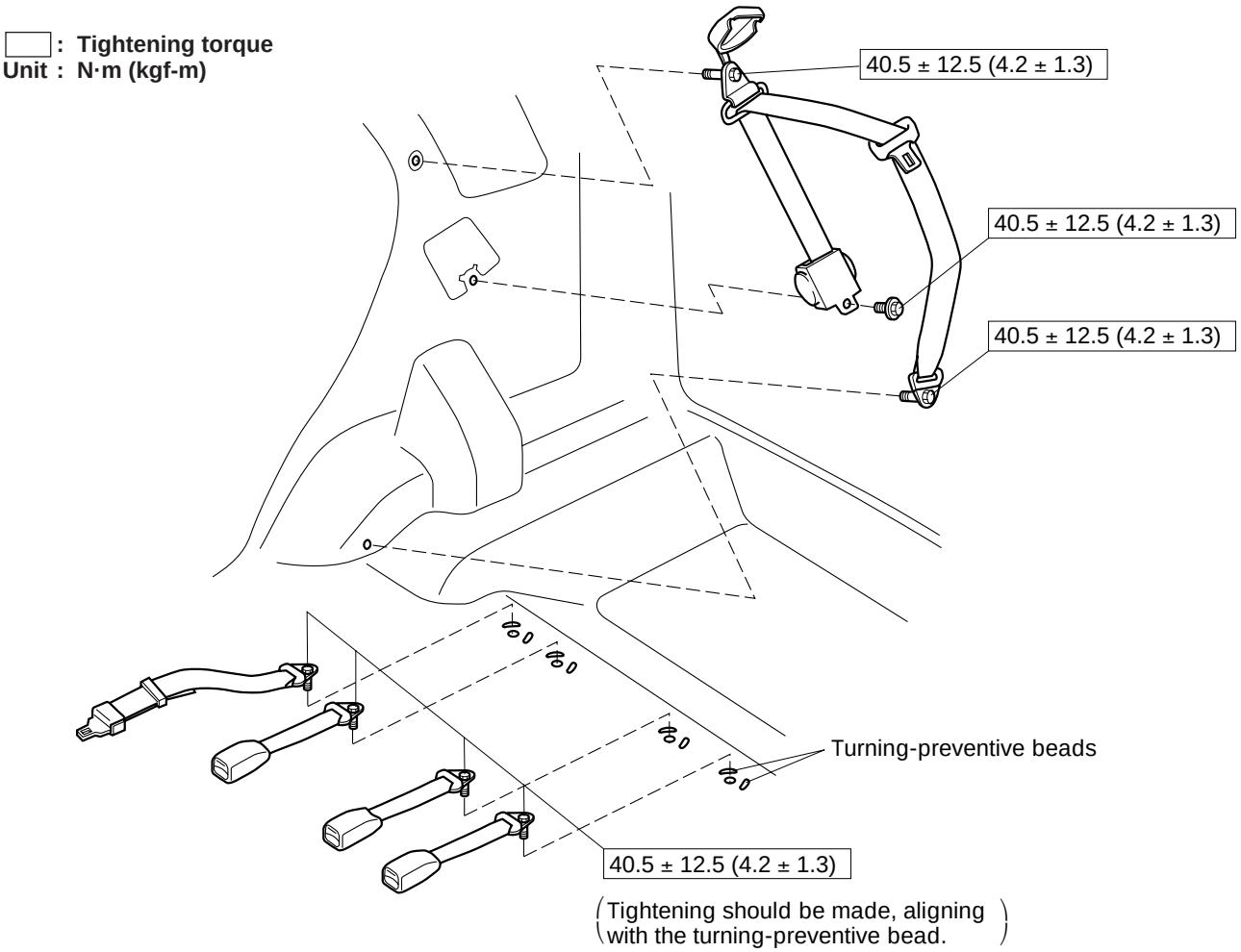
REAR SEAT BELT



JBO00106-00090

REMOVAL

1. Remove the rear seatback.
   (Refer to the rear seat section for the removal procedure.)
2. Remove the deck board assembly.
   (Refer to the trim & garnish section for the removal procedure.)
3. Remove the rear door scuff plate assembly.
   (Refer to the trim & garnish section for the removal procedure.)
4. Remove the deck side trim.
   (Refer to the trim & garnish section for the removal procedure.)
5. Open the rear seat belt upper anchor bolt cover.
6. Remove the attaching bolt of the seat belt upper anchor.
7. Remove the rear seat belt retractor by removing the attaching bolts.
8. Remove the rear seat inner belt assembly and center seat belt by removing the attaching bolts.

JBO00107-00000

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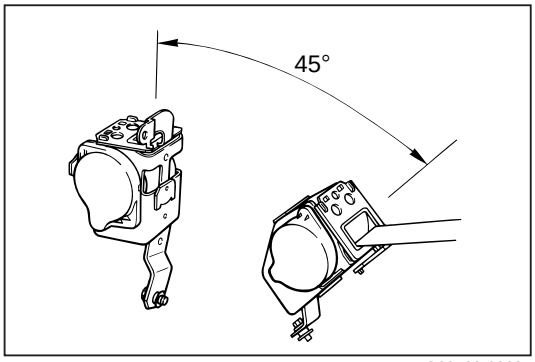
INSPECTION

1. Ensure that the seat belt will not be locked until the seat belt retractor is tilted more than 15 degrees in all directions.
   Also, ensure that the locked state is retained when the retractor is tilted 45 degrees or more.
2. Ensure that the seat belt will be locked when the seat belt is pulled quickly.
3. Ensure that no scratch, wear or any other damage exists on the seat belts.
   If any damage is found, replace the seat belt with a new one.
   CAUTION:
   - Never attempt to disassemble the retractor.
   - After the anchor bolts have been tightened, make sure that each anchor can move in a circumferential direction of the bolt.
   - Ensure that the belt in the installed state can be pulled out smoothly and also it can be retracted smoothly in position.



JBO00108-00091

INSTALLATION

1. Install the rear seat inner belt assembly and center seat belts with the attaching bolt. Then, tighten the attaching bolt to the specified tightening torque.
   Tightening Torque: 40.5 ± 12.5 N·m (4.1 ± 1.3 kgf-m)

2. Install the rear seat belt retractor with the attaching bolt and tighten it to the specified tightening torque.
   Tightening Torque: 40.5 ± 12.5 N·m (4.1 ± 1.3 kgf-m)

3. Install the rear seat belt upper anchor with the attaching bolt and tighten it to the specified tightening torque.
   Tightening Torque: 40.5 ± 12.5 N·m (4.1 ± 1.3 kgf-m)

4. Close the seat belt anchor bolt cover of the rear seat belt upper anchor.
5. Install the deck side trim. (Refer to the trim & garnish section for the installation procedure.)
6. Install the rear door scuff plate assembly. (Refer to the trim & garnish section for the installation procedure.)
7. Install the rear seat belt end anchor with the attaching bolts and tighten them to the specified tightening torque.
   Tightening Torque: 40.5 ± 12.5 N·m (4.1 ± 1.3 kgf-m)

8. Install the deck board assembly. (Refer to the trim & garnish section for the installation procedure.)
9. Install the lower back trim. (Refer to the trim & garnish section for the installation procedure.)
10. Install the rear seat. (Refer to the rear seat section for the installation procedure.)

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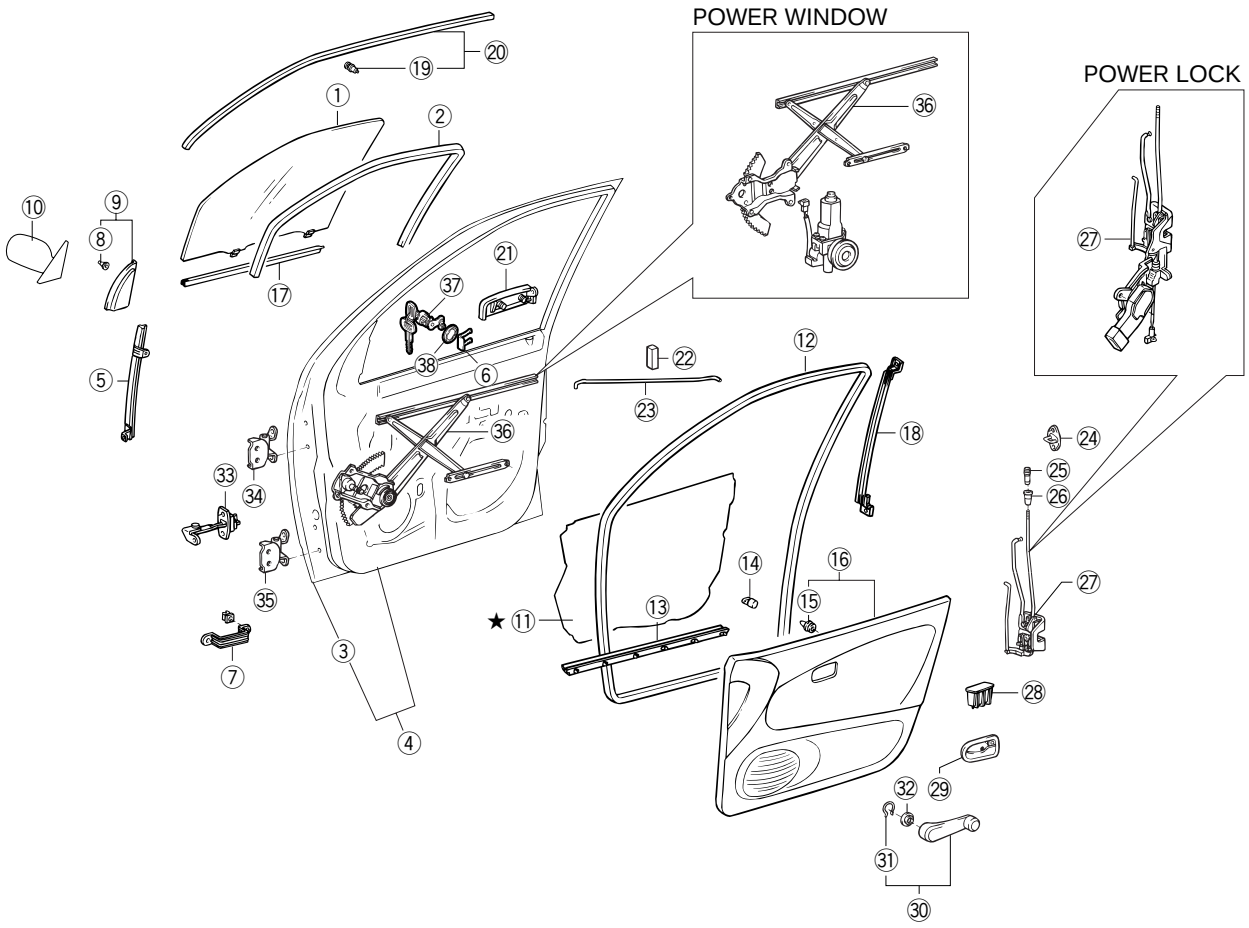
FRONT DOOR

COMPONENTS

★ : **Non-reusable parts**



① Front door glass subassembly
② Front door glass run
③ Front door outside panel
④ Front door panel subassembly
⑤ Front door front lower frame subassembly
⑥ Lock retainer
⑦ Door trim bracket
⑧ Clip
⑨ Front door lower frame bracket garnish
⑩ Outside rear view mirror
⑪ Front door service hole cover
⑫ Front door weatherstrip
⑬ Front door glass inner weatherstrip assembly
⑭ Cushion
⑮ Front door trim retainer
⑯ Front door trim panel assembly
⑰ Front door glass outer weatherstrip
⑱ Front door rear lower frame subassembly
⑲ Retainer
⑳ Front door glass outer weatherstrip
㉑ Front door outside handle assembly
㉒ Front door lock link No 1 silencer
㉓ Front door open control link assembly
㉔ Front door lock striker plate subassembly
㉕ Front door locking button
㉖ Door lock control knob holder
㉗ Front door lock assembly
㉘ Door pull handle
㉙ Front door inside handle subassembly
㉚ Front door window handle assembly
㉛ Shaft snap ring
㉜ Door vent window control handle plate
㉝ Front door check assembly
㉞ Front door upper hinge assembly
㉟ Front door lower hinge assembly
㊱ Front door window regulator subassembly
㊲ Lock cylinder
㊳ Lock cylinder pad

JBO00110-00092

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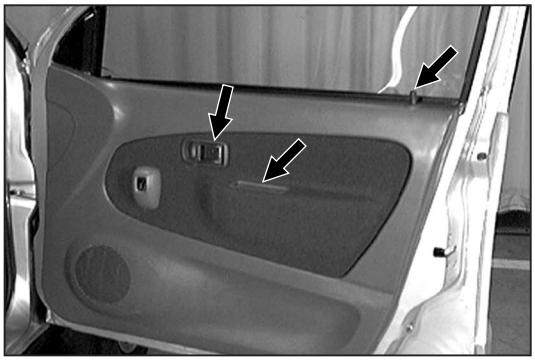
DISASSEMBLY

1. Unlock the shaft snap ring of the front door window handle assembly by inserting a piece of cloth between the handle and the door vent window control handle plate. Then, pull the inserted cloth alternately so as to unlock the shaft snap ring.
2. Remove the front door window handle, shaft snap ring and door vent window control handle plate.

JBO00111-00093

3. Remove the front door inside handle subassembly attaching screw.
4. Remove the front door pull handle by removing the attaching screw.
5. Unscrew the front door locking button.
6. Unlock the inside door handle from the front door and insert it into the front door trim panel assembly.



JBO00112-00094

7. Remove the front door lower frame bracket garnish by pulling it out to disengage the retainers provided on the bracket, using a clip remover.

JBO00113-00095

8. Unlock the nail section of the front door inside handle subassembly from the front door panel and insert it into the front trim panel assembly.
9. Disengage the retainers provided on the rear side of the front door trim panel assembly by pulling out one by one from the door panel.
   CAUTION:
   - Be sure to disconnect the retainers, using a clip remover.
     Failure to observe this caution may bend the front door trim panel assembly or cause cracks on the front door trim panel assembly.

JBO00114-00096

10. Pull up the front trim panel assembly to disengage it from the front door panel.
11. Disconnect the connector of the wire harness from the power window switch. (Only for power window-equipped model.)
12. Remove the front door trim panel assembly from the front door panel.

JBO00115-00097

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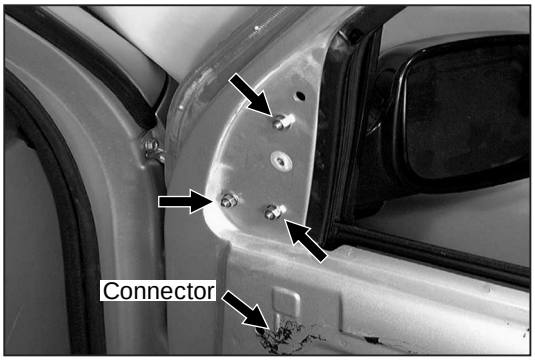
13. Remove the front door inside handle subassembly by disconnecting the front door open control link.
14. Remove the door trim bracket by removing the attaching screws.
15. Remove the speaker by removing the three attaching screws. (Only when equipped.)
16. Remove the front door service hole cover from the front door panel.
    CAUTION:
    - Never reuse the service hole covers. Failure to observe this caution may lead to water leakage.

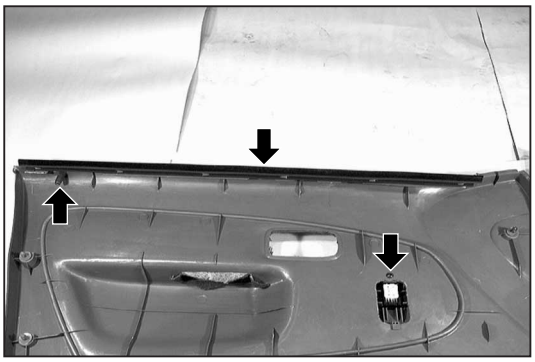
JBO00116-00098

17. Removal of outside rear view mirror
    (1) Disconnect the connector of the wire harness from the connector of the outside rear view mirror. (Only for remote control mirror-equipped model.)
    (2) Remove the three attaching nuts of the outside rear view mirror while holding the outside rear view mirror by hand.
    (3) Remove the outside rear view mirror.



JBO00117-00099

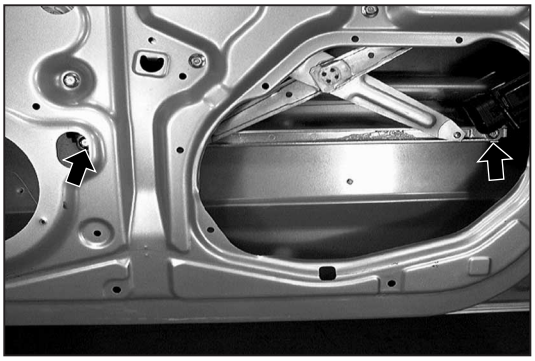
18. Remove the door lock control knob holder from the door trim panel assembly.
19. Remove the power window control switch by removing the attaching screws. (Only for power window-equipped model.)
20. Remove the front door glass weatherstrip assembly from the front door trim panel assembly by straightening the protrusion sections on the front door glass weatherstrip assembly.


JBO00118-00100

21. Remove the attaching bolts of the front door front lower frame assembly. Then, remove the front lower frame assembly.

JBO00119-00101

22. Removal of front door glass subassembly
    (1) Install the front door window handle assembly temporarily.
    (2) Place the front door glass attaching bolts in position at the holes provided on the front door panel by turning the front door window handle.
    (3) Remove the bolts attaching the front door glass to the front door regulator subassembly.


JBO00120-00102

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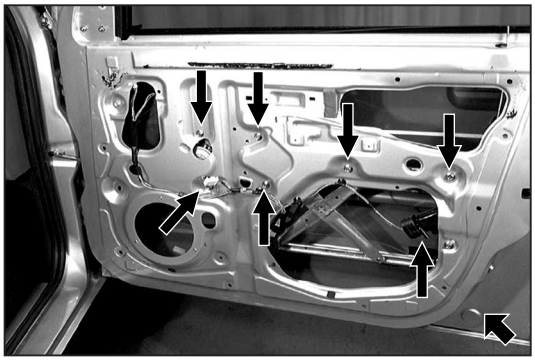
23. Remove the front door glass subassembly.

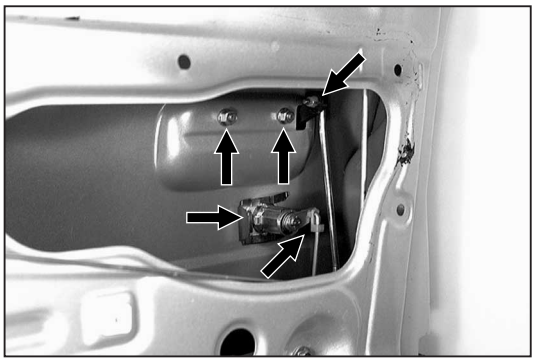
JBO00121-00103

24. Disconnect the connector of the front door wire harness from the power window motor. (For model equipped with power window)
25. Remove the front door window regulator subassembly by removing the attaching bolts.
26. Remove the front door rear lower frame subassembly by removing the attaching screw and bolt.



JBO00122-00104

27. Removal of front door lock assembly
    (1) Disconnect the front door open control link from the front door outside handle assembly.
    (2) Disconnect the front door open control link assembly from the front door lock assembly.
    (3) Remove the front door lock cylinder and lock cylinder pad by removing the lock retainer.
    (4) Remove the front door outside handle assembly by removing the attaching nuts.



JBO00123-00105

    (5) Disconnect the connector of the wire harness from the door lock control motor. (For model equipped with central door lock.)
    (6) Remove the front door lock assembly by removing the attaching screws.

JBO00124-00106

28. Remove the front door glass outer weatherstrip from the front door panel by unlocking the front door glass weatherstrip grips.
29. Remove the front door glass run.

JBO00125-00107

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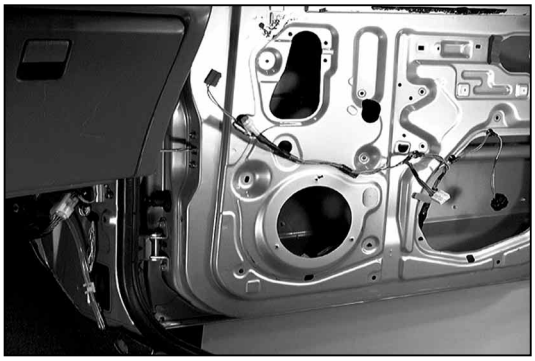
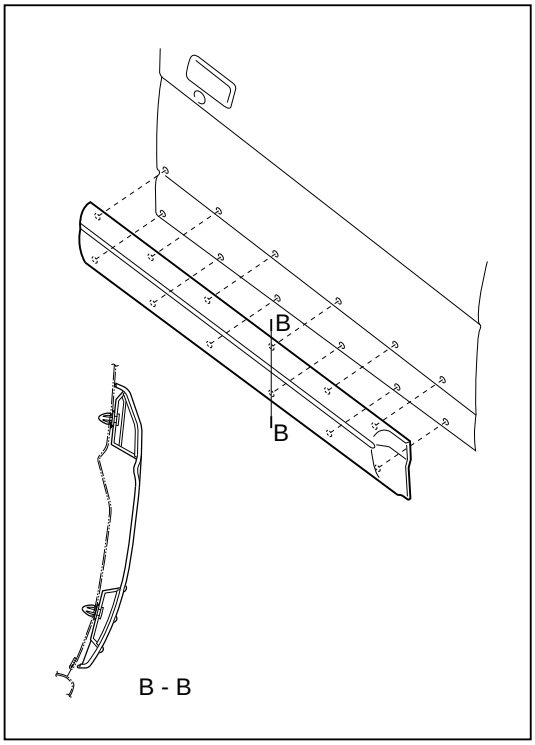
30. Remove the cowl side trim board. (Refer to the trim & garnish section.)
31. Disconnect the connector of the wire harness (cowl wire) from the connector of the wire harness (front door wire).
32. Disconnect the various clamps of the wire harness from the front door.
    (For models equipped with power window, central door lock and/or speaker.)
33. Remove the front door wire from the inside of the front door by removing the grommet section of the front door wire.



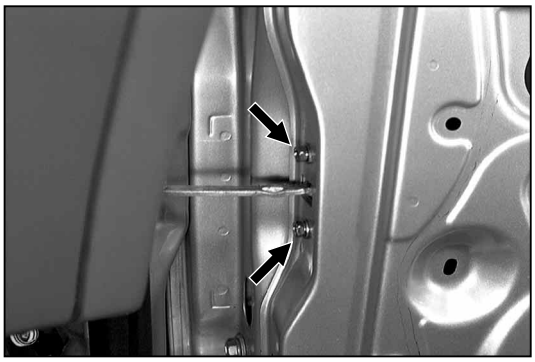
JBO00126-00220

34. Remove the front door garnish by retracting the mushroom section of the retainers.
    CAUTION:
    - The front part of the garnish is affixed with a two-faced adhesive tape.
      Therefore, be very careful not to bend the garnish during the removal of the front part of the garnish.



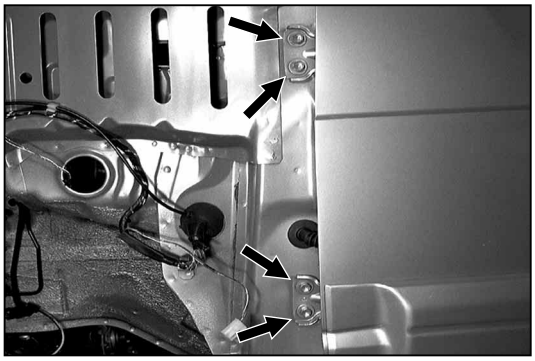
JBO00127-00108

35. Remove the front door check assembly by removing the attaching bolts.
36. Remove the front fender.
    (Refer to the front fender section for the removal procedure.)
37. Remove the front door by removing the attaching bolts of the front door hinges while holding the front door securely.



JBO00128-00109

38. Remove the front door upper and lower hinges from the front door by removing the attaching bolts.



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ASSEMBLY

NOTE:

- Basically the assembling procedure is reverse to the disassembling procedure. Therefore, illustrations are not mentioned in this assembling procedure. Refer to the illustrations in the disassembling procedure in cases where any difficulty is encountered.

1. Install the front door upper and lower hinges to the front door with the attaching bolts.
2. Install the front door to the vehicle shell with the attaching bolts while holding the front door securely and adjust the front door alignment. (Refer to the section under the adjustment of front door and rear door alignment.)
3. Install the front fender.
   (Refer to the front fender section for the installation procedure.)
4. Install the door check assembly with the attaching bolts.
5. Installation of front door garnish.
   (1) Affix a two-faced adhesive tape to the front part of the front door garnish.
   (2) Install the front door garnish to the front door panel by connecting the retainers and ensure that the retainers are engaged securely.

   NOTE:

   - If the installation is performed in a cold wether, hear the front door panel to about 40°C before the installation.

6. Installation of front door wire.
   (Only for model equipped with power window, central door lock and speaker, For the details, refer to the BE section.)
   (1) Install the front door wire to the front door and connect the wire harness clamp to the front door panel.
   (2) Route the front door wire through the front door panel and hole provided on the body shell.
   (3) Secure the front door wire grommets to the front door and body shell.
   (4) Connect the connector of the wire harness to the connector of the front door wire.
   (5) Install the cowl side trim board. (Refer to the trim & garnish section.)

7. Install the front door glass run.
8. Install the front door glass outer weatherstrip to the front door panel and ensure that the front door glass weatherstrip grips are engaged with the front door panel securely.
9. Installation of front door lock assembly
   (1) Install the front lock assembly to the front door panel with the attaching screws and bolt. (Only for central door lock-equipped model.)
   (2) Connect the connector of the wire harness to the door lock control motor.
   (3) Install the front door outside handle assembly with the attaching nuts.
   (4) Install the front door lock cylinder and lock cylinder pad by installing the lock retainer.
   (5) Connect the front door open control link assembly to the front door lock assembly.
   (6) Connect the front door open control link to the front door outside handle assembly.
10. Install the front door rear lower frame subassembly by installing the attaching screw and bolt and insert the front glass run into the front floor rear lower frame subassembly.
11. Install the front door regulator subassembly with the attaching bolts.
12. Connect the connector of the front door wire harness to the power window motor. (For model equipped with power window.)
13. Install the front door glass subassembly into the front door panel.
14. Install the front door window regulator handle assembly temporarily and align the attaching bolt holes of the front door window with the regulator by adjusting the height of the regulator.
15. Install the front door glass to the front regulator subassembly by installing the attaching bolts.
16. Insert the front door frame assembly into the front door panel and insert the front glass run into position.
17. Install the front door front frame assembly with the attaching bolts.
18. Install the front door glass outer weatherstrip assembly to the front door trim panel assembly by bending the nail sections of the front door glass outer weatherstrip.

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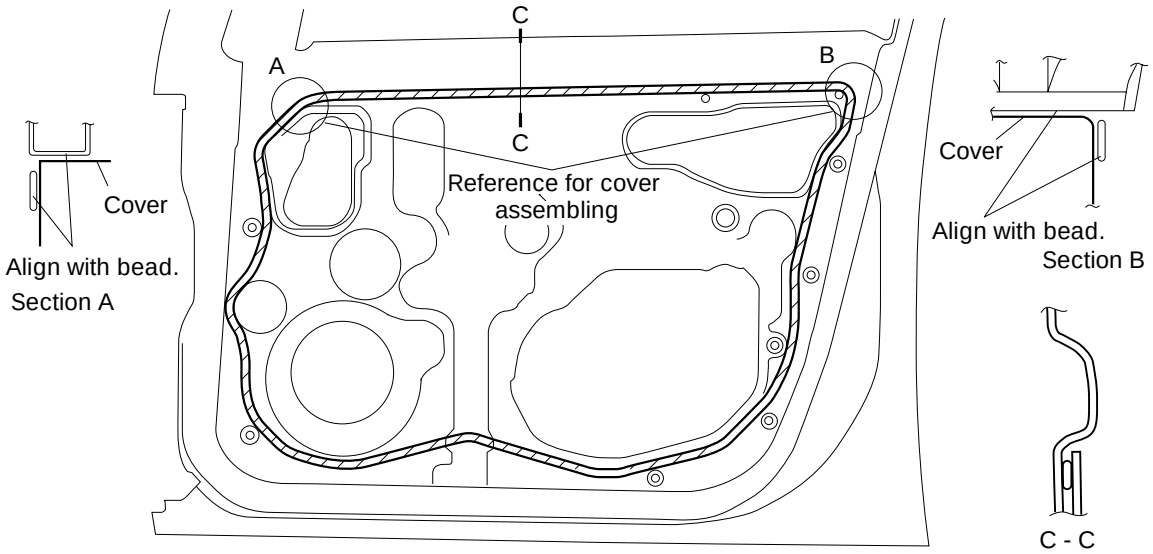
19. Install the power window control switch by installing the attaching bolt. (For power window-equipped model.)
20. Install the door control lock knob holder to the front door trim panel assembly.

JBO00130-00000

21. Installation of front door service hole cover
    (1) Affix a butyl tape at the groove provided around the front door panel, as shown.
    (2) Attach the service hole cover on the butyl tape, as shown.
    CAUTION:
    - Care must be exercised so that the joint section of the butyl tape may come at the upper section. If the joint section of the tape comes at the lower side of the door, it may cause water leakage.
    - The butyl tape should be routed just under the water drain holes. Failure to observe this caution may lead to collection of water, resulting in rust formation.
    - Never reuse the front door service hole cover. Failure to observe this caution may lead to water leakage.
    - Be sure to route the front door open control link for front door inside handle subassembly.



JBO00131-00111

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22. Install the door trim bracket with the attaching screws.
23. Connect the front door inside handle subassembly to the front door open control link.
24. Installation of outside rear view mirror
    (1) Install the outside rear view mirror with the three attaching nuts.
    (2) Connect the connector of the front door wire harness to the connector of the remote control mirror. (For remote control rear view mirror-equipped model.)
    (3) Connect the clamp of the wire harness to the door panel.
25. Connect the connector of the front door wire harness to the power window switch. (For power window-equipped model.)
26. Insert the front door inside handle subassembly into the front door trim panel assembly.
27. Hang the front door trim panel assembly on the front door panel.
28. Connect the front door trim panel assembly to the front door panel by connecting the retainers on the front door trim panel assembly.
29. Connect the front door inside handle to the front door panel and install the attaching screw.
    NOTE:
    • An oversize screw is available as a spare part for cases where the ordinary screw becomes loose.

30. Install the front door pull handle to the front door with the attaching screw.
    NOTE:
    • An oversize screw is available as a spare part for cases where the ordinary screw becomes loose.

31. Install the shaft snap ring to the front door window handle.
    NOTE:
    • Install the shaft snap ring to the front regulator handle in such a direction that the open end faces toward the handle side.

32. Install the front door window handle to the window regulator with the door vent window control handle plate.
33. Install the front door lower fame bracket garnish.
34. Screw in the front door locking button.

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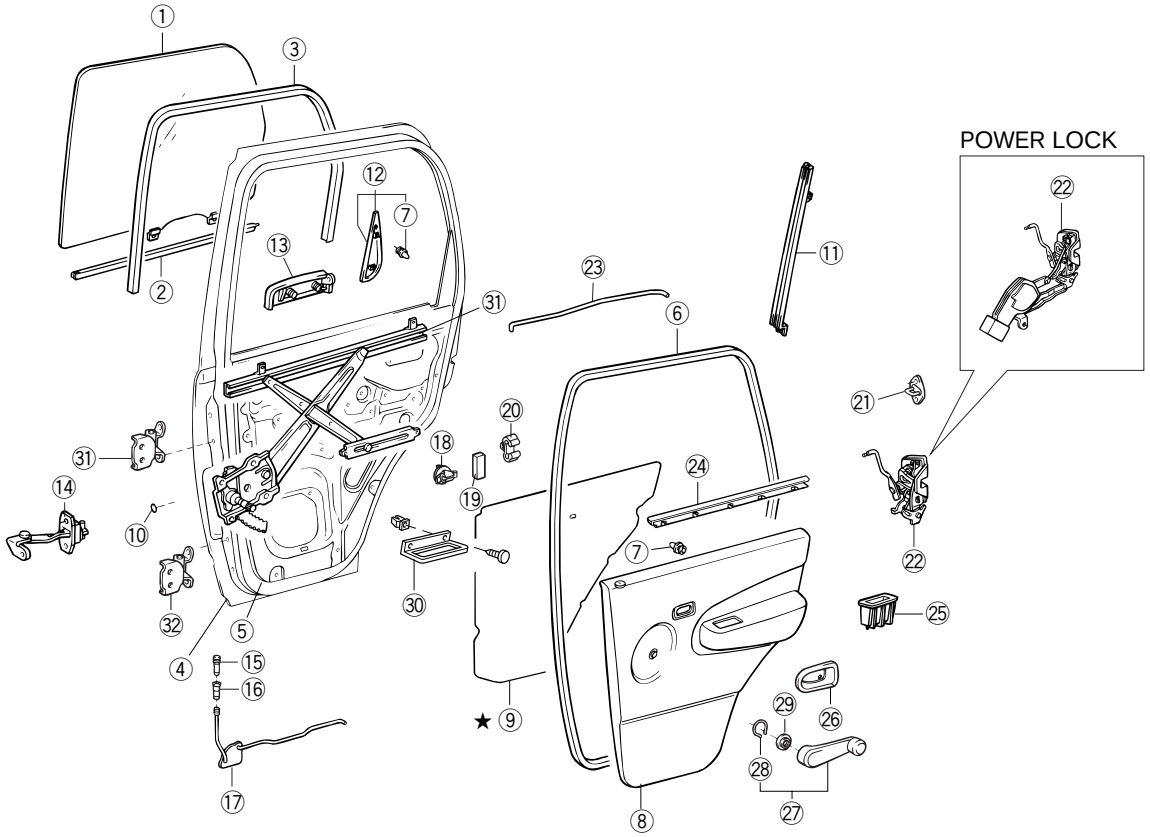
REAR DOOR

COMPONENTS

★ : Non-reusable parts



① Rear door glass subassembly
② Rear door glass outer weatherstrip
③ Rear door glass run
④ Rear door outside panel
⑤ Rear door panel subassembly
⑥ Rear door weatherstrip
⑦ Door trim retainer
⑧ Rear door trim board subassembly
⑨ Rear door service hole cover
⑩ Hole cover
⑪ Rear door window guide subassembly
⑫ Rear door rear lower frame seal
⑬ Rear door outside handle assembly
⑭ Rear door check assembly
⑮ Rear door locking button
⑯ Door lock control knob holder
⑰ Rear door locking control link subassembly
⑱ Rear door locking link clamp
⑲ Rear door locking silencer
⑳ Rear door lock link clamp
㉑ Door lock striker plate subassembly
㉒ Rear door lock assembly
㉓ Rear door open control link
㉔ Rear door glass inner weatherstrip assembly
㉕ Door pull handle
㉖ Rear door inside handle
㉗ Rear door window handle assembly
㉘ Shaft snap ring
㉙ Door vent window control handle plate
㉚ Door trim No. 1 bracket
㉛ Rear door upper hinge assembly
㉜ Rear door lower hinge assembly

JBO00133-00112

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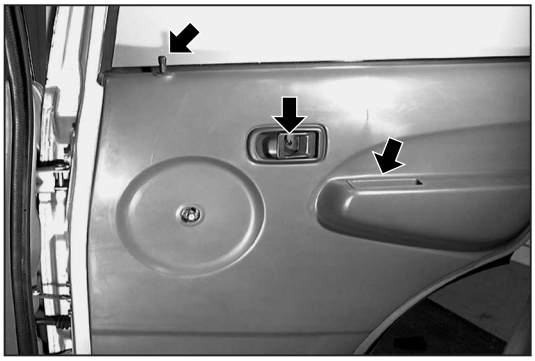
DISASSEMBLY

Removal of rear door trim panel assembly

1. Unlock the shaft snap ring of the rear door window regulator handle assembly by inserting a piece of cloth between the rear door window regulator handle and the door vent window control handle plate. Then, pull the inserted cloth alternately so as to unlock the shaft snap ring.
2. Remove the rear door window regulator handle, shaft snap ring and door vent window control handle plate.

JBO00134-00113

3. Remove the attaching screws of the rear door inside handle assembly.
4. Unscrew the rear door locking button.
5. Remove the door pull handle by removing the attaching screw.

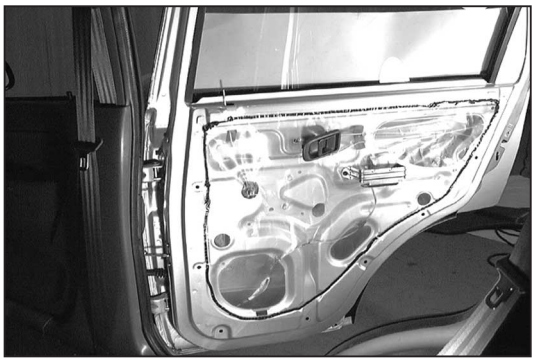


JBO00135-00114

6. Disengage the retainers provided on the back side of the rear door trim panel assembly.
7. Unlock the nail section of the rear door inside handle subassembly from the rear door panel. Then, insert it into the rear door trim panel assembly.
8. Remove the rear door trim panel assembly from the rear door panel by hang it off.
9. Remove the door trim No.1 bracket by removing the attaching bolts.
10. Remove the rear door inside handle subassembly by disconnecting it from the rear door open control link assembly.

JBO00136-00115

11. Remove the rear door service hole cover from the rear door panel.
    CAUTION:
    - Never reuse the removed service hole cover.



JBO00137-00116

12. Remove the rear door glass weatherstrip assembly from the rear door trim panel assembly by straightening the protrusion section on the rear door glass weatherstrip assembly.
13. Remove the door control knob holder from the door trim panel panel assembly.

JBO00138-00117

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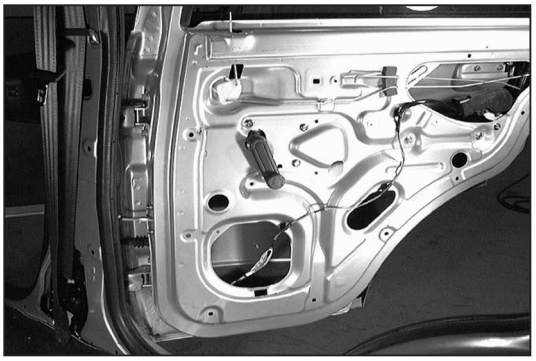
14. Disconnect the rear door harness clamp from the door panel.
    (For the central door lock and/or speaker-equipped vehicle.)
15. Disconnect the connector of the rear door wire harness from the door control motor assembly.
    (For the central door lock and/or speaker-equipped vehicle.)



JBO00139-00118

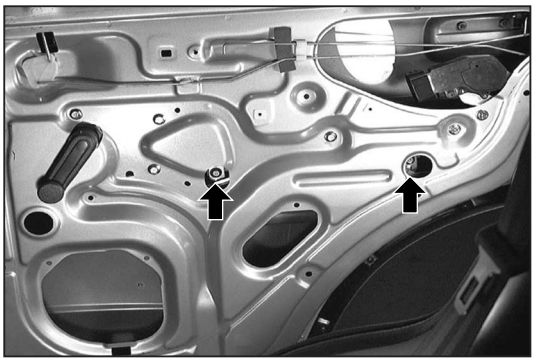
16. Remove the rear lower frame seal of the rear door by disengaging the retainers from the rear door panel, using a clip remover or the like.

JBO00140-00119

17. Remove the rear door window guide subassembly by removing the attaching bolts.

JBO00141-00120

18. Removal of rear door glass subassembly
    (1) Install the rear door window handle assembly temporarily.
    (2) Align the rear door glass attaching bolts with the holes provided on the rear door panel by turning the rear door window handle.
    (3) Remove the attaching bolts of the rear door glass from the rear door window regulator subassembly.



JBO00142-00121

19. Remove the rear door glass subassembly from the rear door panel.

JBO00143-00122

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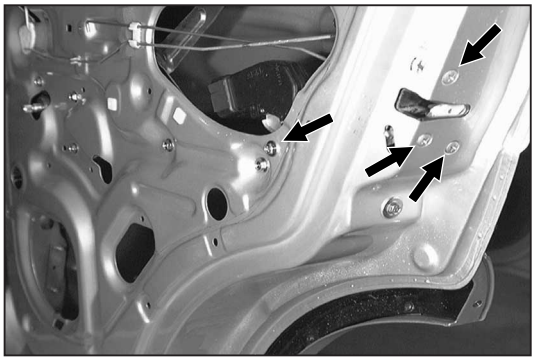
20. Remove the rear door glass outer weatherstrip from the rear door panel by disconnecting the rear door glass weatherstrip clip from the rear door panel.
21. Remove the rear door glass run.
22. Remove the rear door window regulator handle assembly by removing the attaching bolts.

JBO00144-00123

23. Disconnect the door control link from the rear door outside handle assembly.
24. Remove the rear door outside handle assembly by removing the attaching nuts.
25. Disconnect the rear door open control link assembly from the rear door lock assembly.
26. Remove the rear door lock assembly.

JBO00145-00124

27. Remove the rear door lock assembly by removing the three attaching screws and one bolt. (For door control motor-equipped vehicles.)
28. Remove the rear door lock assembly from the rear door panel.



JBO00146-00125

29. Removal of rear door garnish
    (1) Remove the attaching screws of the rear door garnish which is installed to the outside molding No. 2 retainer.
    (2) Remove the rear door garnish by removing the retainers.

JBO00147-00126

30. Remove the outside molding No. 2 retainer by removing the attaching bolts.

JBO00148-00127

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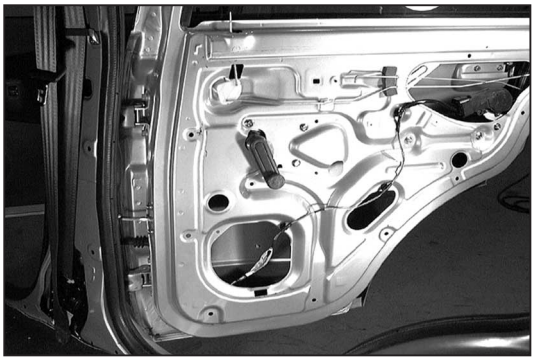
31. Remove the center pillar lower garnish. (Refer to the trim & garnish section.) (Only for model equipped with central door lock and/or speaker.)
32. Disconnect the connector of the rear door wire from the wire harness. (Only for model equipped with central door lock and/or speaker.)
33. Remove the rear door wire by disconnecting the rear door wire clamp from the rear door panel while retracting the lock section of the various clamps and disconnect the rubber grommet from the body shell and rear door panel.
    (Only for model equipped with central door lock and/or speaker.)
34. Remove the rear door check assembly by removing the attaching bolts.
35. Remove the rear door by removing the attaching bolts.
36. Remove the rear door hinges from the rear door by removing the attaching bolts.

JBO00149-00221



JBO00000-00128

ASSEMBLY

NOTE:

- Basically the assembling procedure is reverse to the disassembling procedure. Therefore, some illustrations are not mentioned in this assembling procedure. Refer to the illustrations in the disassembling procedure in cases where any difficulty is encountered.

1. Install the rear door hinges to the rear door with the attaching bolts.
2. Install the rear door by installing the attaching bolts of the rear door hinges while holding the rear door securely and adjust the rear door alignment. (Refer to the section under the adjustment of front door and rear door alignment.)
3. Install the rear door check assembly by installing the attaching bolts.
4. Install the rear door wire harness to the rear door through the body shell and rear door panel and set the rubber grommets to the body shell and rear door panel.
   (Only for model equipped with central door lock and/or speaker.)
5. Connect the rear door wire clamps to the rear door panel.
   (Only for model equipped with central door lock and/or speaker.)
6. Connect the connector of the rear door wire to the wire harness.
   (Only for model equipped with central door lock and/or speaker.)
7. Install the center pillar lower garnish. (Refer to the trim & garnish section.)
8. Install the outside molding No. 2 retainer to the rear door by installing the attaching bolts.
9. Installation of rear door garnish
   (1) Ensure that the retainers are installed on the rear door garnish properly.
   (2) Affix a two-faced adhesive tape at the front part of the rear door garnish.
   (3) Install the rear door garnish to the rear door panel by connecting the retainers securely.
   (4) Install the rear door garnish to the outside molding No. 2 retainer by installing the attaching screws.
10. Install the rear door lock assembly with the three attaching screws and one bolt. (For central door lock-equipped model.)
11. Install the rear door open control link assembly to the rear door panel and connect it to the rear door lock control assembly.
12. Install the rear door outside handle assembly with the two attaching nuts securely.
13. Connect the door control link to the rear door outside handle assembly.
14. Install the rear door glass run.

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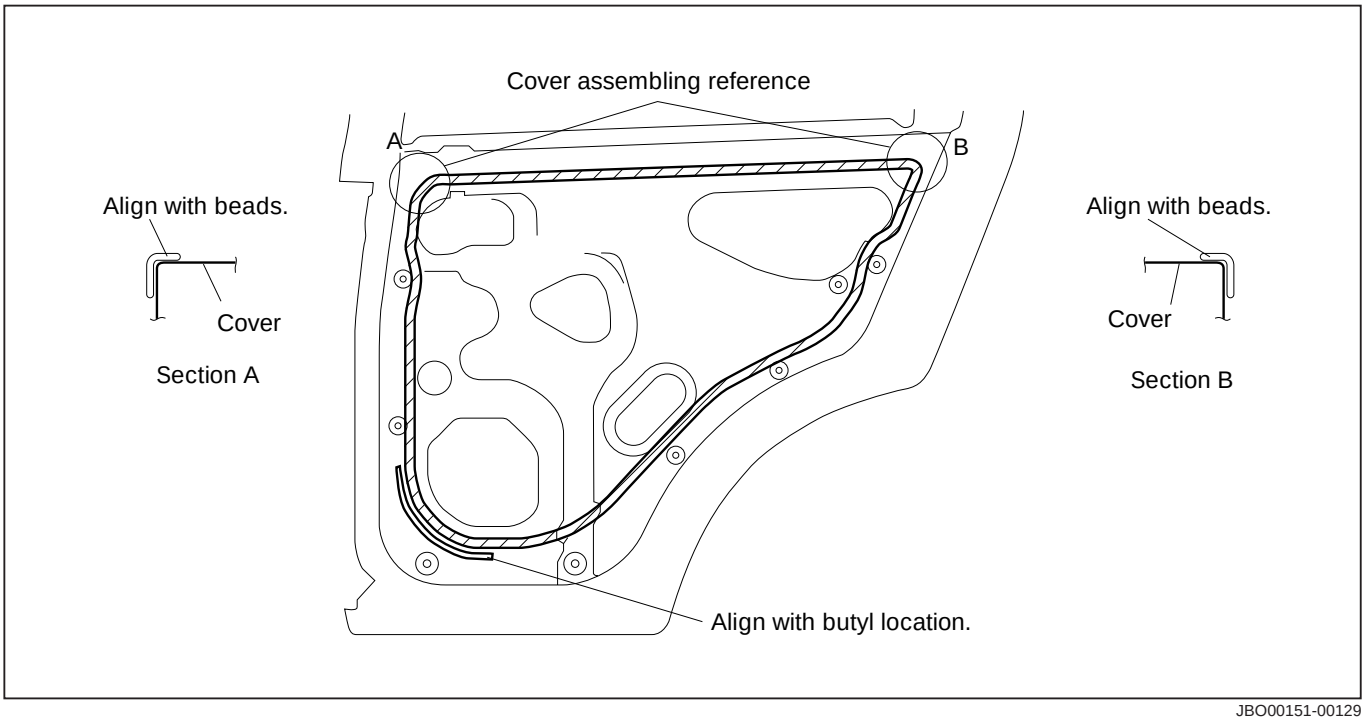
15. Install the rear door glass outer weatherstrip to the rear door panel by connecting the rear door glass weatherstrip clip to the rear door panel.
16. Install the rear door regulator subassembly with the attaching bolts.
17. Install the rear door window regulator handle temporarily.
18. Align the position for the rear door glass attaching bolts with the hole on the rear door panel.
19. Install the rear door glass subassembly to the rear door panel.
20. Install the attaching bolts of the rear door glass to the rear door window regulator subassembly.
21. Install the rear door window guide subassembly into the rear door panel and connect the rear window glass run to the rear door window guide subassembly.
22. Install the rear door window guide subassembly to the rear door panel while inserting the rear door window glass into the glass run.
23. Install the rear door lower frame seal by connecting its retainers to the rear door panel assembly.
24. Connect the connector of the rear door wire to the door control motor assembly.
25. Install the rear door glass weatherstrip assembly to the rear door trim panel assembly by bending the protrusion sections on the front door glass weatherstrip assembly.

JBO00150-00000

26. Installation of rear door service hole cover
    (1) Affix a butyl tape to the groove provided around the rear door panel as shown.
    CAUTION:
    - Care must be exercised so that the joint section of the butyl tape may come at the upper section. If the joint section of the tape comes at the lower side of the door, it may cause water leakage.
    - The butyl tape should be routed just under the water drain holes. Failure to observe this caution may lead to collection of water, resulting in rust formation.
    - Never reuse the removed service hole cover.

    (2) Affix the front door service hole cover, as shown.
    NOTE:
    - Pass the rear door open control link through the front door service hole cover during the assembly.



JBO00151-00129

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27. Install the door trim No. 1 bracket with the attaching bolts.
28. Connect the rear door inside handle subassembly to the rear door open control link assembly.
29. Ensure that the retainers are installed on the back side of the rear door trim panel assembly properly.
30. Pass the rear door inside handle subassembly through the rear door panel while holding the rear door trim panel assembly slightly.
31. Install the rear door trim panel assembly on the rear door panel while aligning the rear door lock control link position.
32. Engage the retainers provided on the rear side of the front door trim panel assembly by pressing the position where retainers are installed.
33. Hang the nail section provided on the rear door inside handle subassembly to the rear door panel and secure the attaching screws.
    NOTE:
    - An oversize screw is available.

34. Install the attaching screw of the door lock control knob holder securely.
35. Screw in the rear door locking button.
36. Close the window glass fully.
37. Install the snap ring to the rear door window regulator handle assembly in such a direction that the open ends of the snap ring face toward the arm side of the window regulator handle assembly.
38. Attach the door vent window control handle plate in such a direction that the recessed side faces toward the front door trim panel assembly side.
39. Insert the window handle assembly to the regulator in such a way that the tilt angle is 30 degrees from the horizontal.
40. Ensure that the rear door mechanism operates properly.
41. Check and adjust the rear door alignment.
    (Refer to the section under the adjustment front door and rear door alignment.)

JBO00152-00000

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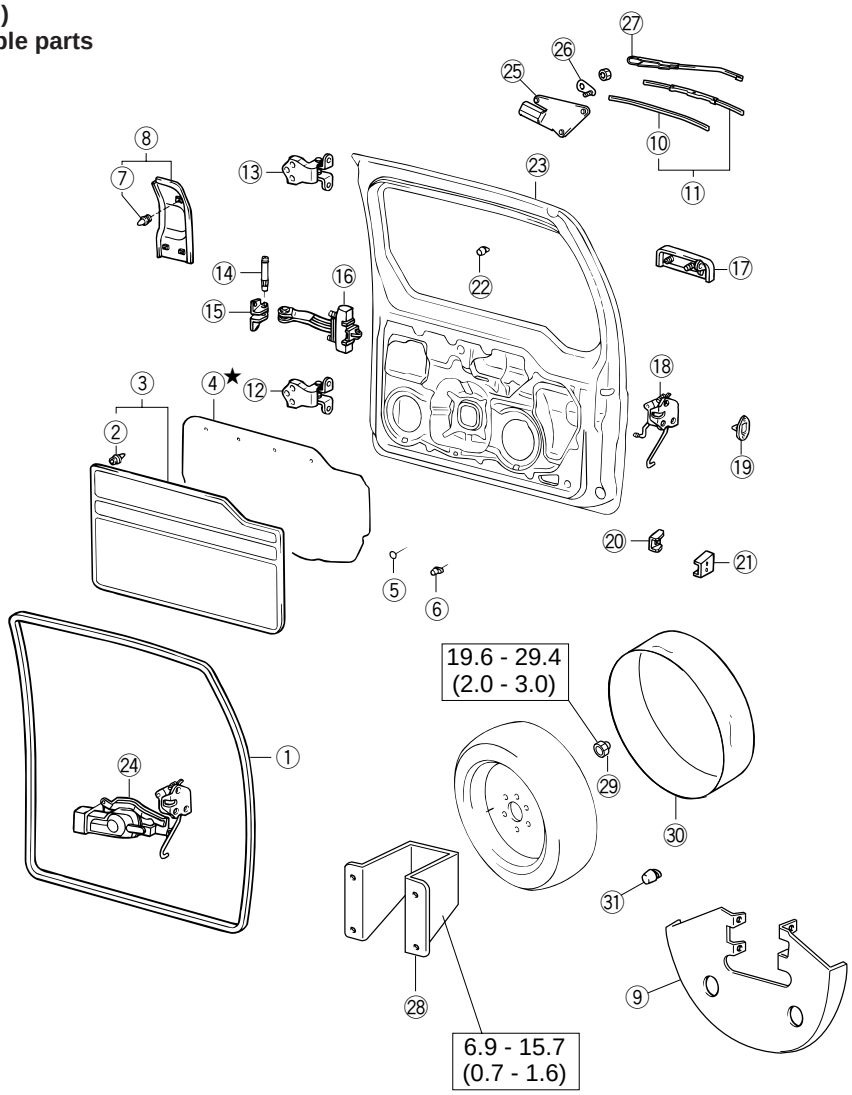
BACK DOOR

COMPONENTS

: Tightening torque
Unit : N·m (kgf-m)
★ : Non-reusable parts



① Back door weatherstrip
② Retainer
③ Back door trim board
④ Back door service hole cover
⑤ Hole plug
⑥ Cushion
⑦ Clip
⑧ Back door hinge cover
⑨ Spare wheel cover tray (only for model equipped)
⑩ Rear wiper blade rubber
⑪ Rear wiper blade assembly
⑫ Lower hinge assembly
⑬ Upper hinge assembly
⑭ Door check pin
⑮ Back door check base
⑯ Back door check assembly
⑰ Back door handle assembly
⑱ Back door lock assembly
⑲ Door lock striker plate assembly
⑳ Back door down male stopper
㉑ Back door down female stopper
㉒ Cushion
㉓ Back door panel subassembly
㉔ W/motor back door lock assembly
㉕ Rear wiper motor assembly
㉖ Rear wiper link cap
㉗ Rear wiper arm assembly
㉘ Spare wheel carrier assembly
㉙ Nut
㉚ Spare wheel cover (only for model equipped)
㉛ Spare wheel carrier protector cushion (only for model equipped)

JBO00153-00130

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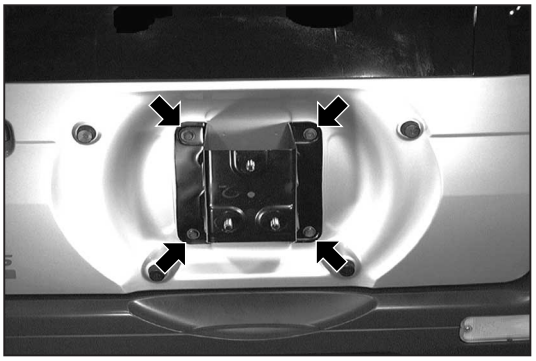
DISASSEMBLY

1. Removal of spare wheel
   (1) Remove the spare wheel by removing the attaching bolts.
   (2) Remove the spare wheel cover tray by removing the four attaching bolts. (For model equipped with spare wheel carrier.)

JBO00154-00131

   (3) Remove the spare wheel carrier assembly by removing the four attaching bolts.


JBO00155-00132

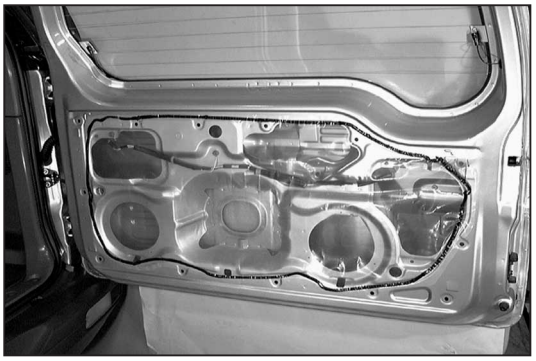
2. Remove the rear wiper arm by removing the attaching nut. (Only for rear wiper-equipped model. Refer to the BE section for the removal procedure.)

JBO00156-00133

3. Remove the back door trim board by disengaging the retainers provided on the back side of the back door trim board, using a clip remover.

JBO00157-00134

4. Remove the back door service hole cover from the back door panel subassembly.
   NOTE:
   • Never reuse the removed service hole cover.
     Failure to observe this note may lead to water leakage.


JBO00158-00135

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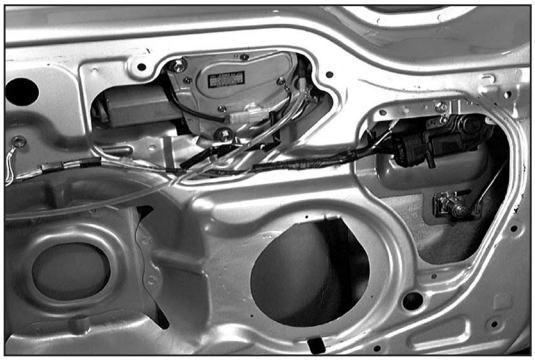
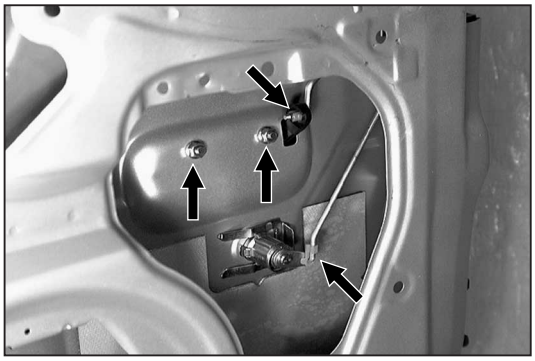
5. Disconnect the connectors of the rear wiper motor and door lock control switch.
   (Only for models equipped with such equipment. Refer to the BE section for the removal procedure.)
6. Remove the rear wiper motor by removing the attaching bolts.
   (Only for rear wiper-equipped model. Refer to the BE section for the removal procedure.)



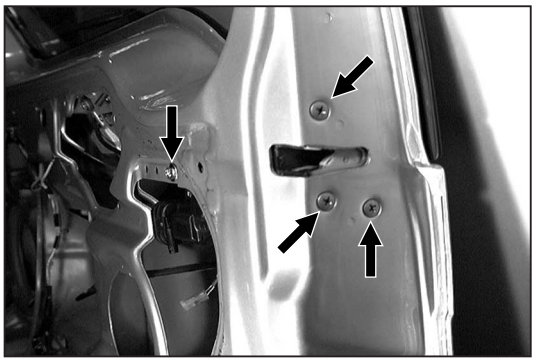
JBO00159-00136

7. Removal of back door handle assembly
   (1) Disconnect the back door open control link from the back door handle assembly.
   (2) Remove the back door handle assembly by removing the two attaching nuts.
8. Removal of back door lock cylinder
   (1) Disconnect the back door lock control link from the back door lock cylinder.
   (2) Remove the back door lock cylinder and lock cylinder pad by removing the lock retainer.



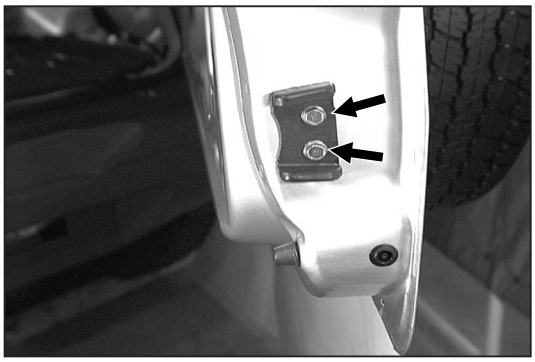
JBO00160-00137

9. Disconnect the connector of the central door lock.
   (Only for central door lock-equipped model)
10. Remove the back door lock assembly by removing the three attaching bolts.



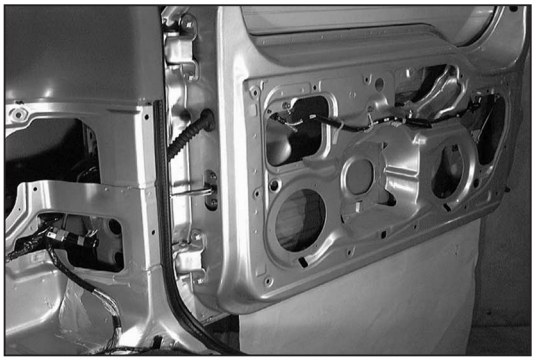
JBO00161-00138

11. Remove the back door lower male stopper by removing the two attaching bolts.



JBO00162-00139

12. Disconnect the clamps of the wire harness from the back door panel.
13. Disconnect the rear window washer hose and plug the disconnected hose.
14. Disconnect the connector of the back door wire harness from the rear window defogger.
15. Disconnect the connector of the high mount stop lamp from the back door wire harness.
16. Remove the deck side trim. (Refer to the trim & garnish section.)
17. Disconnect the connector of the rear door wire harness from the connector of the wire harness.
18. Remove the back door wire harness from the body shell and back door by disconnecting the grommets on the back door wire harness.



JBO00163-00140

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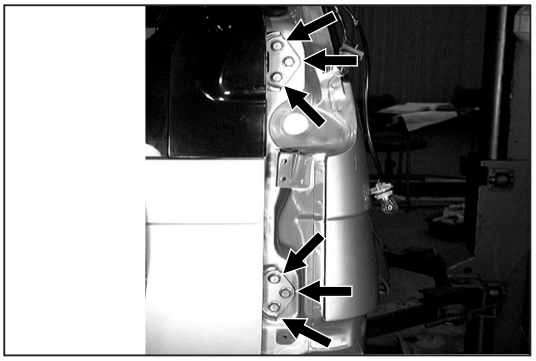
19. Remove the back door check assembly by removing the attaching bolts.

JBO00164-00141

20. Remove the right hand side rear combination lamp and rear bumper filler.
    (Refer to the rear bumper section)

21. Remove the back door by removing the attaching bolts of the back door hinge.
22. Remove the hinges from the back door by removing the attaching bolts.



JBO00165-00142

ASSEMBLY

NOTE:

- Basically the assembling procedure is reverse to the disassembling procedure. Therefore, illustrations are not mentioned in this assembling procedure. Refer to the illustrations in the disassembling procedure in cases where any difficulty is encountered.

1. Installation of back door panel subassembly
   (1) Install the back door hinges (upper & lower) to the back door panel with the attaching bolts.
   (2) Install the back door to the vehicle shell with the attaching bolts securely.
   (3) Adjust the back door alignment.
   (Refer to the section under the adjustment of back door alignment.)
   (4) Install the back door check assembly with the attaching bolts.
2. Install the right hand side rear combination lamp and rear bumper filler.
   (Refer to the rear bumper section)
3. Install the rubber grommets of the back door wire harness to the back door panel and body shell.
4. Connect the connector of the rear door wire harness to the connector of the wire harness (body side.).
5. Install the deck side trim. (Refer to the trim & garnish section.)
6. Install the high mount stop lamp.
7. Connect the connector of the high mount stop lamp and/or rear window defogger.
   (For model equipped with such equipmemt.)
8. Connect the rear door wire harness clamps to the rear door panel.
9. Connect the window washer hose.
10. Install the back door lower male stopper with the two attaching bolts.
    (Refer to the section under the adjustment of back door alignment.)
11. Install the back door lock assembly with the attaching screws.
12. Connect the connector of the door lock control motor. (Only for central door lock-equipped model)
13. Installation of back door lock cylinder
    (1) Install the back door lock cylinder and lock cylinder pad with the attaching lock retainer.
    (2) Connect the back door lock control link to the back door lock cylinder.
14. Installation of back door handle assembly
    (1) Install the back door handle assembly with the two attaching nuts.
    (2) Connect the back door open control link to the back door handle assembly.

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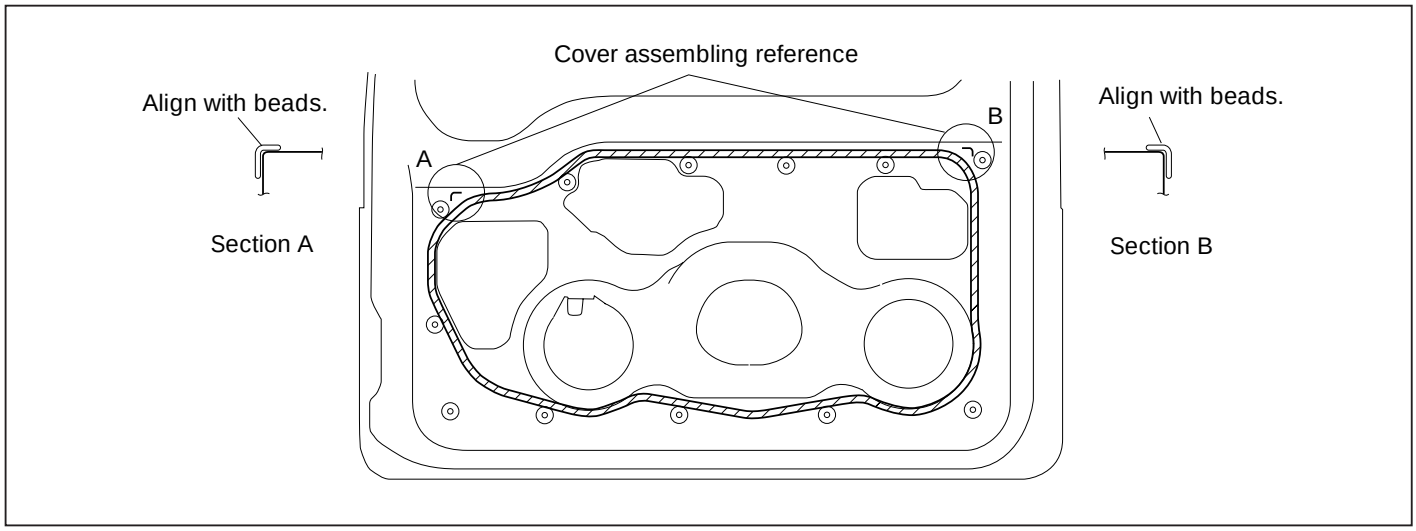
15. Install the rear wiper motor with the attaching bolts.
    (Only for rear wiper-equipped model. Refer to the BE section for the installation procedure.)
16. Connect the connectors of the rear wiper motor and door lock control switch.
    (Only for models equipped with such equipment. Refer to the BE section for the installation procedure.)

JBO00166-00000

17. Installation of back door service hole cover
    CAUTION:
    - Never reuse the used service hole cover.

    (1) Affix a butyl tape to the groove provided around the back door panel.
    (2) Affix the back door service hole cover as shown.



JBO00167-00143

18. Ensure that the back door trim retainers are installed properly.
19. Install the back door trim to the back door and ensure that the retainers are connected to the rear door panel properly.
20. Install the rear wiper arm with the attaching nut.
    (Only for rear wiper-equipped model. Refer to the BE section for the installation procedure.)
21. Installation of spare wheel
    (1) Install the spare wheel carrier assembly with the four attaching bolts and tighten them to the specified tightening torque.
        Tightening Torque: 24.5 - 44.1 N·m (2.5 - 4.5 kgf-m)

    (2) Install the spare wheel cover tray with the four attaching bolts and tighten them to the specified tightening torque.
        Tightening Torque: 6.9 - 15.7 N·m (0.7 - 1.6 kgf-m)

    (3) Install the spare wheel to the spare wheel carrier with the attaching bolts.
        Tightening Torque: 19.6 - 29.4 N·m (2.0 - 3.0 kgf-m)

JBO00168-00000

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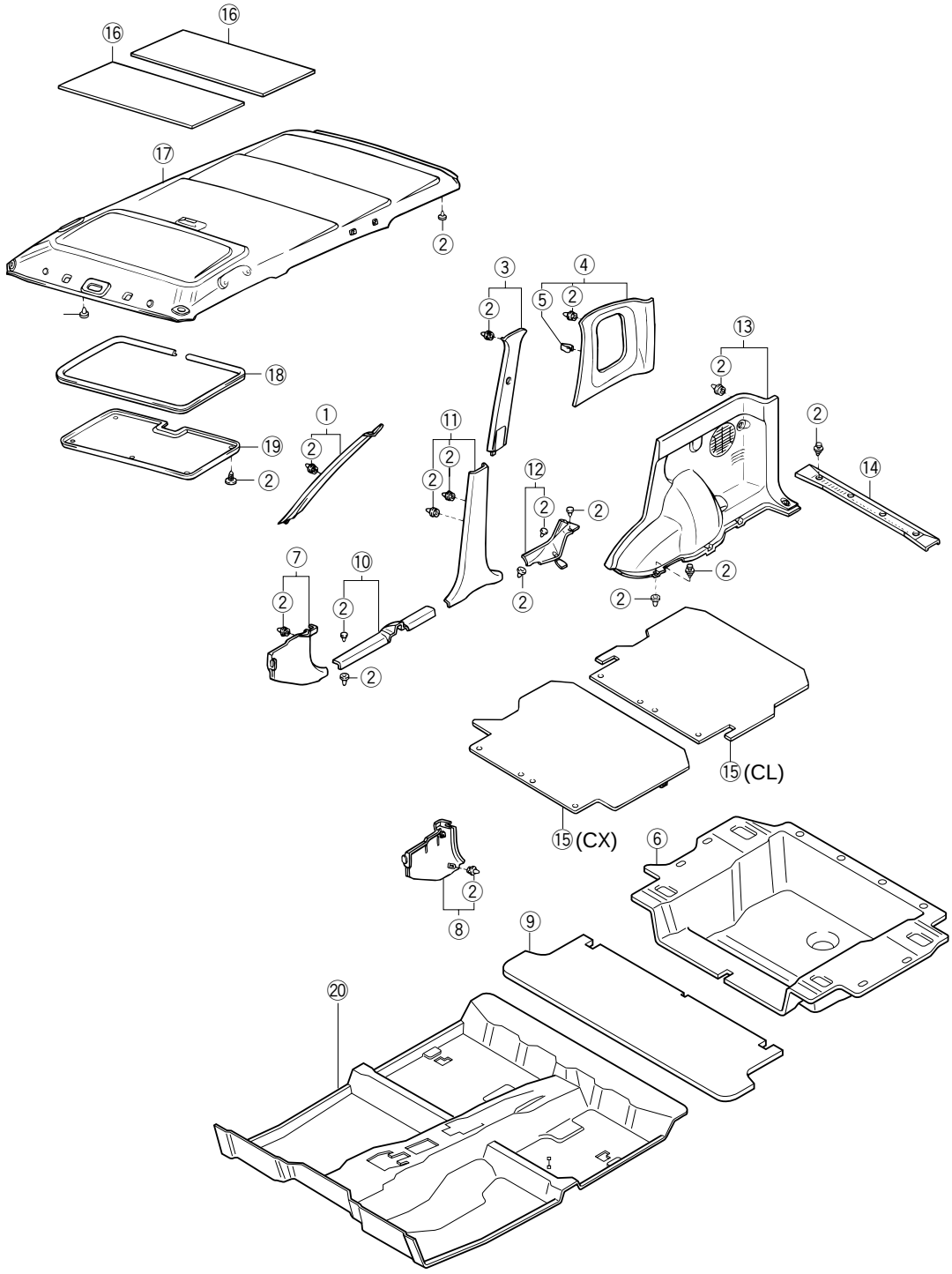
TRIM & GARNISH

COMPONENTS



① Front pillar garnish (R, L)
② Retainer
③ Center pillar upper garnish (R, L)
④ Roof side inner garnish (R, L)
⑤ Clip
⑥ Rear floor rear carpet
⑦ Cowl side trim right board assembly
⑧ Cowl side trim left board assembly
⑨ Rear floor front carpet
⑩ Front door scuff plate (R, L)
⑪ Center pillar lower garnish (R, L)
⑫ Rear door scuff plate assembly (R, L)
⑬ Deck side trim (R, L)
⑭ Lower back trim
⑮ Deck board assembly
⑯ Roof silencer
⑰ Roof headlining assembly
⑱ Sun roof opening trim molding
⑲ Sun roof headlining
⑳ Floor carpet assembly

JBO00169-00144

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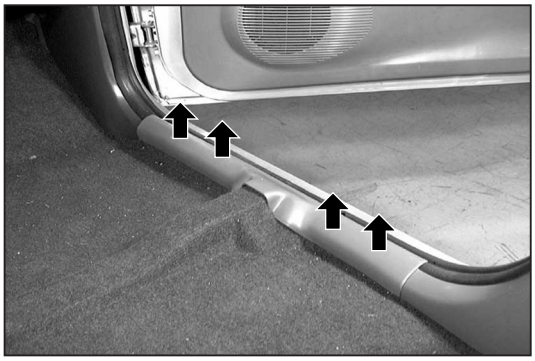
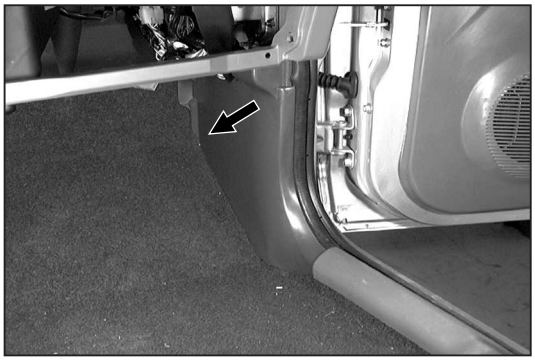
REMOVAL

1. Remove the front and rear seats.
   (Refer to the front and rear seat section.)
2. Removal of front door scuff plate
   (1) Disconnect the four retainers provided under the scuff plate by pulling them up straight.
   (2) Remove the front scuff plate.


JBO00170-00145

3. Removal of cowl side trim board assembly
   (1) Disconnect the retainers of the cowl side trim board from the body panel, using a clip remover or the like.
   (2) Pull out the cowl side trim board assembly rearward to disengage it from the locator.


JBO00171-00146

4. Removal of rear door scuff plate assembly
   (1) Remove the attaching clips of rear door scuff plate.
   (2) Gradually disconnect the retainers provided under the scuff plate by lifting them up.
   (3) Remove the rear door scuff plate.

JBO00172-00147

5. Removal of center pillar lower garnish
   (1) Disconnect the retainers of the center pillar lower garnish, using a clip remover or the like.
   (2) Remove the center pillar lower garnish while lifting it upward.

JBO00173-00148

6. Removal of center pillar upper garnish
   (1) Remove the front seat outer belt shoulder anchor.
   (Refer to the seat belt section for the removal procedure.)
   (2) Disconnect the retainers of the center pillar upper garnish, using a clip remover or the like.
   (3) Remove the center pillar upper garnish.
7. Removal of the front floor carpet assembly and rear floor front carpet.
   (Only when necessary.)
   (1) Remove the rear console box assembly and console panel. (Refer to instrument panel section for removal.)
   (2) Remove the front floor carpet assembly by removing the attaching clip and rear floor front carpet.

JBO00174-00149

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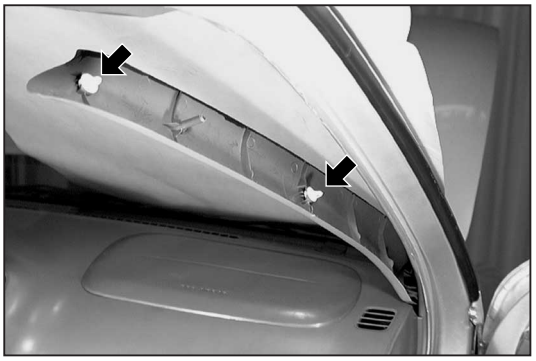
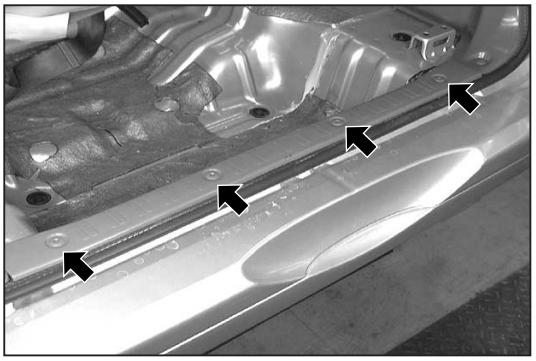
8. Removal of front pillar garnish
   (1) Disconnect the clips provided on the back side of the front pillar garnish, using a clip remover or the like.
   (2) Remove the front pillar garnish.



JBO00175-00150

9. Removal of lower back trim
   (1) Unlock the clips by pushing the central part of the clips one notch.
   (2) Remove the clips from the lower back trim.
   (3) Remove the lower back trim.
10. Remove the deck board assembly by removing the attaching bolts.



JBO00176-00222

11. Removal of deck side trim
    (1) Remove the rear seat outer belt anchor.
    (Refer to the seat belt section.)
    (2) Unlock the clips by pushing the central part of the clips one notch.
    (3) Remove the deck side trim by carefully disconnecting the three spring clips installed at the rear door side.
    (4) Remove the luggage room lamp connector.
    (Only for luggage room lamp-equipped model. Refer to the BE section.)

JBO00177-00151

12. Remove the rear floor rear carpet.
13. Removal of roof side inner garnish
    (1) Remove the rear seat outer belt anchor assembly.
    (Refer to the seat belt section for the removal procedure.)
    (2) Disconnect the retainers of the roof side inner garnish by pulling it out, using a clip remover.
    (3) Remove the roof side inner garnish.

JBO00178-00152

14. Remove the assist grip assembly by removing the attaching screws.
    NOTE:
    • Open the cover for assist grip attaching screws, before removing the attaching screws, if the model equipped with the assist grip attaching screw cover.

JBO00179-00153

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15. Removal of inner rear-view mirror assembly and visor assembly
    (1) Disconnect the visor assembly from the visor holder.
    (2) Remove the visor assembly by removing the two attaching screws.
    (3) Remove the visor holder by removing the attaching screws.
    (4) Remove the room lamp cover.
    (5) Remove the two attaching screws of the inner rear-view mirror.
    (6) Remove the inner rear-view mirror by disconnecting its connector.

JBO00180-00154

16. Remove the removable roof assembly.
    (Refer to the removable roof section.)

17. Remove the roof headlining assembly by removing the attaching retainer.
    CAUTION:
    - Be very careful not to smear the roof headlining during the removal.
    - Be very careful not to bend the roof headlining during the removal.
    - Never reuse the damaged grommet.

JBO00181-00155

18. Tear off the roof silencer from the roof panel.
    (Only when necessary)
    NOTE:
    - Never reuse the removed silencer pad.

JBO00182-00156

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INSTALLATION

NOTE:

- Basically the assembling procedure is reverse to the disassembling procedure. Therefore, some illustrations are not mentioned in this assembling procedure. Refer to the illustrations in the disassembling procedure in cases where any difficulty is encountered.

1. Sticking of roof silencer pad
   (1) Clean the roof silencer attaching surface of the roof panel.
   (2) Apply adhesive agent to the roof silencer.
   CAUTION:
   - Ensure that the adhesive agent be applied to at least 90% of the roof silencer. Failure to observe this caution may lead to producing echo or resonance noise from the roof panel.

   (3) Stick the roof silencer pad to the roof panel.
2. Install the roof headlining with the attaching retainer.
   CAUTION:
   - Never reuse the damaged retainer.
   - Be very careful not to bend the roof headlining during the installation.
   - Be very careful not to smear the roof headlining during the installation.
   - Make sure that each connector is located at the lamp attaching section.

3. Install the removable roof assembly. (Refer to the removable roof section.)
4. Installation of inner rear-view mirror and visor assembly
   (1) Connect the connector of the roof wire to the inner rear-view mirror.
   (2) Install the inner rear-view mirror with the two attaching screws.
   (3) Install the room lamp cover.
   (4) Install the visor holder with the attaching screw.
   (5) Install the visor assembly with the two attaching screws.
   (6) Connect the visor assembly to the visor holder.
5. Install the assist grip assembly with the attaching screws.
6. Place the front floor carpet in position and install the clip.
7. Install the rear floor front carpet and rear floor rear mat in position.
8. Install the child restraint anchorage. (Only for vehicles with the Australian specifications)
   Tightening Torque: 15.4 - 28.6 N·m (1.57 - 2.91 kgf-m)

9. Installation of roof side inner garnish
   (1) Ensure that the door trim retainers are properly installed on the back side of the roof side inner garnish.
   (2) Install the roof side inner garnish by engaging the retainer with the body shell. To engage the retainer with the body shell, lightly tap the retainer attached position of the roof side inner garnish surface horizontally by hand.
   CAUTION:
   - Be sure to tap the back side of the retainer attaching position horizontally by hand. Failure to observe this caution may damage the retainer or other related parts.

10. Installation of deck side trim
    (1) Connect the luggage room lamp connectors to luggage room lamp. (Refer to BE section of the installation procedure.)
    (2) Install the deck side trim.
    (3) Push back the central part of the retainer one click from the position where the central part is flush with the outer part.
    (4) Install the retainer and lock the retainer by pushing the central part of the retainer until its upper surface becomes flush with the outer part of the retainer.
    (5) Install the rear seat outer belt assembly.
    (Refer to the seat belt section for the installation procedure.)

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11. Install the deck board assembly by installing the attaching bolts.
12. Installation of lower back trim
    (1) Place the lower back trim in position.
    (2) Push back the central part of the retainer one click from the position where the central part is flush with the outer part.
    (3) Install the retainer and lock the retainer by pushing the central part of the retainer until its upper surface becomes flush with the outer part of the retainer.
13. Installation of front pillar garnish
    (1) Ensure that the clips are installed properly.
    (2) Insert the lower end of the front pillar garnish into the hole of the front pillar.
    (3) Install the front pillar garnish by engaging the retainers with the front pillar.
14. Installation of center pillar upper garnish
    (1) Ensure that the retainers are installed properly.
    (2) Install the center pillar upper garnish to the center pillar and ensure that the retainers are engaged properly.
    (3) Install the front seat outer belt shoulder anchor. (Refer to the seat belt section for the removal procedure.)
15. Install the center pillar lower garnish.
16. Installation of rear door scuff plate assembly
    (1) Ensure that the retainers are installed properly.
    (2) Install the rear door scuff plate. Ensure that the retainers are engaged properly.
    (3) Secure the door scuff plate installing the attaching clips.
    (4) Install the retainer and lock the retainer by pushing the central part of the retainer until its upper surface becomes flush with the outer part of the retainer.
17. Installation of cowl side trim board assembly
    (1) Ensure that the retainers are installed properly.
    (2) Insert the cowl side trim into the retainers from the back side of the vehicle.
    (3) Connect the retainer on the cowl side trim to the body panel.
18. Installation of front door scuff plate
    (1) Ensure that the retainers are installed properly.
    (2) Install the front door scuff plate. Ensure that the retainers are connected securely.
19. Install the front and rear seat. (Refer to the front and rear seat section.)

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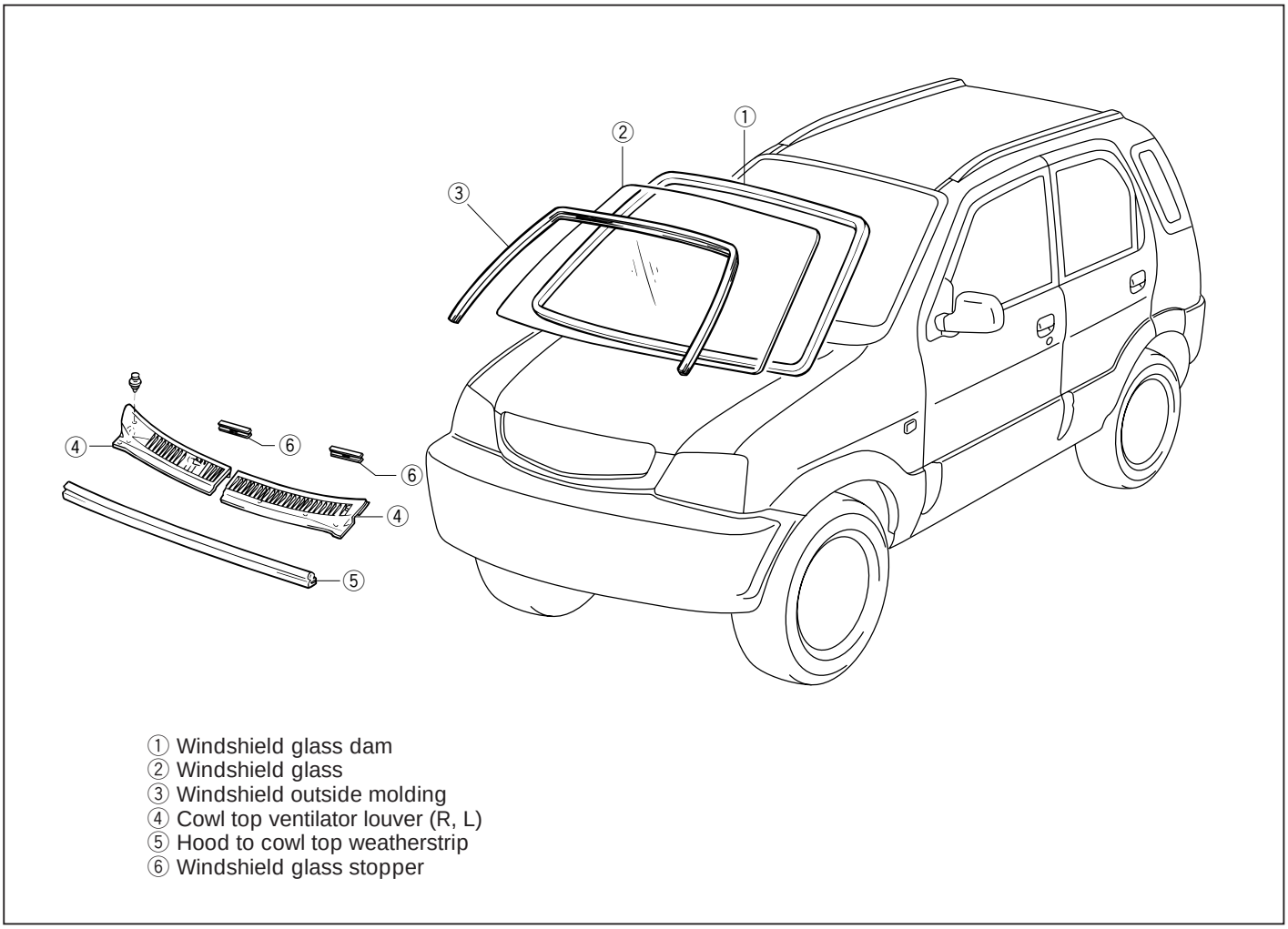
WINDOWS

COMPONENTS



① Windshield glass dam
② Windshield glass
③ Windshield outside molding
④ Cowl top ventilator louver (R, L)
⑤ Hood to cowl top weatherstrip
⑥ Windshield glass stopper

JBO00184-00157

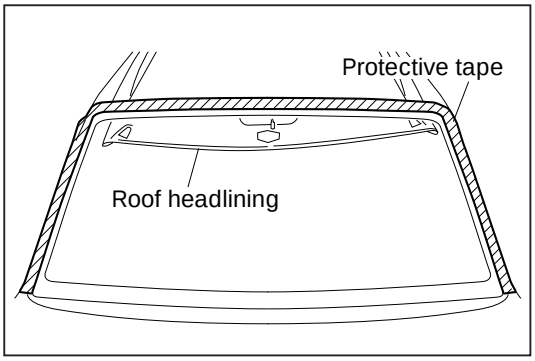
REMOVAL

1. Preparation prior to removal
   (1) Remove the front pillar garnish & roof headlining. (Refer to the trim & garnish section.)
   (2) Remove the instrument panel. (Refer to the instrument panel section.)
   (3) Remove the wiper arms. (Refer to the BE section.)
   (4) Remove the hood-to-cowl top weatherstrip.
   (5) Remove the cowl top ventilator louver by removing the attaching retainers.
   (6) Remove the windshield outside moulding.

JBO00185-00000

   (7) Protection of paint surface around windshield glass
   Protect the paint surface around the windshield glass by applying a protective tape or the like.

CAUTION:
- To protect the paint surface, be sure to apply a protective tape to the inside of the edge (groove around the window attaching surface) as far as it will go.
- Be sure to protect both cabin and outside surface.



JBO00186-00158

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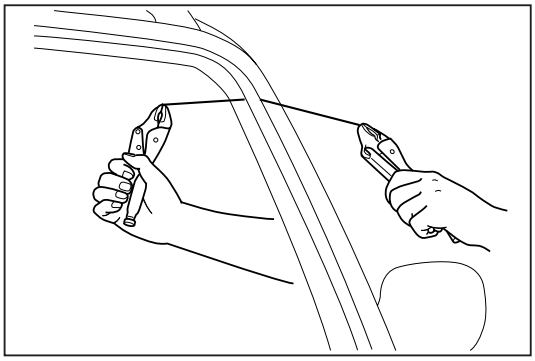
2. Cut off the windshield glass adhesive by a cutter knife or the like to make a small hole, in order to pass a piano wire through the hole.
   CAUTION:
   - Be very careful not to damage the paint surface and windshield by the cutter knife or the like.

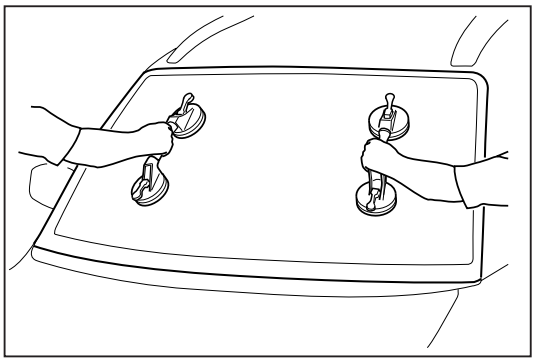
   NOTE:
   - Change the position of the hole to be made if any difficulty is encountered, because spacers or retainers are installed at some parts.
   - For quicker operation, make a hole on the adhesive agent with a heated wire.

   CAUTION:
   - Be very careful not to get scalded during the operation.


JBO00187-00159

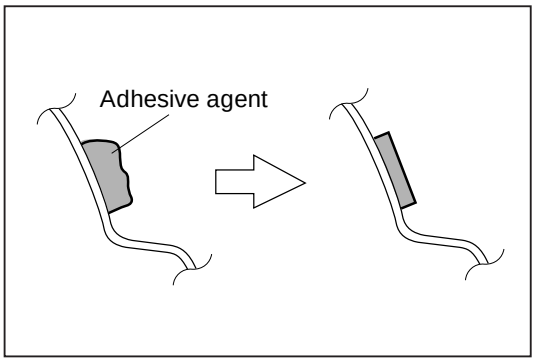
3. Pass the piano wire through the adhesive agent.
4. Hold both ends of the piano wire by pliers or the like and cut off the adhesive by pulling the piano wire one side to the other.
   NOTE:
   - Some parts are hard to be cut off, because spacers or retainers are built in between the glass and the body panel.

5. Remove the windshield glass.
6. Remove the remaining material of the stopper and dam from the windshield glass frame.


JBO00188-00160

7. Clean the adhesive applying part of the windshield glass frame and windshield glass as follows.
   CAUTION:
   - Degrease the blade of a cutter knife before it is put into use.

   The surface of the adhesive agent that was cut by the piano wire should be made flat by means of a cutter knife, while leaving a thin layer of the adhesive material.



JBO00189-00161

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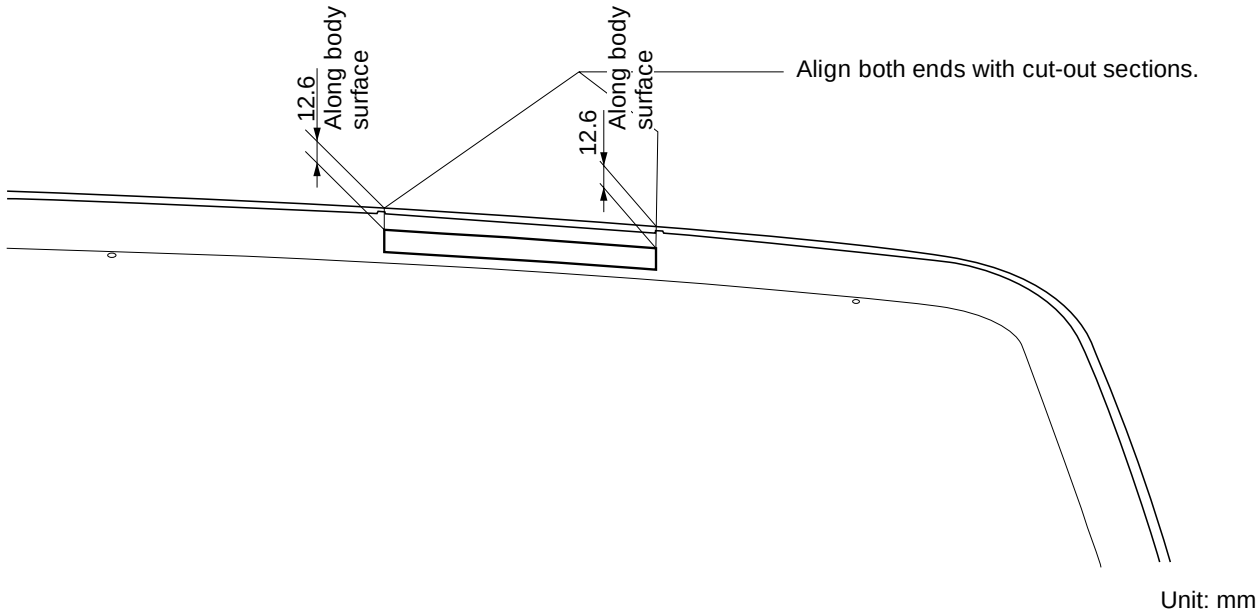
INSTALLATION

1. Affix locating stoppers to the windshield glass as shown in the figure below.

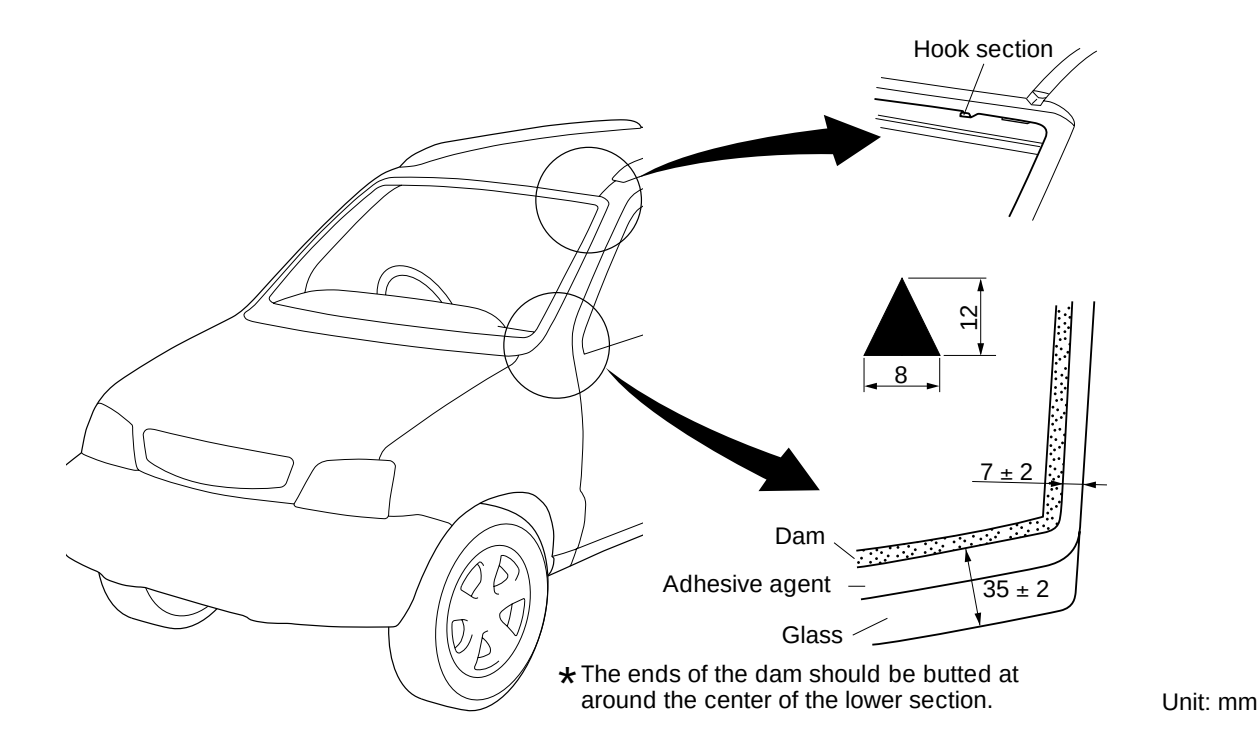


JBO00190-00162

2 Affix a windshield glass dam of the windshield glass to the position shown in the figure below.

3. Apply the primer for the windshield glass frame and/or windshield glass to under the adhesive agent applying portion if the adhesive agent has been removed completely.
   NOTE:
   - Do not apply the primer when adhesive materials remain on the windshield glass frame or windshield glass. Be sure to apply the adhesive agent three minutes after the primer has been applied.

4. Apply the adhesive agent to the positions shown in the figure below.
   Apply the adhesive agent in such a way that the cross section of the applied agent may measure 8 mm in base length and 12 mm in height.



JBO00191-00163

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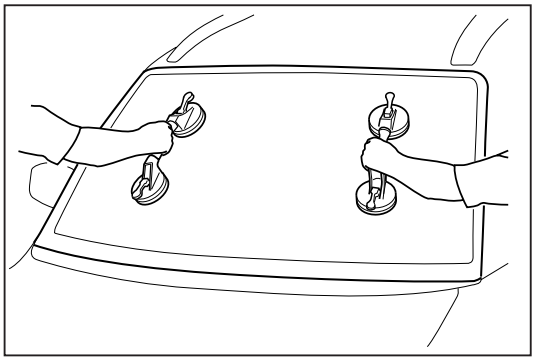
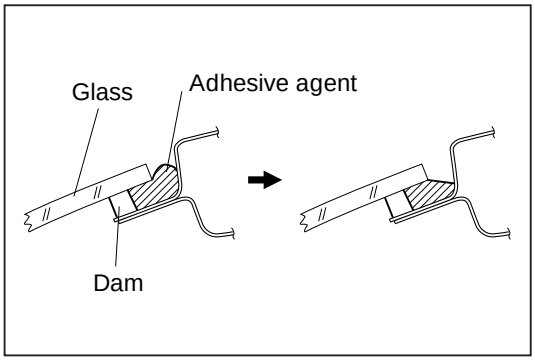
5. Install the glass, using suction rubbers. Push the entire glass surface lightly so that the glass may fit completely.
   NOTE:
   • At this time, assembling should be performed while the marks of the tinted section of the glass are aligned with the windshield glass stoppers.



JBO00192-00164

6. Using a spatula or the like, correct the adhesive agent which has oozed out to the peripheral section of the glass, as shown in the right figure.
7. Affix the windshield outside molding.



JBO00193-00165

8. Cure the adhesive agent completely.
   NOTE:
   • Observe the curing time of the adhesive agent specified by its manufacturer.

   CAUTION:
   • Do not move the vehicle until the adhesive agent of the windshield cures completely.

   As for the following operations, refer to the front windshield wiper section on the BE section.
9. Install the cowl top ventilator louver.
10. Install the hood-to-cowl top weatherstrip.
11. Install the front windshield wiper arms.
12. Ensure that no water leakage exists.
    If any water leakage is found, repair it, as required, or refix the front windshield glass.

JBO00194-00000

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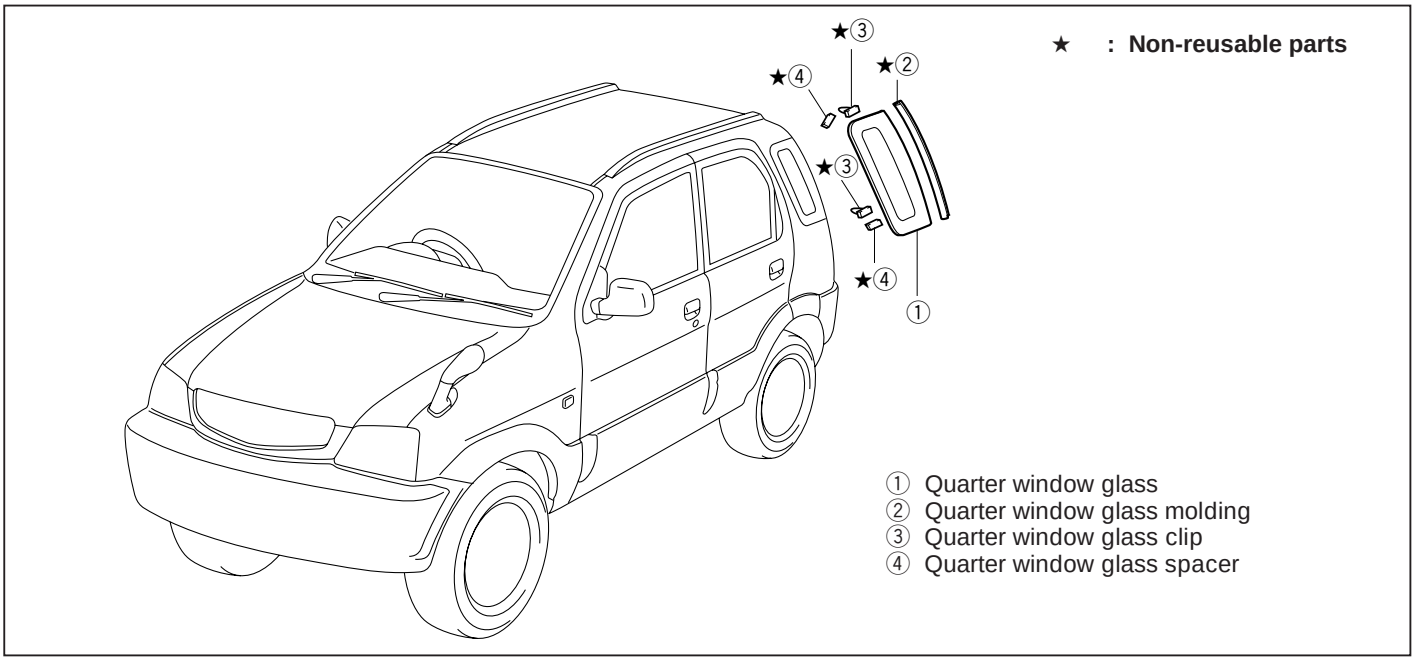
QUARTER WINDOW GLASS

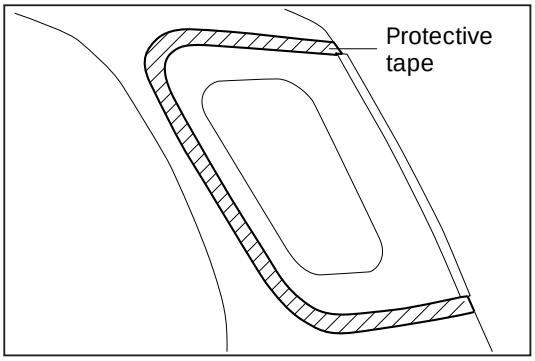
COMPONENTS



JBO00195-00166

REMOVAL

1. Preparation prior to removal
   (1) Remove the roof side inner garnish.
   (Refer to the trim & garnish section.)
   (2) Protection for paint surface around windows
   Protect the paint surface around the windows by applying a protective tape or the like.
   CAUTION:
   - To protect the paint surface, be sure to apply a protective tape to the inside of the edge (groove around the window attaching surface) as far as it will go.
   - Be sure to protect both cabin and outside surface.



JBO00196-00167

2. Cut off the window glass adhesive by a cutter knife or the like to make a small hole, in order to pass a piano wire through the hole.
   CAUTION:
   - Be very careful not to damage the paint surface and window by the cutter knife or the like.

   NOTE:
   - Change the position of the hole to be made if any difficulty is encountered, because spacers or retainers are installed at some parts.
   - For quicker operation, make a hole on the adhesive agent with a heated wire.

   CAUTION:
   - Be very careful not to get scalded during the operation.

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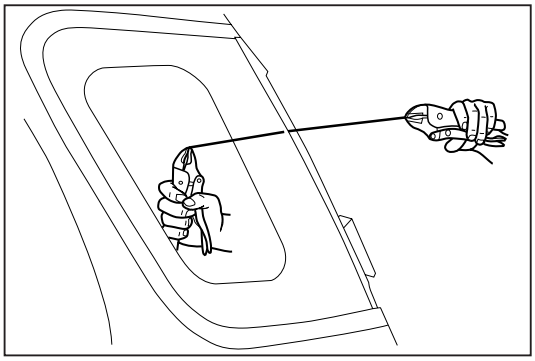
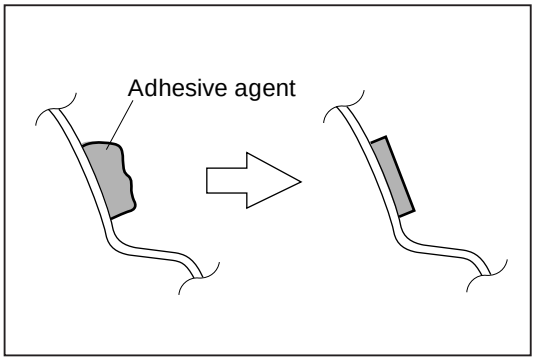
3. Pass a piano wire through the adhesive agent.
4. Hold both ends of the piano wire by pliers or the like and cut off the adhesive by pulling the piano wire one side to the other.
   NOTE:
   - Some parts are hard to be cut off, because spacers or retainers are built in between the glass and the body panel.


JBO00197-00168

5. Remove the window.
6. Remove the remaining material of the stopper and dam from the window frame.
7. Clean the adhesive applying part of the window frame and window glass as follows.
   CAUTION:
   - Degrease the blade of a cutter knife before it is put into use.

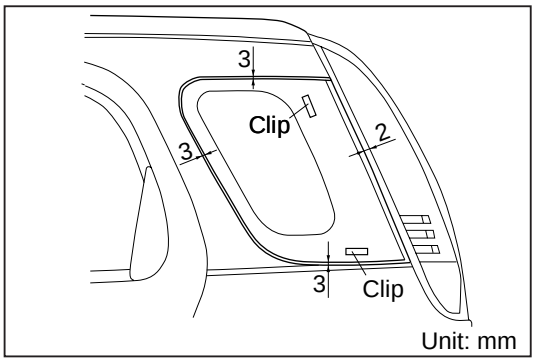
   The surface of the adhesive agent that was cut by the piano wire should be made flat by means of a cutter knife, while leaving a thin layer of the adhesive material.



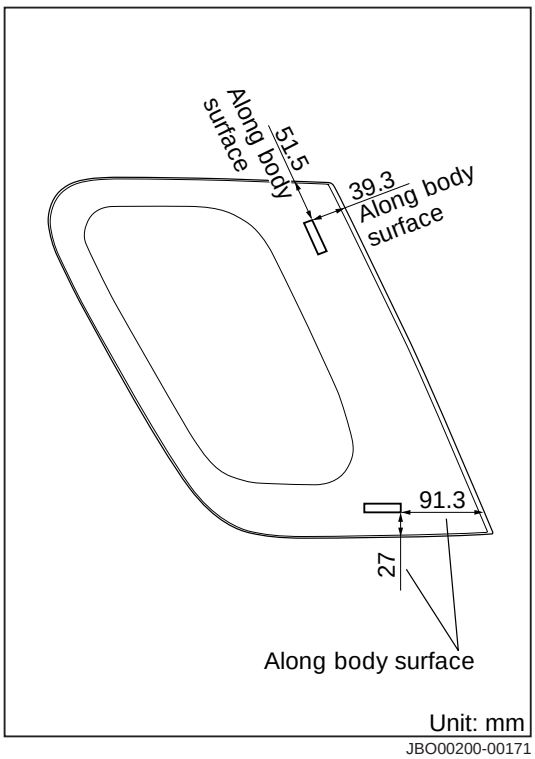
JBO00198-00169

INSTALLATION

1. Affix clips to the quater window glass as follows.
   (1) Install the clips to the holes on the body panel.
   (2) Remove the protective sheet of the clip.
   (3) Place the quater window glass to the body at a location as shown.
   (4) Ensure that the clips are sticked to the quater window glass.
   (5) Remove the quater window glass from the body.
   (6) Ensure that the clips are sticked to the correct position of the quater window glass as shown.



JBO00199-00170



JBO00200-00171

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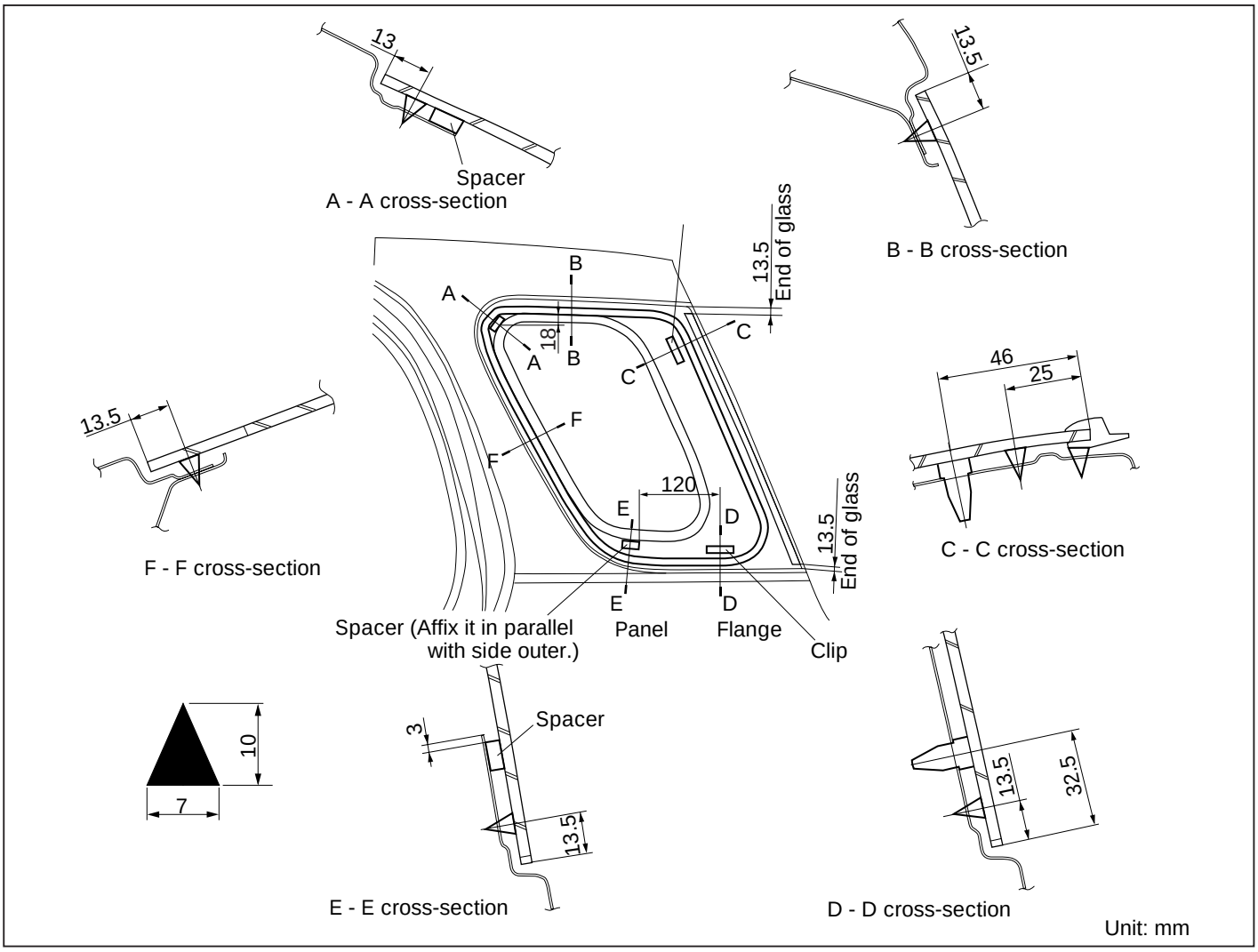
2. Affix the quater window glass molding to the quater window with a two-faced tape.
3. Affix the spacers in position as shown in the figure below.
4. Apply the primer for the window frame or window to under the adhesive agent applying portion if the adhesive agent has been removed completely.
   NOTE:
   - Do not apply the primer when adhesive materials remain on the window frame or window glass. Be sure to apply the adhesive agent three minutes after the primer has been applied.

5. Apply the adhesive agent to the positions shown in the figure below.
   Apply the adhesive agent in such a way that the cross section of the applied agent may measure 8 mm in its base length and 12 mm in height.



JBO00201-00172

6. Install the glass by inserting the clips into the holes on the body side. Push the entire glass surface lightly so that the glass may fit completely.
7. Cure the adhesive agent completely.
   NOTE:
   - Observe the curing time of the adhesive agent specified by its manufacturer.

   CAUTION:
   - Do not move the vehicle until the adhesive agent of the window cures completely.

8. Install the roof side inner garnish. (Refer to the trim & garnish section of the service manual.)
9. Ensure that no water leakage exists.
   If any water leakage is found, repair it, as required, or refit the quarter window glass.

JBO00202-00000

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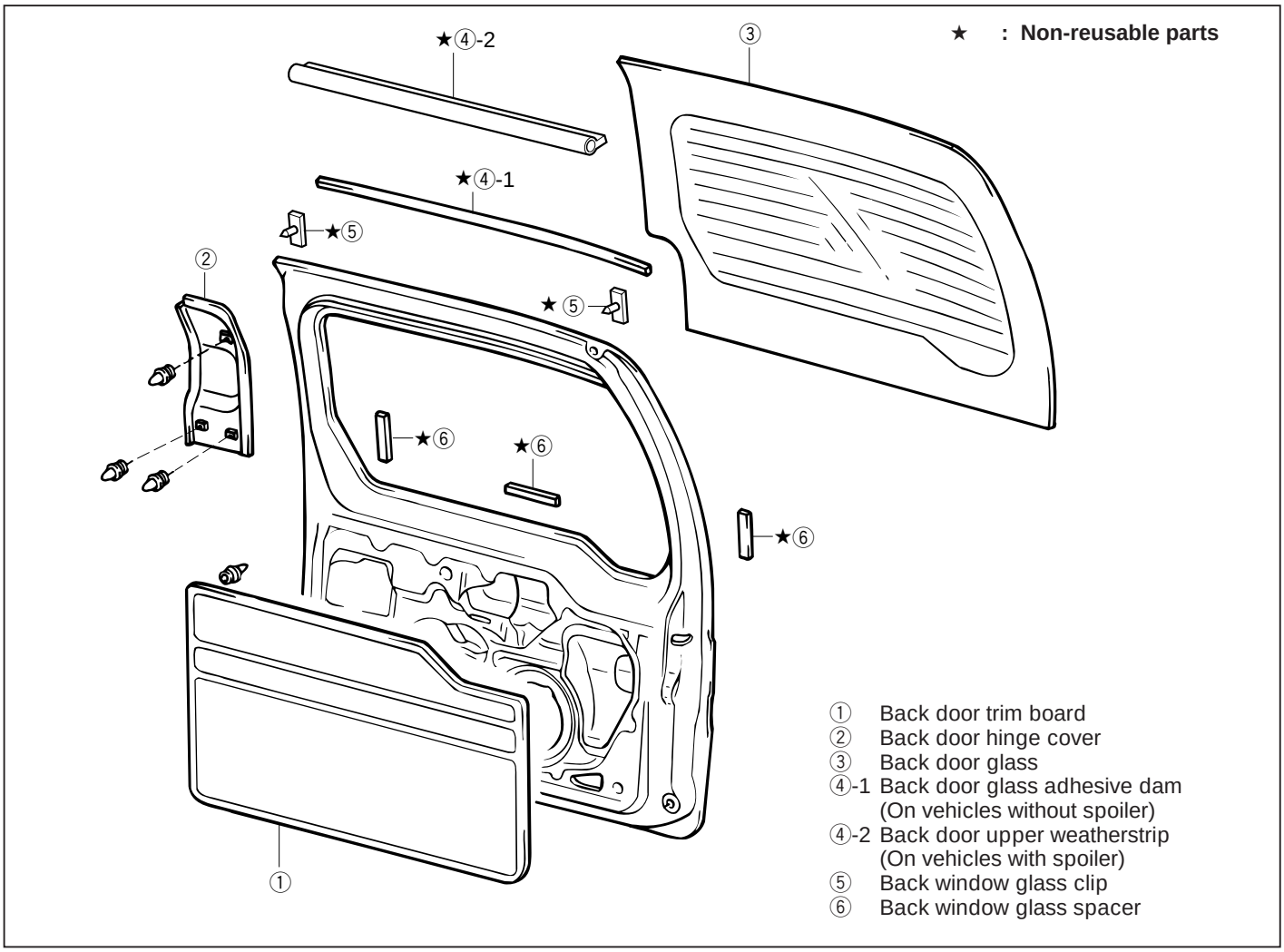
BACK DOOR WINDOW

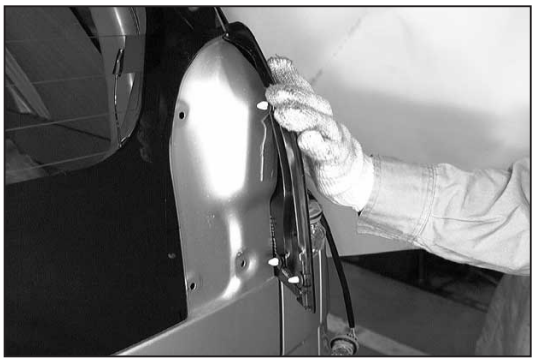
COMPONENTS



JBO00203-00173

REMOVAL

1. Preparation prior to removal
   (1) Remove the back door hinge cover by disconnecting the retainers, using a clip remover.



JBO00204-00174

   (2) Remove the back door trim board and service hole cover. (Only for model equipped with the rear wiper.) (Refer to the back door section.)
   (3) Remove the back door window wiper arm and wiper motor. (Only for model equipped with the rear wiper.) (Refer to BE section.)
   (4) Disconnect the connectors of the rear window defogger from the back door window. (Only for model equipped with the rear window defogger.) (Refer to the back door section.)
   (5) Remove the high mount stop lamp. (Only for model equipped with the high mount stop lamp.)

JBO00205-00000

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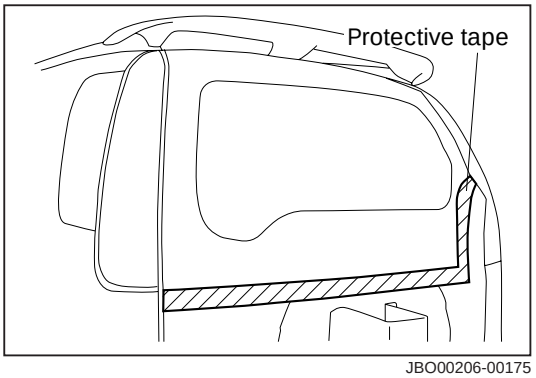
(6) Protection for paint surface around windows
Protect the paint surface around the windows by applying a protective tape or the like.

CAUTION:
- To protect the paint surface, be sure to apply a protective tape to the inside of the edge (groove around the window attaching surface) as far as it will go.
- Be sure to protect both cabin and outside surface.



JBO00206-00175

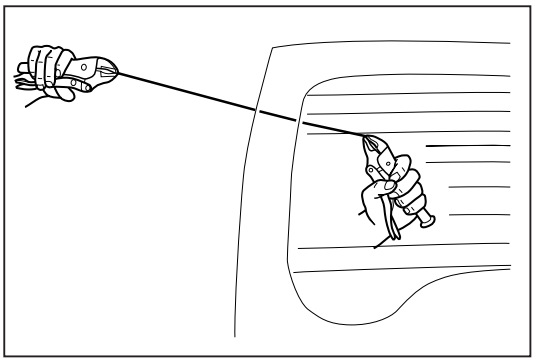
2. Cut off the window glass adhesive by a cutter knife or the like to make a small hole, in order to pass a piano wire through the hole.
CAUTION:
- Be very careful not to damage the paint surface and window by the cutter knife or the like.

NOTE:
- Change the position of the hole to be made if any difficulty is encountered, because spacers or retainers are installed at some parts.
- For quicker operation, make a hole on the adhesive agent with a heated wire.

CAUTION:
- Be very careful not to get scalded during the operation.

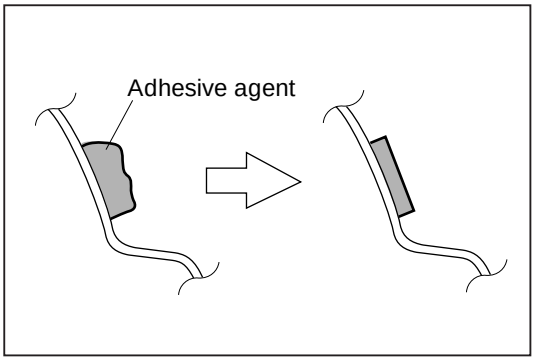
JBO00207-00000

3. Pass a piano wire through the adhesive agent.
4. Hold the both ends of the piano wire by pliers or the like and cut off the adhesive by pulling the piano wire one side to the other.
NOTE:
- Some parts are hard to be cut off, because spacers or retainers are built in between the glass and the body panel.


JBO00208-00176

5. Remove the window.
6. Remove the remaining material of the clips, spacer and dam from the window frame.
7. Clean the adhesive applying part of the window frame and window glass as follows.
CAUTION:
- Degrease the blade of a cutter knife before it is put into use.

The surface of the adhesive agent that was cut by the piano wire should be made flat by means of a cutter knife, while leaving a thin layer of the adhesive material.



JBO00209-00177

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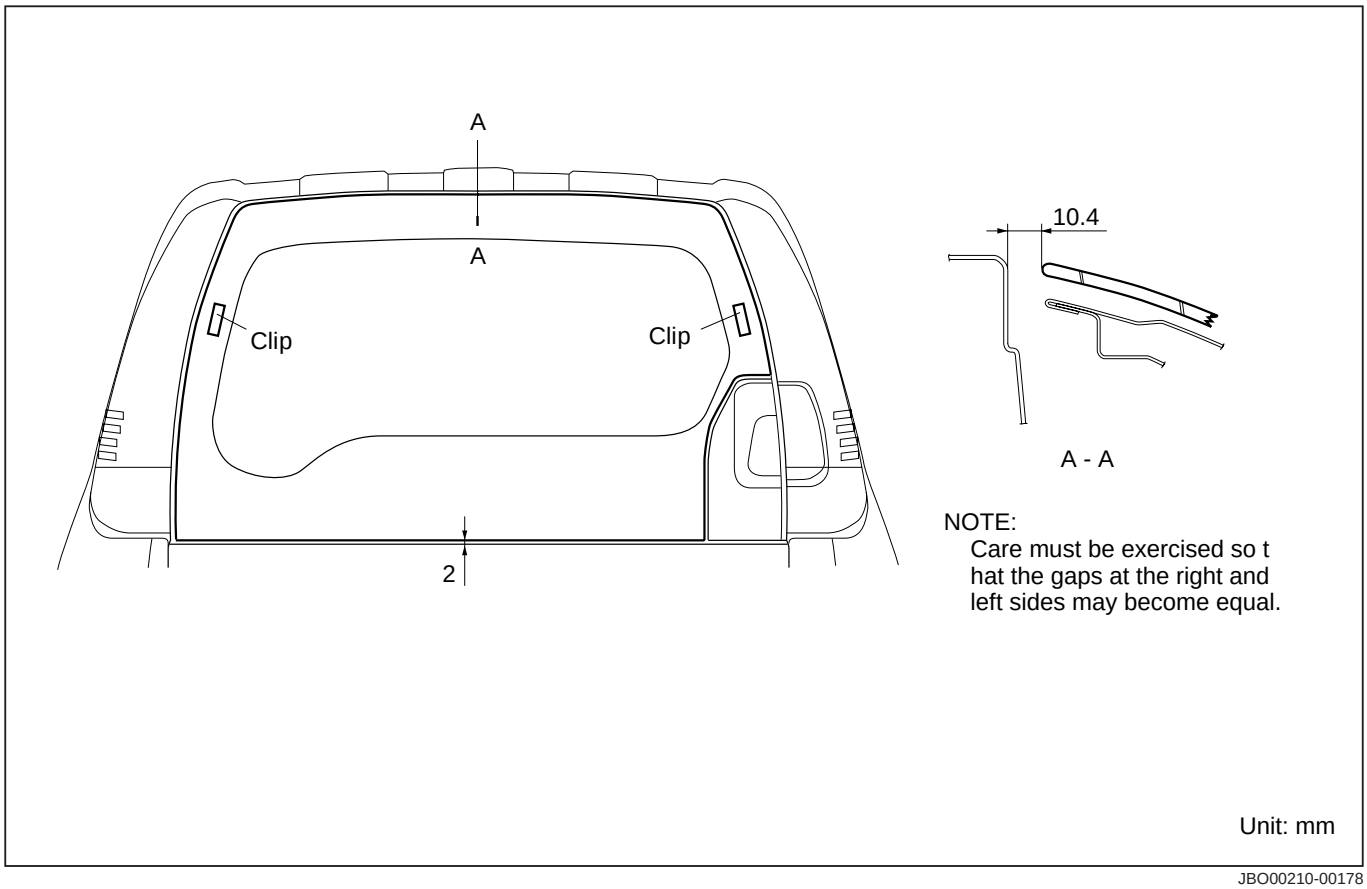
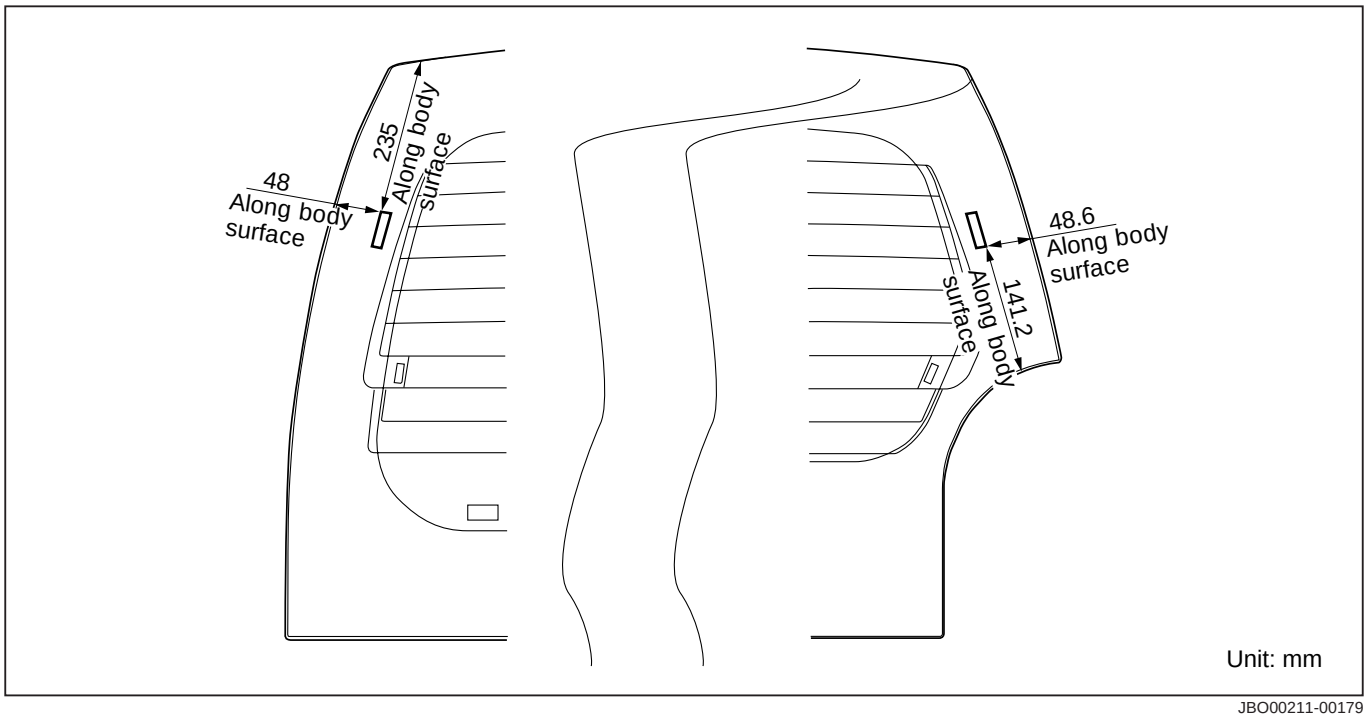
INSTALLATION

1. Affix the clips of the back door window glass as follows.
   (1) Install the clips to the holes on the back door panel.
   (2) Remove the protective sheet of the clip.
   (3) Place the back door window glass to the body in such a location as shown.
   (4) Ensure that the clips are sticked to the back door window glass.
   (5) Remove the back door window glass from the back door.



JBO00210-00178

   (6) Ensure that the clips are sticked to the correct position of the quater window glass as shown.



JBO00211-00179

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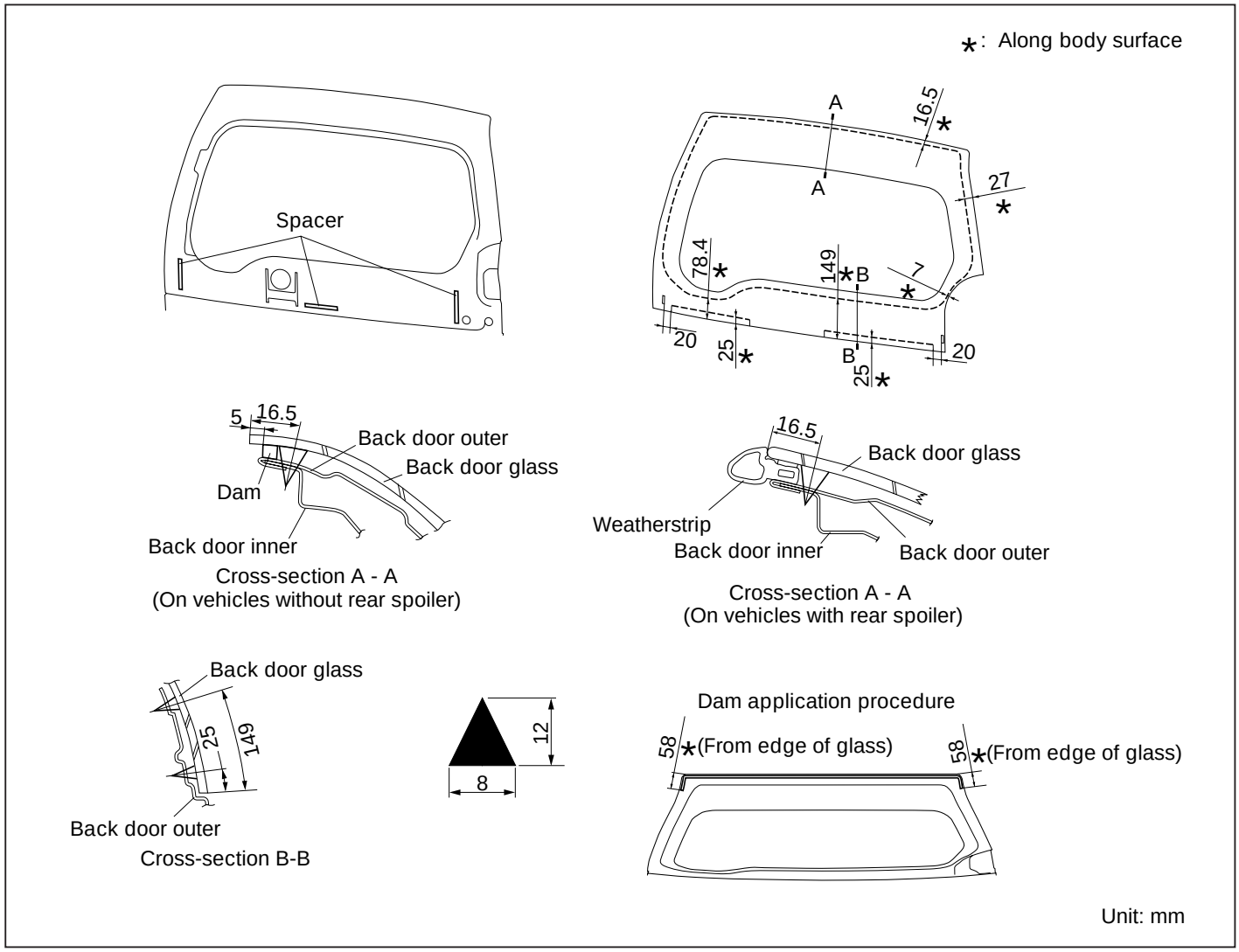
2. Affix the spacers in position as shown in the figure below.
3. Affix the dam in position as shown in the figure below.
4. Apply the primer for the window frame and/or window to under the adhesive agent applying portion if the adhesive agent has been removed completely.
   NOTE:
   - Do not apply the primer when adhesive materials remain on the window frame or window glass. Be sure to apply the adhesive agent three minutes after the primer has been applied.

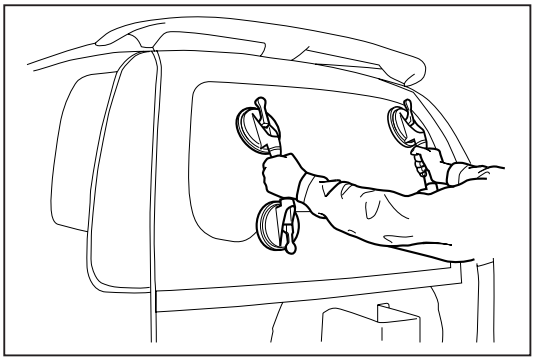
5. Apply the adhesive agent to the positions shown in the figure below.
   Apply the adhesive agent in such a way that the cross section of the applied agent may measure 8 mm in its base length and 12 mm in height.
6. Affix the weatherstrip to the upper edge of the back door glass as shown in the figure below.



JBO00212-00180

7. Install the glass by inserting the clips into the holes on the back door side. Push the entire glass surface lightly so that the glass may fit completely.
8. Cure the adhesive agent completely.
   NOTE:
   - Observe the curing time of the adhesive agent specified by its manufacturer.

   CAUTION:
   - Do not move the vehicle until the adhesive agent of the window cures completely.



JBO00213-00181

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9. Install the roof side inner garnish. (Refer to the trim & garnish section of the service manual.)
10. Ensure that no water leakage exists.
    If any water leakage is found, repair it, as required, or refit the quarter window glass.
    NOTE:
    • Be sure to seal the back door window wiper attaching hole before checking.

11. Remove the protective tape from around the windows.
12. Install the back door hinge cover by connecting the retainers.
13. Install the high mount stop lamp. (Only for model equipped with the high mount stop lamp.)

14. Connect the connectors of the rear window defogger to the back door window. (Only for model equipped with the rear window defogger.) (Refer to the back door section.)
15. Install the back door window wiper arm and wiper motor. (Only for model equipped with the rear wiper.) (Refer to the BE section.)
16. Install the back door trim board and service hole cover. (Only for model equipped with the rear wiper.) (Refer to the back door section.)

JBO00214-00000

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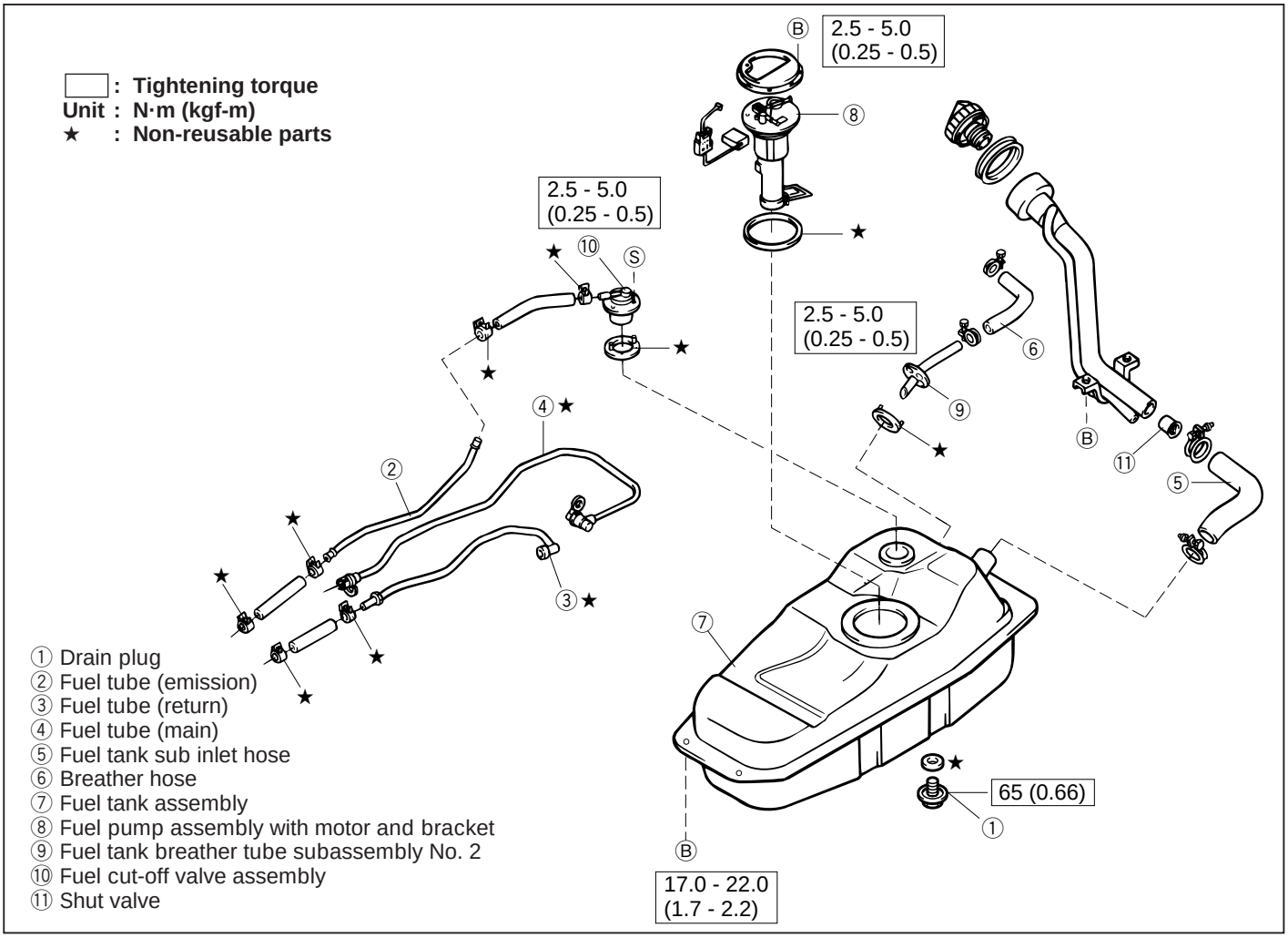
FUEL TANK

COMPONENTS



JBO00215-00182

REMOVAL

WARNING:

- Never work near open flame or never smoke near the working site of fuel-related components.

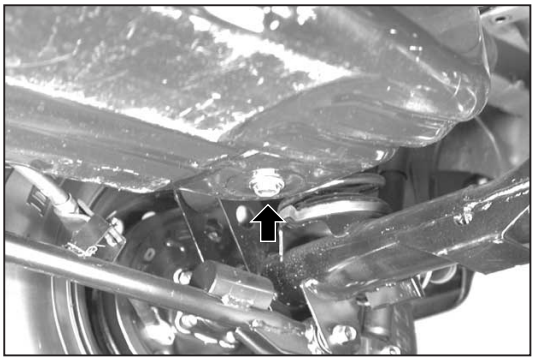
1. Draining of fuel from fuel tank
   (1) Remove the fuel filler cap.

JBO00216-00183

   (2) Place a suitable container under the fuel drain plug.
   (3) Drain the fuel to the container by removing the fuel drain plug.

CAUTION:

- Never reuse the used gasket.



JBO00217-00184

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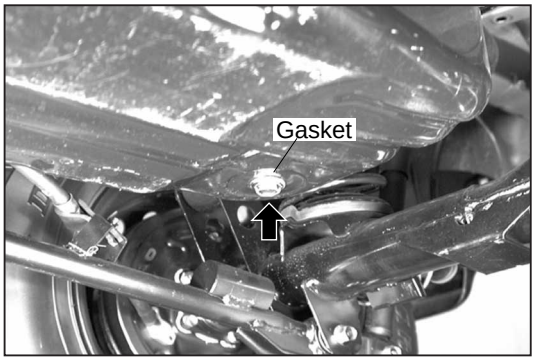
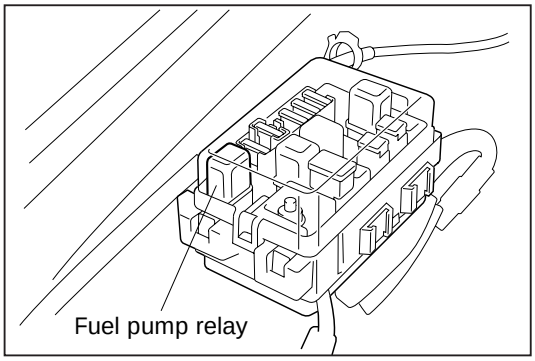
(4) Install the fuel drain plug with new gasket interposed and tighten it to specified tightening torque.
(When fuel tank is reused.)
Tightening torque: 65 N·m (0.66 kgf-m)

CAUTION:
- Be sure to clean the gasket attaching surface of fuel tank and fuel drain plug before installation.
- Never reuse the used gasket.
- Never over tighten the fuel drain plug.



JBO00218-00185

2. Remove the fuel pump relay.
3. Start the engine and leave it until engine stopped.
4. Turn off the ignition switch.
5. Install the fuel pump relay to relay box.
6. Disconnect the negative terminal of the ground wire from the battery negative terminal.

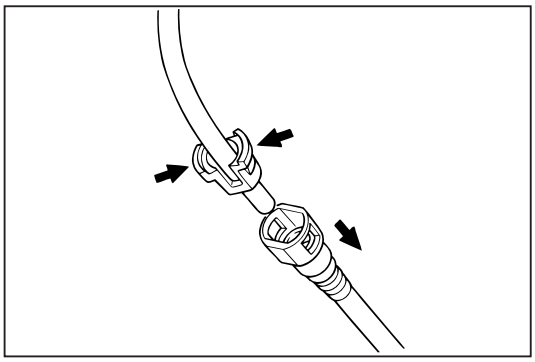


JBO00219-00186

7. Disconnection of fuel tubes.
(1) Remove the hose bands. Then, disconnect the fuel hoses form the fuel pipes.

JBO00220-00187

(2) Disconnect the quick connector of the fuel hose from the fuel pipe while retracting the retainer as shown in the figure.
CAUTION:
- Never use any tools during disconnection.
- Never reuse the removed fuel hose (quick connector) again. Failure to observe this caution may lead to fuel leakage.


JBO00221-00188

8. Remove the breather hose and fuel tank inlet hose from the fuel inlet pipe assembly by loosening the hose bands.
CAUTION:
- Never reuse the removed hose bands.

JBO00222-00189

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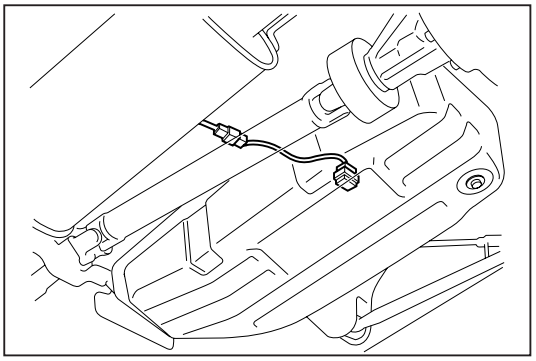
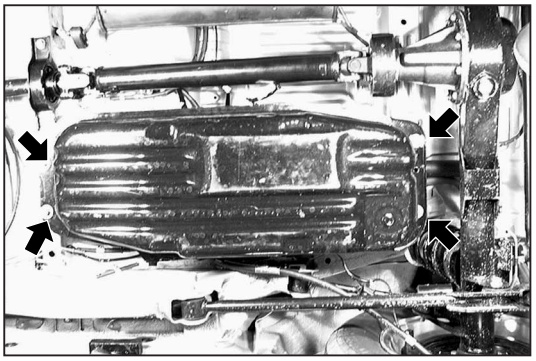
9. Disconnect the connector of the wire harness from the fuel pump with motor and bracket located upper side of fuel tank while unlocking the lock on the connector.



JBO00223-00190

10. Support the fuel tank with suitable jack or bench.
11. Remove the fuel tank by removing the four attaching bolts.



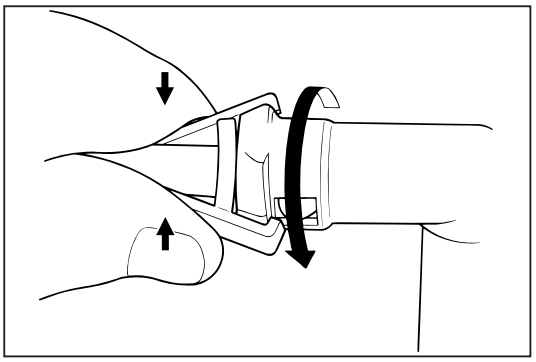
JBO00224-00191

12. Removal of the fuel hoses from the fuel pump with motor and bracket (fuel pump assembly) by following manner.
    (1) Disconnect the main fuel hose from fuel pump assembly by pull it out while retracting the retainer as shown.

    CAUTION:
    - Never reuse the removed fuel hose again. Failure to observe this caution may lead to fuel leakage.

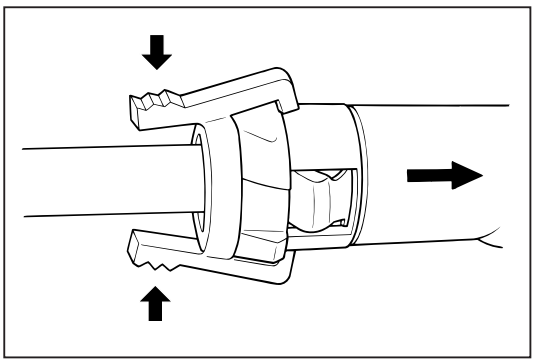
JBO00225-00192

    (2) Remove the fuel main hose from fuel tank by unlocking the main hose from the hose clips.
    (3) Remove the retainer for quick connector from the fuel pump assembly.
    (4) Disconnection of the fuel return hose
        ① Hold the checker as shown.
        ② Turn the checker to 90 degree in clockwise direction while pushing the checker to connector side.



JBO00226-00193

        ③ Pull out the fuel hose from fuel pump assembly while pushing the checker to connector side.
    (5) Remove the fuel return hose from the fuel tank by unlocking the fuel return hose from the hose clamps.
    (6) Remove the checker for quick connector from the fuel tank assembly.



JBO00227-00194

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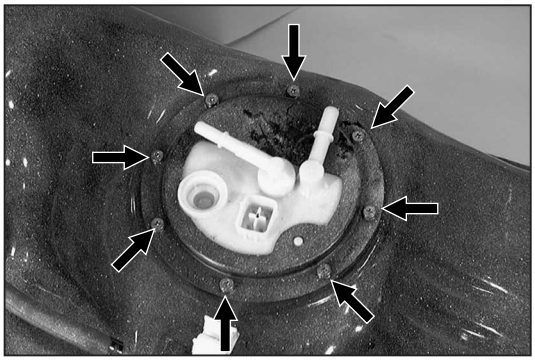
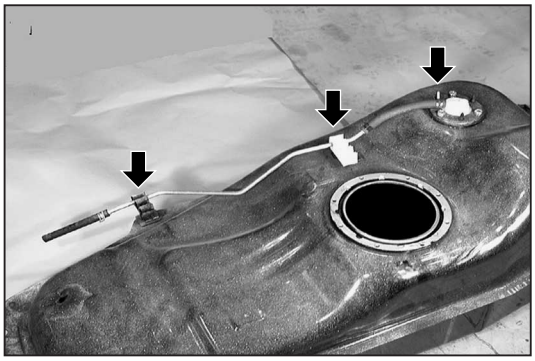
13. Remove the fuel pump assembly and gasket by removing the attaching screws evenly
    CAUTION:
    • Never reuse the removed gasket again. Failure to observe this caution may cause to fire.



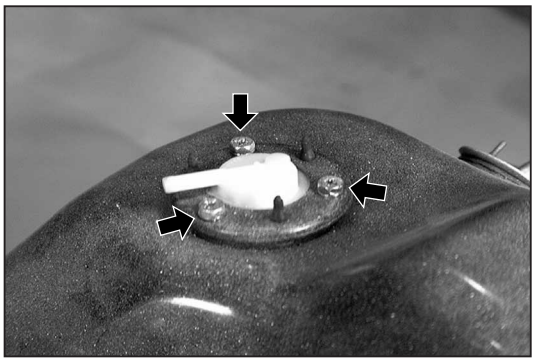
JBO00228-00195

14. Remove the fuel hose from the check valve by removing the hose clamp.
15. Remove the fuel pipe from the fuel tank by unlocking the fuel pipe from the hose clamps.



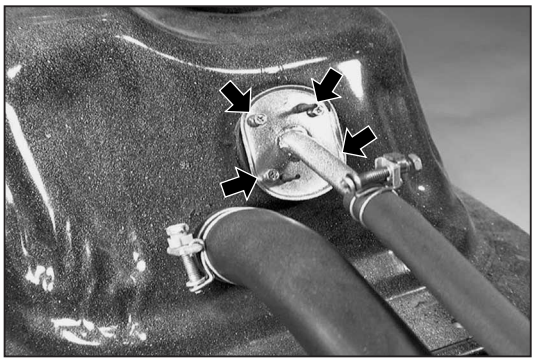
JBO00229-00196

16. Remove the check valve by removing the attaching screws.
    CAUTION:
    • Never reuse the removed gasket again. Failure to observe this caution may cause to fire.



JBO00230-00197

17. Disconnect the fuel tank sub inlet hose from the fuel tank by loosening the hose clamp.
18. Remove the shut valve from the fuel inlet pipe.
19. Disconnect the breather hose from the fuel tank breather No. 2 tube by loosening the hose clamp.
20. Remove the fuel tank breather No. 2 tube with gasket.
    CAUTION:
    • Never reuse the removed gasket again. Failure to observe this caution may cause to fire.



JBO00257-00223

INSPECTION

NOTE:
• Be sure to check the electrical parts by referring the BE section.

1. Inspect all component parts for any crack, deformation, aging, deterioration or other damage.
   If any damage is found, replace the damaged part with new one.

JBO00231-00000

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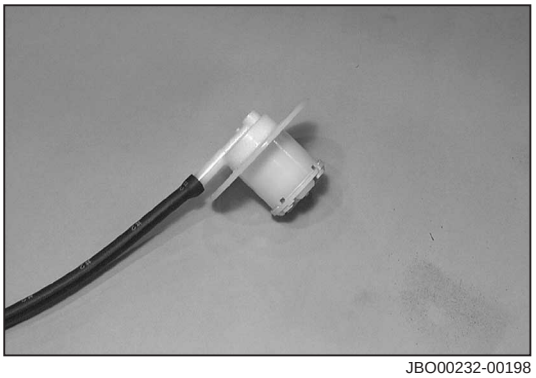
2. Inspection of the check valve
   (1) Connect the suitable rubber hose to check valve.
   (2) Ensure that the air continuity is exists when check valve in installed angle.
   If no air continuity is exists, replace the check valve with new one.
   (3) Ensure that the no air continuity is exists when check valve tilted 90 degrees or before 90 degrees.
   If air continuity is exists, replace the check valve with new one.



JBO00232-00198

INSTALLATION

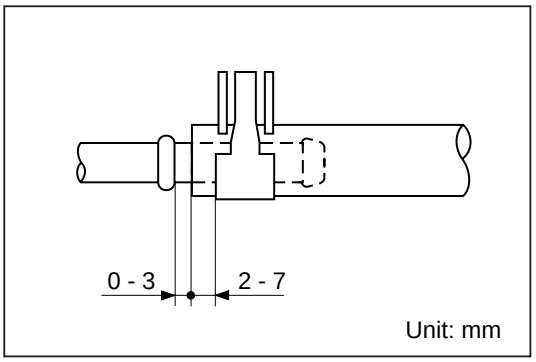
NOTE:
- Installation procedure are basically reverse procedure of the removal procedure. Therefore, no illustration shown in this installation procedure. Refer to the illustration shown in the removal procedure when any difficulty is encountered.

1. Installation of the check valve
   (1) Clean the attaching surface of the fuel tank, check valve and new gasket.
   (2) Install the check valve to the fuel tank by installing the attaching screws with new gasket interposed. Then, tighten the attaching screws to specified tightening torque evenly.
   Tightening Torque: 2.5 - 5.0 N·m (0.25 - 0.5 kgf-m)

CAUTION:
- Never reuse the used gasket again.

JBO00258-00000

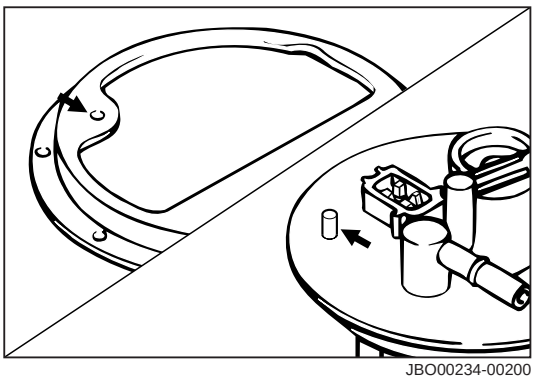
2. Connect the fuel hoses to the fuel tube (for emission). Then, attach the new hose bands as shown.
3. Connect the fuel tube (for emission) with fuel hoses to the fuel pipe clamp on the fuel tank.
4. Connect the fuel hose (for emission) to the check valve and secure the fuel hose with new hose band.
5. Connect the fuel pipe to fuel pipe clamp securely.



JBO00233-00199

6. Installation of the fuel pump assembly
   (1) Clean the attaching surface of the fuel tank, fuel pump assembly and new gasket.
   (2) Install the fuel pump assembly to the fuel tank while aligning the protruding section of the fuel pump with the hole on the bracket by installing the attaching screws with new gasket interposed. Then, tighten the attaching screws to specified tightening torque evenly.
   Tightening Torque: 2.5 - 5.0 N·m (0.25 - 0.5 kgf-m)

CAUTION:
- Never reuse the used gasket again.



JBO00234-00200

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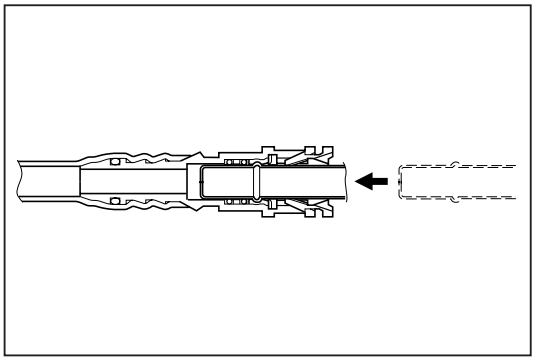
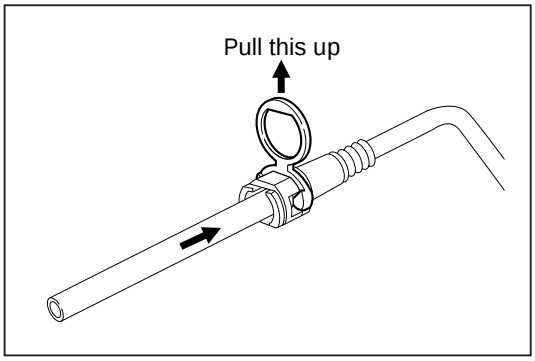
7. Connection of the fuel hoses to fuel pump assembly
   (1) Connection of the fuel main tube
      ① Clean the fuel main pipe on the fuel pump assembly.
      ② Apply the few drops of engine oil to the fuel pipe.
      ③ Connect the new fuel hose to the fuel pipe until clicking sounds emits from the retainer.



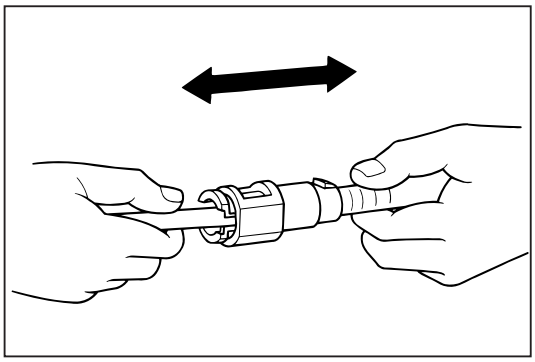
JBO00235-00201

      ④ Remove the checker from the quick connector.



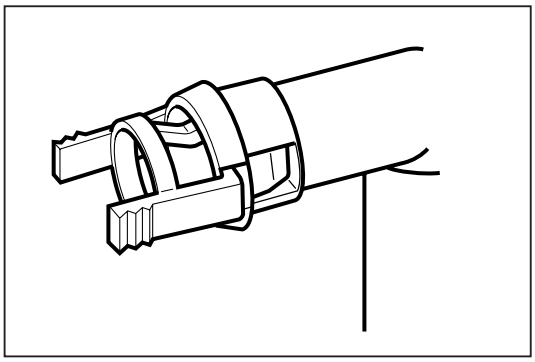
JBO00236-00202

      ⑤ Ensure that the connector is connected properly by pull the connector from the fuel pipe lightly.
   (2) Connect the fuel main tube to the fuel pipe clamps installed on the fuel tank securely.



JBO00237-00203

   (3) Connection of the fuel return tube
      ① Ensure that the checker of the quick connector is installed on the quick connector as shown.
      ② Clean the fuel return pipe on the fuel pump assembly.
      ③ Apply the few drops of engine oil to the fuel pipe.



JBO00238-00204

      ④ Connect the new fuel hose to the fuel pipe until clicking sounds emits twice.

JBO00239-00205

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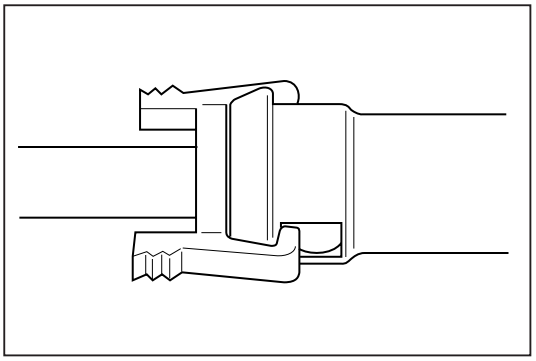
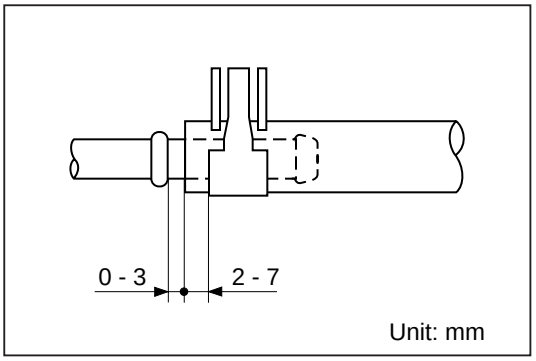
⑤ Hold the checker as shown and connect the nail sections of checker to the quick connector.
⑥ Ensure that the connector is connected properly by pull the connector from the fuel pipe lightly.

(4) Connect the fuel return tube to the fuel pipe clamps installed on the fuel tank securely.



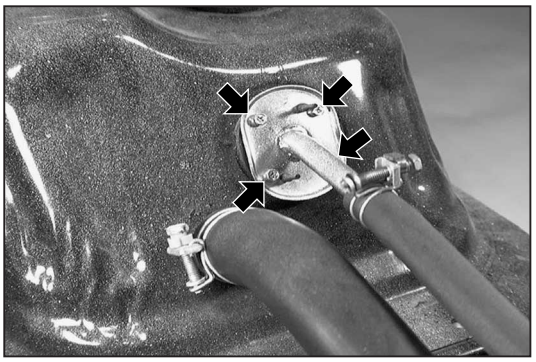
JBO00240-00206

8. Connect the fuel return tube and emission tubes to the fuel hoses and attach the new hose clamps properly as shown.



JBO00241-00207

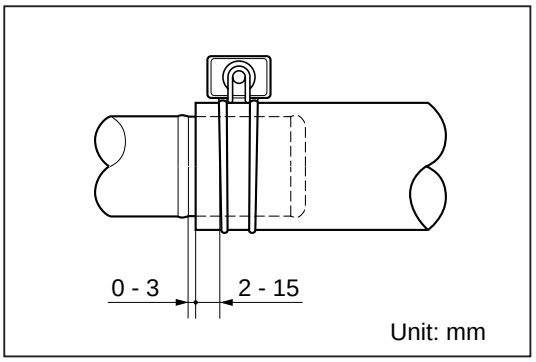
9. Clean the fuel tank breather No. 2 tube and its attaching surface of fuel tank thoroughly.
10. Install the fuel tank breather No. 2 tube to the fuel tank by the attaching bolts with the new gasket interposed.
CAUTION:
• Never reuse the used gasket again. Failure to observe this caution may lead to fuel leakage.



JBO00242-00224

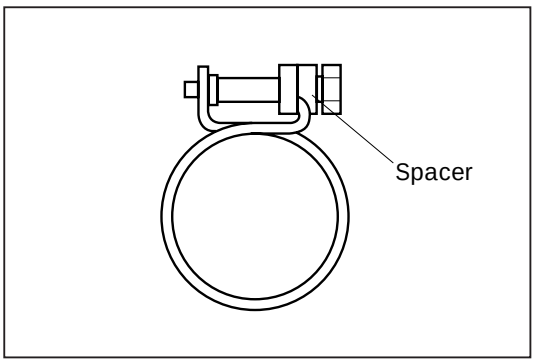
11. Tighten the attaching bolts of the fuel tank breather No. 2 tube to specified tightening torque.
Tightening Torque: 2.5 - 5.0 N·m (0.25 - 0.5 kgf-m)

12. Connect the breather hose to fuel tank breather No. 2 tube.
Then, attach the new hose band as shown.



JBO00258-00208

CAUTION:
• Hose clamp should be tighten until attaching bolt base contact with the spacer.



JBO00243-00209

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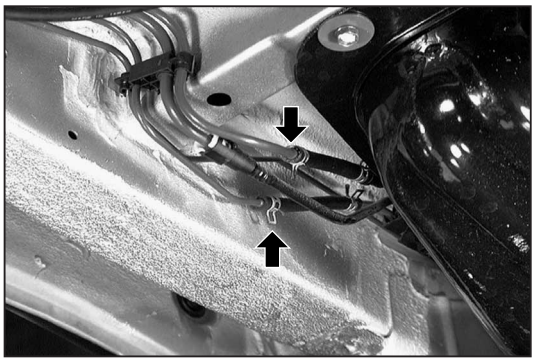
13. Install the shut valve to the fuel inlet securely.
14. Connect the fuel tank sub inlet hose with new hose band to the fuel tank temporary.
15. Install the fuel tank to the floor panel with the four attaching bolts and tighten the attaching bolts to specified tightening torque evenly while supporting the fuel tank with suitable stand or the like.
    Tightening Torque: 17.0 - 22.0 N·m (1.7 - 2.2 kgf-m)

JBO00244-00000

16. Connection of fuel tubes.
    (1) Connect the fuel hoses to the fuel pipes and attach the new hose bands. (Refer to the illustration in step 8.)
    (2) Connection of fuel main tube (Refer to the step 7.)
        ① Clean the fuel main pipe on the fuel pump assembly.
        ② Apply the few drops of engine oil to the fuel pipe.
        ③ Connect the new fuel hose to the fuel pipe until clicking sounds emits from the retainer.
        ④ Remove the checker from the quick connector.
        ⑤ Ensure that the connector is connected properly by pull the connector from the fuel pipe lightly.
    (3) Connect the breather hose with new hose band to the fuel inlet and tighten the hose band securely. (Refer to the step 12.)

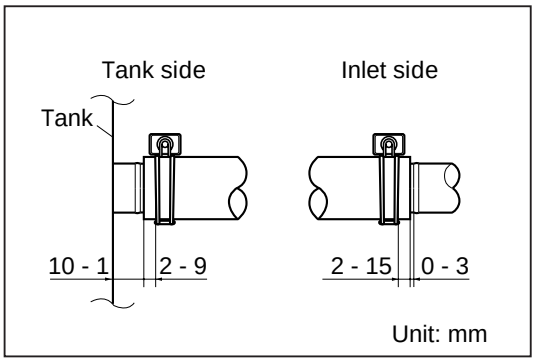
    CAUTION:
    • Hose clamp should be tighten until attaching bolt base contact with the spacer.
      (Refer to illustration in step 12.)



JBO00259-00225

    (4) Connect the fuel tank sub inlet hose to fuel inlet with new hose band as shown and tighten the hose bands securely.

    CAUTION:
    • Hose clamp should be tighten until attaching bolt base contact with the spacer.



JBO00260-00226

17. Connect the connector of the wire harness to the fuel pump with motor and bracket located upper side of fuel tank and ensure that lock is locked properly.
18. Connect the negative terminal of the ground wire to the battery negative terminal.
19. Fill the fuel tank with the fuel.
20. Close the fuel filler cap.
21. Start the engine and ensure that the no fuel leakage exists.

JBO00261-00000

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REMOVAL OF FUEL INLET

CAUTION:

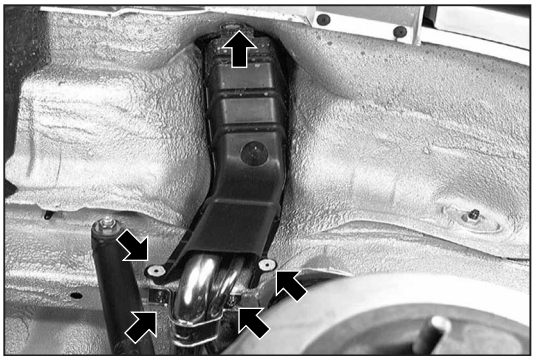
- Be sure to drain the fuel from the fuel tank before removing the fuel inlet when fuel filled-up more than half in the fuel tank.

1. Remove the fuel tank cap assembly.
2. Disconnect the fuel hose and fuel breather hose by removing the hose bands.

3. Remove the fuel tank filler pipe protector by removing the attaching three grommet.
   NOTE:
   - Two screw type grommet can be loosened by turning the screw section 90 degree to counter clockwise.
   - Upper section grommet can be removed by pull it out while retracting the lock sections on the grommet.

4. Remove the fuel inlet by removing the two attaching bolts.
5. Remove the fuel tank filler pipe shield from the fuel inlet box.

JBO00245-00211



JBO00246-00212

INSTALLATION OF FUEL INLET

Install the components in the reversed order of the removal procedure.

1. Install the fuel tank filler pipe shield to the fuel inlet box.
2. Install the fuel inlet with the two attaching bolts and tighten the attaching bolts to specified tightening torque.
   Tightening Torque: 6.24 - 9.36 N·m
   (0.64 - 0.96 kgf-m)

3. Install the fuel tank cap assembly.
4. Connect the fuel hose and fuel breather hose. Then, secure it with attaching new hose bands.
   CAUTION:
   - Hose clamp should be tighten until attaching bolt base contacts with the spacer. (Refer to page BO–88.)

5. Install the fuel tank filler pipe protector with the attaching three grommets.

JBO00247-00000

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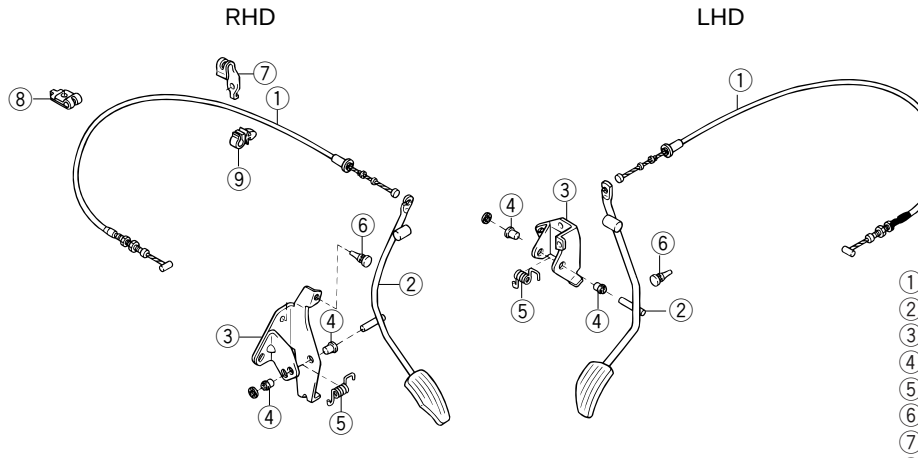
ACCELERATOR PEDAL

COMPONENTS



① Accelerator cable
② Accelerator pedal
③ Accelerator pedal support bracket
④ Bush
⑤ Accelerator link rod return spring
⑥ Cushion
⑦ Clamp
⑧ Clamp
⑨ Clamp

JBO00248-00214

INSPECTION OF ACCELERATOR PEDAL

Ensure that the accelerator pedal operates smoothly without being caught or interference.
If any problem is found, replace the damaged accelerator pedal related part, as required.

REMOVAL

1. Disconnect the accelerator cable assembly from the accelerator pedal.
2. Remove the accelerator pedal support bracket by removing the attaching bolt.
3. Remove the accelerator cable assembly after disconnecting the cable from throttle body side (Refer to the EM section.)

DISASSEMBLY

1. Remove the retainer from the accelerator pedal.
   CAUTION:
   - Never reuse the removed retainer again.

2. Pull out the accelerator pedal slightly. Then, unlock the accelerator link rod return spring from the accelerator pedal.
3. Remove the accelerator pedal from the accelerator pedal support bracket.
4. Remove the accelerator link rod return spring and bushs from the accelerator pedal support bracket.
5. Remove the cushion from the accelerator pedal support bracket.

ASSEMBLY

1. Install the cushion from the accelerator pedal support bracket.
2. Thinly apply the chassis grease to accelerator link rod return spring and bushs.
3. Install the accelerator link rod return spring and bushs to the accelerator pedal support bracket.
4. Connect the accelerator pedal to the accelerator pedal support bracket half way.
5. Connect the accelerator link rod return spring to the accelerator pedal.
6. Connect the accelerator pedal to accelerator pedal support bracket completely.
7. Install the retainer to accelerator pedal.
8. Ensure that the retainers is securely installed on the accelerator pedal.

JBO00249-00000

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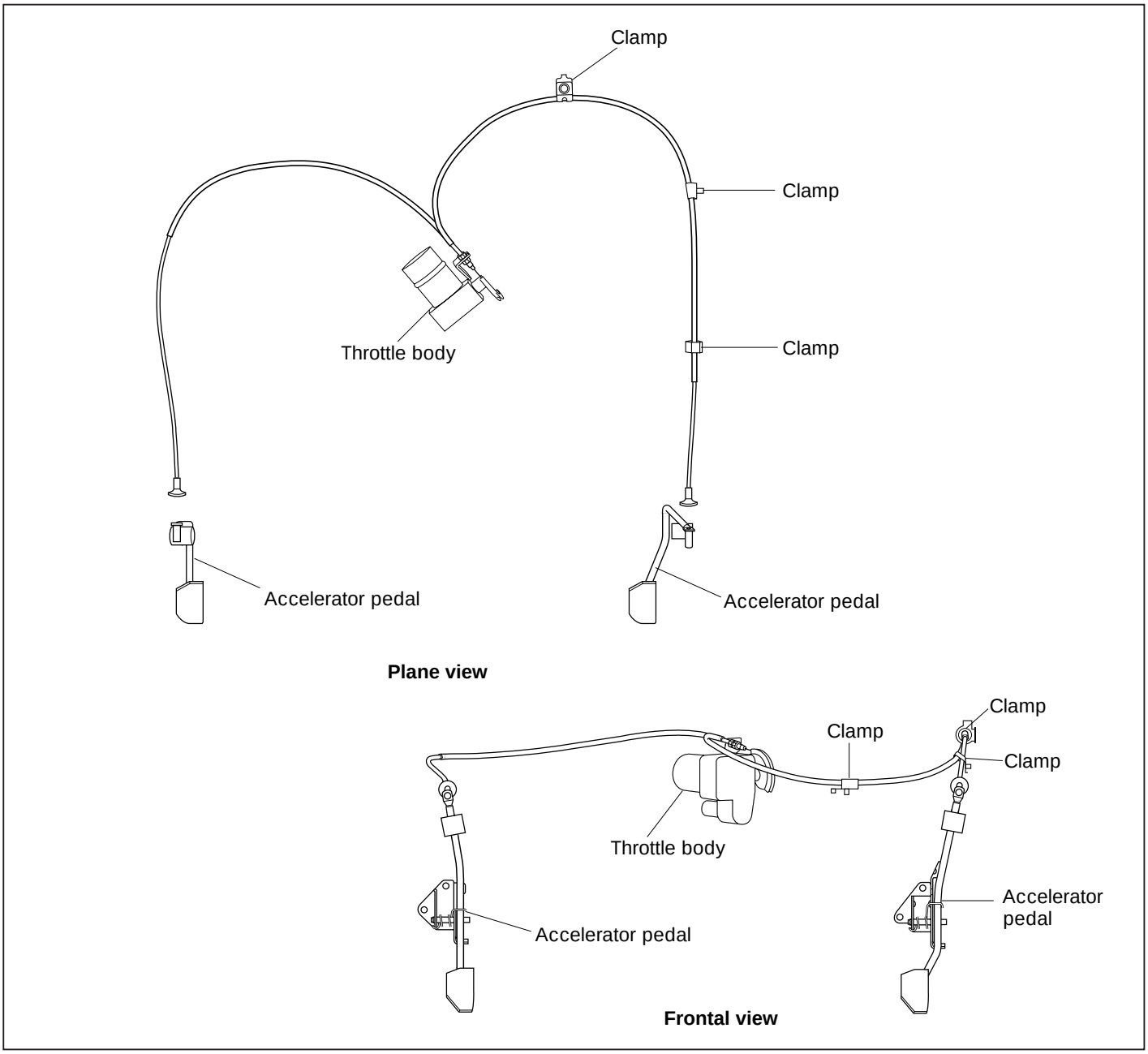
INSTALLATION

1. Install the accelerator cable assembly and connect the cable to the throttle body side (Refer to the EM section of the service manual.)
2. Install the accelerator pedal assembly to the floor panel with attaching bolts and tighten the attaching bolts to the specified tightening torque.
   Tightening Torque: 3.9 - 6.9 N·m (0.4 - 0.7 kgf-m)

3. Connect the accelerator cable assembly to the accelerator pedal while aligning protrusion on the accelerator cable grommet with the recessed sections of accelerator pedal.
4. Adjust the accelerator pedal free play to specified value by adjusting the free play of accelerator inner cable at throttle body side.
   Accelerator pedal free play: 3.0 - 5.0 mm

CAUTION:
- Be sure to connect the accelerator cable assembly to the cable clamp properly.
- Be sure to adjust the free play of the cable in an axial direction by referring to the EM section of the service manual.



JBO00250-00216

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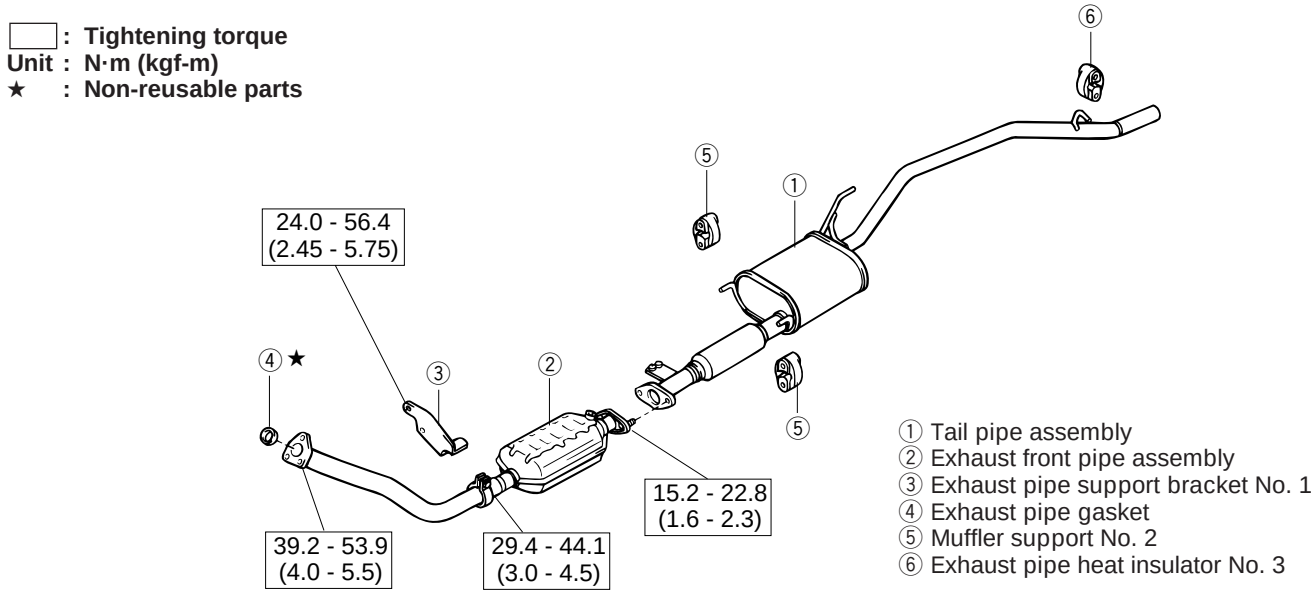
EXHAUST PIPE

COMPONENTS



JBO00251-00217

REMOVAL

1. Jack up the vehicle and support it with safety stands.
2. Separate the tail pipe from the exhaust manifold by removing the two attaching nuts.
3. Remove the tail pipe by disconnecting the muffler supports.
4. Remove the gasket between front pipe and tail pipe.
5. Remove the exhaust pipe support from the exhaust pipe and exhaust pipe support No. 1 by removing the attaching bolt and nut.
6. Remove the exhaust pipe support No. 1 bracket from the transfer case by removing the attaching bolts.
7. Remove the front pipe from the exhaust manifold by removing the attaching nuts and bolt.
8. Remove the exhaust pipe gasket.

INSTALLATION

1. Install the new exhaust pipe gasket to the exhaust front pipe.
2. Install the front pipe to the exhaust manifold with the attaching nuts and bolt. Then, tighten the attaching nuts and bolt to specified tightening torque.
   Tightening Torque (Exhaust manifold × Front exhaust pipe): 39.2- 53.9 N·m (4.0 - 5.5 kgf-m)
3. Install the exhaust pipe support No. 1 bracket to transfer case with the attaching bolts and tighten the attaching bolts to specified tightening torque.
   Tightening Torque: 24.0 - 56.4 N·m (2.45 - 5.75 kgf-m)
4. Secure the front exhaust pipe to the exhaust pipe support No.1 bracket with the exhaust pipe bands. Then, tighten the attaching bolt and nut to specified tightening torque.
   Tightening Torque: 29.4 - 44.1 N·m (3.0 - 4.5 kgf-m)
5. Install the new exhaust pipe gasket to the front pipe.
6. Install the tail pipe by connecting the muffler supports.
7. Connect the tail pipe to the front pipe with the two attaching nuts and tighten the attaching nuts to specified tightening torque.
   Tightening Torque: 15.2 - 22.8 N·m (1.6 - 2.3 kgf-m)
8. Jack down the vehicle.
9. Ensure that the no exhaust gas leakage is exists.

JBO00252-00000

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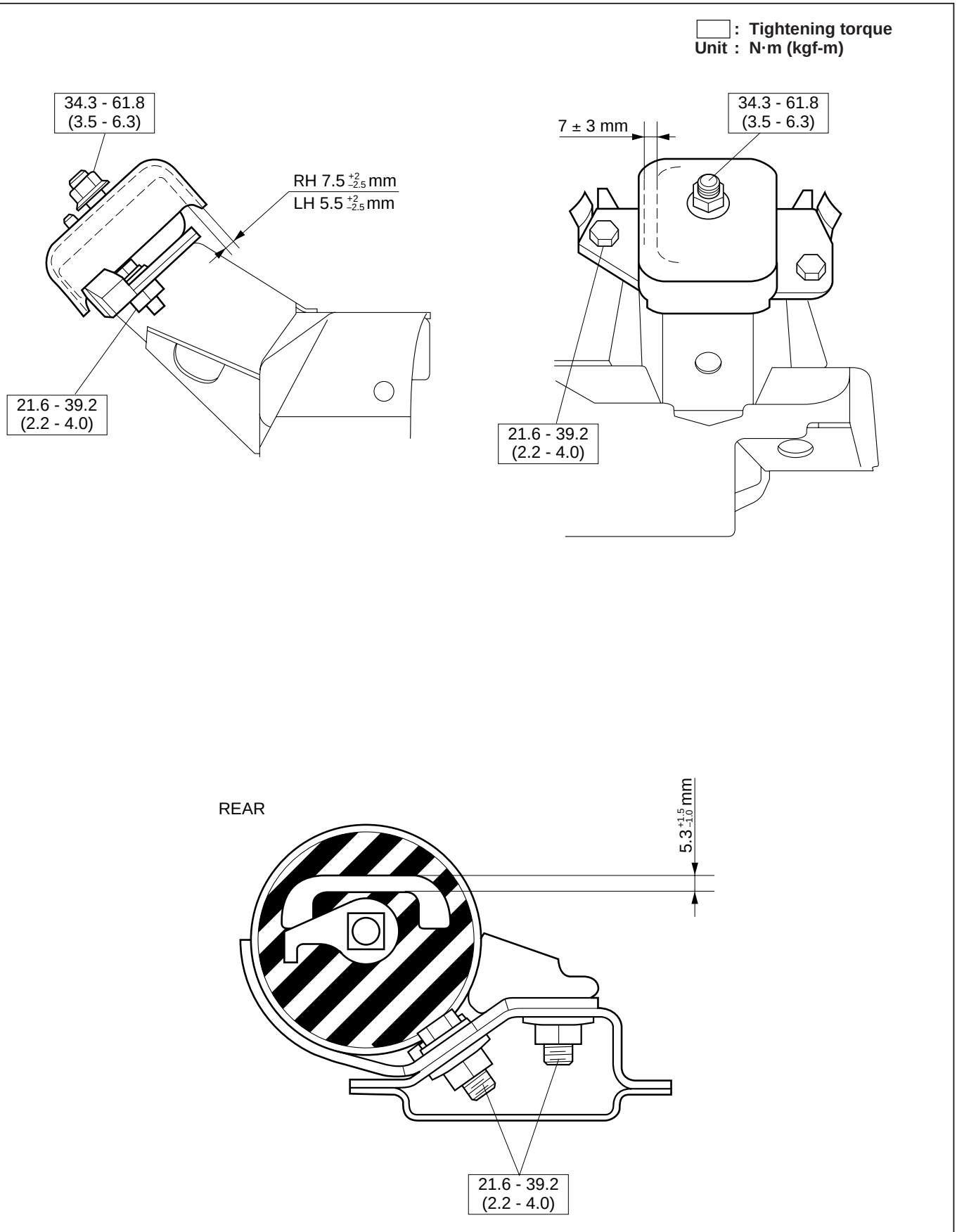
ENGINE MOUNTING INSULATOR

COMPONENTS



JBO00253-00218

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INSPECTION

Ensure that the clearance of each mounting is within the specified value, as shown in the figure.
If the clearance fails meet with the specified value mentioned in the figure, replace the part with a new one or adjust the clearance by changing the attaching position.

REMOVAL/INSTALLATION

1. Lift up the engine and transmission slightly, using an engine lifter and/or transmission jack, etc.
2. Remove the engine mountings.
3. Install a new engine mounting with the attaching bolts and nuts.Then, tighten the attaching bolts and nuts to the specified tightening torque as mentioned in the figure.
4. Remove the engine lifter and/or transmission jack, etc from the engine and transmission.
5. Ensure that the clearance of the engine mountings are within the specified value.
   If the clearance fails to meet the specified value, loosen the attaching bolts of the engine mountings attaching position. Then, tighten the attaching bolts to the specified tightening torque mentioned in the figure.
6. Ensure that the clearance of each mountings are within the specified value as mentioned in the figure above.
   NOTE:
   - Check the alignment of the vehicle shell or the engine mounting member if the clearance fails to meet the specified value after replacing the engine mounting.

JBO00254-00000

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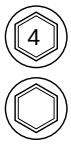
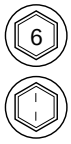
TIGHTENING TORQUE

Tightening torque determination procedure for general standard bolts and nuts

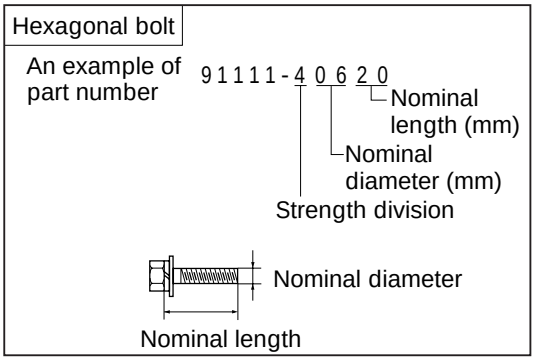
1. Tightening torque determination procedure for bolts
   Determine the strength division of the bolt concerned from the table below. Then, locate the tightening torque in the tightening torque table.
2. Tightening torque determination procedure for nuts
   Determine the tightening torque in the same way as described above, based on the mating bolt.
3. Identification

Identification of strength division by checking bolts them selves

Kind (Strength division)	Shape of head (How to determine strength division)	
	Bolt without flange	Bolt with flange
4 T		
5 T		—
6 T	— —	
7 T		—

JBO00255-00000

Identification by part number



JBO00000-00219

4. Tightening torque table for general standard bolts

Strength division	Nominal diameter (mm)	Pitch (mm)	Standard tightening torque {N·m (kgf-m)}	
			Bolt without flange	Bolt with flange
4 T	6	1.0	5.4 (0.55)	5.9 (0.6)
	8	1.25	13 (1.3)	14 (1.45)
	10	1.25	25 (2.6)	28 (2.9)
	12	1.25	47 (4.8)	53 (5.4)
	14	1.5	74 (7.6)	83 (8.5)
	16	1.5	113 (11.5)	—
5 T	6	1.0	6.4 (0.65)	—
	8	1.25	16 (1.6)	—
	10	1.25	32 (3.3)	—
	12	1.25	59 (6.0)	—
	14	1.5	91 (9.3)	—
	16	1.5	137 (14.0)	—
6 T	6	1.0	7.8 (0.8)	8.8 (0.9)
	8	1.25	19 (1.95)	20.5 (2.1)
	10	1.25	39 (4.0)	43 (4.4)
	12	1.25	72 (7.3)	79 (8.1)
	14	1.5	109 (11.0)	123 (12.5)
7 T	6	1.0	11 (1.1)	12 (1.2)
	8	1.25	25 (2.6)	28 (2.9)
	10	1.25	52 (5.3)	58 (5.9)
	12	1.25	9.5 (9.7)	103 (10.5)
	14	1.5	147 (15.0)	167 (17.0)
	16	1.5	225 (23.0)	—

JBO00256-00000

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DAIHATSU

TERIOS

J100

BODY ELECTRICAL SYSTEM

GENERAL DESCRIPTION ..... BE– 2
POWER SUPPLY ..... BE– 6
IGNITION KEY SWITCH ..... BE– 8
COMBINATION METER ..... BE– 9
HEAD LAMP ..... BE– 15
HEAD LAMP LEVELING ..... BE– 18
FRONT FOG LAMP ..... BE– 19
STOP LAMP ..... BE– 20
BACK UP LAMP ..... BE– 21
REAR FOG LAMP ..... BE– 22
TAIL LAMP & LICENSE PLATE LAMP .... BE– 24
INTERIOR LAMP & LUGGAGE ROOM LAMP ..... BE– 25
HAZARD WARNING & HORN ..... BE– 27
HATER & VENTILATION ..... BE– 29
POWER DOOR LOCK ..... BE– 32
POWER WINDOW ..... BE– 34
WIPER & WASHER ..... BE– 36
DEFOGGER ..... BE– 39
CIGARETTE LIGHTER ..... BE– 41
REAR VIEW MIRROR ..... BE– 43
ITC SYSTEM ..... BE– 45
SRS AIR BAG SYSTEM ..... BE– 52
IMMOBILIZER SYSTEM ..... BE– 91
SSTs (Special service tools) BE–104
TIGHTENING TORQUE BE–104

JBE00001-00001

BE

NO. 9710-JE

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GENERAL DESCRIPTION

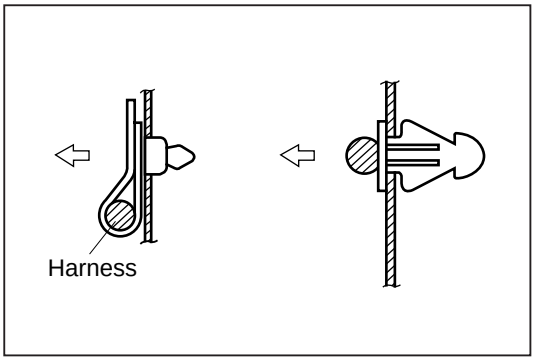
HANDLING PRECAUTION

General instructions

1. Never pull the connectors or step on them during the wire harness transport or assembly.
   (Prevention of pulling-out of terminals, connector cracks, deformation and so forth.)

JBE00002-00002

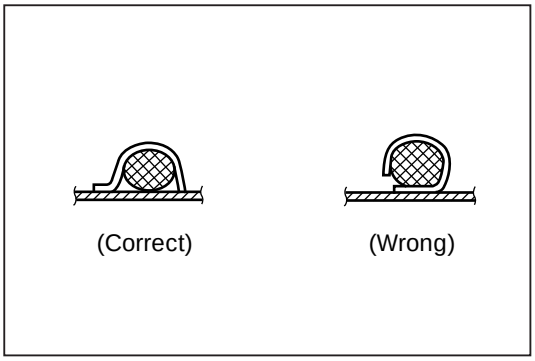
2. Care must be exercised to ensure that no scratch is made to the wire harness by burrs or edges during the wire harness transport or assembly.
   (Prevention of scratches to the outer trim, electrical insulators and so forth.)
3. Clamping method
   In the case of resin clamps, ensure that the clamp section is fitted in the body hole.



JBE00003-00003

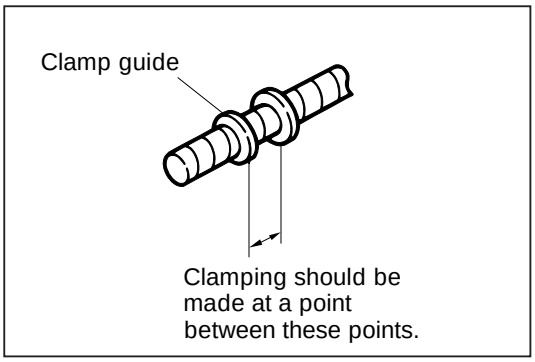
NOTE:

- Ensure that the clamp will not be detached when it is pulled lightly in the arrow-headed direction.
  (Prevention of interference due to the detachment of the clamp)
- In the case of metal sheet welded clamps, be sure to assemble the harness in such a way that the harness will not come in contact with the welded surface.
  (Prevention of wire harness damage due to welding burrs)



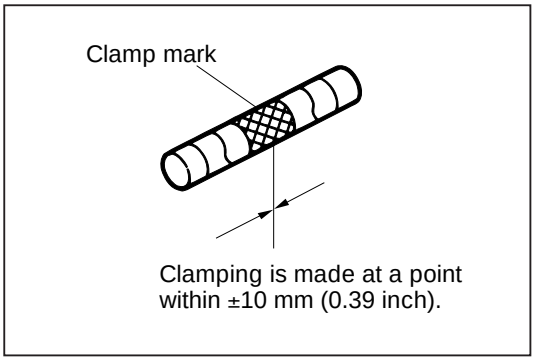
JBE00004-00004

- In case that the locating guide of the clamp position or the clamp mark is clamped, make sure that the clamp is located within the guide. As for the clamp at the clamp mark section, ensure that the clamping is made at a point within ±10 mm.



JBE00005-00005

(Prevention of slackness or interference)



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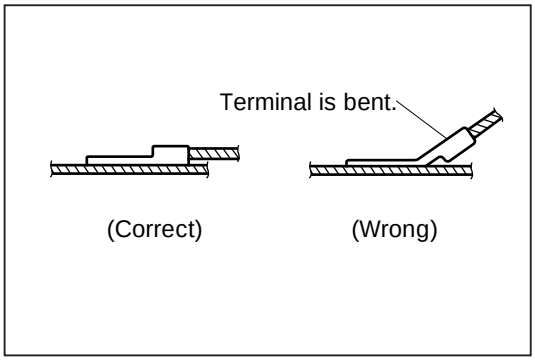
4. Terminals and connectors
   Perform the connection of connectors positively.
   Connector with lock; Ensure that the locking is made.
   Connector without lock; Connect the connector positively until it stops.

JBE00007-00007

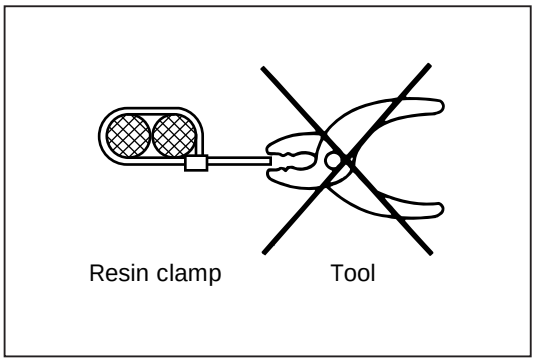
Retention by screws

- When the tightening torque is specified, be sure to observe the specification strictly.
  (The tightening torque is posted in the table separately.)
- Ensure that the staked section may not come on the assembling surface.
- After completion of the tightening operation, lightly pull out the terminal. Ensure that there is no slackness.
- When performing other operations, care must be exercised to ensure that no connected connector is detached by pulling out the wire harness forcibly.



JBE00008-00008

5. Work procedure for tightening-up type resin clamps
   When the tightening-up type resin clamps are employed, do not use any pliers, cutting pliers or the like.
   <Reason>
   Prevention of clamps being cut or scratched



JBE00009-00009

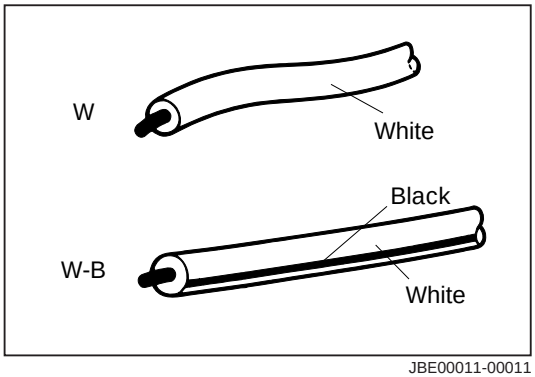
WIRE SIZE & COLOR CODE

- For identification purpose, each wire has its own color. Each color bears a code as described in the right table. These codes are used in the wiring diagram and will be helpful during trouble shooting.

Code	Gr	Br	B
Color	Gray	Brown	Black
Code	W	R	G
Color	White	Red	Green
Code	Y	L	O
Color	Yellow	Blue	Orange
Code	P	Lg	V
Color	Pink	Light green	Violet

JBE00010-00010

- The wire color comes in two kinds: single color and composite color. In the case of single color, the whole outer coat of the harness is of a single color.
  In the case of composite color, a fine line of the second color is drawn on the harness basic color.
  In this case, the code is composed of the basic color code which comes first and the second color code which comes after a hyphen.



JBE00011-00011

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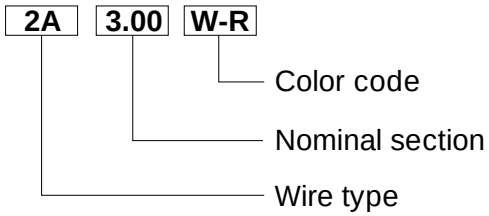
WARNING:
- The wire diameter and capacity of each harness have been determined to assure the normal operation of the electrical system.
- Hence, do not take power for accessories carelessly through the original wiring harness. Failure to observe this caution may cause system malfunction or fire.

JBE00012-00012



JBE00013-00013

Nominal section	Section area (mm)	Diameter (mm)	Permissible current (A)
0.5	0.56	1.0	9
0.85	0.88	1.2	12
1.25	1.28	1.5	15
2.00	2.09	1.9	20
3.00	3.29	2.4	27

JBE00014-00014

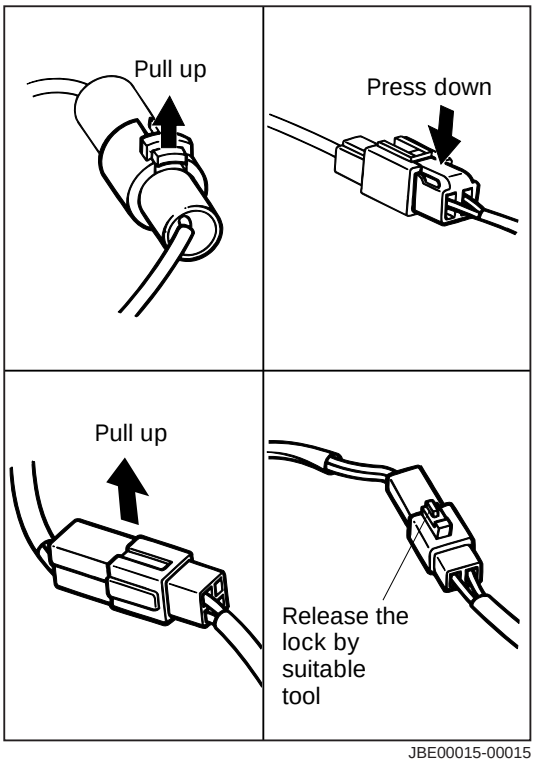
OPERATION OF LOCK TYPE CONNECTOR

Conventional type

The lock type of the connector comes in a push release type, a pull release type, a spring lock type, an one-way lock type and so on.

After confirming the shape of the lock, unlock the lock. Disconnect the connector white holding the connector by hand.

NOTE:
- Never pull the harness during the disconnection.
- Be sure to pull out the connector straight so as not to damage the terminal.



JBE00015-00015

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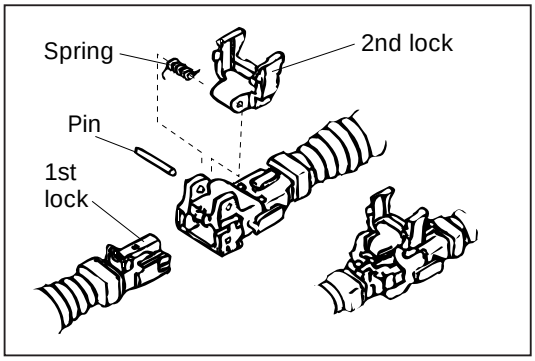
Double lock type

The double lock type connector has been adopted for air bag system to prevent unexpected troubles such as poor connecting.

NOTE:

- Disconnection and connection of each connector should be kept at a minimum level. If unnecessary disconnection or connection is repeated, it may cause unexpected troubles such as poor continuity and chattering.



JBE00016-00017

TERMINAL REMOVAL & INSTALLATION

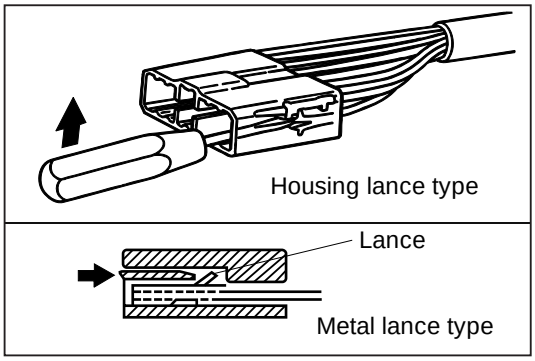
Removal of terminal

<Housing lance type>

Insert a miniature screwdriver through the opening section of the connector into between the locking lug and the terminal. While prying up the locking lug with the screwdriver, pull the terminal backward.

<Metal lance type>

While pushing the lance with the screwdriver, pull the terminal backward.



JBE00017-00018

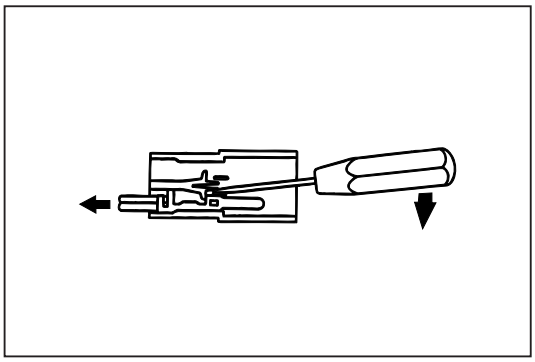
Installation of terminal

<Housing lock type>

Push the terminal into the protruding section of the connector, until the lock is engaged completely. Lightly pull the harness to assure that the locking has been made completely.

<Metal lance type>

Insert the terminal into the connector, until lance is locked completely. Lightly pull the harness to assure that the locking has been made completely.



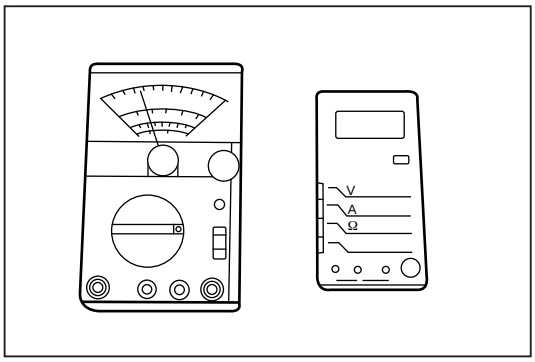
JBE00018-00019

INSPECTION

Tester (Volt/ohmmeter)

For the inspection, use a tester having an internal resistance of more than 10 kΩ/V.

Use of a tester with a low internal resistance may cause wrong measurement or secondary troubles.



JBE00019-00020

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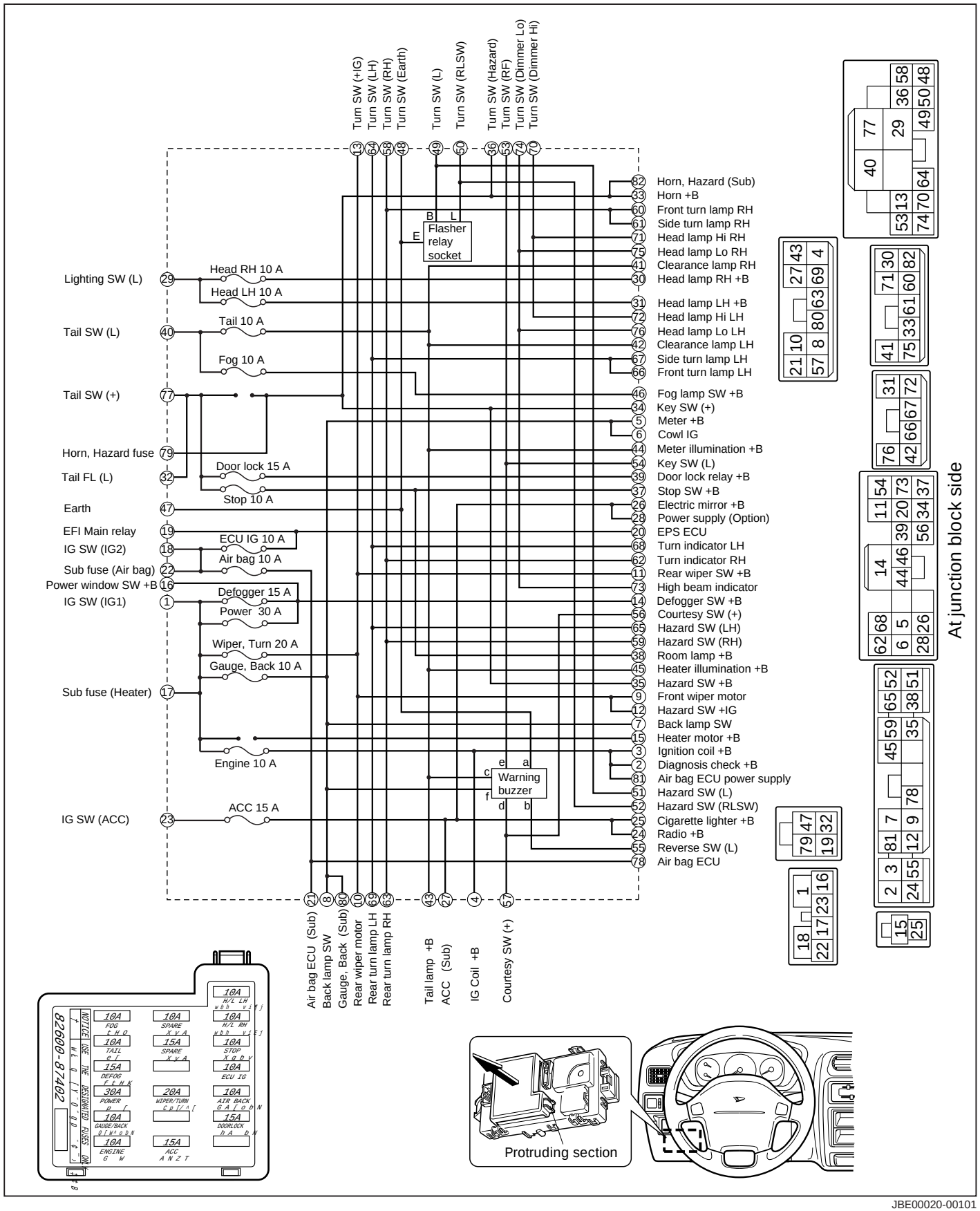
POWER SUPPLY

JUNCTION BLOCK

The junction block assembly is located underneath the steering post at the driver's seat side.



JBE00020-00101

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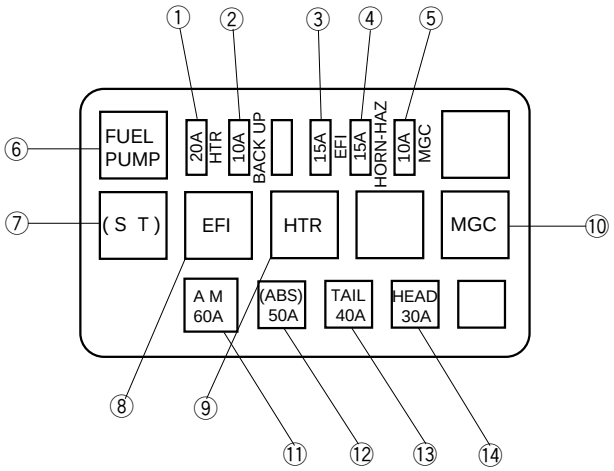
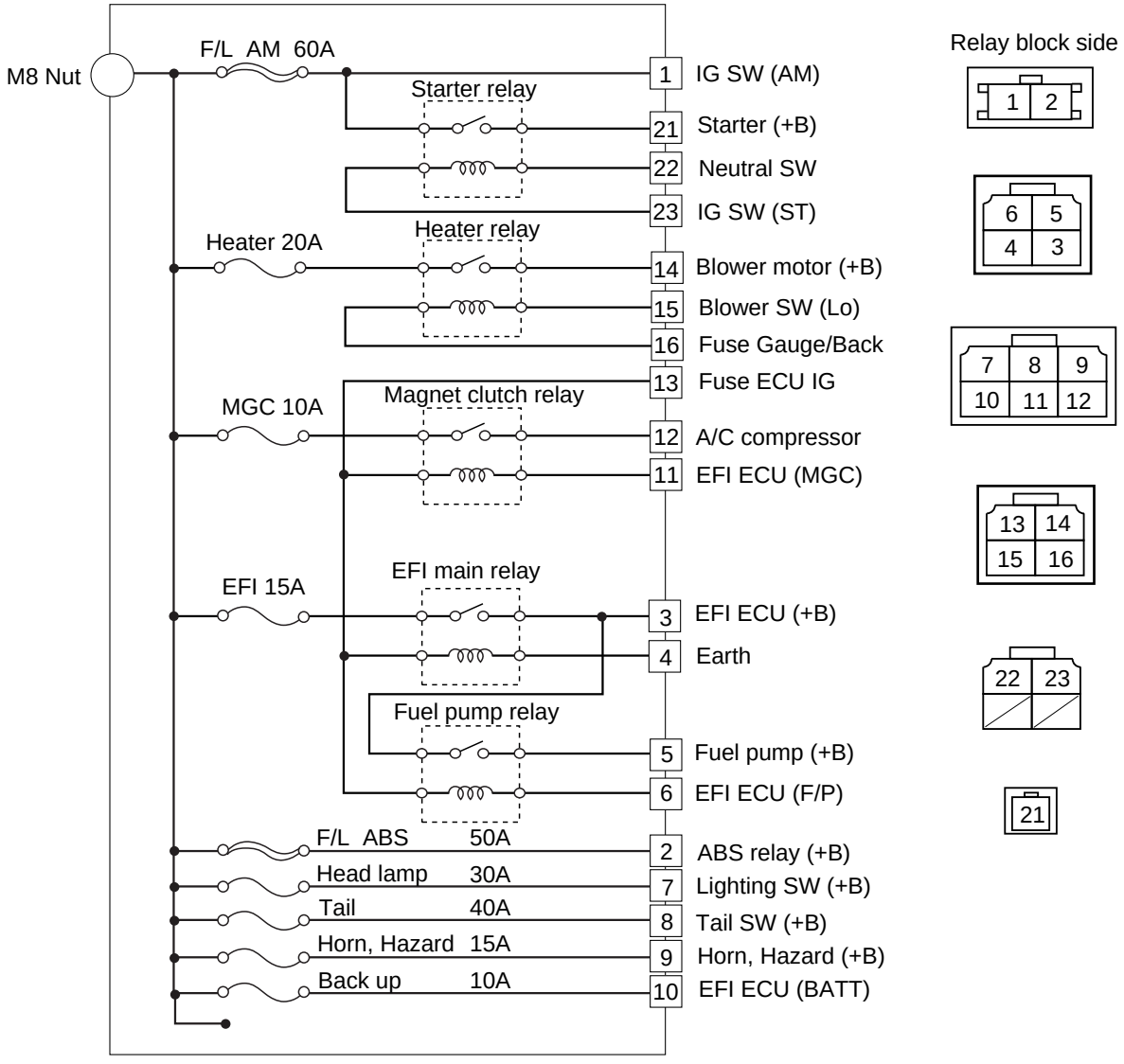
RELAY BLOCK

The relay block is located near the battery in the engine compartment.

① Heater 20A
② Back-up 10A
③ EFI 15A
④ Horn-Hazard 15A
⑤ Magnet clutch 10A
⑥ Fuel pump relay
⑦ Starter relay (for A/T)
⑧ EFI main relay
⑨ Heater relay
⑩ Magnet clutch relay (for air conditioner)
⑪ F/L AM 60A
⑫ F/L ABS 50A
⑬ Tail lamp 40A
⑭ Head lamp 30A





JBE00021-00102

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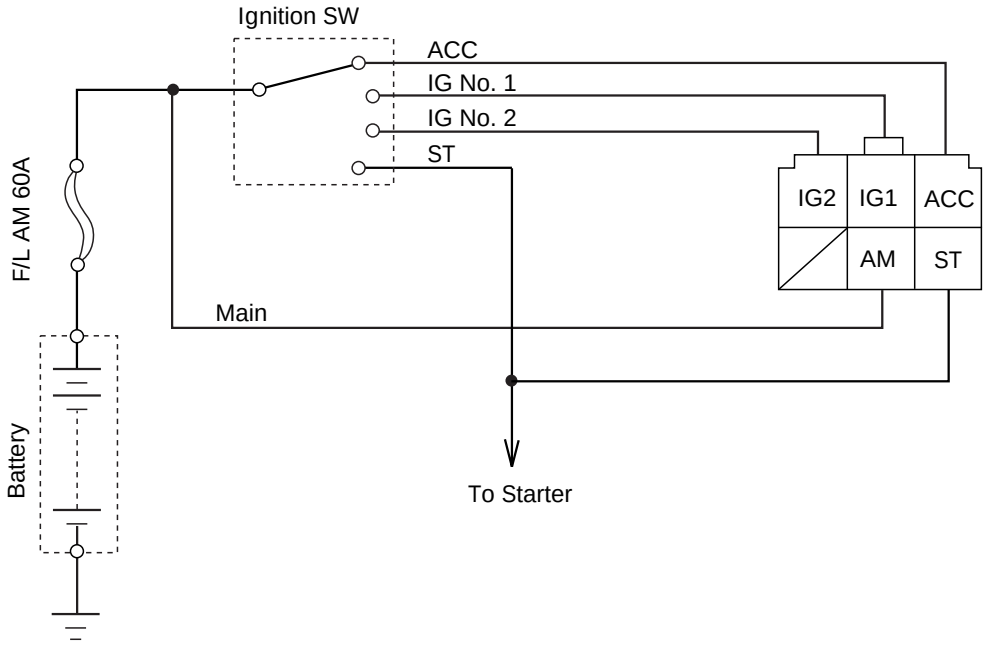
IGNITION KEY SWITCH

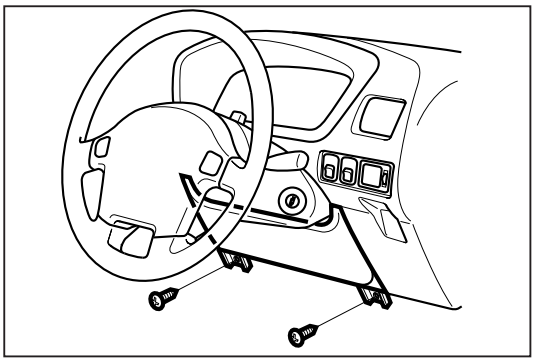
WIRING DIAGRAM



JBE00022-00201

Removal

1. Turn off the ignition key switch.
2. Disconnect the battery ground cable from the negative (–) terminal of the battery.
3. Remove the instrument lower panel and steering column lower cover.
4. Disconnect the connectors of the ignition switch.
5. Disconnect the immobilizer antenna terminal, if equipped.

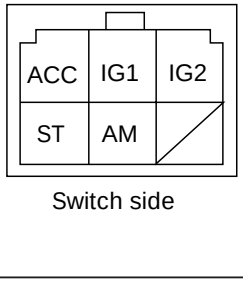


JBE00023-00202

UNIT INSPECTION

Ensure that continuity exists between the respective terminals as indicated in the continuity table.

	AM	ACC	IG1	IG2	ST
LOCK					
ACC	○	○			
ON	○	○	○	○	
START	○		○	○	○



Switch side

JBE00024-00203

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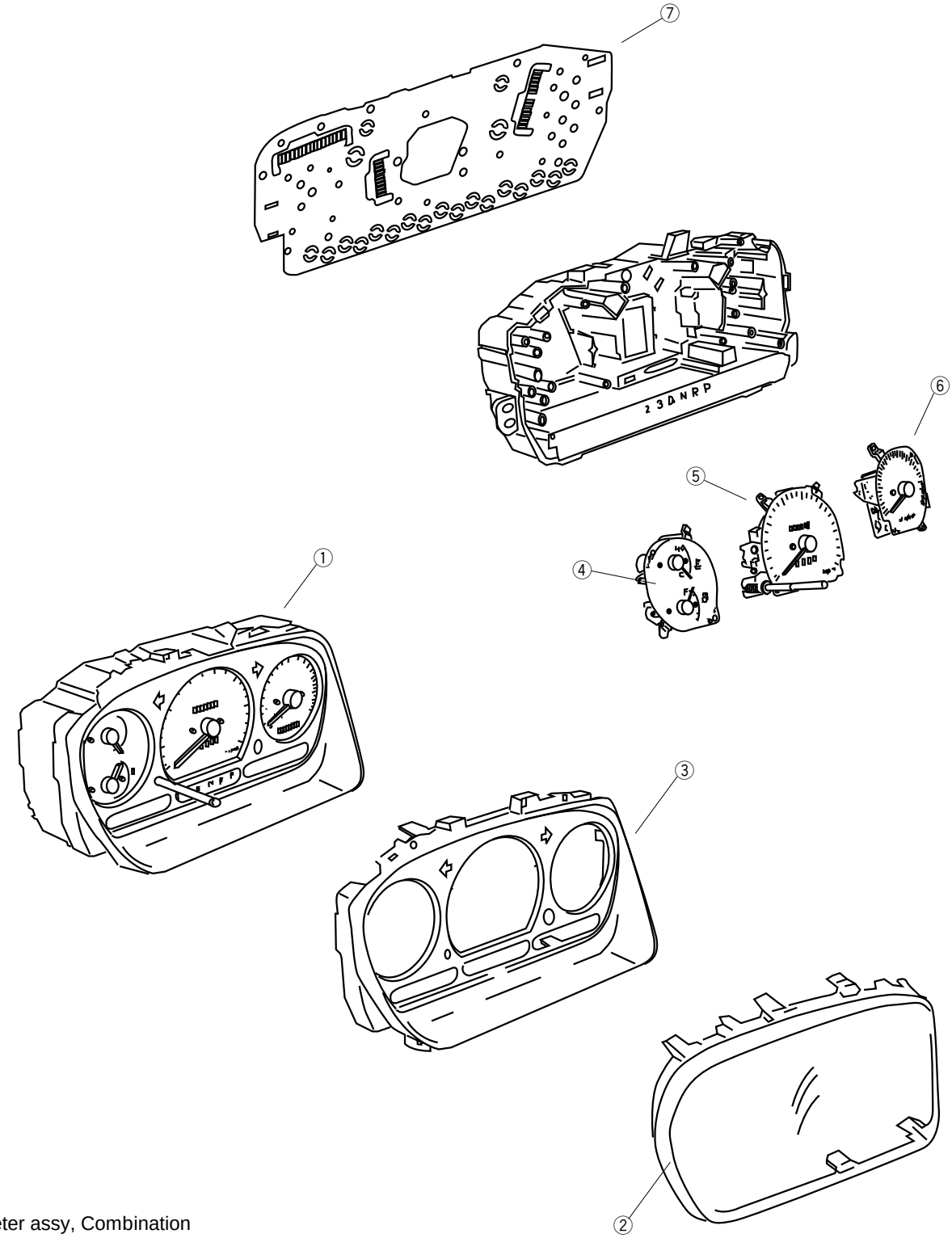
COMBINATION METER

CONSTRUCTION



① Meter assy, Combination
② Glass, Front
③ Plate, window
④ Gauge, water temperature & Fuel
⑤ Speedometer
⑥ Tachometer
⑦ Plate, Circuit meter

JBE00025-00301

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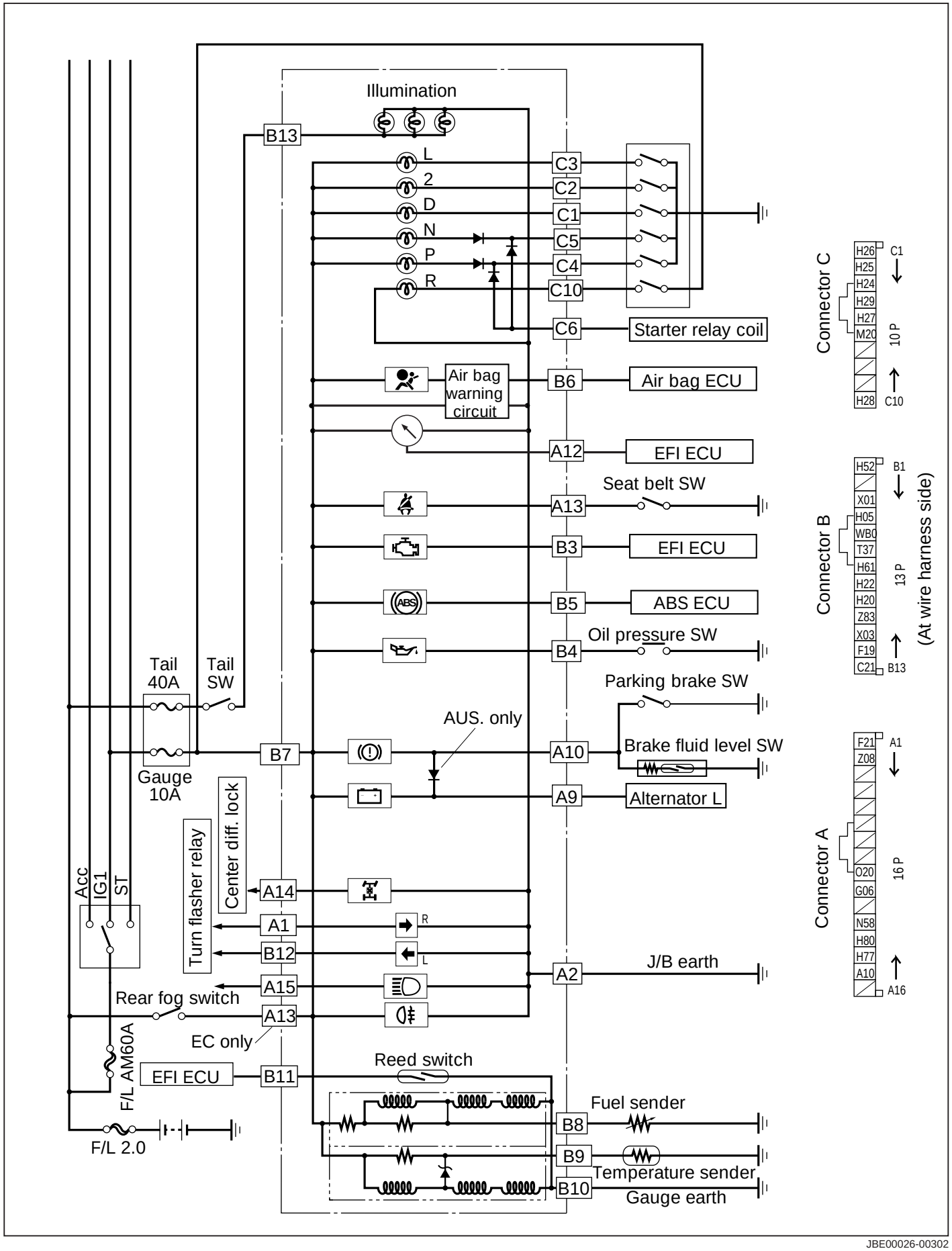
WIRING DIAGRAM



JBE00026-00302

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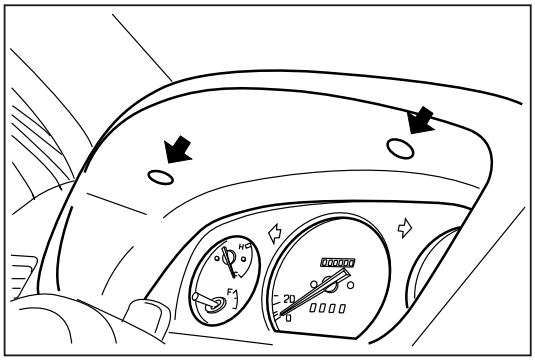
Removal of combination meter

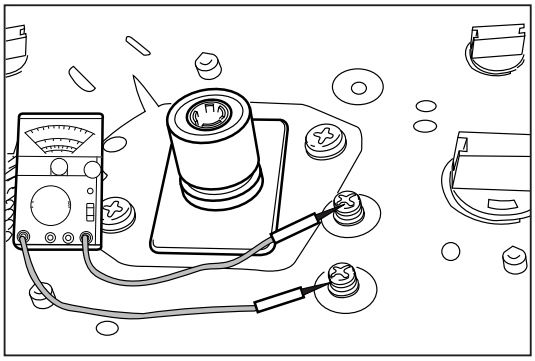
1. Pull of the hazard warning switch knob.
2. Remove the instrument cluster finish panel from the instrument panel by removing the screws.
3. Remove the attaching screws of the combination meter assembly.
4. Disconnect the speedometer cable and wire harness coupler at the back side of the combination meter assembly.
5. Remove the combination meter assembly.



JBE00027-00303

SPEED SENSOR

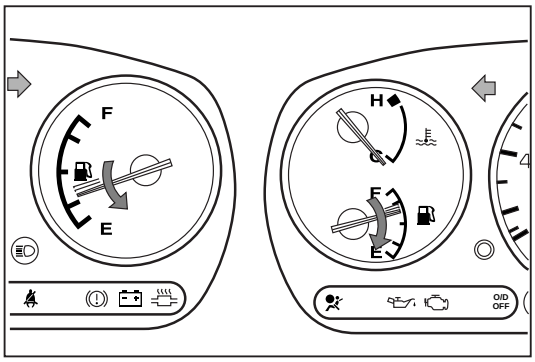
1. With a circuit tester set to the ohmmeter range, connect the circuit tester between the terminal B10 and B11.
2. Turn the speedometer drive shaft.
3. Check to see if continuity exists.
   NOTE:
   - The continuity should be 4 times per each revolution of the speedometer drive shaft.



JBE00028-00304

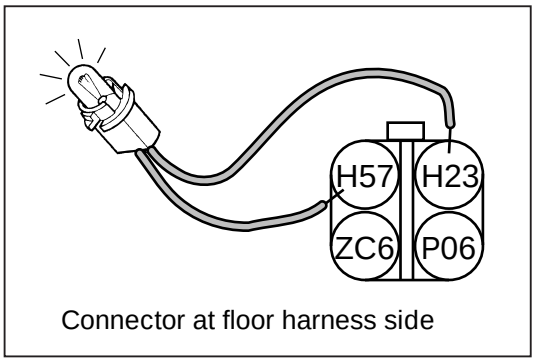
FUEL RECEIVER GAUGE

1. Jack up the vehicle.
2. Disconnect the connector from the fuel sender gauge/fuel pump assembly by the fuel tank.
3. Under this condition, turn on the ignition switch.
4. Ensure that the pointer of the receiver gauge returns to the position “E.”



JBE00029-00305

5. Turn off the ignition switch.
6. Connect the connector between the terminal H23 and H57 through a test lamp (12 V - 3.4 W).
7. Under this condition, turn on the ignition switch.
8. Ensure that the pointer of the receiver gauge rises gradually and resisters the position “F.”
9. Turn off the ignition switch.
10. Ensure that the pointer of the receiver gauge remains stationary and registers the position “F.”
    NOTE:
    - If not, check the wire harness and the fuel sender gauge.

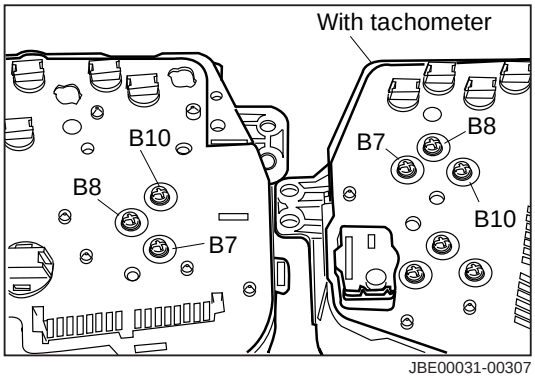


JBE00030-00306

Unit check

1. Remove the combination meter.
2. Measure the resistance between the terminals.

Specified Resistance:	B7 - B8	approx. 127 Ω
	B7 - B10	approx. 286 Ω
	B8 - B10	approx. 160 Ω



JBE00031-00307

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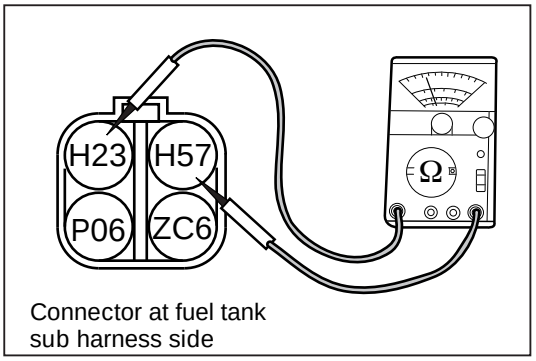
FUEL SENDER GAUGE

1. Jack up the vehicle.
2. Disconnect the connector of the wire harness from the sender gauge/fuel pump assembly by the fuel tank.
3. Connect a circuit tester between the terminal H23 and H57.
4. Ensure that the resistance conforms to the standard value for float position specified in the table.

Float position	Resistance (Ω)
F	3 ± 2
E	120 ± 7

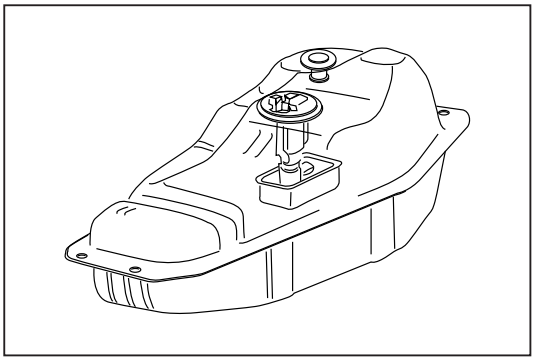


JBE00032-00308

Replacement

1. Remove the fuel tank.
   Refer to the BO section of the service manual.
   WARNING:
   - Never allow any fire to be brought near the working site.

2. Remove the fuel sender gauge by removing the screws.



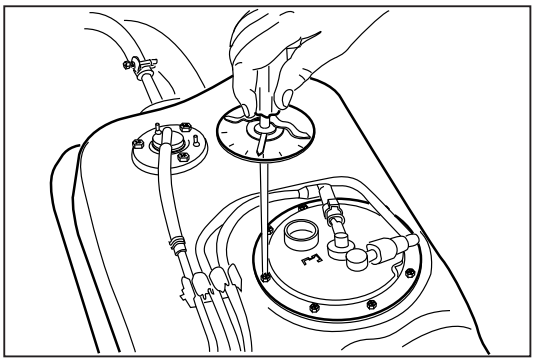
JBE00033-00309

Installation

1. Place a new gasket on the fuel tank.
   WARNING:
   - Be sure to replace the fuel sender gauge gasket with new one. Failure to observe this caution may cause fire.

2. Install the fuel sender gauge to the fuel tank.
   Tightening Torque: 1.5 - 2.5 N·m

3. Install the fuel tank to the body.
   Refer to the BO section of the service manual.

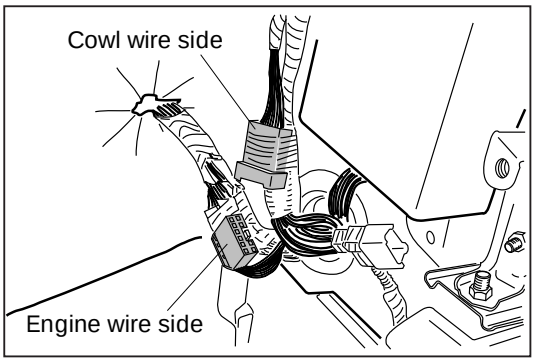


JBE00034-00310

WATER TEMPERATURE RECEIVER GAUGE

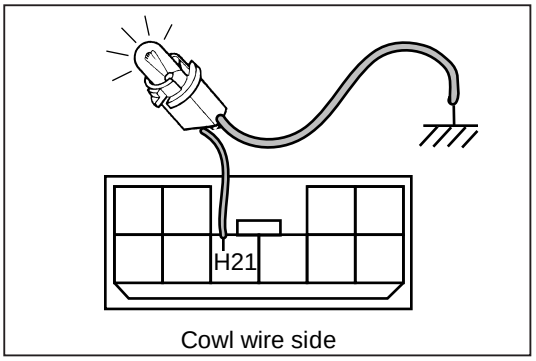
In-Vehicle inspection

1. Disconnect the connector of the engine wire harness from the cowl wire harness at the back side of the glove compartment.



JBE00035-00311

2. Ground the terminal at the cowl wire harness side through a test lamp (12 V - 3.4 W).
3. Turn on the ignition switch. Ensure that the test lamp goes on and the pointer of the receiver gauge starts to rise gradually.



JBE00036-00312

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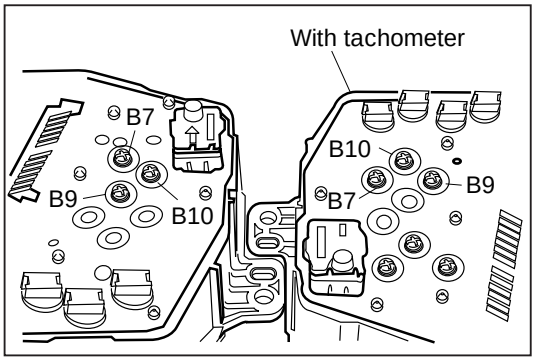
4. Remove the combination meter, measure the resistance between the terminals.
   Resistance: B7 - B9: approx. 54 Ω
   B7 - B10: approx. 177 Ω
   B9 - B10: approx. 231 Ω

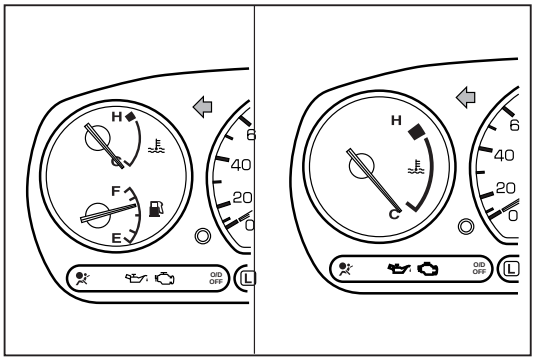


JBE00037-00313

WATER TEMPERATURE SENDER GAUGE

In-Vehicle inspection

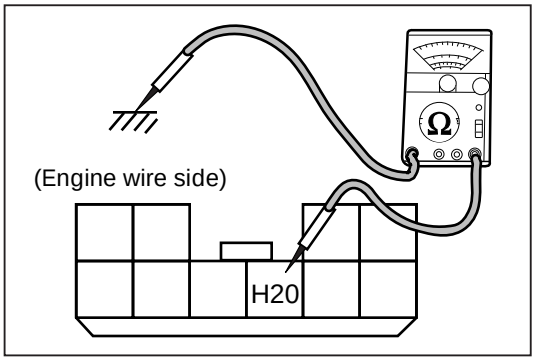
1. Disconnect the connector of the engine wire harness from the cowl wire harness at the back side of the glove compartment.
2. Under this condition, turn on the ignition switch. Ensure that the pointer of the receiver gauge indicates lowest position.



JBE00038-00314

3. Turn off the ignition switch, Ground the terminal at the engine wire harness side through a circuit tester.
4. Ensure that the resistance conforms to the standard value in the table.
   NOTE:
   • If not, check the wire harness and the water temperature sender gauge.

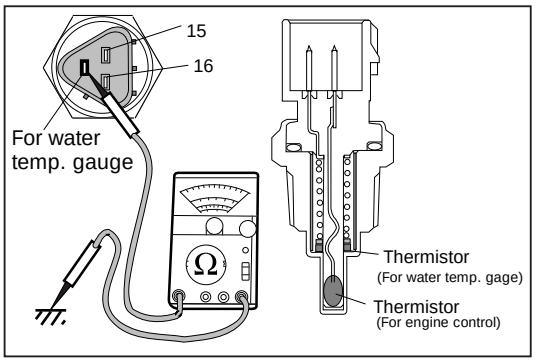
Temperature (°C)	Resistance (Ω)
50	190 - 260
115	24 - 28



JBE00039-00315

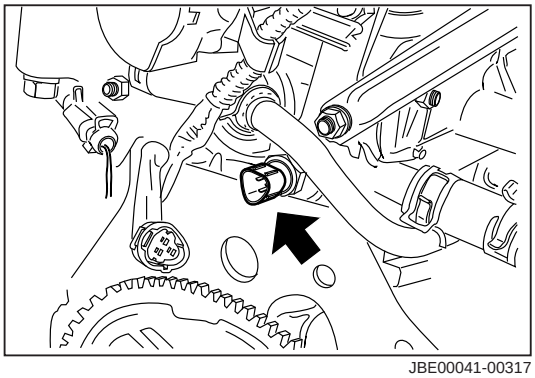
Unit check

1. Remove the engine cylinder head.
   Refer to the EM section of the service manual.
2. Remove the sender gauge.
3. Measure the resistance between the terminals as in the illustration.



JBE00040-00316

4. Clean the threaded portion of new water temperature sender gauge. Wind seal tape around the threaded portion.
5. Install the sender gauge.
   Tightening Torque: 24.5 - 34.3 N·m


JBE00041-00317

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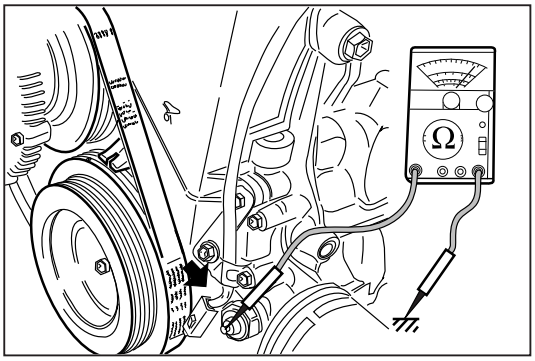
LOW OIL PRESSURE WARNING

Unit inspection

1. Disconnect the connector from the warning switch.
2. Connect a ohm meter. Ensure that continuity exists between the oil pressure switch terminal and the ground while the engine is stopped, whereas no continuity exists while the engine is running.
   NOTE:
   - If not, replace the unit.
     Refer to the LU section of the service manual.

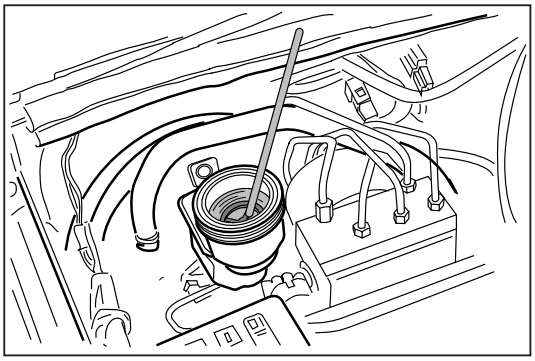


JBE00042-00318

BRAKE FLUID LEVEL WARNING

Unit inspection

1. Disconnect the connector.
2. Connect an ohm meter.
3. Remove the reservoir tank cap. Press down the float with a clean rod. Ensure that continuity exists.
   NOTE:
   - As for a rod to be used for pressing down the float, be sure to thoroughly clean it. Special care must be exercised to ensure that no dust nor water gets into the reservoir.

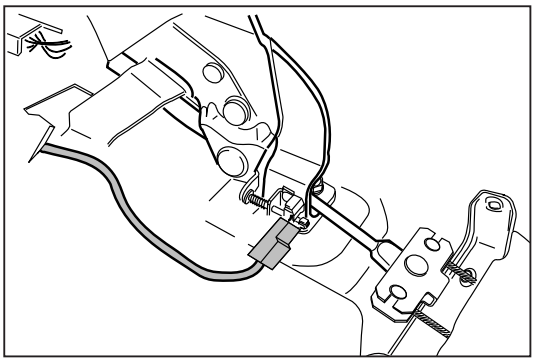


JBE00043-00319

PARKING BRAKE WARNING

Unit inspection

1. Disconnect the connector from the parking brake switch.
2. Ensure that the parking brake warning lamp or brake warning lamp goes on when ground the terminal at the harness side.
3. Ensure that continuity exists between the terminal and the body earth when the parking brake lever is pulled up ward.



JBE00044-00320

REAR FOG LAMP WARNING

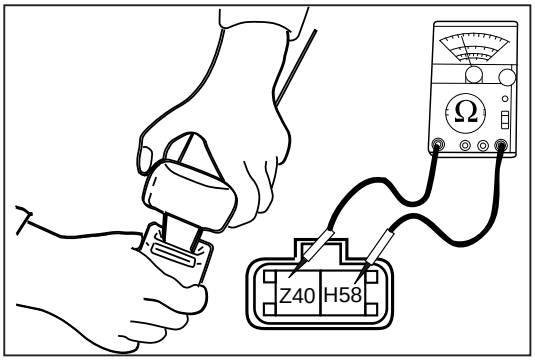
Refer to rear fog lamp system.

JBE00045-00321

SEAT BELT WARNING

Unit inspection

1. Disconnect the connector of the seat belt buckle.
2. Ensure that the seat belt warning glows when short the terminal at the harness side and the body earth.
3. Ensure that continuity exists between the terminals of the buckle side.
4. Ensure that no continuity exists when insert the tongue plate into the buckle until it clicks.



JBE00046-00322

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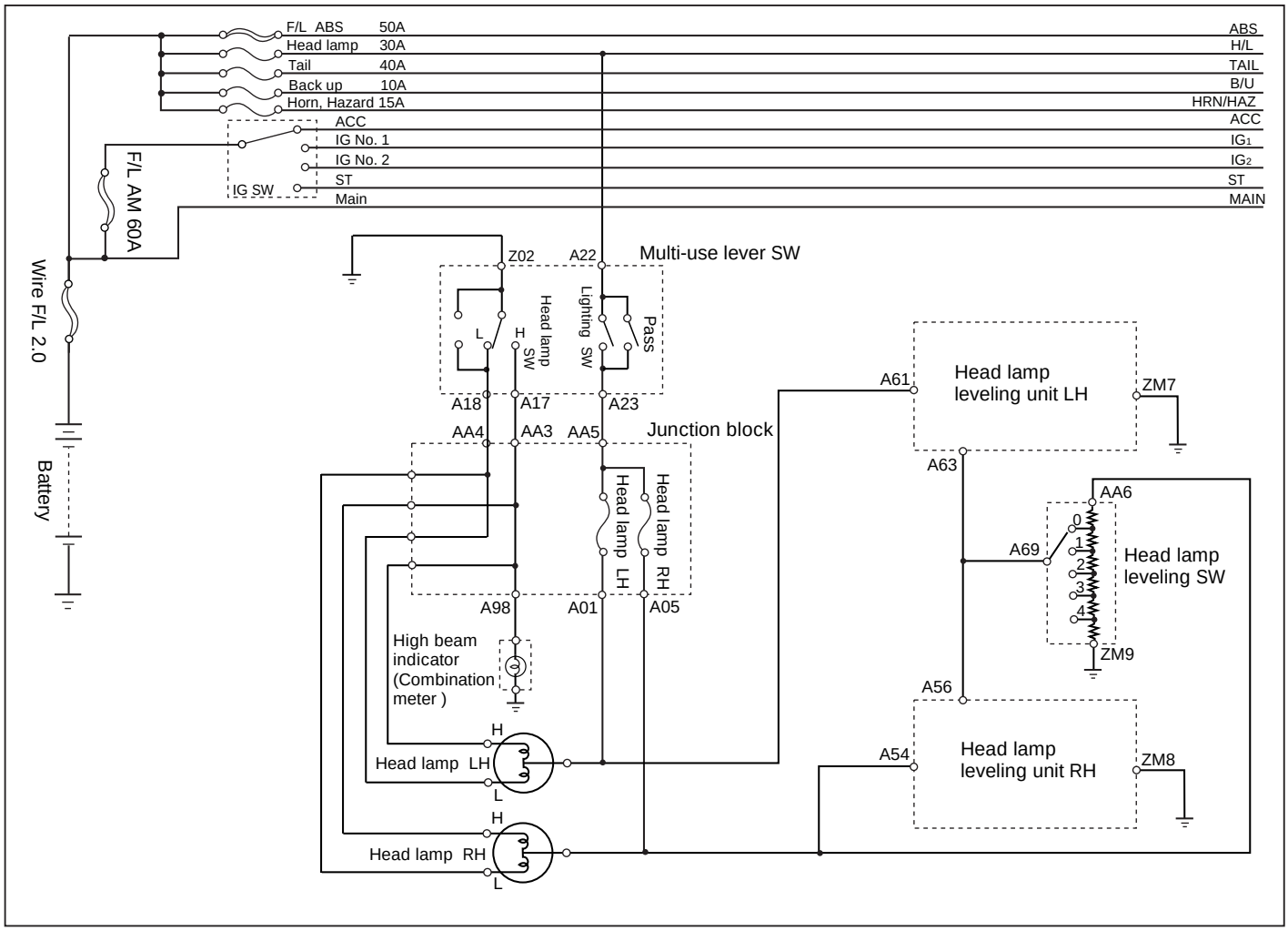
HEAD LAMP

WIRING DIAGRAM

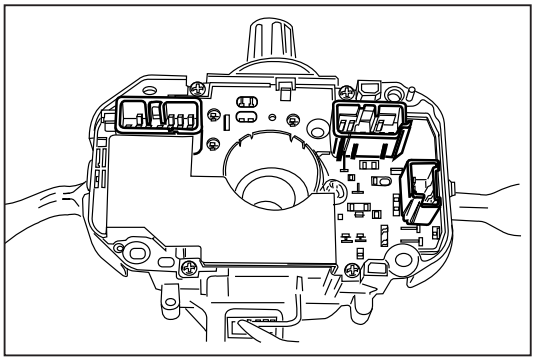


JBE00047-00401

HEAD LAMP SWITCH (with air bag system)

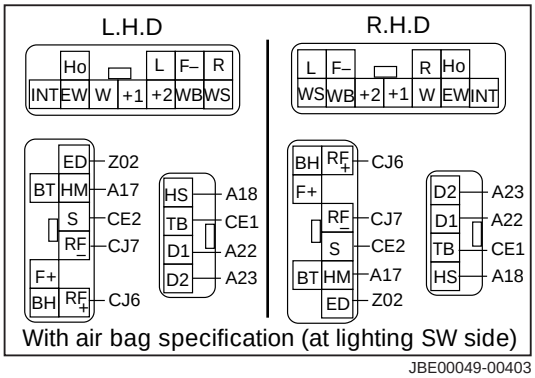
Unit inspection

Disconnect the connector for multi-use lever switch. Ensure that continuity exists between the respective terminals in accordance with the following continuity table.



JBE00048-00402

		HM	HS	ED	TB	S	(RF+)	(RF–)	D1	D2
OFF	HF	○		○					○	○
	HL		○	○						
	HU	○		○						
I	HF	○		○	○	○			○	○
	HL		○	○	○	○				
	HU	○		○	○	○				
II	HF	○		○	○	○	○	○	○	○
	HL		○	○	○	○	○	○	○	○
	HU	○		○	○	○	○	○	○	○



JBE00049-00403

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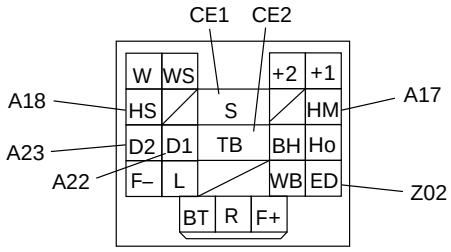
HEAD LAMP SWITCH (without air bag system)

Unit inspection

Disconnect the connector for multi-use lever switch. Ensure that continuity exists between the respective terminals in accordance with the following continuity table.

		HM	HS	ED	TB	S	D1	D2
OFF	HF	○		○			○	○
	HL							
	HU							
I	HF	○		○	○	○	○	○
	HL				○	○		
	HU				○	○		
II	HF	○		○	○	○	○	○
	HL		○	○	○	○	○	○
	HU	○		○	○	○	○	○



Without air bag specification (at lighting SW side)

JBE00050-00404

JBE00051-00405

Aiming adjustment

Perform the following operation in advance.

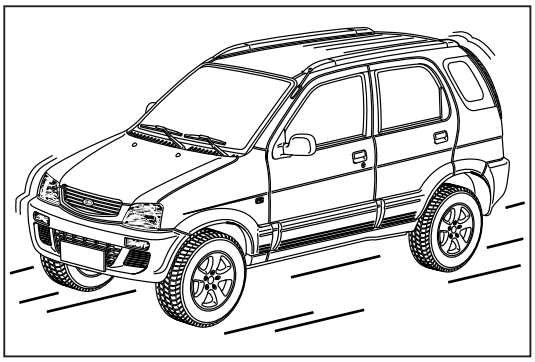
1. Seat one person (weighing about 75 kg) at the driver's seat.
2. Set the tire inflation pressure to the specified values.
3. Ensure that a spare tire, tools, a jack are mounted at the specified points.
4. Check to see if the engine oil, transmission oil, window washer fluid, etc. are filled to the specified levels. Fill them, as required. Further more, fuel in the tank is filled up.

kPa

Tire size	Tire air pressure	
	Front	Rear
205/70R15	200	

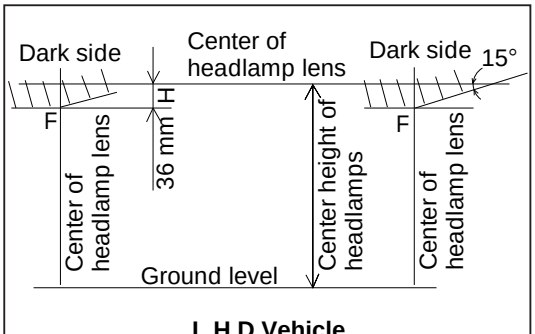
JBE00052-00406

5. Rock the vehicle in up-&-down and right-&-left directions so that the suspensions may support the load evenly and the vehicle may assume the proper vehicle posture.
   NOTE:
   - In case of a vehicle which has the head lamp leveling system, perform this aiming adjustment with the leveling control switch set to the "0" position.



JBE00053-00407

6. Setting of reference points on screen
   (1) Measure the center height "H" of the head lamps.
   (At 3 m from lens surface)
   Draw an adjustment line on the screen at;
   L.H.D. vehicle:
   31 mm below the center height "H"
   R.H.D. vehicle:
   31 mm below the center height "H"
   Vehicle with head lamp leveling system:
   36 mm below the center height "H"



L.H.D Vehicle

JBE00054-00408

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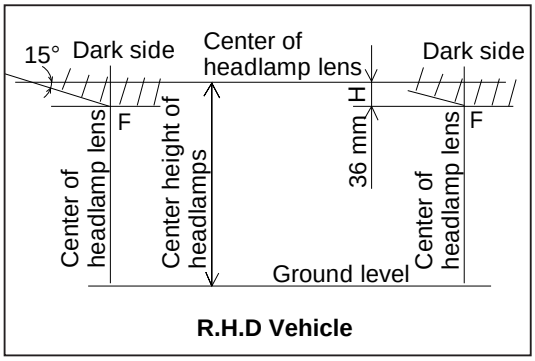
NOTE:
- Keep the engine speed at 1500 rpm or more during the aiming adjustment.

(2) Draw a vertical straight line on the screen at each center of the head lamps on both right and left sides.
Thus, establish each intersection “F” made by the vertical center line and the adjustment line.

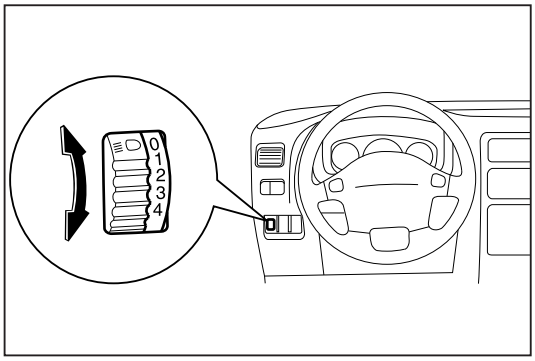


R.H.D Vehicle

JBE00055-00409

(3) Ensure that the optical axis moves down ward when the head lamp leveling switch is turned 0-1-2-3-4.

Position	Stroke
0 – 1	28 mm
1 – 2	28 mm
2 – 3	28 mm
3 – 4	28 mm



JBE00056-00410

NOTE:
- The head lamp leveling system functions only when the head lamp switch is turned on.

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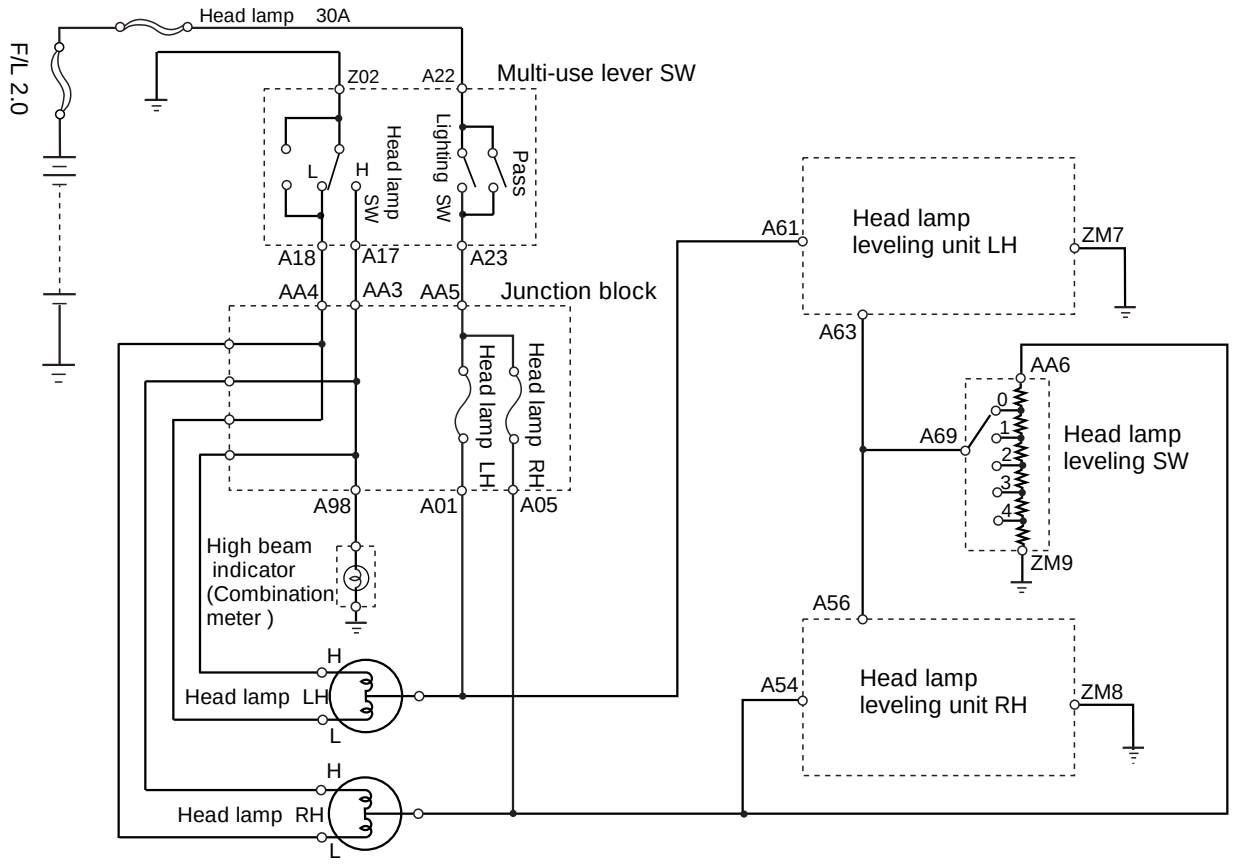
HEAD LAMP LEVELING

WIRING DIAGRAM

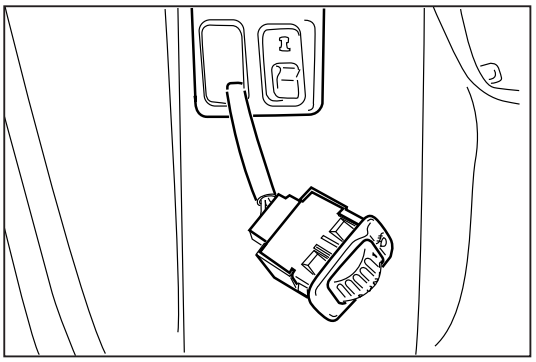


JBE00057-00501

HEAD LAMP LEVELING SWITCH

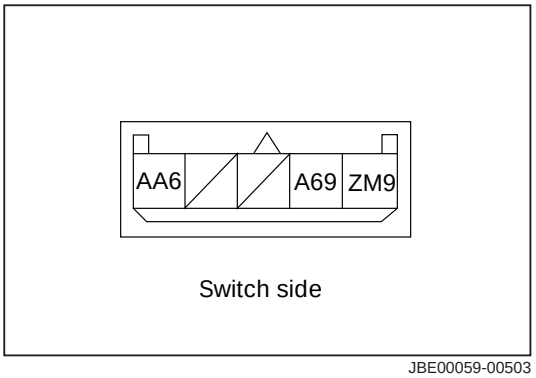
Unit inspection

1. Remove the head lamp leveling switch by pushing it with your fingers at the back side of the instrument panel.
2. Disconnect the connector of the wire harness.
3. Remove the switch assembly from the instrument panel.



JBE00058-00502

4. Ensure the resistance between the respective terminals conforms to the following specifications.
   - Between A69 and ZM9 (Position 0); Approx. 2.0 kΩ
   - Between A69 and ZM9 (Position 1); Approx. 1.7 kΩ
   - Between A69 and ZM9 (Position 2); Approx. 1.6 kΩ
   - Between A69 and ZM9 (Position 3); Approx. 1.4 kΩ
   - Between A69 and ZM9 (Position 4); Approx. 1.2 kΩ
   - Between AA6 and ZM9 (Each position); Approx. 2.4 kΩ



JBE00059-00503

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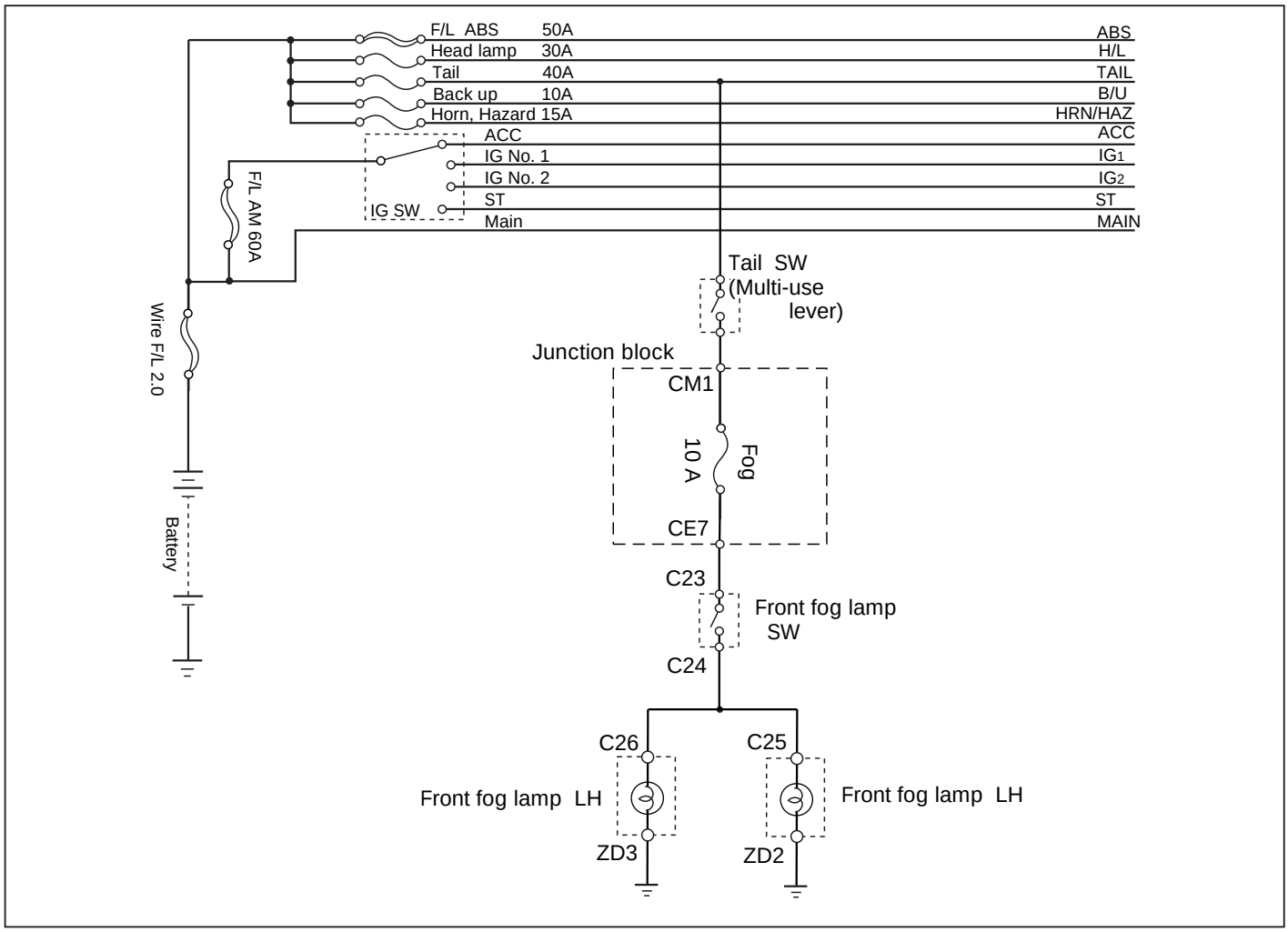
FRONT FOG LAMP

WIRING DIAGRAM

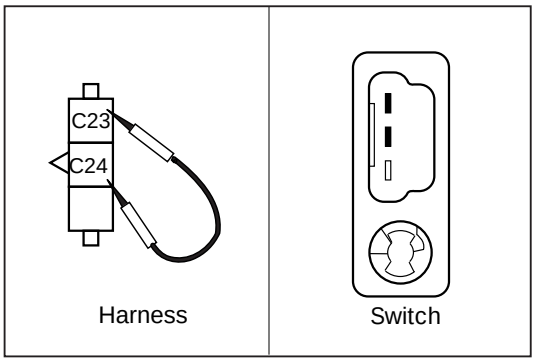


JBE00060-00601

FRONT FOG LAMP SWITCH

Unit inspection

1. Pull out the switch assembly from the instrument panel. Disconnect the connector.
2. Ensure that the continuity exists between the terminals of the front fog lamp switch while the switch is turned on.



JBE00061-00602

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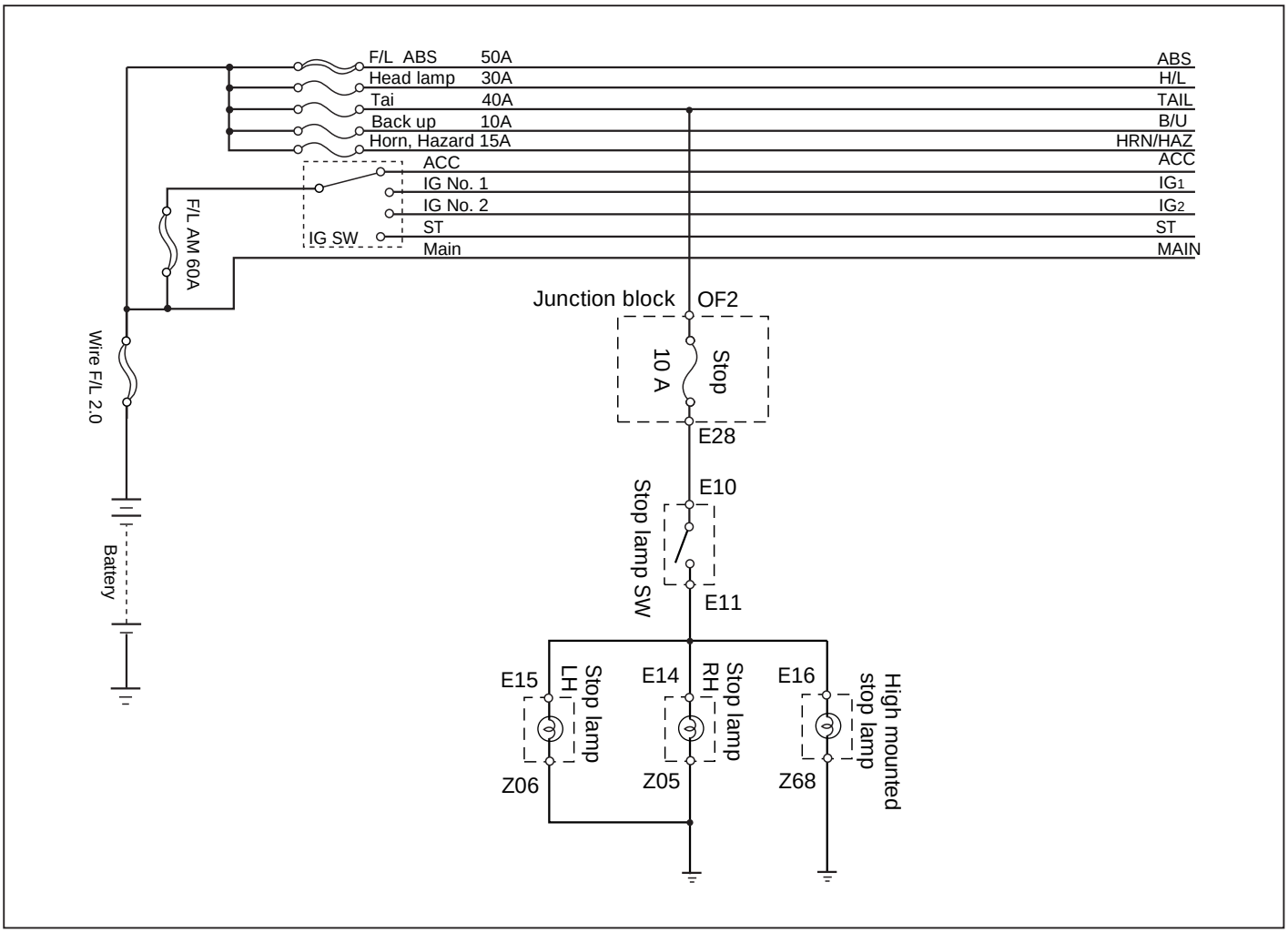
STOP LAMP

WIRING DIAGRAM

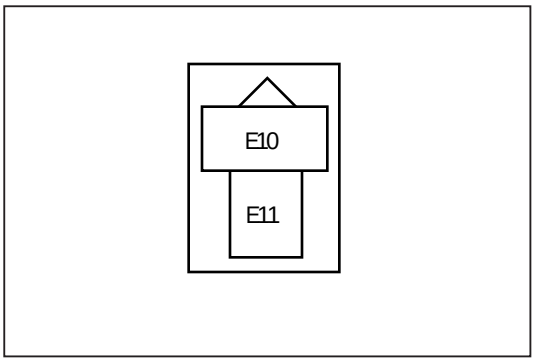


JBE00062-00701

STOP LAMP SWITCH

Unit inspection

1. Disconnect the connector of the stop lamp switch. (at the brake pedal arm)
2. Ensure that continuity exists between the terminals when the brake pedal is depressed.
3. Ensure that no continuity exists between the terminals when the brake pedal is not depressed.



JBE00063-00702

Removal and installation

Refer to the BR section of the service manual.

JBE00064-00703

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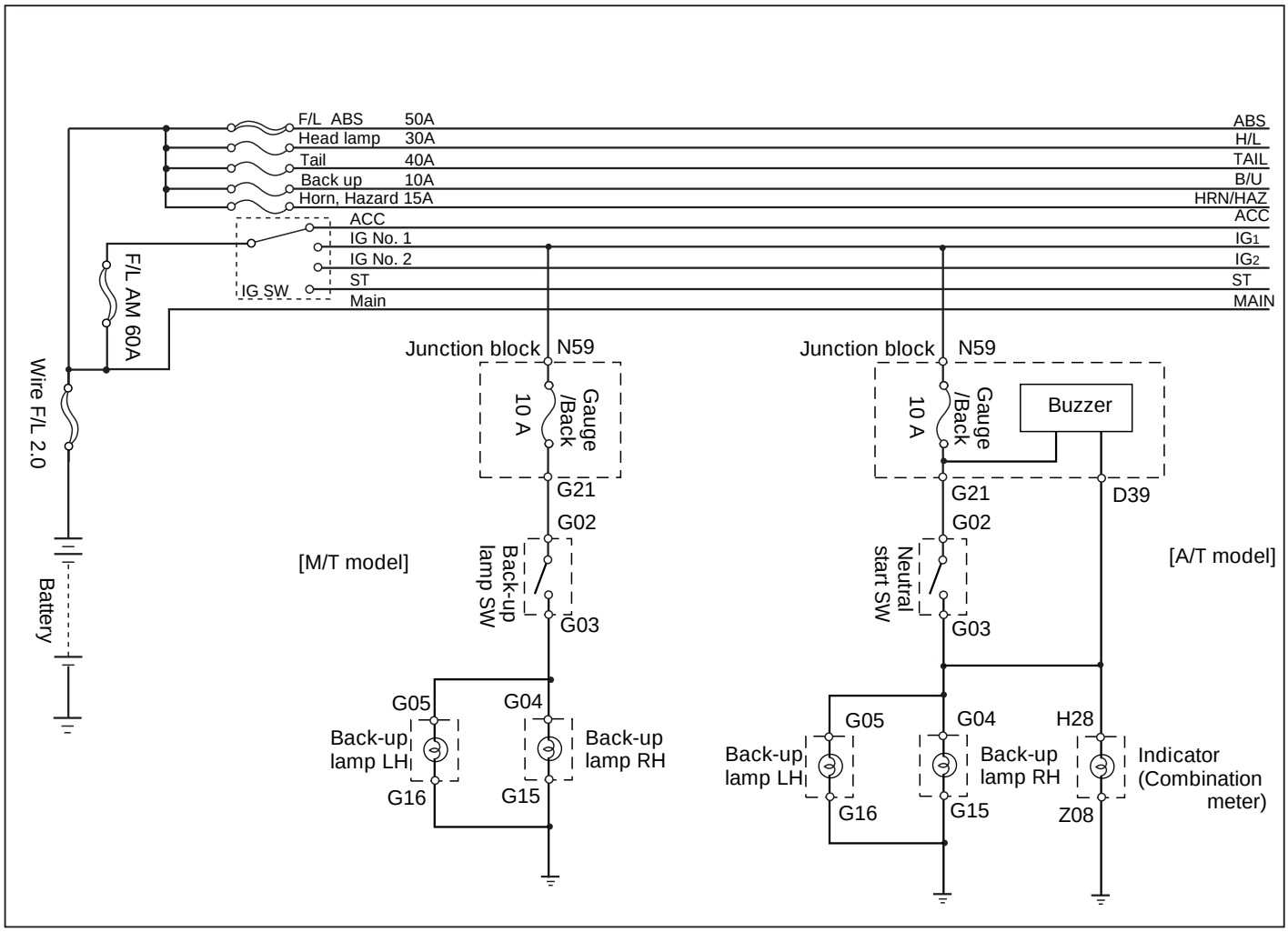
BACK UP LAMP

WIRING DIAGRAM



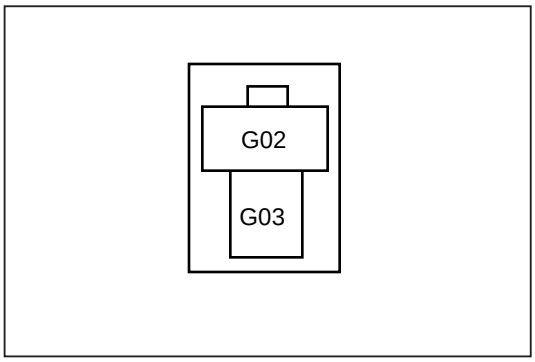
JBE00065-00801

BACK UP LAMP SWITCH

Unit inspection

(Manual transmission)

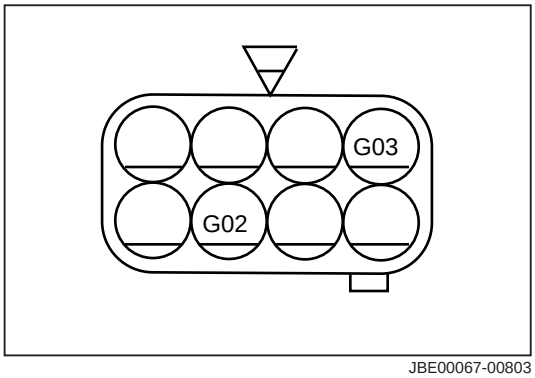
1. Disconnect the connector of the back up lamp switch. (on the transmission case)
2. Ensure that continuity exists between the terminals when shift lever of the manual transmission is shifted to the reverse position.



JBE00066-00802

(Automatic transmission)

1. Disconnect the connector of the transmission neutral switch. (on the transmission case)
2. Ensure that continuity exists between the terminals when shift lever of the automatic transmission is shifted to the reverse position.



JBE00067-00803

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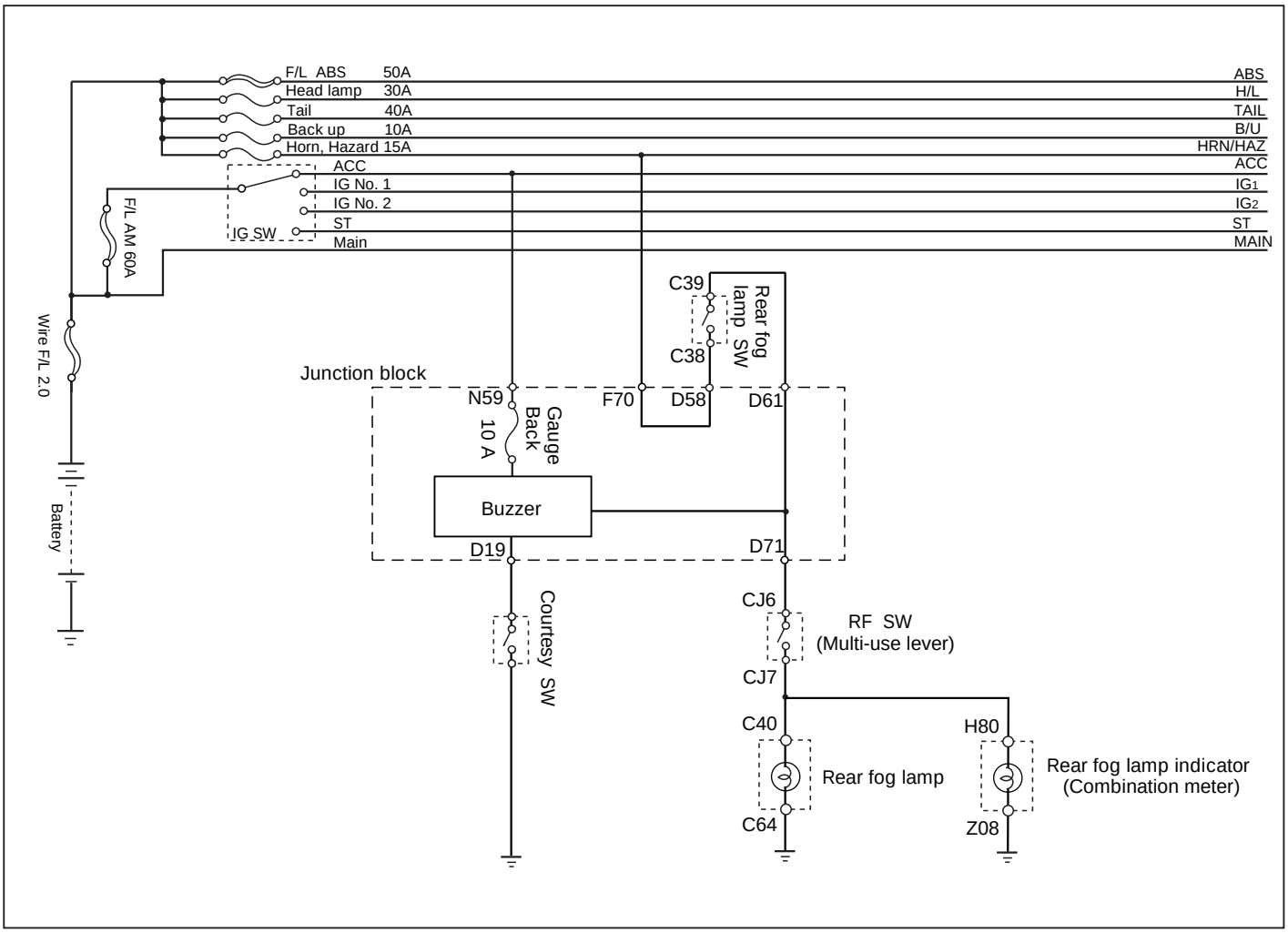
REAR FOG LAMP

WIRING DIAGRAM

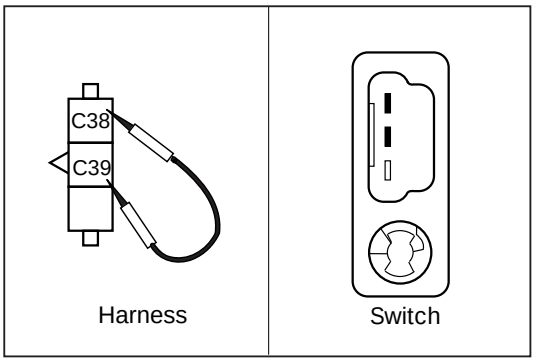


JBE00068-00901

REAR FOG LAMP SWITCH

Unit inspection

1. Pull out the switch assembly from the instrument panel. Disconnect the connector.
2. Ensure that the rear fog lamp warning glows when ignition switch turns on and short the terminals at the harness side.
   If not glows the warning, check the wire and meter assembly.
3. Ensure that the continuity exists between the terminals of the rear fog lamp switch while the switch is turned on.



JBE00069-00902

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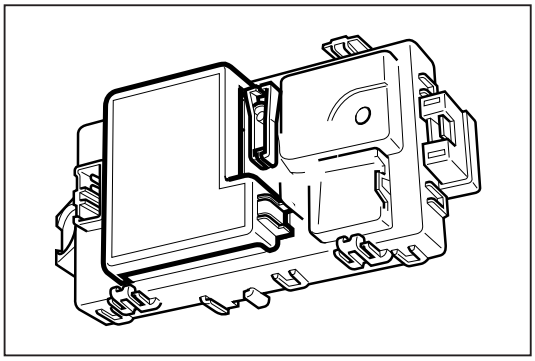
REAR FOG LAMP WARNING BUZZER



JBE00070-00904

In-vehicle inspection

1. Ensure if the warning buzzer is set off under the conditions given following table.

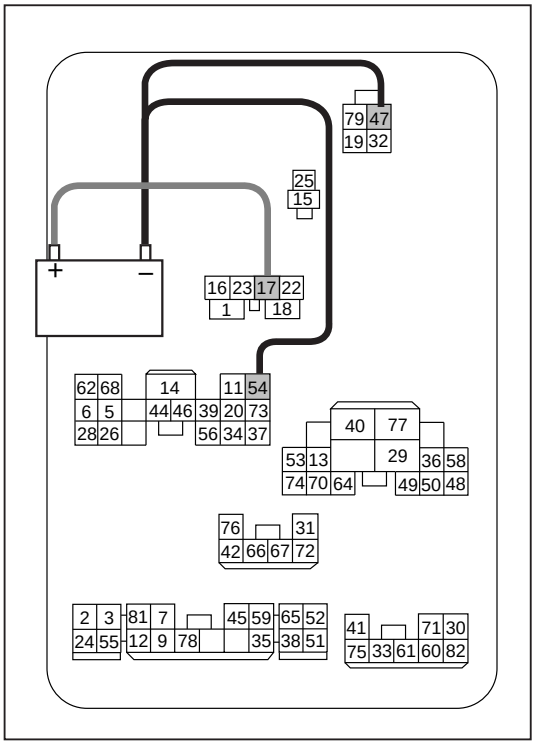
Ignition SW	Front door	Rear fog lamp SW	Buzzer
OFF / Acc	Open	On	Set off
		Off	—
	Close	On	—
		Off	—
ON	Open	On	—
		Off	—
	Close	On	—
		Off	—

2. If not, check the wiring harness and warning buzzer.

JBE00071-00905

Unit inspection

1. Disconnect the connectors and remove the junction block by removing attaching bolts.
2. Apply a battery voltage to the terminal 17 (+) and the terminal 47 (–).
3. Check that the warning buzzer will set off when the battery (+) (or the terminal 47) is connected to the terminal 54 with a jump wire.



JBE00072-00906

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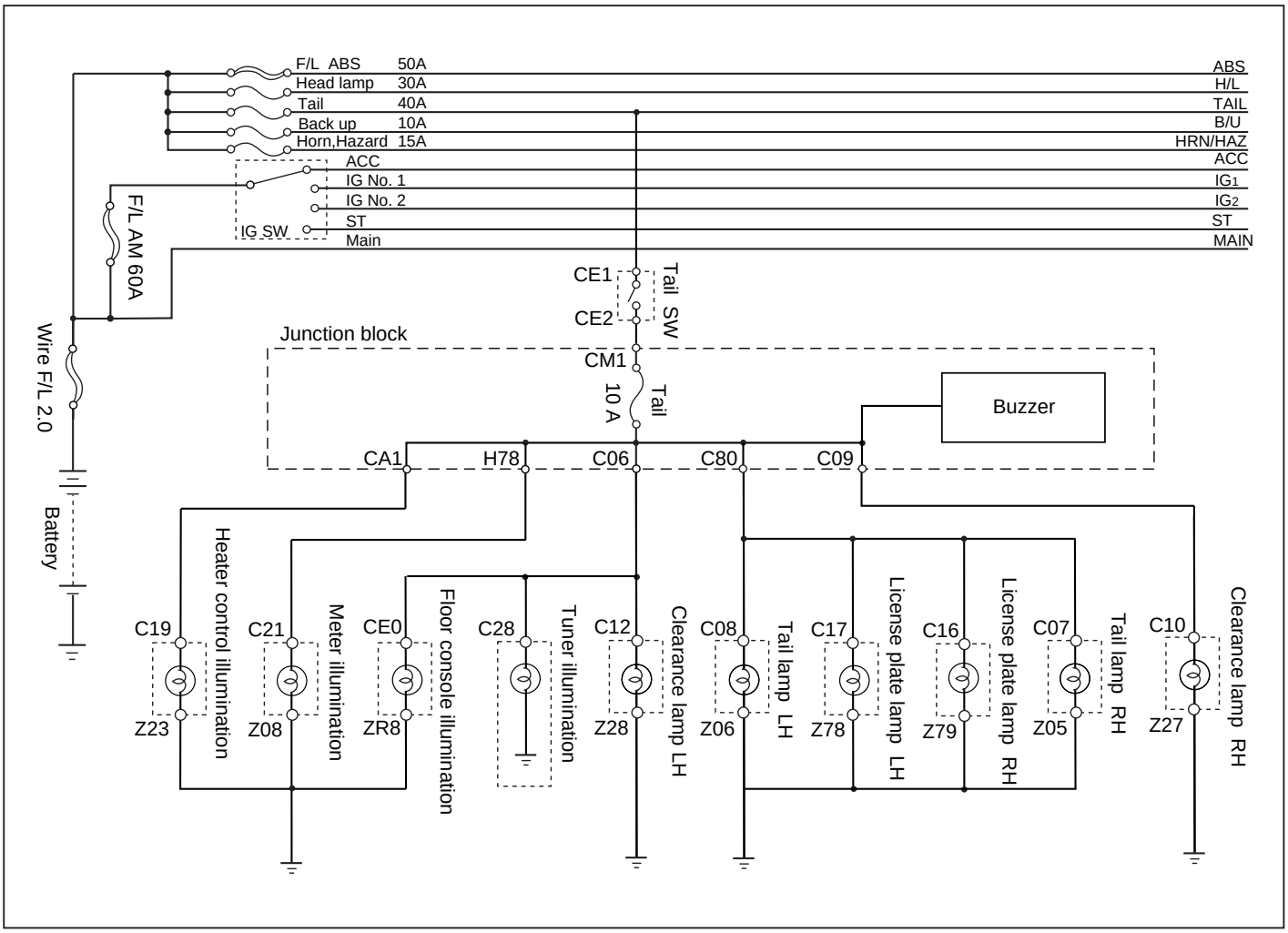
TAIL LAMP & LICENSE PLATE LAMP

WIRING DIAGRAM

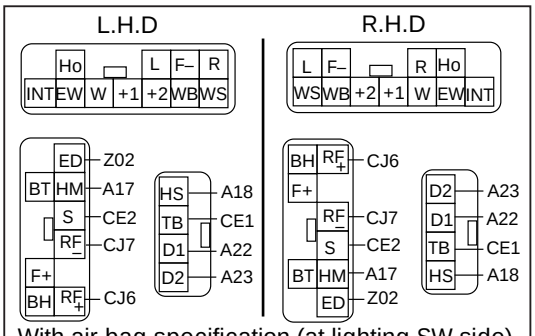


JBE00073-01001

TAIL LAMP SWITCH

Unit inspection

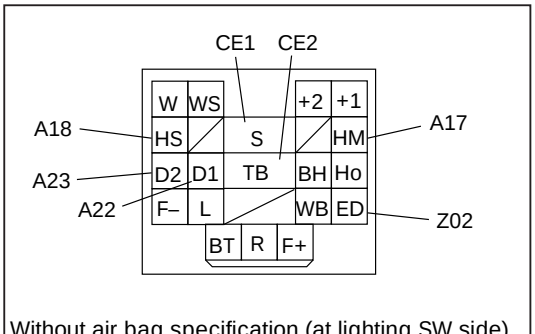
Disconnect the connector of the multi-use lever switch. Ensure that continuity exists between the respective terminals in accordance with the following continuity table.



With air bag specification (at lighting SW side)

JBE00074-01002

		TB	S
OFF	HF		
	HL		
	HU		
I	HF	○—○	
	HL	○—○	
	HU	○—○	
II	HF	○—○	
	HL	○—○	
	HU	○—○	



Without air bag specification (at lighting SW side)

JBE00075-01003

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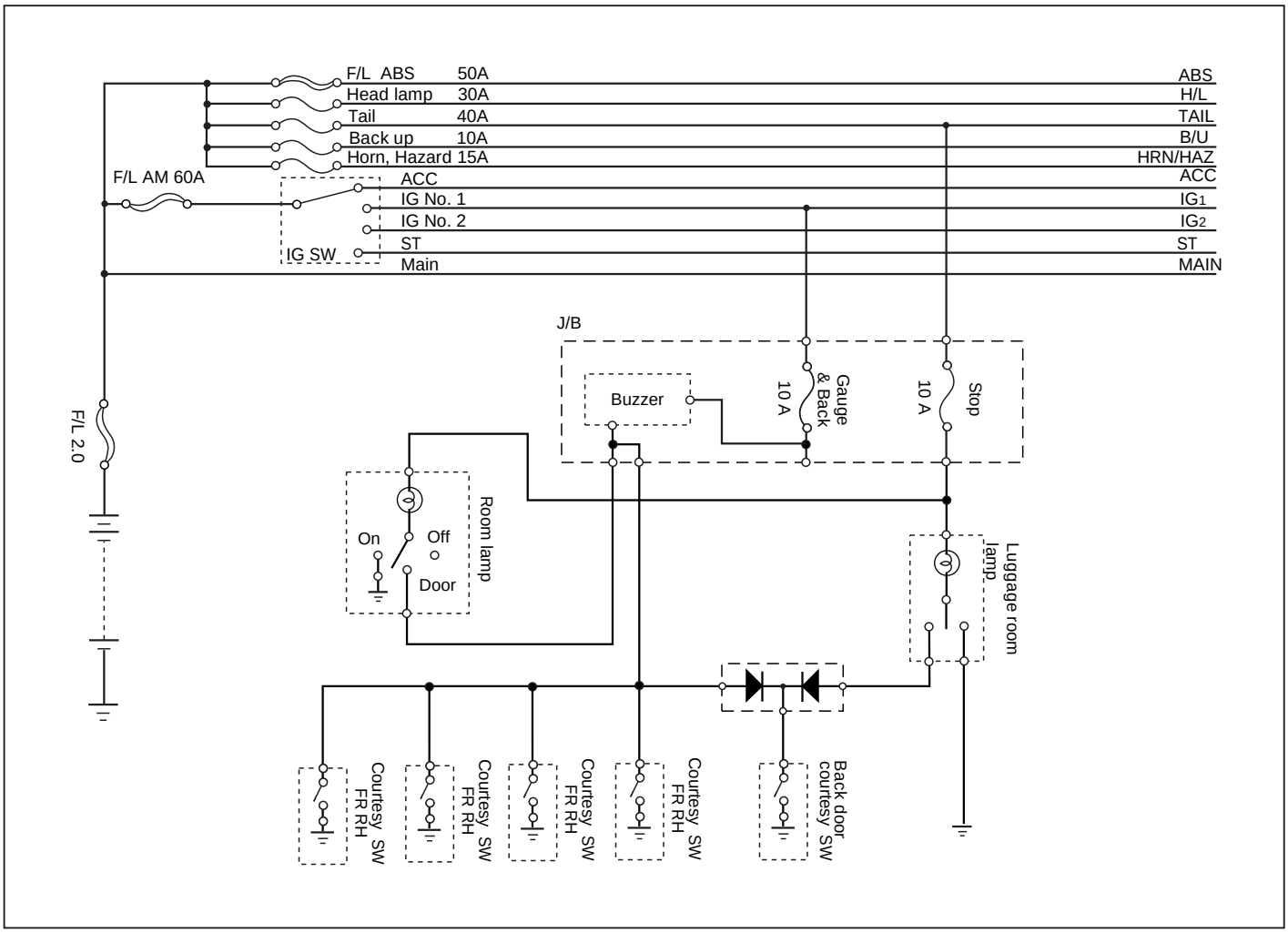
INTERIOR LAMP & LUGGAGE ROOM LAMP

WIRING DIAGRAM



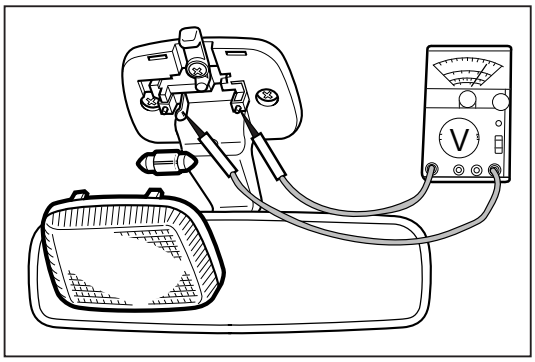
JBE00076-01101

INTERIOR LAMP SWITCH

Unit inspection

1. Lightly pry the lens to detach it and pull out the bulb straight.
2. Turns on the ignition switch.
3. Ensure if the voltage exists between the terminals when interior lamp switch is located to the respective position.

	Interior lamp switch position		
	Left	Center	Right
Front door open	—	Battery voltage	Battery voltage
Front door close	—	—	Battery voltage



JBE00077-01102

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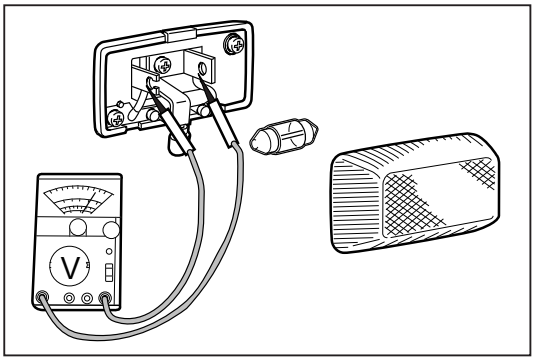
LUGGAGE ROOM LAMP SWITCH

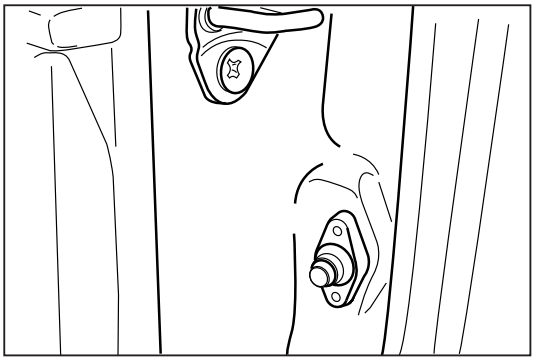
Unit inspection

1. Lightly pry the lens to detach it and pull out the bulb straight.
2. Turns on the ignition switch.
3. Ensure if the voltage exists between the terminals when the rear gate is opened.

Rear gate open	Battery voltage
Rear gate close	—



JBE00078-01104



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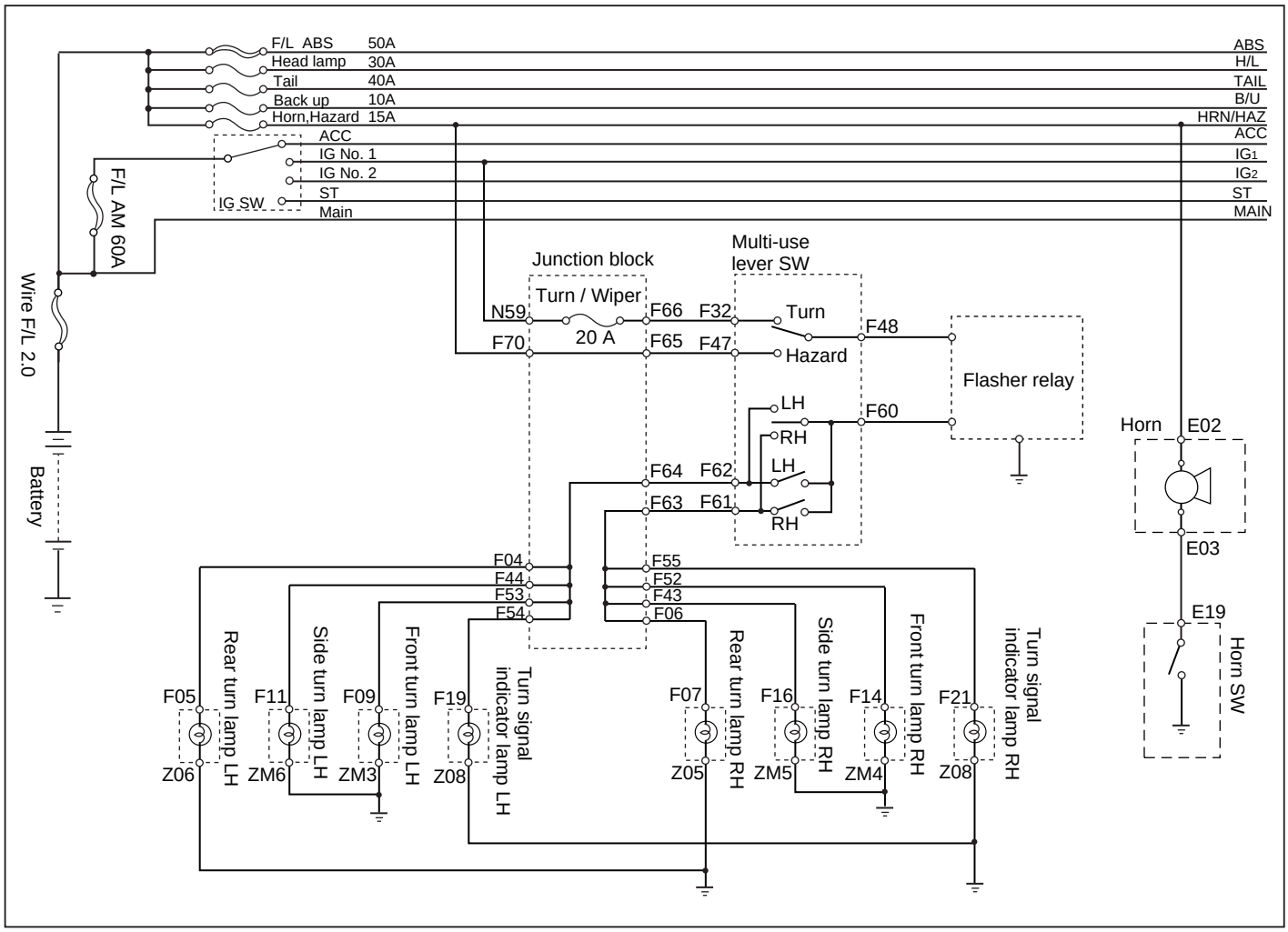
HAZARD WARNING & HORN

WIRING DIAGRAM



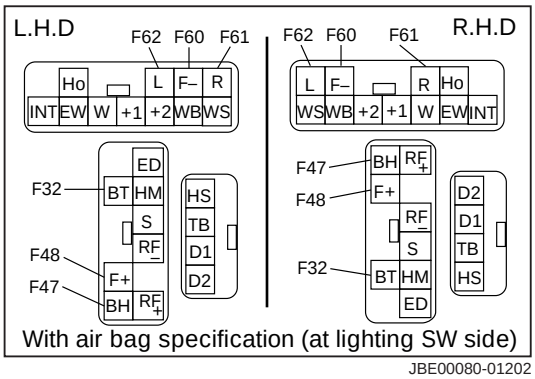
JBE00079-01201

HAZARD WARNING SWITCH

Unit inspection

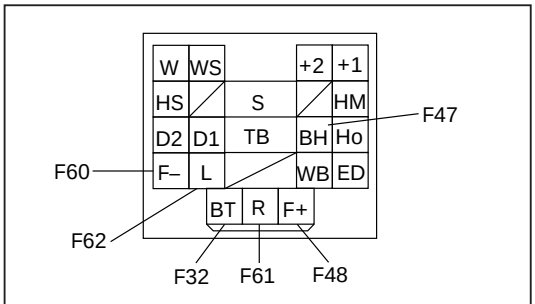
1. Disconnect the connector of the multi-use lever switch.
2. Ensure that continuity exists between the respective terminals in accordance with the following continuity table.

Hazard		F–	L	R	BT	BH	F+
OFF	L	○	○		○		○
	N				○		○
	R	○		○	○		○
ON		○	○	○		○	○



With air bag specification (at lighting SW side)

JBE00080-01202



Without air bag specification (at lighting SW side)

JBE00000-01203

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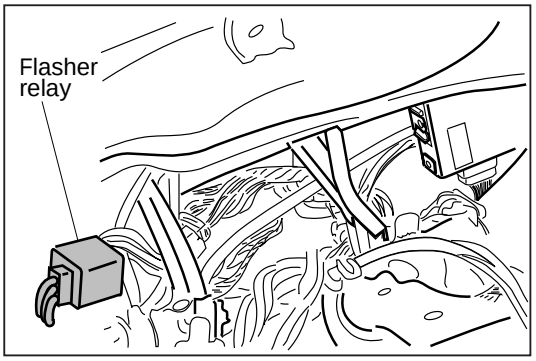
FLASHER RELAY

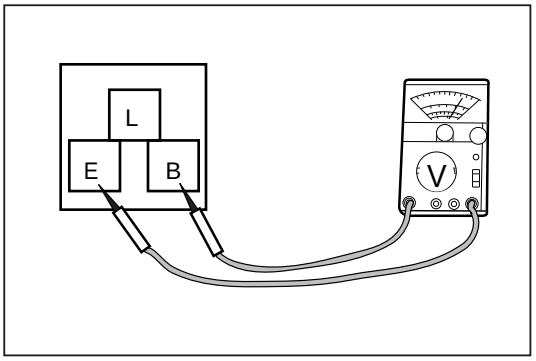
Unit inspection

1. Remove the combination meter. Then remove the flasher unit at the bracket of the cowl panel.
2. Disconnect the connector of the flasher unit.



JBE00081-01211

3. Ensure if the voltage exists the respective terminals at wire harness connector when ignition switch is turned on.
4. Ensure if the voltage exists the terminal when hazard switch is turned on.
5. Connect the flusher unit to the wire harness connector. Under the condition, if the flusher unit will not work, then the unit is failure.



JBE00082-01212

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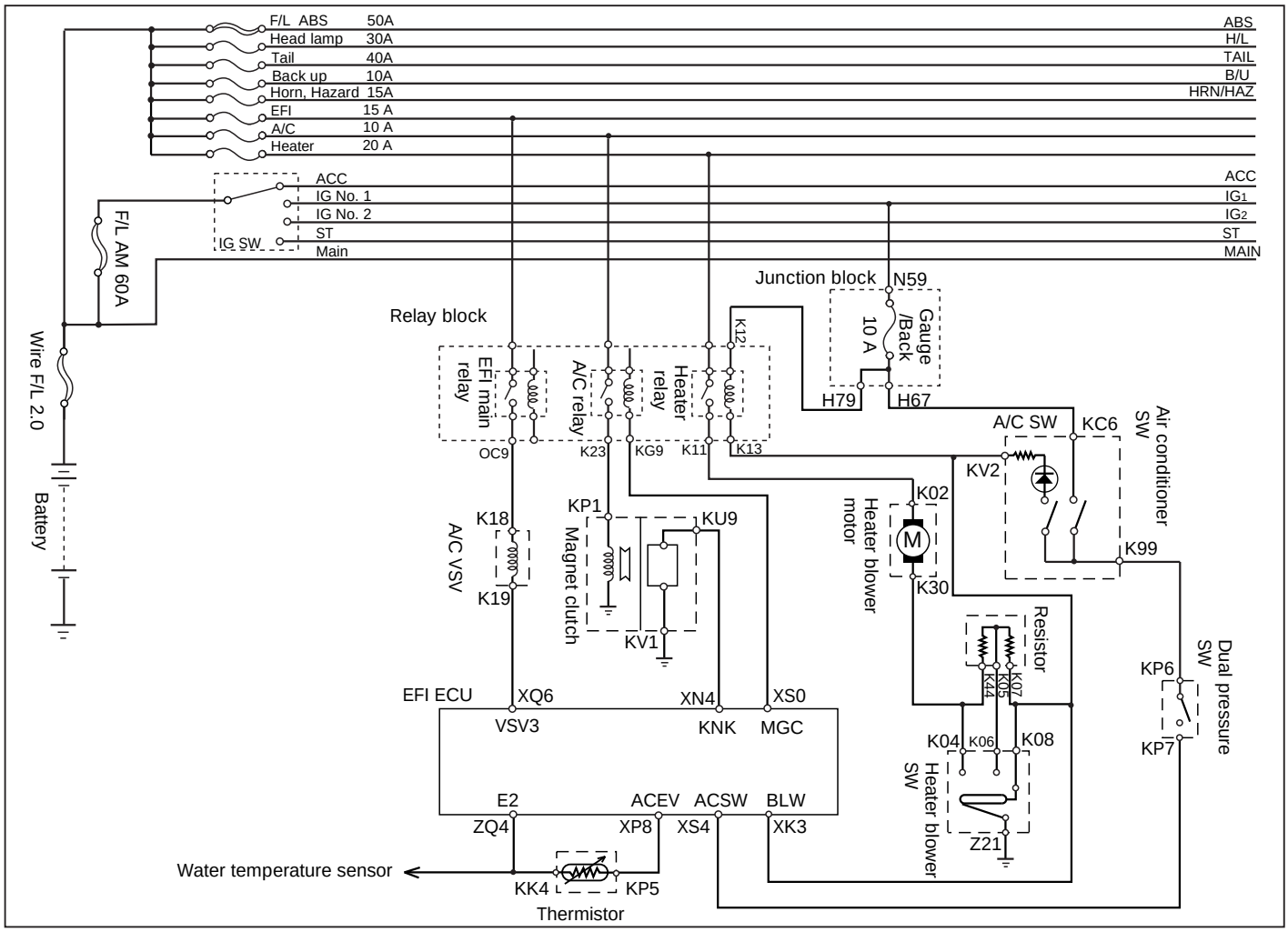
HATER & VENTILATION

WIRING DIAGRAM

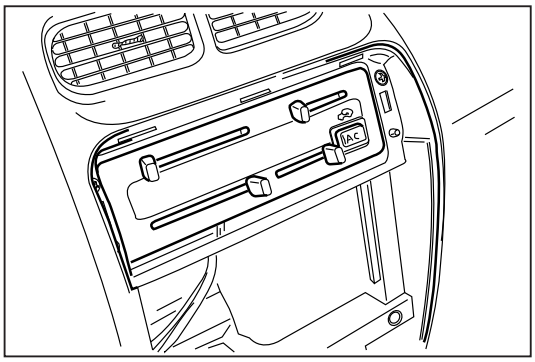


JBE00083-01301

BLOWER SWITCH

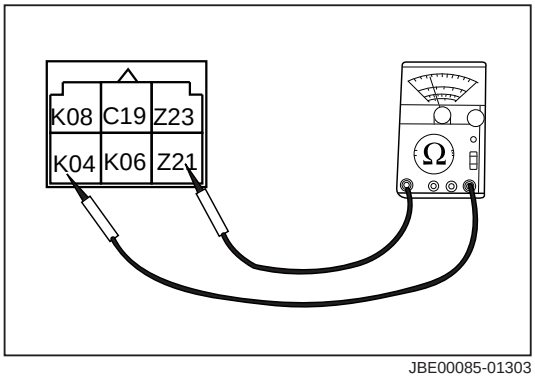
Unit inspection

1. Remove the instrument cluster finish center panel.
2. Remove the radio opening cover.
3. Remove the attaching screws of the heater control panel assembly.
   (Refer to the BO section of the service manual)
4. Disconnect the connector of the blower switch and the air conditioner switch.
5. Disconnect the control cables from the heater unit.
6. Remove the heater control panel assembly from the instrument panel.



JBE00084-01302

7. When the blower switch is set to each stage, ensure that continuity exists between the respective terminals as indicated in the table below.



JBE00085-01303

	Z21	K08	K06	K04
OFF				
L	○	○		
M	○	○	○	
H	○	○		○

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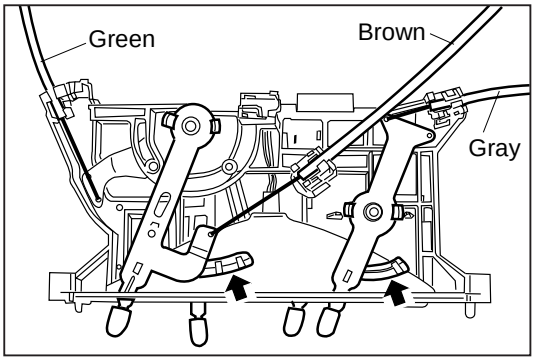
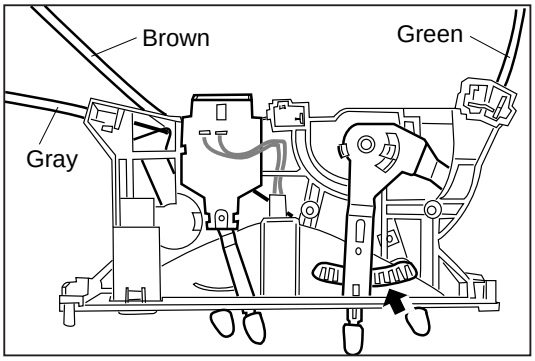
8. Ensure that each of the air outlet control lever, air intake control lever and temperature control lever is functioning smoothly with a positive dent feeling.
   NOTE:
   • If not, apply a rubber grease to the points or replace the control panel assembly.



JBE00086-01304

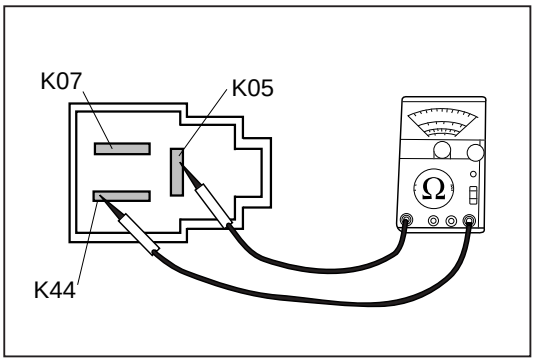


JBE00000-01305

BLOWER RESISTER

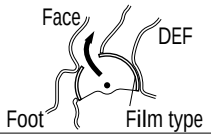
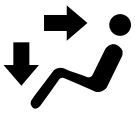
Unit inspection

1. Connect the connector of the the blower resistance.
2. Ensure that resistance between the respective terminals conforms to the following specifications.
   Between Terminal K44 and K07: 3.35 Ω
   Between Terminal K44 and K05: 1.1 Ω
   Between Terminal K07 and K05: 2.25 Ω



JBE00087-01311

VENTILATION SYSTEM

Film type rotary door position					
	Face	Bi-level	Foot	Foot/DEF	DEF
Lever position					

JBE00088-01321

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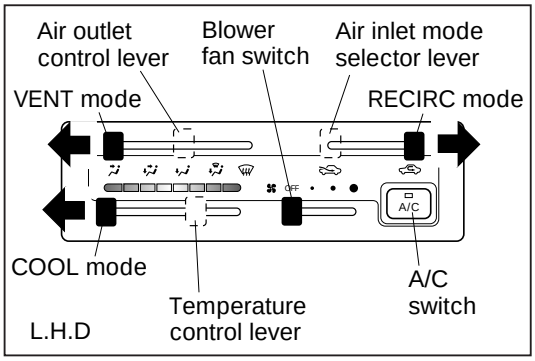
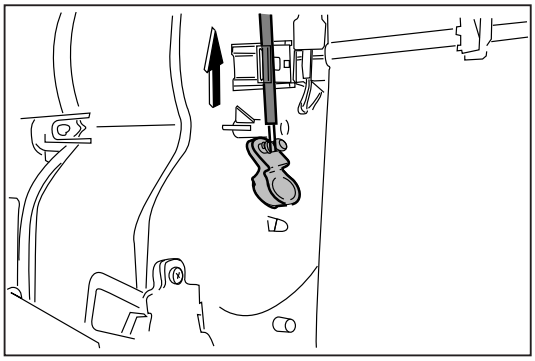
Adjustment of ventilation control

1. Ensure that the control levers move in a right-and-left direction without stiffness and binding over the full range of each lever.



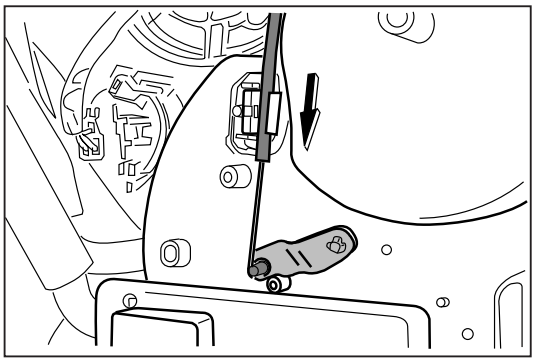
JBE00089-01331

2. Set the air outlet control lever to the VENT mode. Clamp the outer cable while pulling the outer cable toward VENT side.



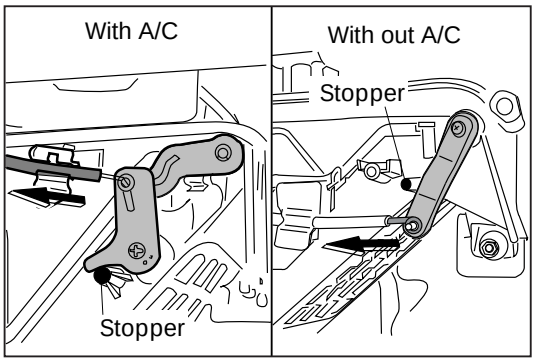
JBE00090-01332

3. Set the temperature control lever to the COOL mode. Clamp the outer cable while pushing the outer cable toward COOL side.



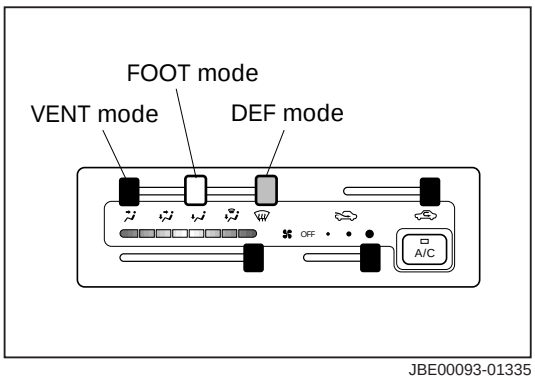
JBE00091-01333

4. Set the air inlet mode selector lever to the RECIRC mode. Clamp the outer cable while pulling the outer cable toward RECIRC side.



JBE00092-01334

5. After completion of the adjustments in the steps 2 through 4, set the blower switch to the most highest position. Check the following items.
   (1) When the VENT mode is selected, ensure that no air leaks from the foot side outlet and defroster.
   (2) When the DEF mode is selected, ensure that no air leaks from the foot side outlet and register.
   (3) When the FOOT mode is selected, ensure that no air leaks from the register. if not, readjust the control lever.



JBE00093-01335

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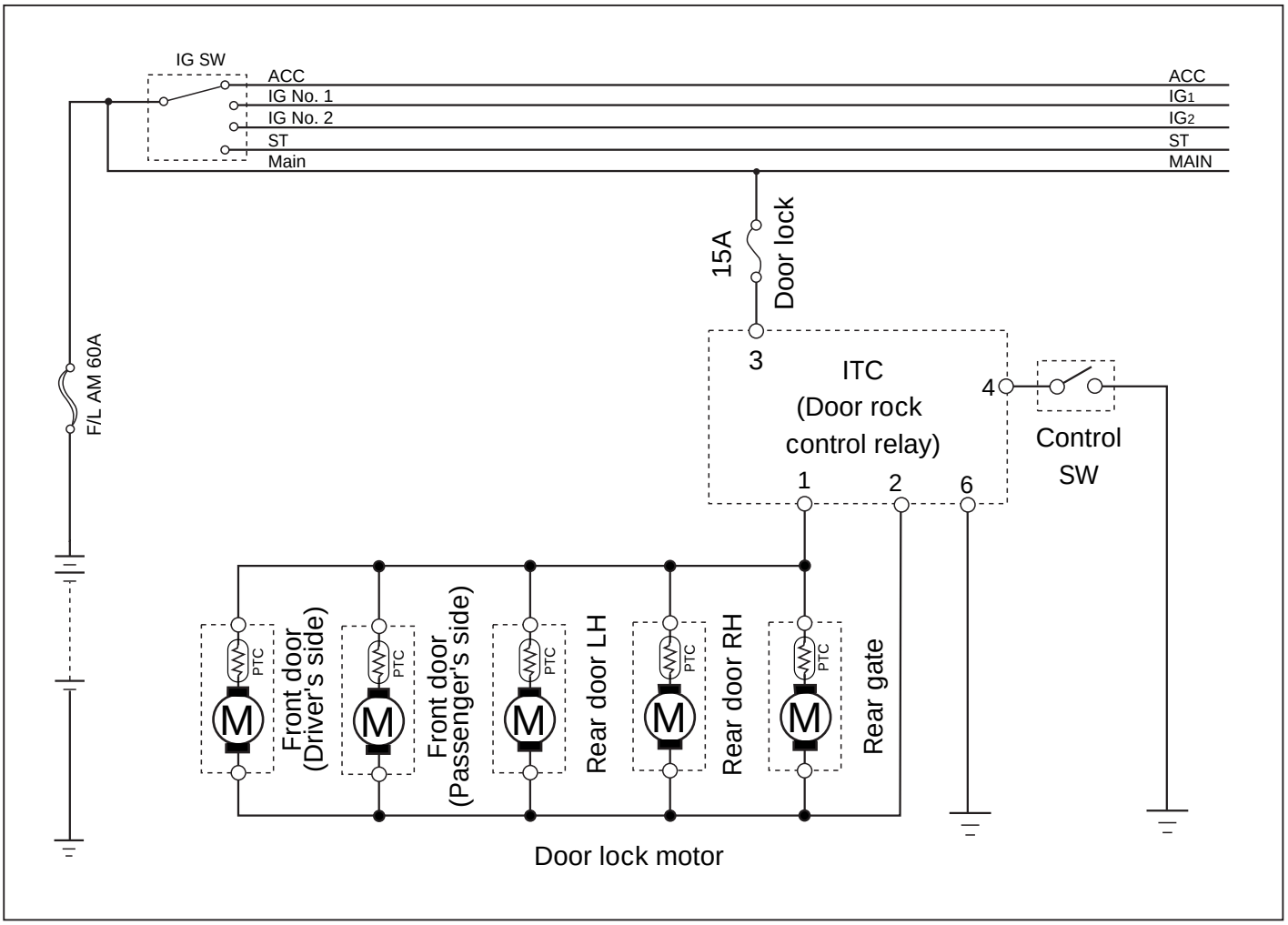
POWER DOOR LOCK

WIRING DIAGRAM

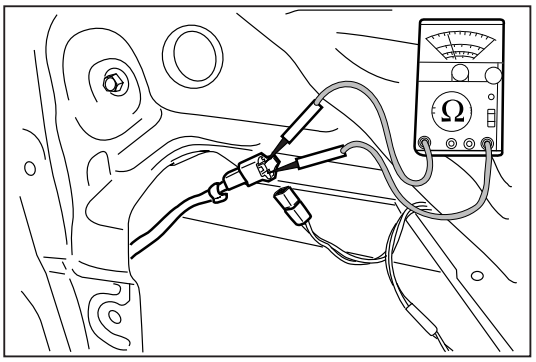


JBE00094-01401

DOOR LOCK CONTROL SWITCH

Unit inspection

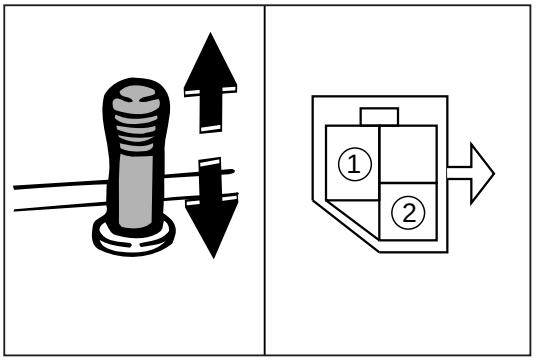
1. Remove the door trim-related parts.
2. Disconnect the connector.



JBE00095-01402

3. When the door lock switch is set to the LOCK and UNLOCK positions, respectively, ensure that continuity between the terminals of the door lock switch conforms to the requirements as indicated in the table below.

Terminal	①	②
LOCK		
UNLOCK	○	○



JBE00096-01403

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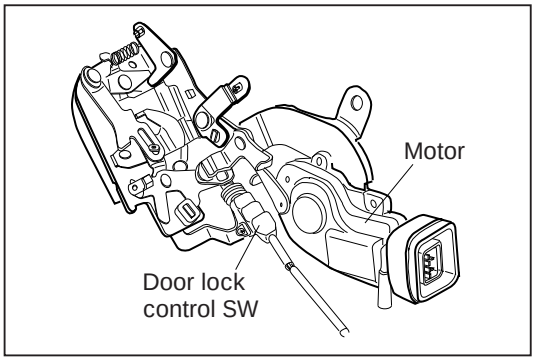
DOOR LOCK MOTOR

Unit inspection

1. Detach the door locking knob from the control link.
2. Remove the door trim-related parts.
3. Remove the link-related parts.
4. Remove the attaching screws of the lock assembly.
5. Take out the lock assembly.
6. Apply a voltage of 12 V between the following two terminals. Ensure that the plunger operates in accordance with the table below.

Terminal / Operation direction	①	②
LOCK	⊕	⊖
UNLOCK	⊖	⊕



JBE00097-01404

DOOR CONTROL RELAY

See page BE–45, ITC.

JBE00098-01405

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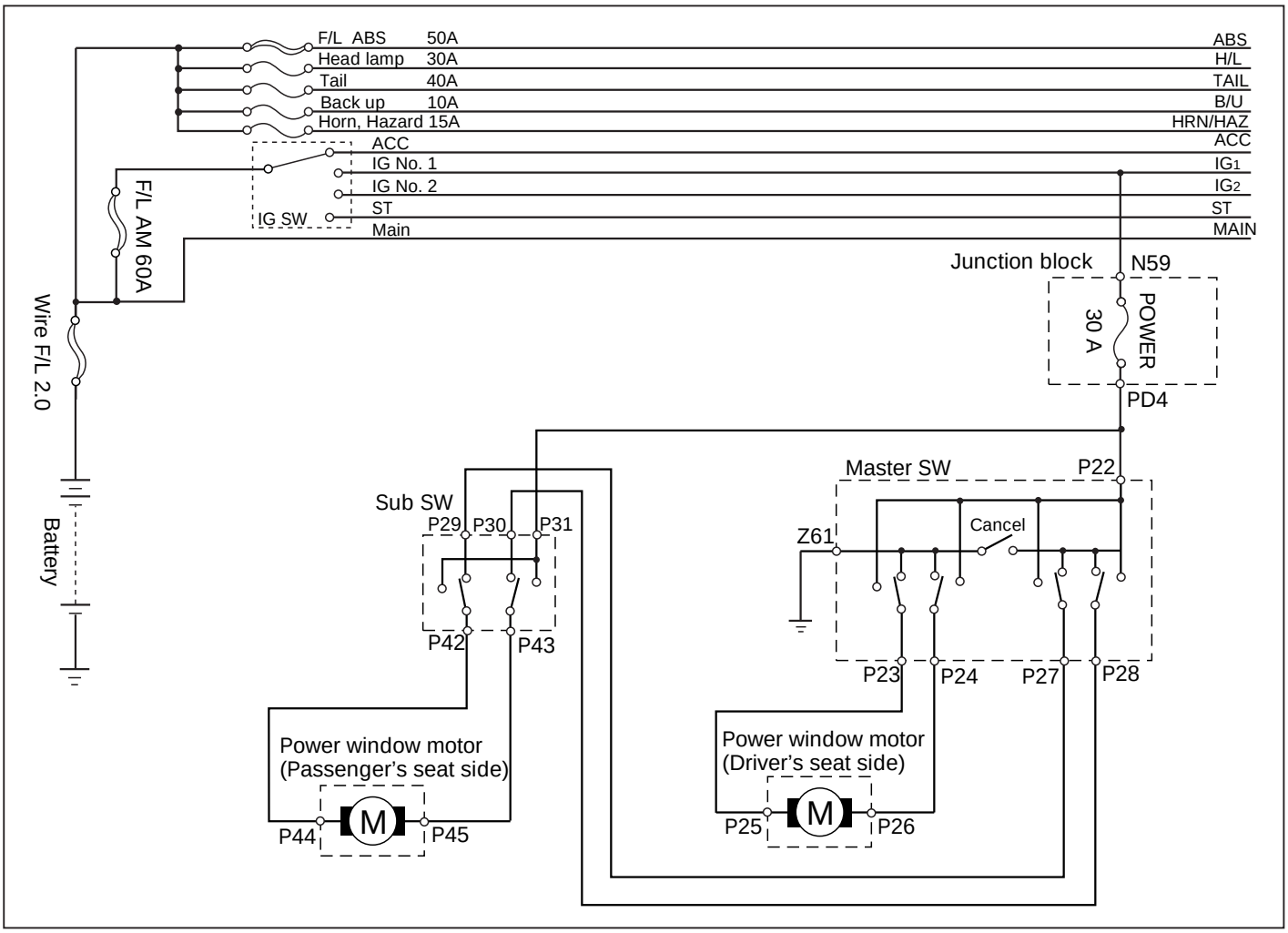
POWER WINDOW

WIRING DIAGRAM

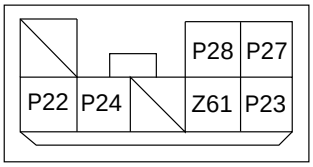


JBE00099-01501

DRIVER'S SEAT SIDE SWITCH

Unit inspection (Left hand drive)

1. Remove the switch by means of suitable wooden peace.
2. When the switch is operated, ensure that continuity between the terminals conforms to the requirements as indicated in the table below.



Switch side

JBE00100-01502

	Driver's seat side			
	P22	P23	P24	Z61
UP manual	○—○		○—○	
OFF		○—○		○—○
DOWN	○—○			○—○
DOWN auto	○—○			○—○

Window lock switch		Passenger's (master)			
		P22	P27	P28	Z61
ON	UP	○—○		○—○	
	OFF		○—○		○—○
	DOWN	○—○		○—○	
OFF	UP	○—○			
	OFF		○—○		
	DOWN	○—○		○—○	

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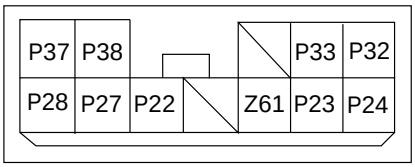
Unit inspection (Right hand drive)

1. Remove the switch by means of suitable wooden peace.
2. When the switch is operated, ensure that continuity between the terminals conforms to the requirements as indicated in the table below.

	Driver's seat side			
	P22	P23	P24	Z60
UP manual	○—○		○—○	
OFF		○—○	○—○	
DOWN	○—○		○—○	
DOWN auto	○—○		○—○	

Window lock switch		Passenger's (master)			
		P22	P27	P28	Z60
ON	UP	○—○		○—○	
	OFF		○—○	○—○	
	DOWN	○—○	○—○		
OFF	UP	○—○			
	OFF		○—○		
	DOWN	○—○		○—○	



Switch side

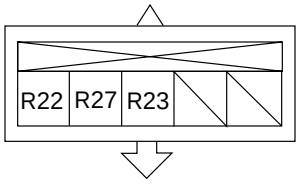
JBE00101-01504

FRONT PASSENGER'S SEAT SIDE SWITCH

Unit inspection

1. Remove the switch by means of suitable wooden peace.
2. When the switch is operated, ensure that continuity between the terminals conforms to the requirements as indicated in the table below.

	Power window switch				
	P42	P29	P30	P31	P43
UP	○			○	
			○		○
OFF	○—○		○		○
DOWN	○—○			○—○	



Switch side

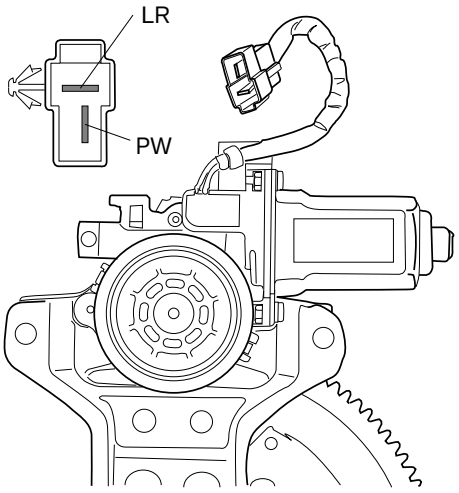
JBE00102-01506

POWER WINDOW MOTOR

Unit inspection

1. Remove the door trim assembly, service hole cover and remove the door window regulator.
1. Connect the positive (+) terminal of the battery to the connector PW of the power window motor; the negative (–) terminal to the connector LR. Ensure that the motor rotates clockwise, as viewed from the driving shaft side.
2. Connect the positive (+) terminal of the battery to the connector LR of the power window motor; the negative (–) terminal to the connector PW. Ensure that the motor rotates counterclockwise, as viewed from the driving shaft side.

	PW	LR
Clockwise	⊕	⊖
Counterclockwise	⊖	⊕



JBE00103-01508

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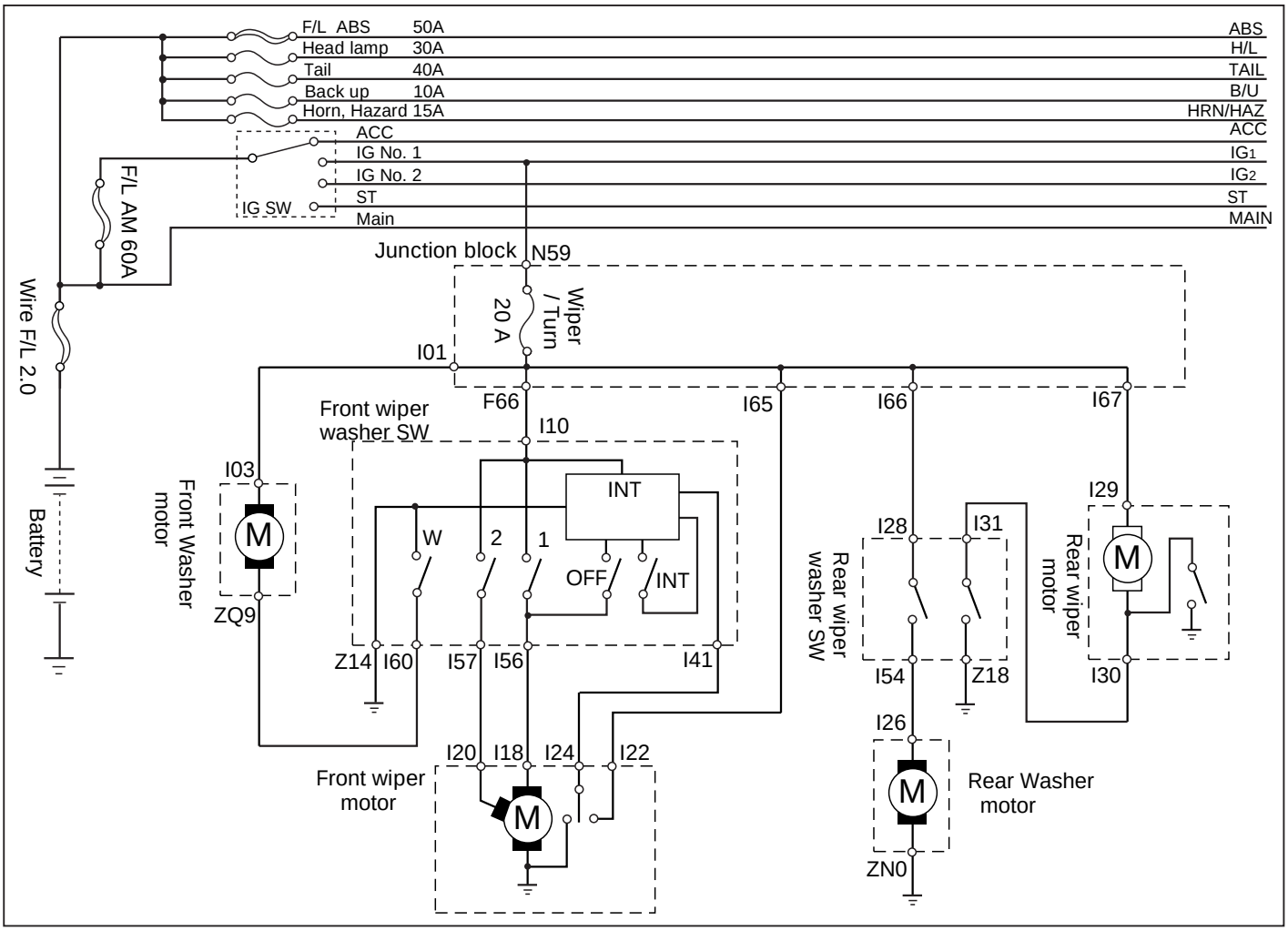
WIPER & WASHER

WIRING DIAGRAM

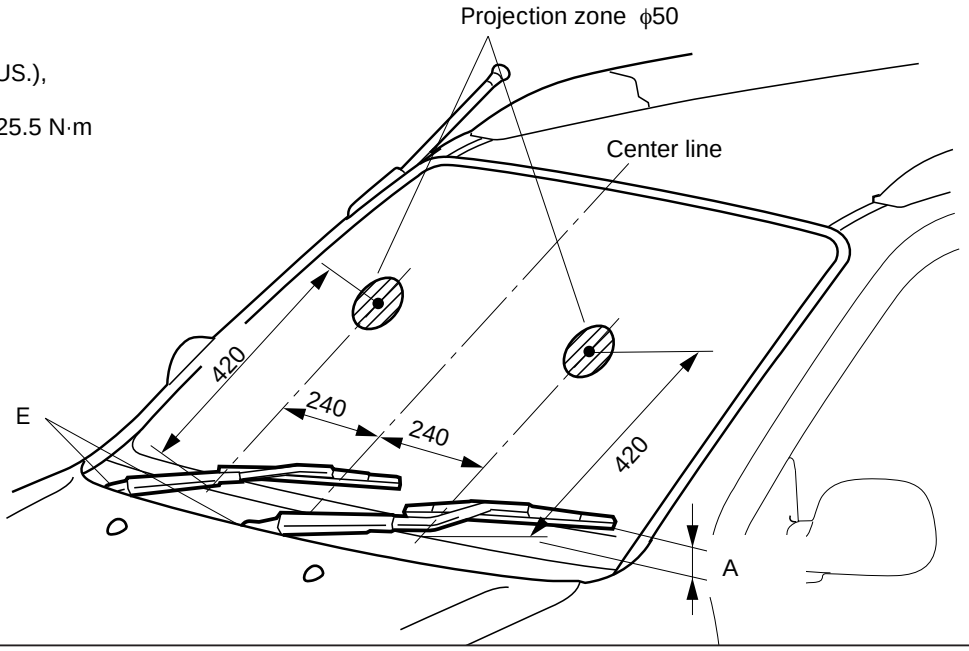


JBE00104-01601

Adjustment of wiper arm and washer nozzle

Inspect the wiping area and stationary position of the wiper blade.

A: 15 - 25 mm (Except for AUS.),
27- 37 mm (AUS. only)
E: Tightening torque; 14.7 - 25.5 N·m



JBE00105-01602

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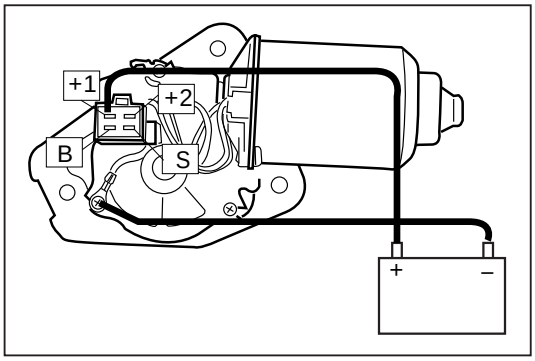
WIPER MOTOR

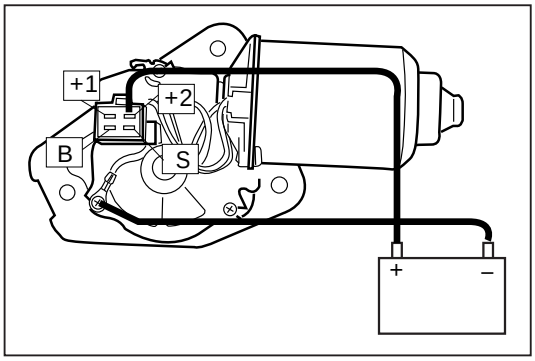
Unit inspection

1. Low speed operation check
   (1) Connect the terminal +1 to the positive ⊕ terminal of the battery; the body to the negative ⊖ terminal of the battery. Ensure that the wiper operates at the low speed 1



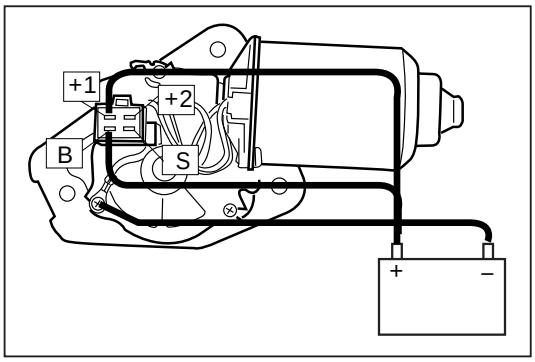
JBE00106-01604

2. High speed operation check
   (1) Connect the terminal +2 to the positive ⊕ terminal of the battery; the body to the negative ⊖ terminal of the battery. Ensure that the wiper operates at the high speed.



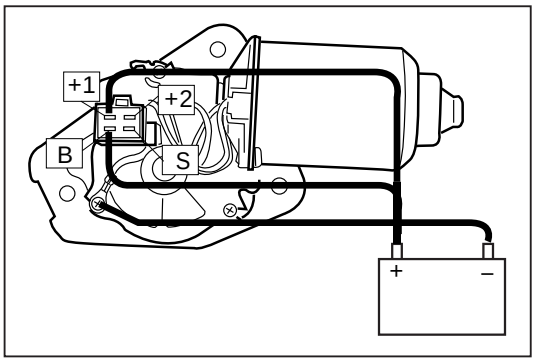
JBE00107-01605

3. OFF operation check
   With the wiper motor body connected to the negative ⊖ terminal of the battery, perform the following checks.
   (1) Connect the terminal B to the positive ⊕ terminal of the battery.
   (2) Operate the wiper at the low speed by connecting the terminal +1 to the positive ⊕ terminal of the battery.



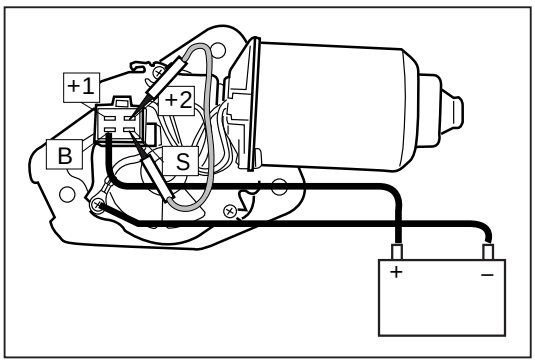
JBE00108-01606

   (3) Under the operating conditions in the step (2), disconnect the terminal +1 to as to interrupt the wiper motor operation.



JBE00109-01607

   (4) Connect the terminal +1 to the terminal S. Ensure that the wiper operates and stops at the automatic stopping position.



JBE00110-01608

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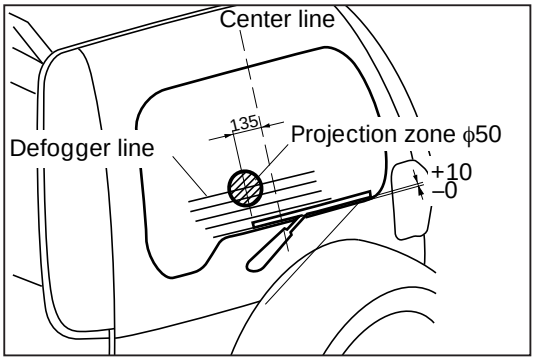
Adjustment of rear wiper arm

Inspect the wiping area and stationary position of the wiper blade.

Tightening Torque: 4 - 7 N·m



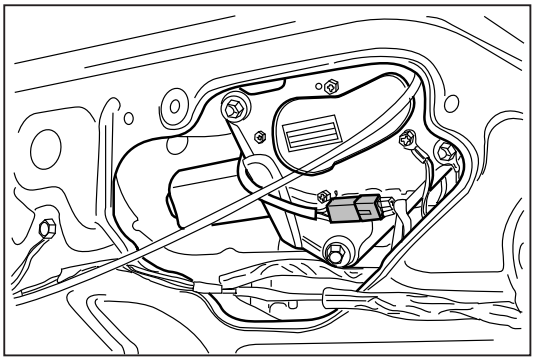
JBE00111-01609

REAR WIPER MOTOR

Unit inspection

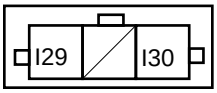
1. Remove the back door trim.
   NOTE:
   - See BO section of service manual.

2. Connect the battery negative terminal (–) to the wiper motor body. Also connect the battery negative terminal to the motor connector (–) and battery positive terminal (+) to the motor connector (+), as indicated in the right figure. Ensure that the wiper motor functions.



JBE00112-01610

3. Ensure that the wiper motor stops at the automatic stopping position when the battery negative (–) terminal is disconnected from the wiper motor negative (–) connector.



Rear wiper motor

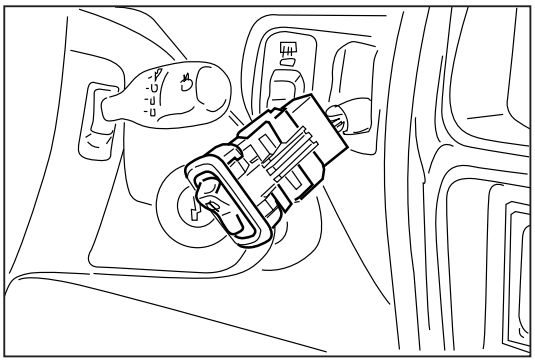
JBE00113-01611

REAR WIPER SWITCH

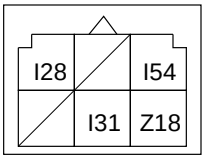
Unit inspection

1. Push the switch from back side while releasing the lock of the switch, remove the switch toward your side.
2. Disconnect the connector.
3. Ensure that continuity exists between the respective terminals, as indicated in the table below.

	Z18	I31	I28	I54
OFF				
Wiper ON	○	○		
Washer ON			○	○



JBE00114-01612



JBE00000-01613

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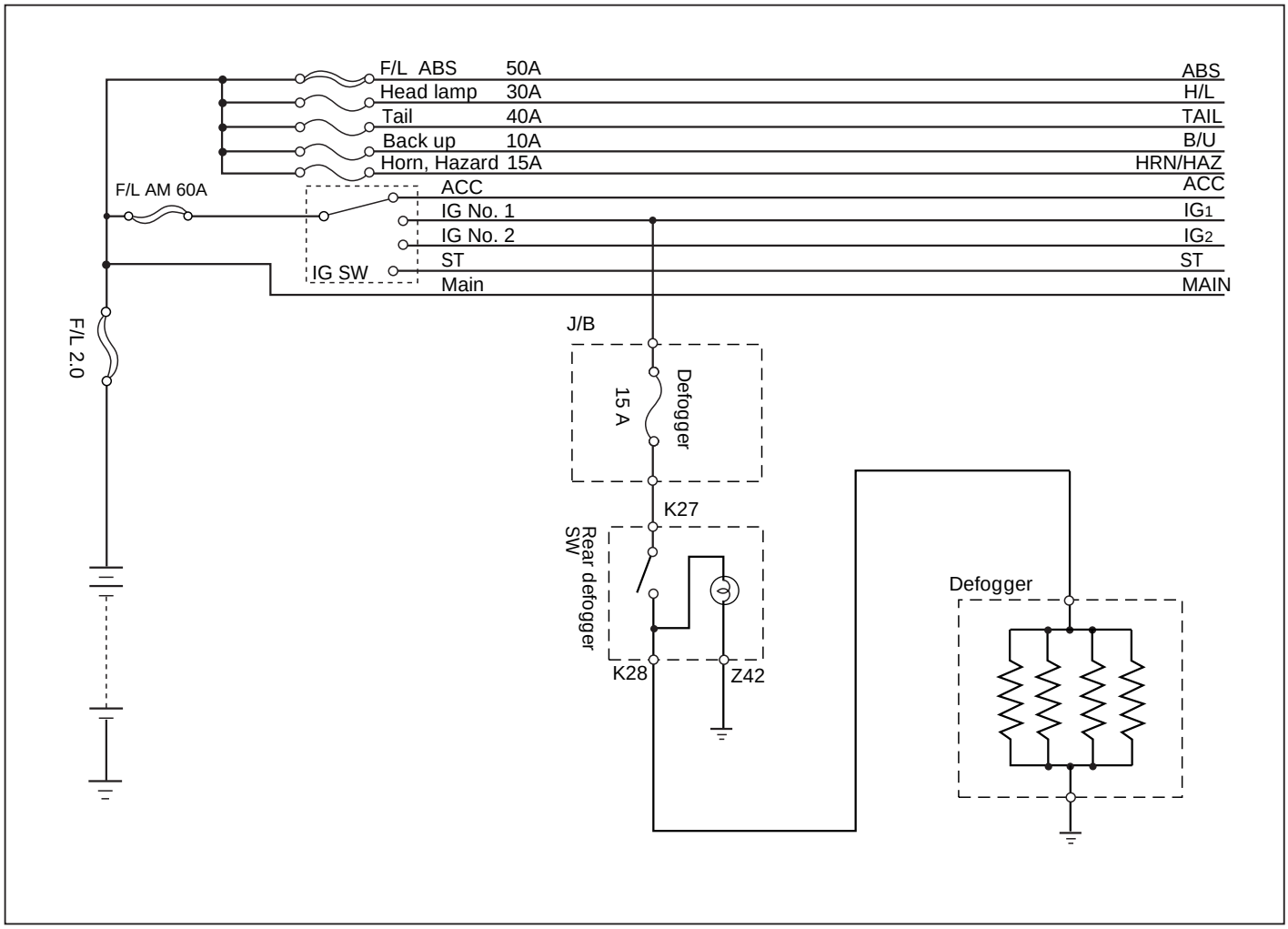
DEFOGGER

WIRING DIAGRAM



JBE00115-01701

DEFOGGER WIRE

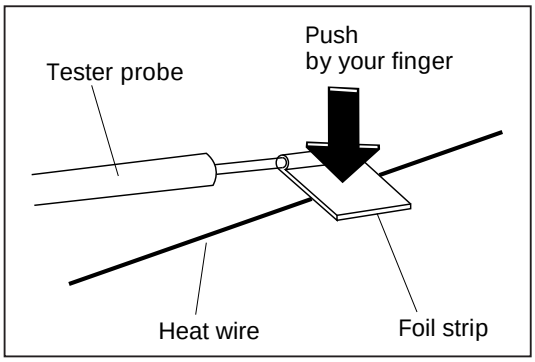
NOTE:

(1) When wiping the glass surface, use a soft, dry cloth. Move the cloth along the wire. Be careful not to damage the wire.

(2) Never use washing agent or glass cleaner which contains abrasive compound.

(3) Wrap the tip end of the tester probe with foil strip so that the tester probe causes no damage on the heat wire during the voltage measurement.

(4) Check the voltage by pushing the foil strip against the heat wire with your finger, as indicated in the figure.



JBE00116-01702

Open wire check

1. Turn on the ignition key switch.
2. Turn on the defogger switch so as to energize defogger wire.
3. Check the voltage at the center section of each heat wire.

Voltage	Judgment criteria
Approx. 5 V	Good (No open wire)
Approx. 10 V or 0 V	Open wire

JBE00117-01703

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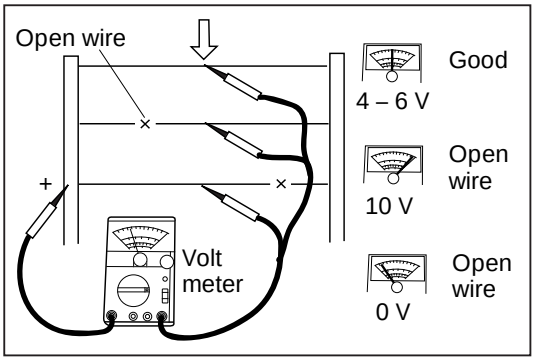
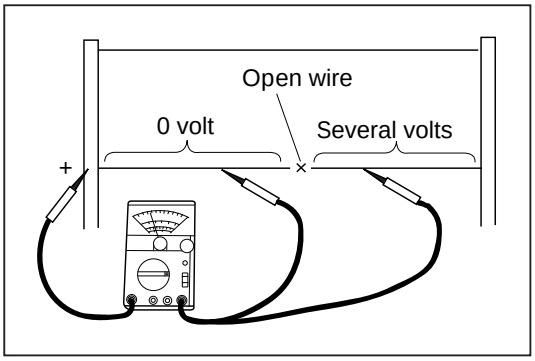
REFERENCE:
- If the voltage is 10 V, it means that open wire exists between the center of the wire and the end of the positive ⊕ side. If the voltage is 0 V, it means that open wire exists between the center of the wire and the end of the earth side.



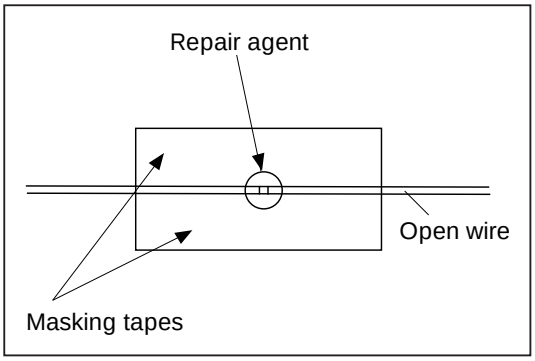
JBE00118-01704

Locating point of open wire
1. Connect the positive ⊕ terminal of the voltmeter to the positive ⊕ side of the defogger wire.
2. Slide the voltmeter's negative ⊖ terminal wrapped with foil strip on the defogger wire from its positive ⊕ side to its negative ⊖ side.
3. The voltmeter reading changes from 0 V to several volts at the point where open wire exists.



JBE00119-01705

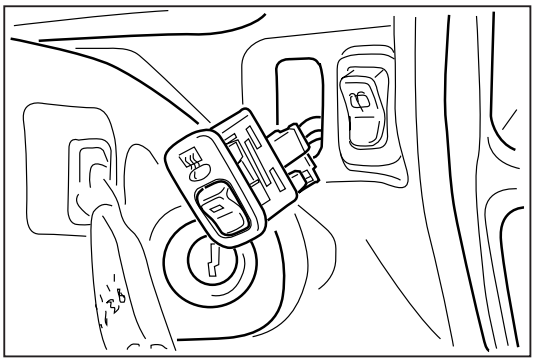
Repairing point of open wire
1. Clean the point of open wire with white gasoline.
2. Affix masking tapes to both upper and lower portions of the point to be repaired.
3. Stir repair agent (Du Pont Paste No. 4817) thoroughly. Apply a small amount of the repair agent to the repairing point, using a fine brush.
4. Two to three minutes later, peel off the masking tapes.
5. Do not energize the defogger wire within 24 hours after the repair.



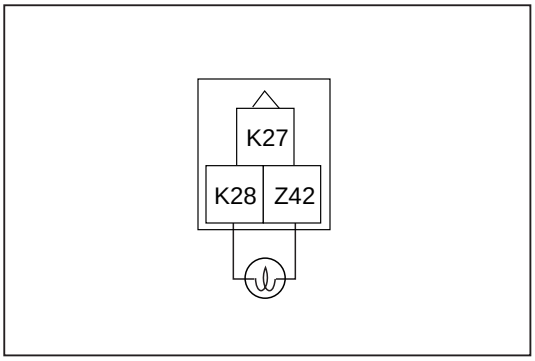
JBE00120-01706

DEFOGGER SWITCH

Unit inspection
1. Remove the instrument panel finish lower panel.
2. Remove the defogger switch by pushing it with your fingers at the back side of the instrument panel.
3. Disconnect the connector of the defogger switch.
4. Remove the defogger switch from the instrument panel.
   NOTE:
   - The indicator of the defogger in the combination meter will glow when the rear window defogger switch is turned on.


JBE00121-01707

5. Ensure that continuity exists between the terminal Z27 and the terminal Z28 when the switch is turned on.
6. Check to see if the bulb is burnt out.



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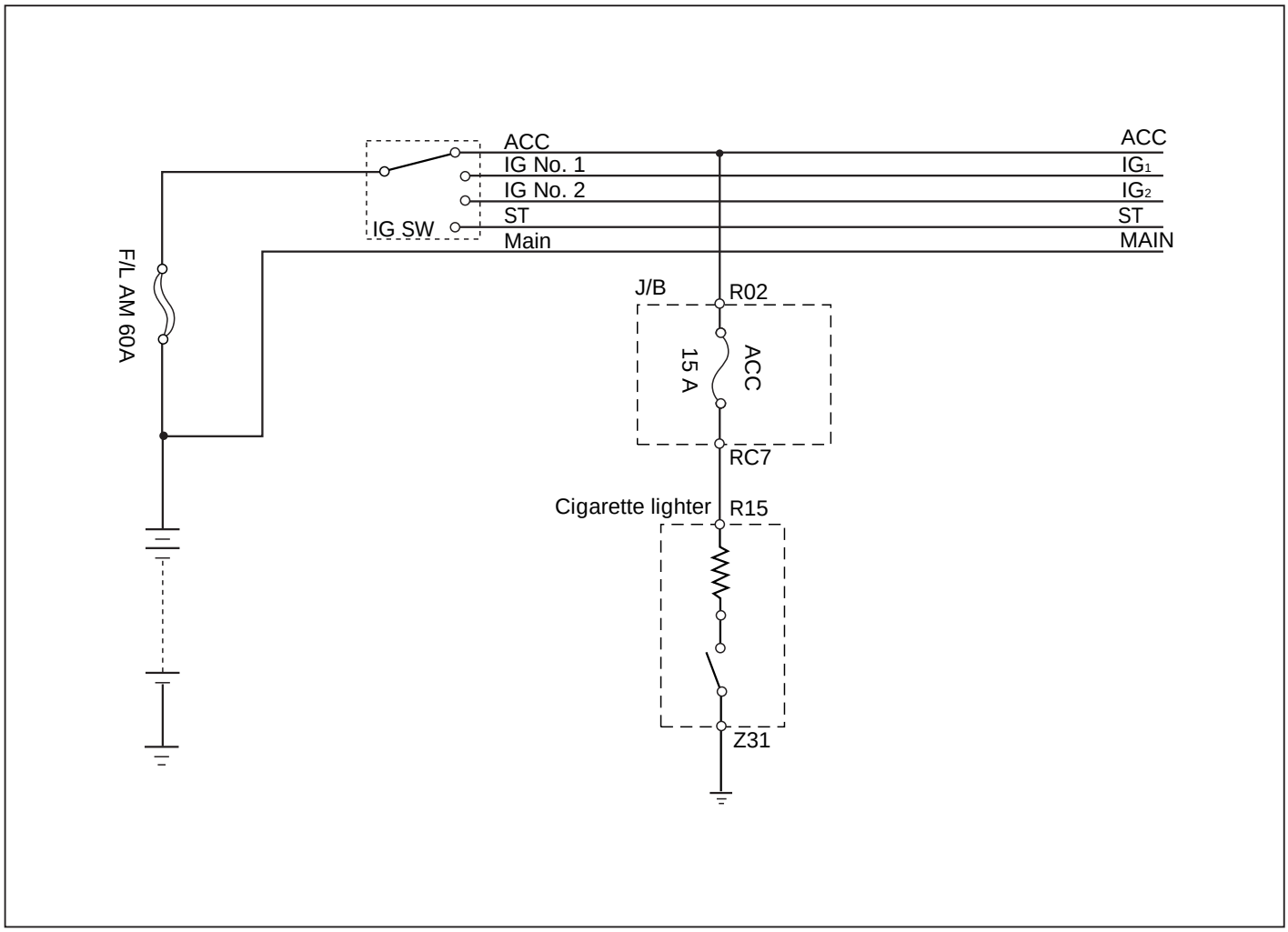
CIGARETTE LIGHTER

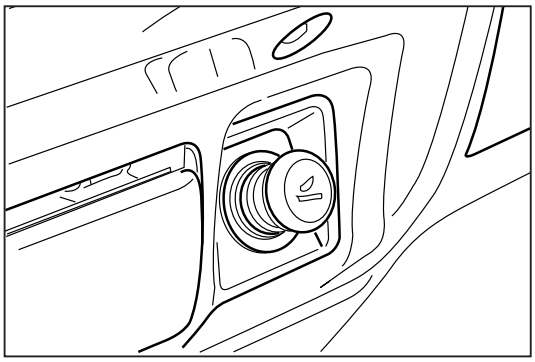
WIRING DIAGRAM



JBE00123-01801

In-vehicle inspection

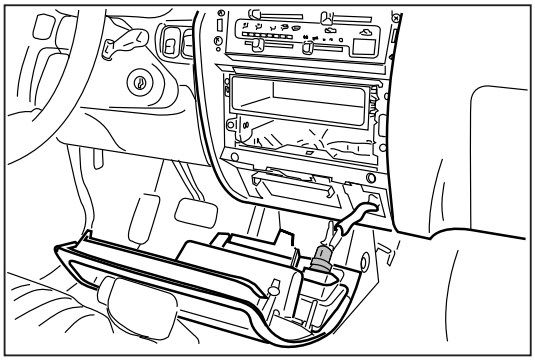
1. Push the cigarette lighter. Ensure that the heater section is heated and glows red.
2. Ensure that the heater section returns to the original position about 18 seconds.
   If not, replace the cigarette lighter.



JBE00124-01802

Removal

1. Remove the retaining screws of the instrument cluster finish center panel.
2. Pull out the instrument cluster finish center panel from the instrument panel.
3. Disconnect the connector from the cigarette lighter assembly.
   NOTE:
   - Refer to the BO section of the service manual.



JBE00125-01803

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4. Turn about 2° and pull out 10 mm the cigarette lighter assembly. Then turn back about 2° (align the embossed at the connector side) and pull out the cigarette lighter assembly from the cigarette lighter bezel.
5. Remove the cigarette lighter.

JBE00126-01804

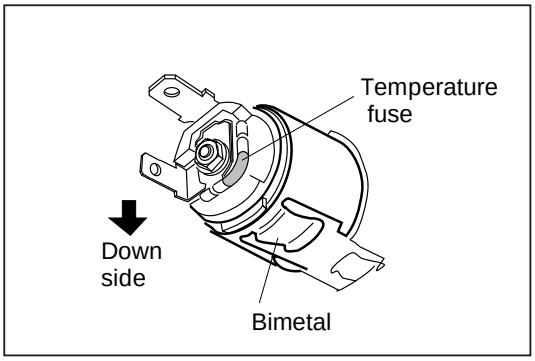
Installation

1. Align the embossed and insert the cigarette lighter assembly to the bezel.
2. Connect the connector of the cigarette lighter assembly.
3. Install the instrument cluster finish center panel with the retaining screws.

JBE00127-01805

WARNING:

- The cigarette lighter has such construction that the heater is energized when the lighter section is pushed-in, resulting in a red-heated heater. When the heater becomes red-heated, the bimetal that is retaining the lighter section will open because of the heat, thereby pushing out the heater unit. As a result, the energizing of the heater ceases.



JBE00128-01807

- A temperature fuse is attached to the terminal of the electric fuse so as to prevent over-heating of the fuse in the event that the lighter can not pop out due to some reasons. make sure to install this temperature fuse at the underside of the terminal so that the circuit may be cut off when the temperature fuse is melt down.

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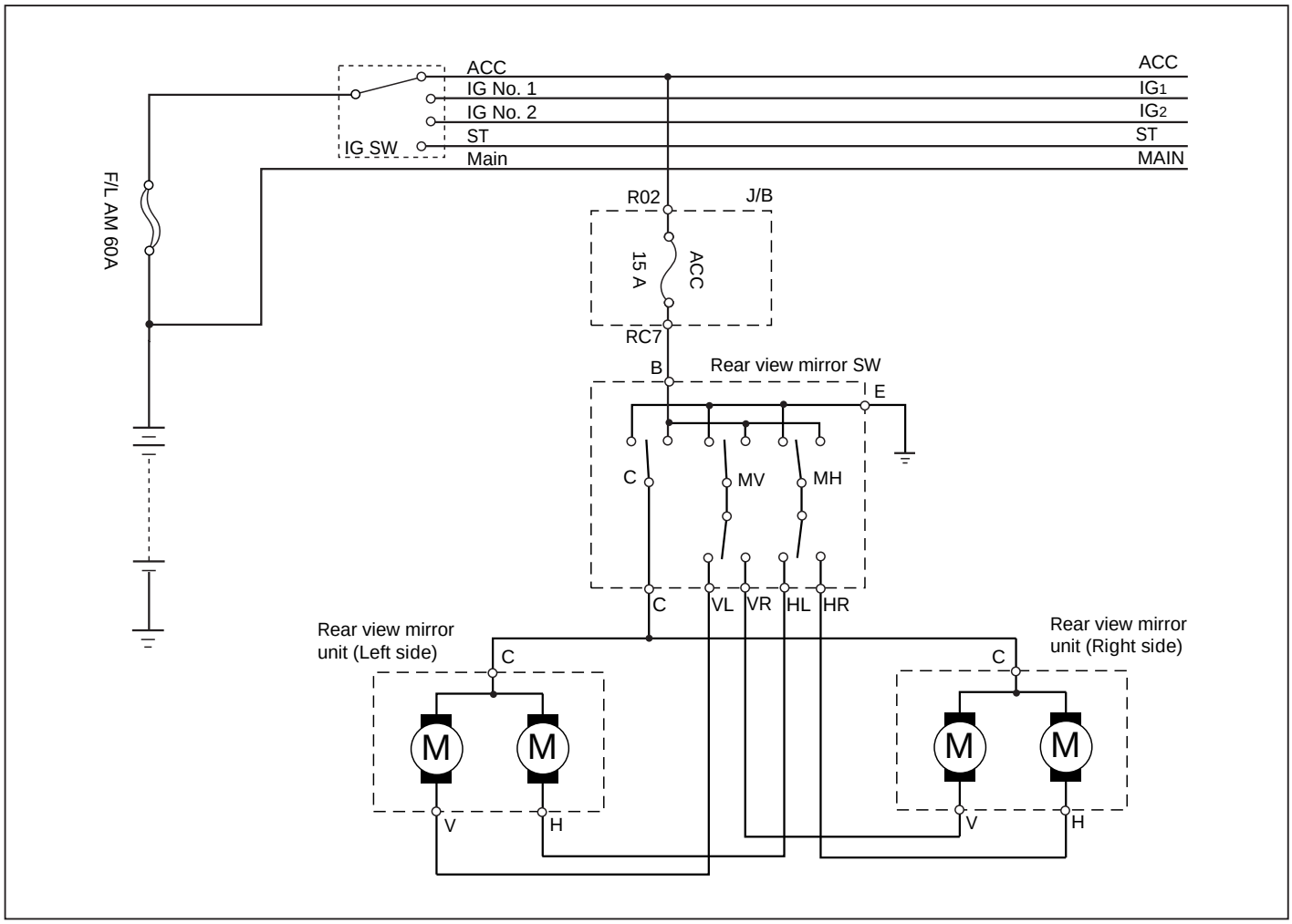
REAR VIEW MIRROR

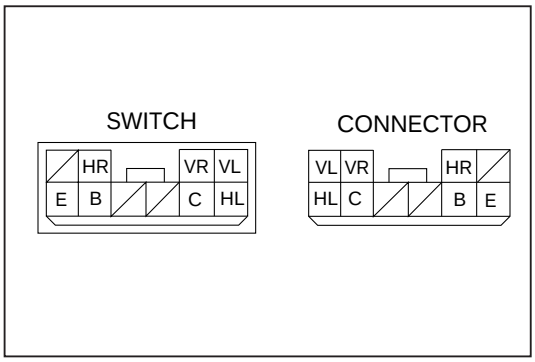
WIRING DIAGRAM



JBE00130-01901

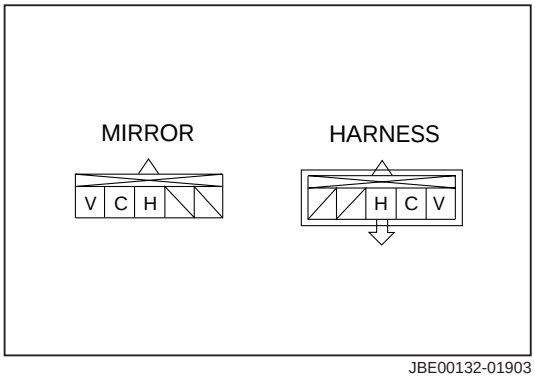
REAR VIEW MIRROR SWITCH

1. Pull out the switch assembly from the instrument panel. Disconnect the connector.
2. Ensure that the continuity exists between the respective terminals in accordance with the following continuity table.



JBE00131-01902

Mirror	Left					Right				
Terminal / Switch position	B	E	VL	C	HL	B	E	VR	C	HR
UP	○		○			○		○		
		○		○			○		○	
DOWN	○			○			○	○		
		○	○			○			○	
LEFT	○				○	○				○
		○		○			○		○	
RIGHT		○			○		○			○
	○			○		○			○	



JBE00132-01903

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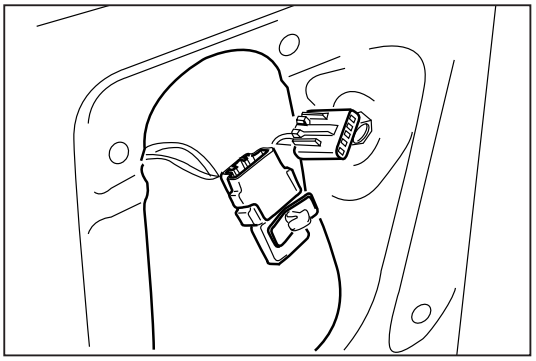
REAR VIEW MIRROR UNIT

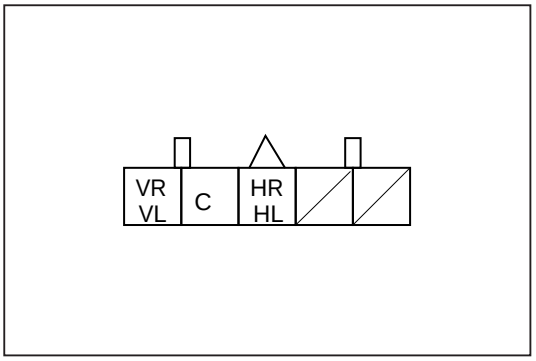
Unit inspection

1. Remove the front door trim assembly.
2. Disconnect the connector of the door mirror.
3. Apply a voltage of 12 V between the following two terminals.
4. Ensure that the mirror operates in accordance with the table below.



JBE00133-01904

Terminal		C	VR	HR	Operation direction
	Right door mirror	C	VR	HR	
	Left door mirror	C	VL	HL	
Connection		⊖	⊕		UP
		⊕	⊖		Down
		⊖		⊕	Left
		⊕		⊖	Right



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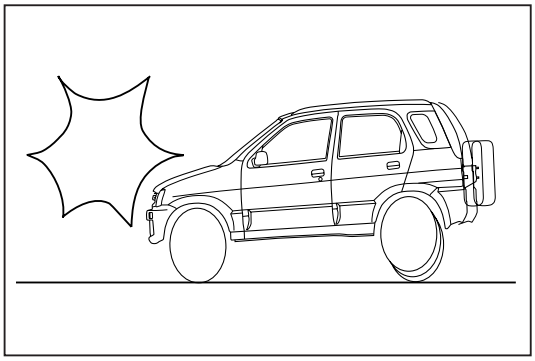
ITC SYSTEM

For enhanced safety of the motor vehicle, the ITC (Integrated Timer Controller) is controlled by an ECU which has the control system interlocked with the following functions.

1. Impact-detecting door unlocking system
2. All-door locking, interlocked with door lock button at driver's seat side.
3. Room lamp timer

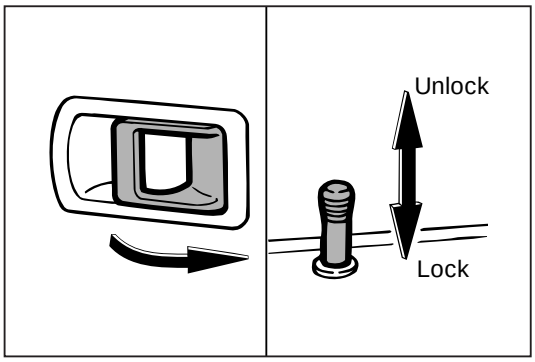
JBE00135-04000

4. Impact-detecting door unlocking system
   In the event that an impact beyond the specified value is applied to the vehicle. all of the doors are unlocked three seconds after the impact detection. Furthermore, when the vehicle speed drops to 0 km/h within 10 seconds after the impact detection, the hazard lamp are start to flash. When the switches of room lamp is set to position in which the lamp is interlocked with the door, the room lamp will go on simultaneously as the hazard lamp goes on. The impact is detected in all around horizontal directions.



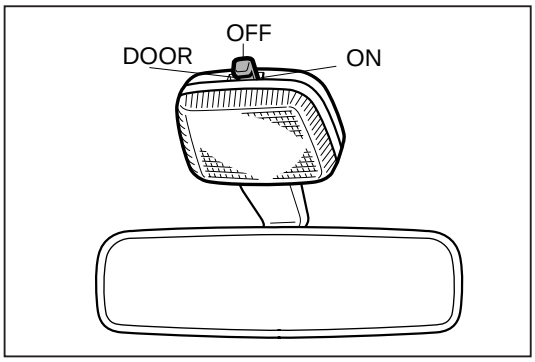
JBE00136-04001

5. All-door locking, interlocked with door lock button at driver's seat side
   All of the doors, including the back door, can be locked and unlocked, interlocked with the door lock button switch at the driver's seat side.



JBE00137-04002

6. Room lamp timer
   When any door is opened with the ignition switch turned off, the room lamp goes on. When all of the doors are closed, each lamp gradually dims, until it is finally extinguished. Namely, the lamp keeps approximately 75% of the original brightness for 3 seconds after the door is closed. For the next 2 seconds, the lamp is illuminated with an approximately 50% of brightness. The lamp goes out 5 seconds after the door is closed. When ignition switch is turned on while the lamp is dimming, the extinguished lag of the lamp is suspended.
   However, this function operates only when the switch of the room lamp is set to position in which the lamp is illuminated in interlocking with the door. Moreover, when the ignition switches set to the ON position, this function will not operate.
   In order to prevent the battery from being discharged, if the door remains opened for 10 minutes with the ignition switch turned off, the room lamp will go out. Afterwards, when the door is closed and again opened, the lamp goes on, and the same function operates.



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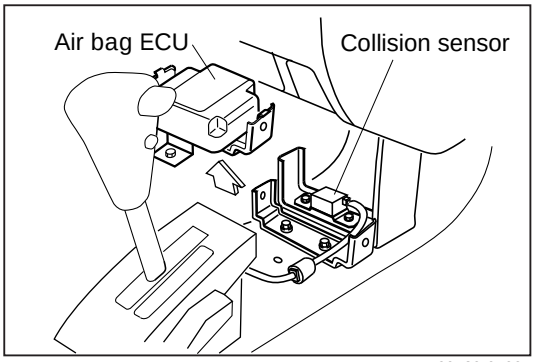
Collision sensor

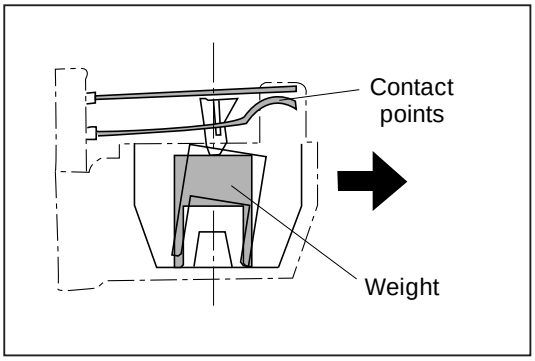
The collision sensor is mounted in front of the air bag ECU.



JBE00139-04005

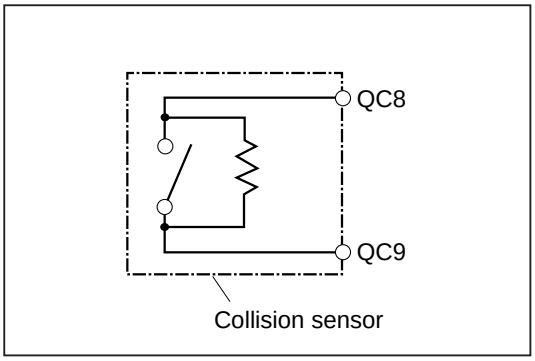
Internal construction of collision sensor

The sensor consists of a weight for impact detection and electric contact points.



JBE00140-04006

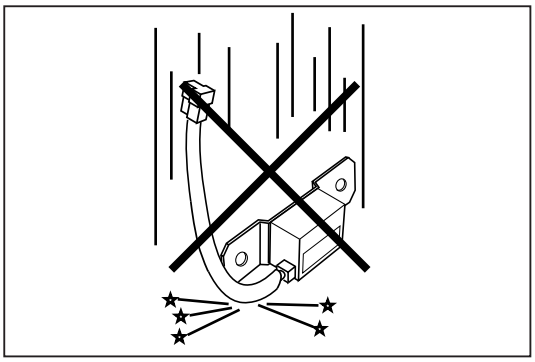
Moreover, the electric circuit is made up of a switch and a resistor which are connected in parallel. A voltage of five volts is always applied to both ends of the circuit from the ECU.
Therefore, in cases where the wire harness between the sensor and the ECU exhibits an open wire, an electric current flowing into the resistor will be shut off. As a result, the sensor judges that the circuit including the wire harness exhibits open wire, then setting off the buzzer.



JBE00141-04007

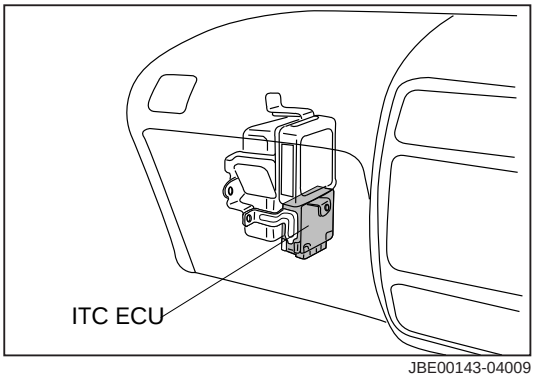
In cases where the sensor circuit is shorted, no distinction can be made between the case where the circuit is shorted and the case where the switch is turned ON due to the function of the collision sensor. In the case of the short circuit, however, the ON condition of the switch lasts longer. Consequently, the ECU judges that it is an abnormality.

Utmost care must be exercised when a sensor is installed. If the sensor is dropped, the sensor cannot be used even if its external appearance exhibits no abnormality.



JBE00142-04008

The ITC ECU is mounted on the bracket of the cowl side inner panel at its passenger's seat side.



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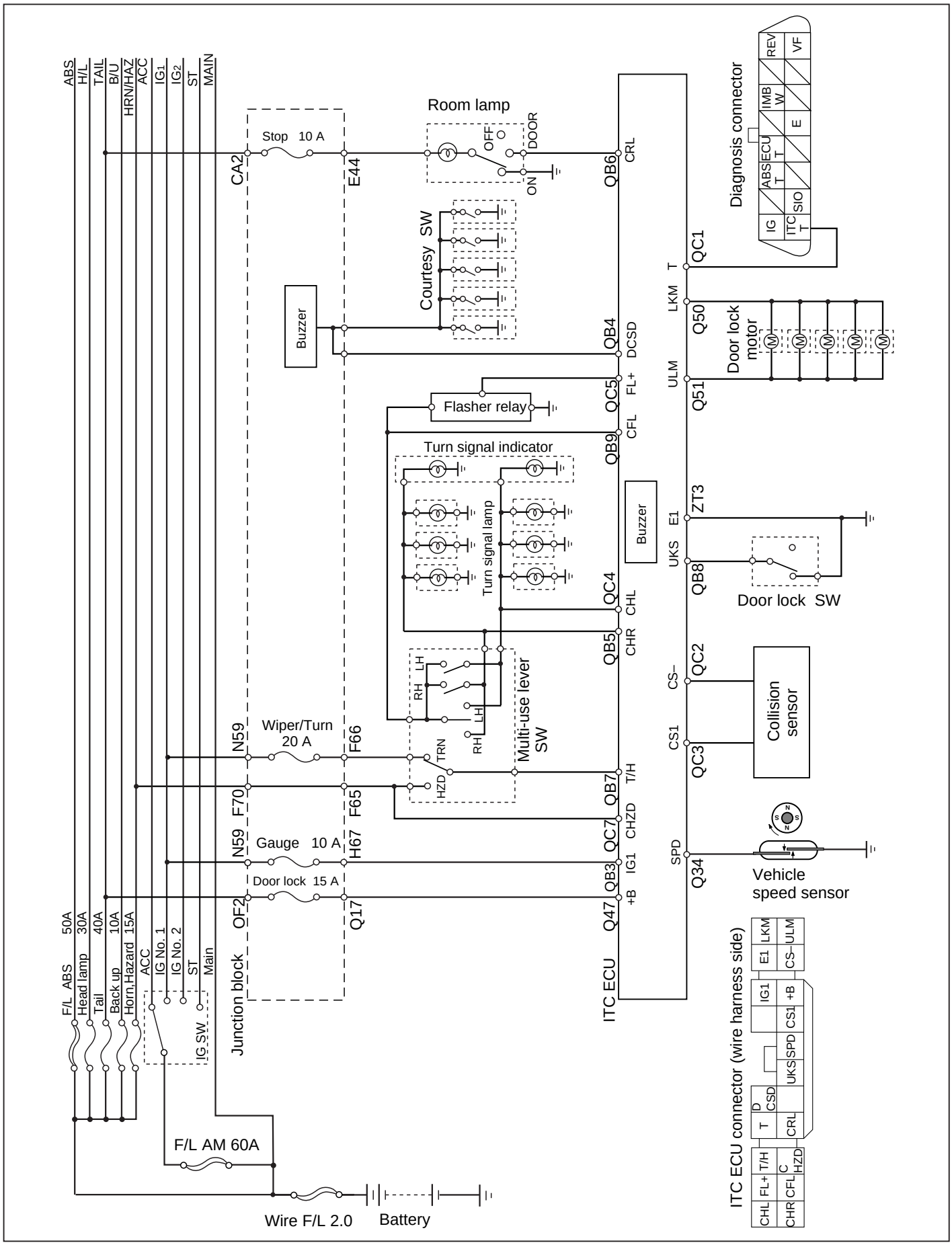
CIRCUIT DIAGRAM



JBE00144-04010

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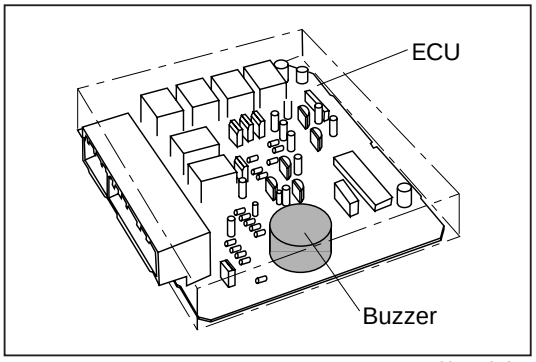
TROUBLE-SHOOTING

When there is an open wire or a short in the collision sensor of the impact-detecting system, a warning buzzer provided in the ITC ECU is set off, emitting a continuous sound for five seconds.

NOTE:

- In the case of an open wire with the ignition switch turned on, if the open wire state continues to exist for 200 ms or more, the buzzer is set off. The impact-detecting function alone will not function, until the open wire state is eliminated.
- In the case of short circuit with the ignition switch turned on, if the short continues to exist for 2 seconds or more, the buzzer is set off. The impact-detecting function alone will not function, until the short circuit state is eliminated.

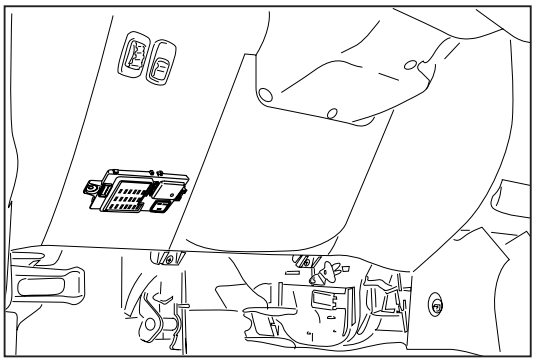


JBE00145-04011

Operation checking method by shorting terminal T (test terminal)

The operations of the following systems can be checked by connecting the test terminal provided at the check connector to the earth terminal with a jump wire.

- Vehicle speed sensor
- Room lamp system
- Hazard lamp system

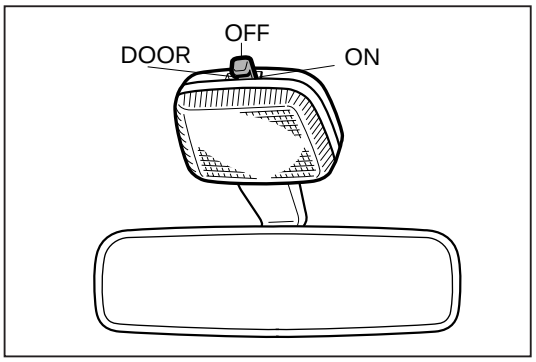


JBE00146-04013

(1) Set the switch for the room lamp to the door position in which the switch is interlocked with the door opening/closing.
(2) Warm up the engine. Drive the vehicle at a speed of 15 km or more.
(3) Stop the vehicle.

NOTE:

- Apply the parking brake. In the case of automatic transmission-equipped vehicles, move the shift lever to the P range.

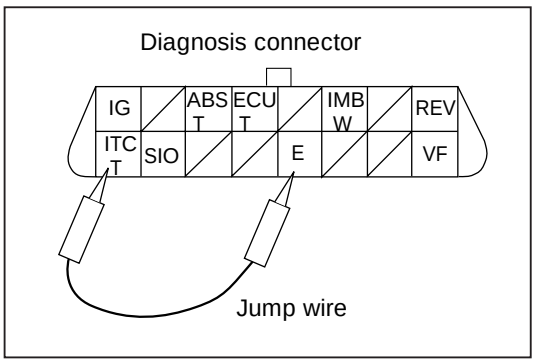


JBE00147-04014

(4) Connect the test terminal for ITC to the earth terminal with a jump wire, as shown in the figure.

NOTE:

- After the vehicle has stopped, do not turn off the ignition switch. Keep the engine idling.



JBE00148-04015

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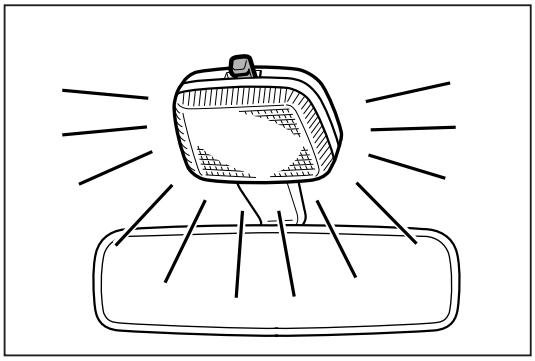
(5) The hazard lamp flashes. At the same time, the room lamp is illuminated.

NOTE:

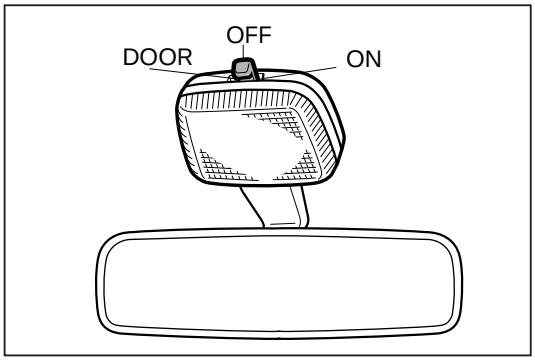
- If the lamp will not go on, check the wire harness and unit itself. If they are satisfactory, disconnect the jump wire. This completes the check.



JBE00149-04016

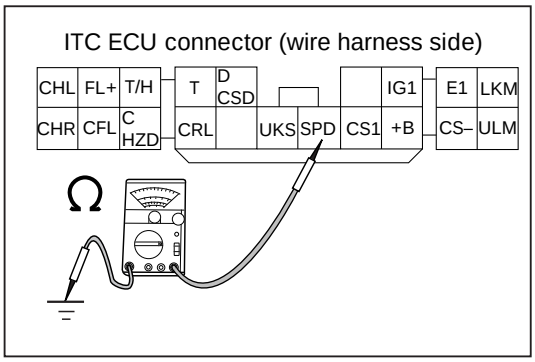
Malfunctions observed during operation check

1. When room lamp will not go on:
   (1) Check to see if the switch of the room lamp is set to the position in which the switch is interlocked with the door opening/closing.
   (2) Check to see if the lamp fuse has open wire.
   (3) Check to see if the lamp bulb is burnt out.
   (4) When the ignition switch is turned off, check to see if the room lamp goes on properly in accordance with switching.



JBE00150-04017

   (5) Turn off the ignition switch. Disconnect the connector for ITC ECU from the wire harness connector.
   (6) With a circuit tester set to the ohmmeter range, connect the circuit tester to between the terminal SPD of the connector at the vehicle wire harness side and the body earth.



JBE00151-04018

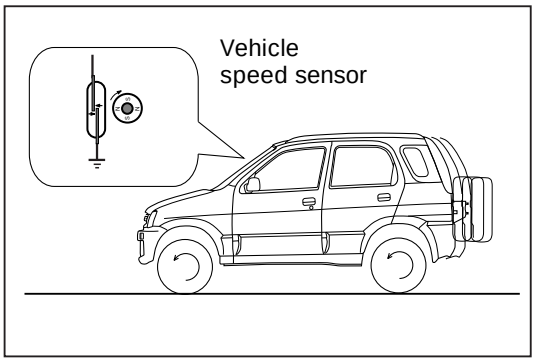
   (7) Move the vehicle one meter by pushing it. During this moving, check that the pointer of the ohmmeter moves.

WARNING:

- Be sure to turn off the ignition switch.

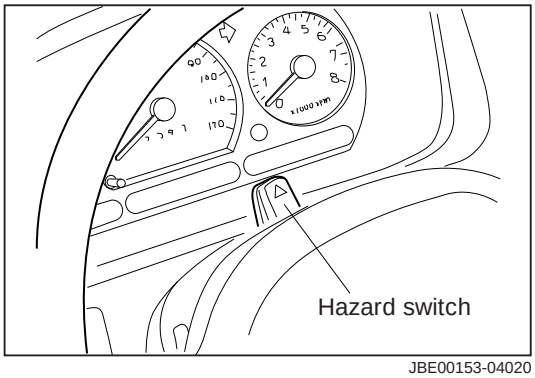
NOTE:

- If no abnormality is found in the checks (1) through (7), the harness or ITC ECU is regarded as faulty. Replace the harness or ITC ECU.



JBE00152-04019

2. When hazard lamp will not flash:
   (1) Turn off the ignition switch and turn on the hazard switch. Check that the hazard lamp flashes properly.
   (2) If the hazard lamp will not flash, check the hazard lamp circuit and switch.
   (3) Check to see if there is open wire in the horn/hazard lamp fuse.
   (4) Check to see if the multi-use lever switch connector is fit properly.
   (5) Check to see if the flasher relay is functioning properly.



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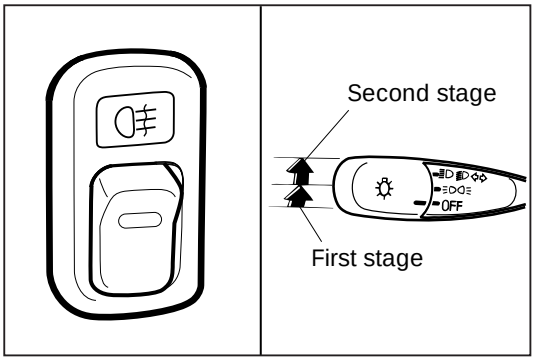
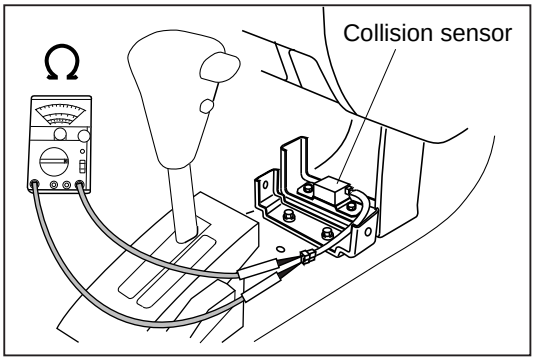
REFERENCE:
- When the buzzer provided in the junction block is set off when the door is opened even if the ignition switch has been turned off, there is the possibility that the following switches given below are turned on. Check these switches.
  (1) Rear fog lamp switch
  (2) Lighting switch



JBE00154-04021

Check to be performed when buzzer is set off with ignition switch turned on

(1) Turn off ignition switch.
(2) Disconnect the connector of the crash sensor sub-harness. Measure the resistance between the terminals of the crash sensor, using a circuit tester.
Specified Value: 2.2 kΩ

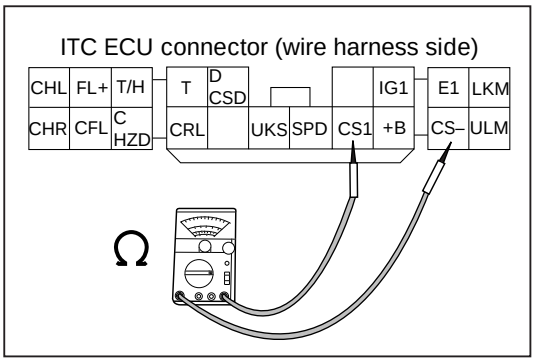


JBE00155-04022

NOTE:
- If there is no open wire nor short, connect the connector of the crash sensor sub-harness and connector of the vehicle wire harness to their original positions.

(3) Disconnect the ITC ECU connector from the connector at the vehicle wire harness side.
(4) Measure the resistance across the terminals CS1 and CS– of the connector at the vehicle wire harness side, using a circuit tester.

NOTE:
- If there is no open wire nor short circuit, the ITC ECU is regarded as faulty. Replace the ITC ECU.

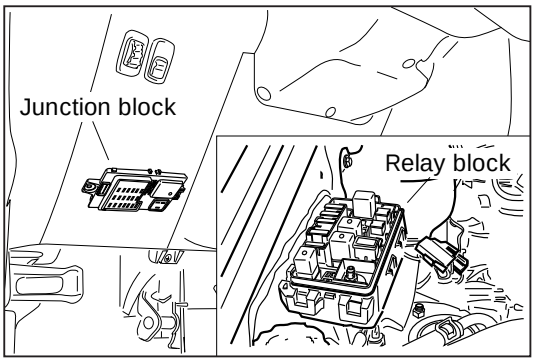


JBE00156-04023

Malfunction of power door lock

NOTE:
- When each door can not be locked in interlocking with the door lock button at driver's seat, proceed to the following checks.

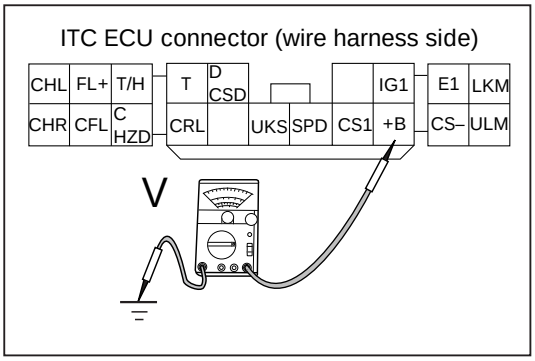
(1) Check to see if the tail fuse (40 A) or door lock fuse (15 A) has open wire.
(2) Turn off the ignition switch. Disconnect the ITC ECU connector from the connector at the vehicle wire harness side.



JBE00157-04024

(3) With a circuit tester set to the voltmeter range, connect the circuit tester to between the terminal +B of the connector at the vehicle wire harness side and the body earth, as shown in the figure. Check to see if the battery voltage is applied.

NOTE:
- The battery voltage is applied to this terminal at all times regardless of the ON/OFF state of the ignition switch.



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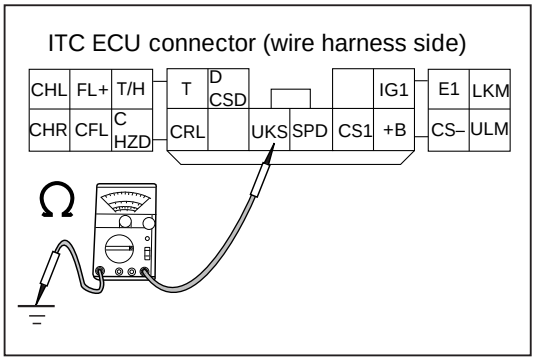
(4) With a circuit tester set to the ohmmeter range, connect the circuit tester to between the terminal UKS of the connector at the vehicle wire harness side and the body earth, as shown in the figure. Check to see if continuity exists.

NOTE:

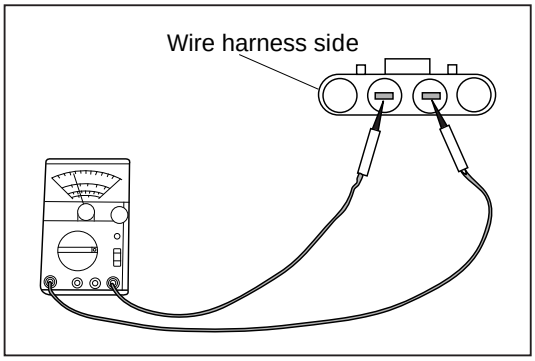
- This terminal has no continuity when the door lock button at driver's seat is locked. Conversely, this terminal has continuity when the door lock button at the driver's seat is not locked.
- If this check reveals abnormality, check the door lock control switch and wire harness.



JBE00159-04026

(5) Connect the ITC ECU connector with the connector at the vehicle wire harness side. (Connect the connectors that were disconnected at Step (2) into the original positions.)

(6) Disconnect the door lock motor connector at the door side whose locking is inoperative from the connector at the vehicle wire harness side. Connect a circuit tester in its voltmeter mode, as shown in the figure.



JBE00160-04027

(7) Turn on the ignition switch and lock or unlock the door lock button at the driver's seat. Check to see if the voltmeter registers the battery voltage. If there is abnormality, check the wire harness.

NOTE:

- The current during the locking state flows in the reverse direction, as opposed to the current during the unlocking state.

JBE00161-04028

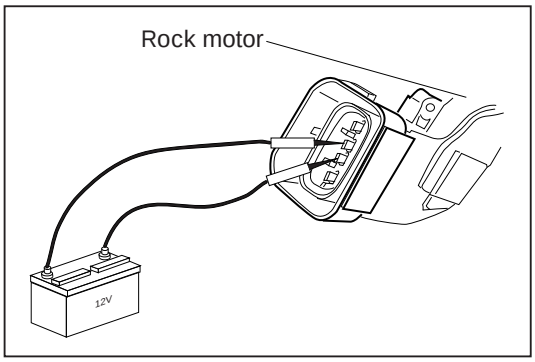
(8) If there is no abnormality in the check at Step (7), apply the battery voltage directly to the door lock motor terminal to see if the door lock functions.

CAUTION:

- Never let the current flow for ten seconds or more continuously.

NOTE:

- If the lock motor has no abnormality, the ITC ECU is regarded as faulty. Replace the ITC ECU.



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SRS AIR BAG SYSTEM

IMPORTANT SAFETY NOTICE

All information used in this service manual was in effect at the time when the manual was approved for printing. However, the specifications and procedures may be revised due to continuing improvements in the design without advance notice and without incurring any obligation to us.
The procedures contained in this manual describe in a general way the techniques which the manufacturer has recommended. Thus, they will contribute to ensuring the reliability of the products. The contents of the servicing operations come in a wide variety of ways. This manual does not cover all details of techniques, procedures, parts, tools and handling instructions which are necessary for these operations, for such coverage is impossible. Hence, any one who obtains this manual is expected first to make his responsible selection as to techniques, tools and parts which are necessary for servicing the vehicle concerned properly. Furthermore, he must assume responsibility for his actions in connection with his own safety. Therefore, one should not perform any service if he is not capable of making responsible selection and/or if he can not understand the contents herein described, for this manual is prepared for experienced service personnel.

JBE000163-05000

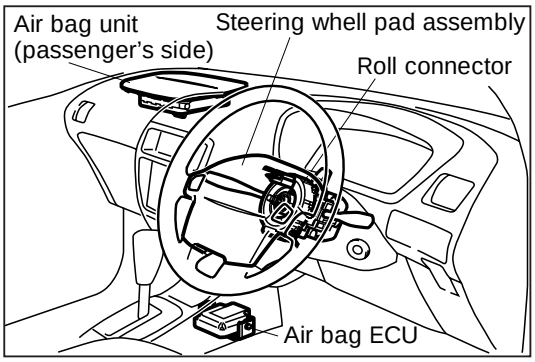
TECHNICIAN SAFETY INFORMATION

WARNING:

- When removing and installing the air bag assembly, the technician should stand whenever possible on the side of the air bag assembly.
- During installation or replacement, do not bump the area near the ECU unit of the SRS air bag, using an impact wrench, a hammer or the like.
- Whenever the ignition switch is on, or has been turned off for only less than three minutes, be carefully not to bump the ECU unit of the SRS air bag, for the air bag could accidentally deploy and cause damage or injuries.
- Never measure the resistance of the inflator squib easily. This may cause the air bag to deploy, thus causing serious injuries to the operators and other people in the surrounding.

CAUTION:

- Before scrapping any air bag assembly or the vehicle which contains the air bag, the air bag assembly must be deployed.
- Do not disassemble the SRS air bag unit. It has no serviceable parts.



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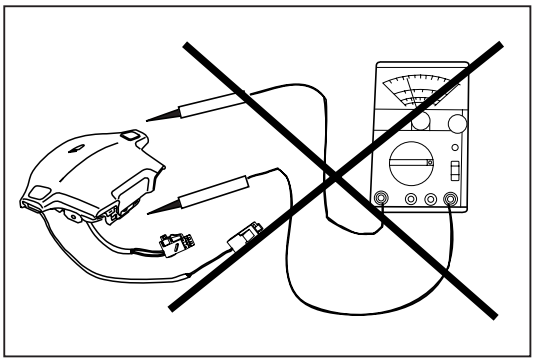
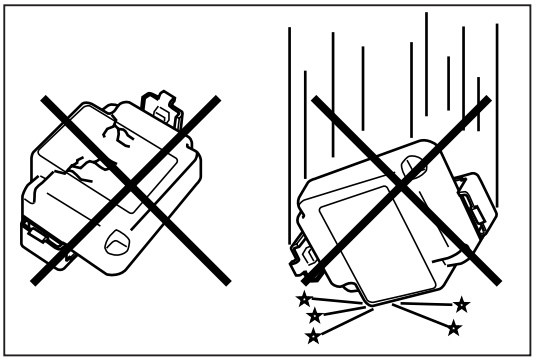


JBE00165-05002

VEHICLE PREPARATION FOR SERVICING

CAUTION:

- Do not install a used air bag assembly from another car. When repairing, use only a new air bag assembly.
- Do not replace the original steering wheel with a steering wheel of any other design, since it will make impossible proper installation of the air bag.
- Do not use any air bag assembly or air bag ECU unit which was subjected to water damage or shows signs of being dropped or improperly handled, such as dents, cracks and deformation.



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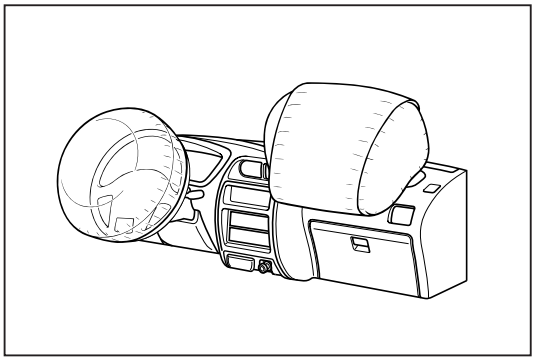
SYSTEM DESCRIPTION

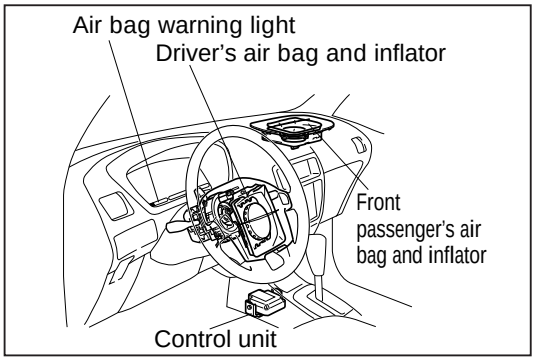
This air bag system is a supplemental device to protect passengers in the event of a frontal collision. The driver's seat is provided with an air bag and a seat belt. The front passenger seat is provided with a seat belt and optional air bag, whereas the rear passenger seat is provided with seat belts only.
If the vehicle undergoes a frontal collision and the system detects it and the impact exceeds a specified value, the air bags deploy to reduce the impact to the passengers.



JBE00167-05004

This air bag system is composed of the following main parts.

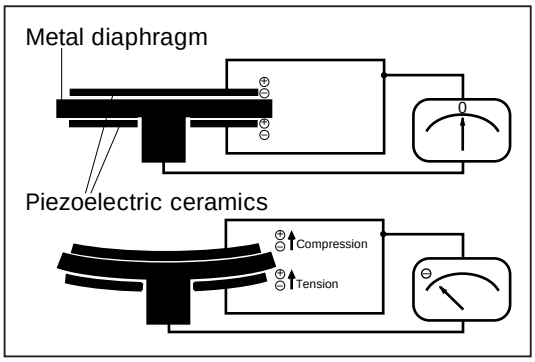
- Air bag ECU (Computer)
- G sensor (built in the air bag ECU)
- Safing sensor (built in the air bag ECU)
- Air bag unit (consists of Inflator and bag)
- Steering roll connector
- Warning lamp



JBE00168-05005

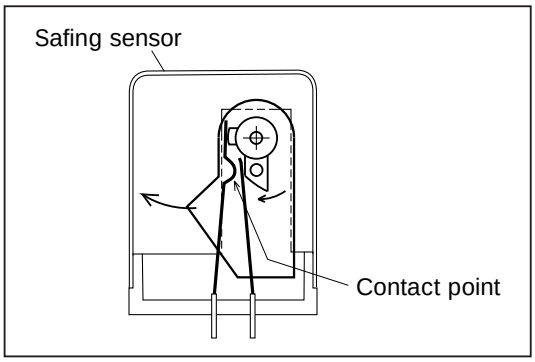
Air bag ECU & sensor

The air bag ECU is located under the console panel.
G sensor and a safing sensor are provided as sensors which sense the deceleration in the event of collision. The crash sensor is incorporated in the logic circuit of the air bag ECU. The G sensor calculates the deceleration, based on the magnitude of a potential difference, when the impact waves vibrates the sensor during the collision.



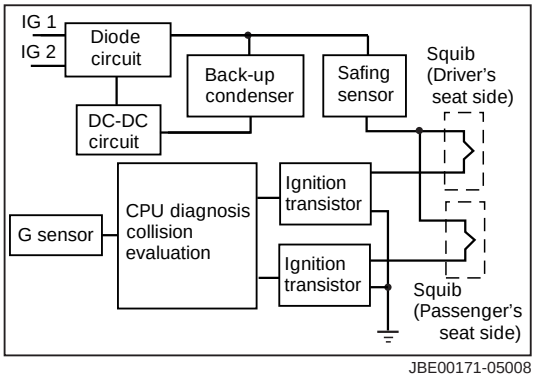
JBE0169-05006

The safing sensor is placed on the circuit board inside the ECU case. If a deceleration exceeding the specified value is applied to the sensor by the impact, the inertia force of the pendulum overcomes the reaction force of the spring. As a result, the pendulum moves to the switch side, thereby closing the contact points of the switch.



JBE00170-05007

As regards the system operation, the ECU calculates the deceleration detected by the G sensor and compares it with the specified value. If the ECU has judged that a collision is taking place, it outputs an ignition signal. If the safing sensor is turned on at this time, an electric current which is necessary for the ignition is supplied to the air bag inflator.
The air bag ECU has a backup power supply consists of a backup condenser and voltage set-up circuit.



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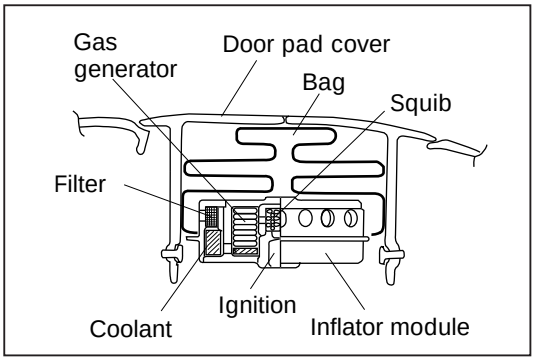
Air bag unit

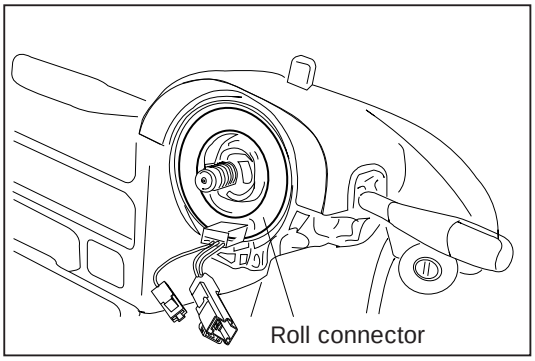
The air bag for the driver's seat is accommodated in the steering wheel pad assembly.
The air bag for the front passenger seat is accommodated in the instrument panel. Each air bag is assembled integral with the inflator module.
The inflator module consists of a squib, gas generator and so forth.



JBE00172-05009

Steering roll connector

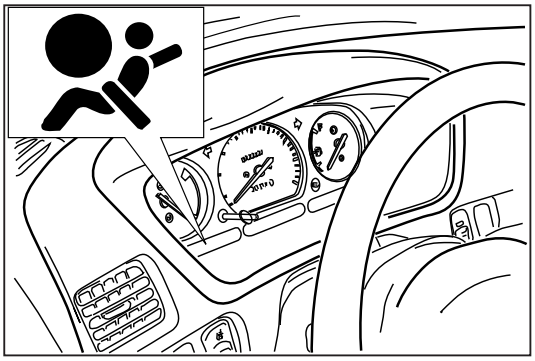
The steering roll connector is installed to the multi-use lever switch section. It is so designed that there may be no faults, such as poor contacts, compared with a slip ring method. This is because the wiring is kept connected even though the steering wheel is turned.



JBE00173-05010

Warning lamp

The warning lamp warns the driver of abnormality of the system.
This lamp, which is located inside the combination meter, tells the driver of abnormality by going on the lamp.
When the engine starts, this lamp is made to go on for six seconds so that the lamp can be checked for open wire of the lamp filament. If the lamp keeps going on for more than six seconds, it is considered abnormal.
In the event of abnormality, the diagnosis code can be read, using the air bag ECU inspection terminal of the check connector under the steering column. This malfunction diagnosis circuit makes it possible to find out malfunctioning sections quickly.



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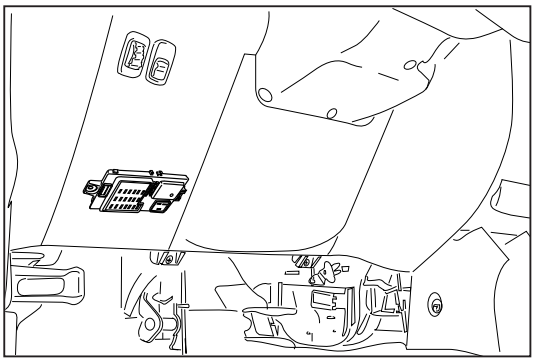
Air bag fuse

The air bag fuse is located inside the fuse block.
The fuse provides power supply for the air bag ECU via the ignition switch. Furthermore, the ECU has a dual construction that its power supply can be furnished from the engine fuse side, too, in the event of failure of the air bag fuse.



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Wire harness and connector of air bag system

All wire harnesses and connectors related to the air bag system are colored yellow uniformly. The following sections have connectors with special functions.

1. Terminal double locking mechanism
2. Terminal short mechanism
3. Connector double lock mechanism
4. Incomplete fitting detecting mechanism

JBE00176-05013

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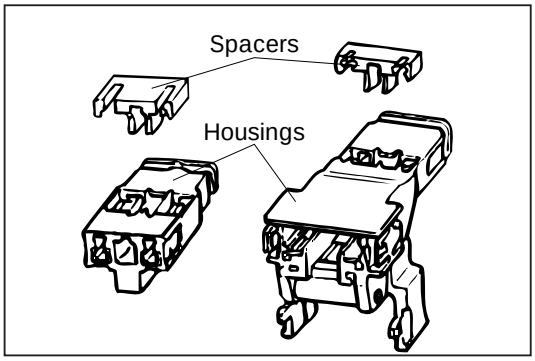
Terminal double locking mechanism

This mechanism is provided with all connectors.

The connector is of a two-piece construction consisting of a housing and a spacer. The terminal holding is double-locked by the lance (primary one) and the spacer (secondary one).

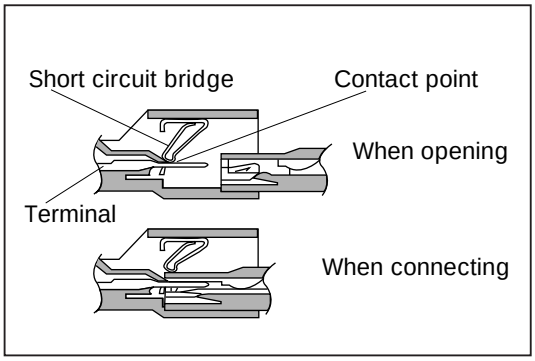


JBE00177-05014

Terminal short mechanism

This mechanism is provided at the connector between the computer and the inflator (squib).

A short spring plate is provided inside the connector. When the connector is disconnected, the terminal at the power supply side of the squib and the terminal at the earth side are shorted automatically, thereby preventing generation of a potential difference between both terminals.

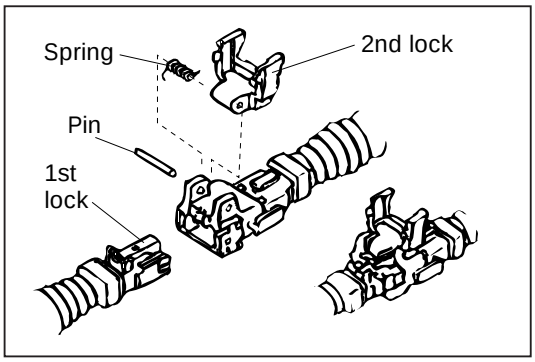


JBE00178-05015

Connector double locking mechanism

This mechanism is provided at the steering roll connector.

For improved reliability of connection, connectors (male and female connectors) are double locked with each other. It is so constructed that, when the primary lock is not made, the secondary lock can not be made because a protrusion hinders the locking.

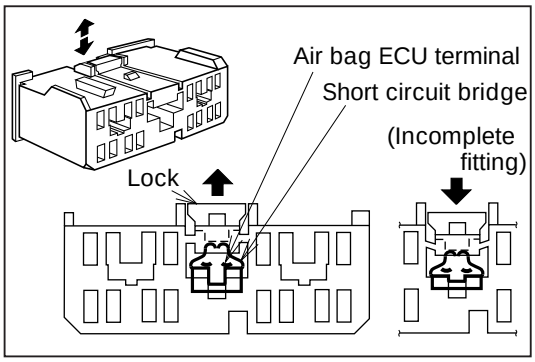


JBE00179-05016

Incomplete fitting detecting mechanism

This mechanism is provided at the connector for the air bag ECU. This mechanism detects electrically whether the connector is connected completely or not. When the connector is fit completely, the detecting pins at the IN and OUT sides are connected through a resistor, allowing an extremely small amount of current to flow to the computer. In this way, the fitting condition is monitored.

When the connector is connected, the detecting pins are inserted along a tilted section provided at the inner wall of the connector. When the connector is inserted completely, the detecting pins are disengaged from the tilted section, and contact the terminal.

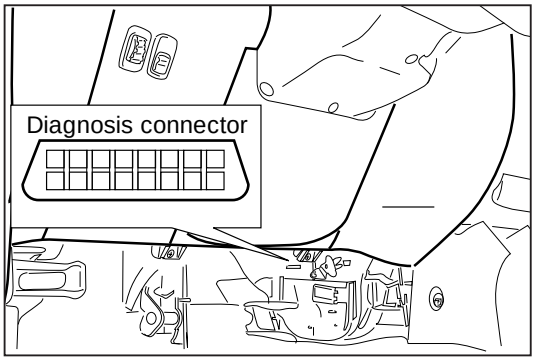


JBE00180-05017

Malfunction diagnosis function

Several items are available as the diagnosis items, including the normal code.

When the system is encountered with an abnormality, the computer memorizes the relevant abnormality item. All malfunction codes are retained until the malfunction codes are erased by the malfunction record erasure procedure or through transmission with the diagnosis tester (DS21).



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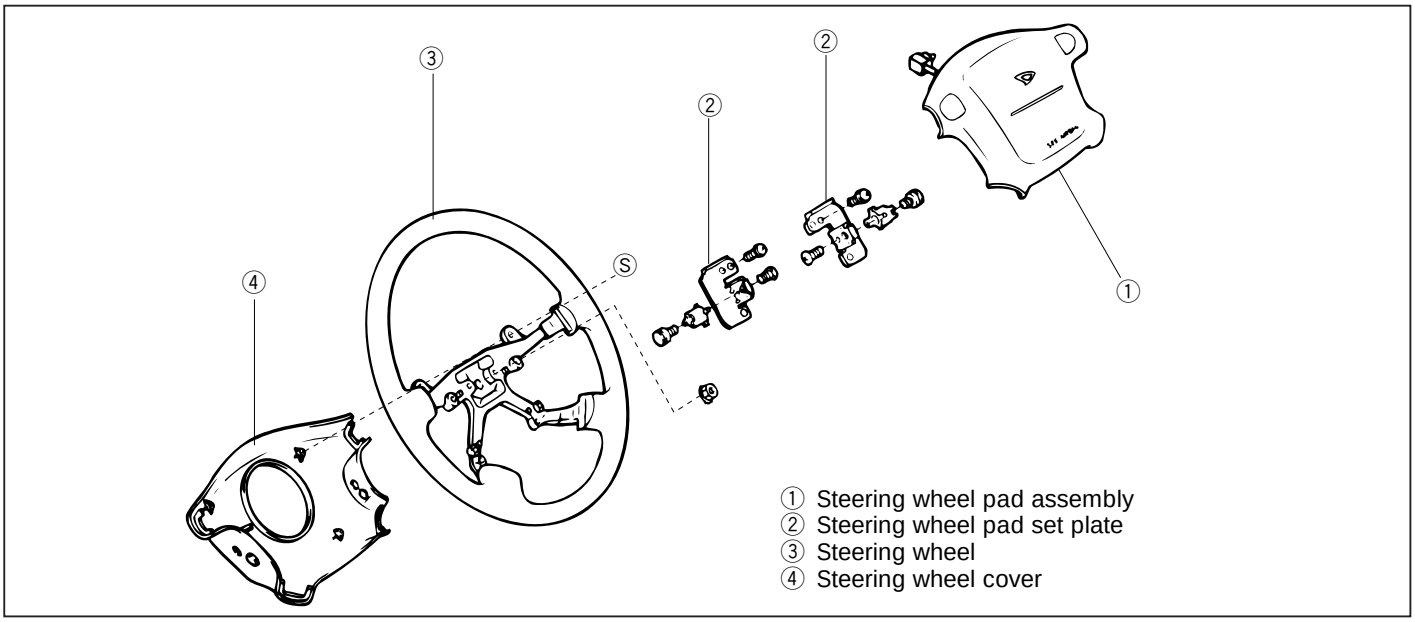
STEERING WHEEL PAD (AIR BAG UNIT FOR THE DRIVER) & STEERING ROLL CONNECTOR

COMPONENTS



JBE00182-05019

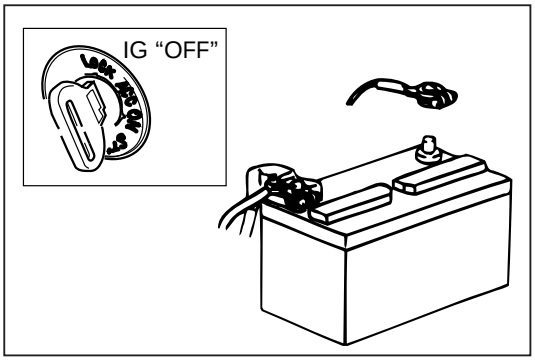
REMOVAL

1. Turn off the ignition switch and detach the negative (–) terminal of the battery cable from the battery terminal.
2. Set the steering wheel to a straight-ahead position.
   Remove the attaching bolts (TORX®) at the right and left sides of the steering wheel cover side.

   WARNING:
   - Be sure to start the operation 60 seconds after the power supply is cut off. Failure to observe this warning may cause unexpected deployment of the air bag owing to impacts, etc. during the removal.
   - Never bring your face, arms and body to the front of the steering wheel during the removal.
   - If the pad assembly is dropped or damaged during the removal or the storage, be sure to dispose of the pad assembly according to the disposal procedure. Be sure to mount a new pad assembly to the vehicle.

   CAUTION:
   - It should be noted that, when the negative (–) terminal of the battery is detached, the memory of the ECU control of the other system will be erased at the same time.

3. Separate the pad assembly and steering wheel.
   Disconnect the connector for the air bag and connector for the horn provided at the reverse side of the pad assembly.
   WARNING:
   - Never resume the operation within 60 seconds after the power supply has been cut off, during which the backup condenser is discharged.



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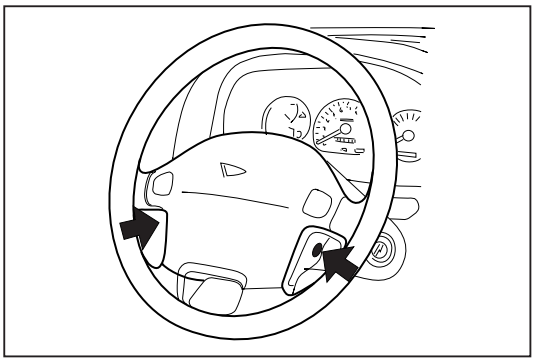

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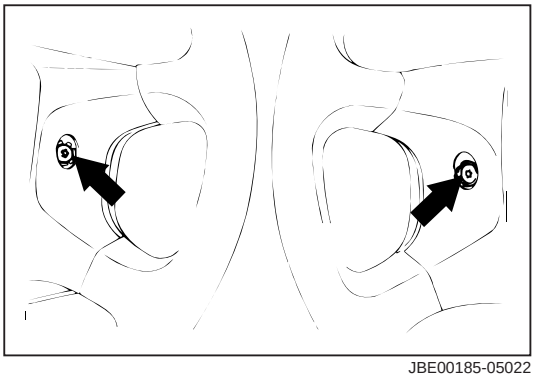

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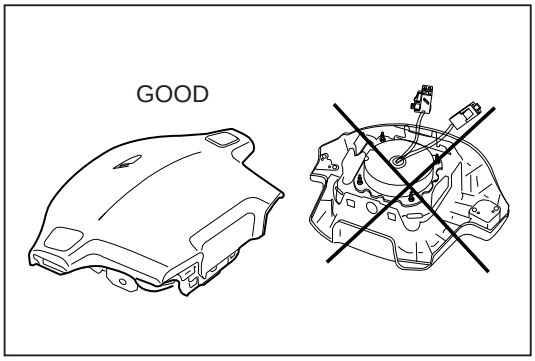
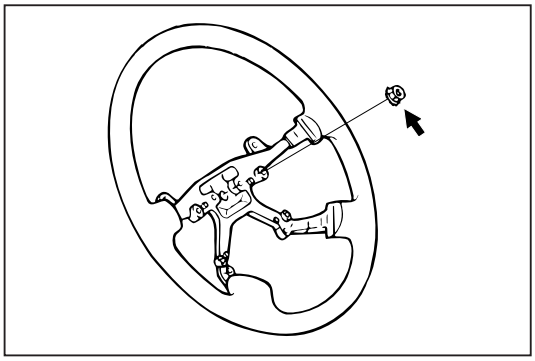
4. After each connector is disconnected, remove the pad assembly from the steering wheel.
   WARNING:
   - Be sure to place the removed pad assembly with the pad surface facing upward. The pad assembly placed with the pad surface facing downward is potentially hazard. Failure to observe this caution may cause unexpected deployment of the air bag, resulting in scattered pad assembly. Furthermore, store the pad assembly at a low place close to the ground level where no heat source (80°C or more) exists in close proximity.

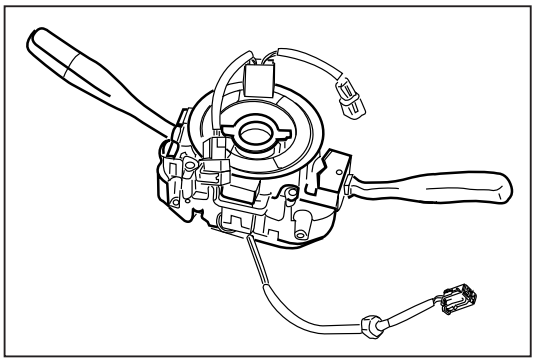


JBE00186-05023

5. Ensure that the steering wheel is set to a straight-ahead position.
6. Remove the lock nut of the steering wheel.
7. Remove the steering wheel.
8. Remove the instrument finish lower panel by the removing attaching screws.
9. Remove the steering column lower cover by the removing attaching screws.
10. Disconnect the connector and detach the wiring harness from the clamp.


JBE00187-05024

11. Remove the multi-use lever switch by removing the attaching screws.
    NOTE:
    - There are cases where the multi-use lever switch can not be removed from the steering column upper cover, unless the steering column is lowered by temporarily loosening the attaching bolts of the column.


JBE00188-05025

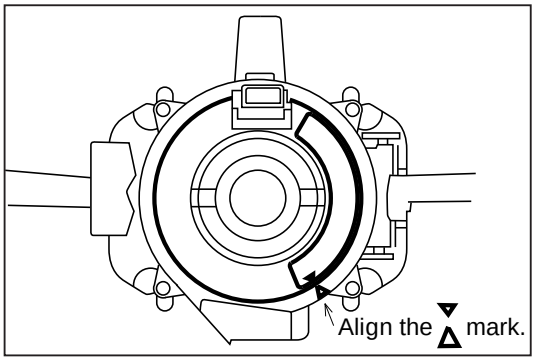
INSTALLATION

PRECAUTION:
- It should be noted wrong installation of the steering roll connector may pose potential hazard, for it may break the wire and also, prevent proper turning of the steering wheel.

1. Ensure that the front wheels are set to the straight-ahead position.
2. Secure the steering roll connector to the multi-use lever switch with screws.

JBE00189-05026

3. Turn the steering roll connector clockwise, until it is locked.
   CAUTION:
   - The steering roll connector makes five turns at the maximum. Hence, when the steering roll connector is connected to the steering wheel, be sure to set the steering roll connector to the midpoint of the rotation.



JBE00190-05027

4. Back off the steering roll connector about 2.5 turns counterclockwise from the locked position. Align the center mark. Temporarily secure the steering roll connector, using a tape, so that it may not move.

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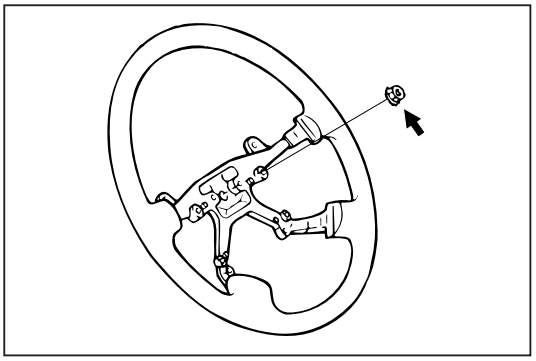
5. Install the steering wheel assembly to the steering shaft and tighten the lock nut.
   Specified Torque: 27.5 - 41.2 N·m



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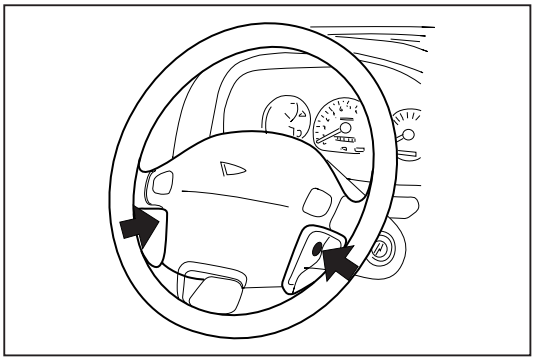
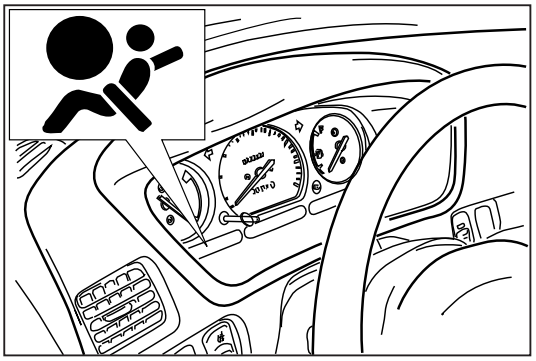
6. Installation of pad assembly
   (1) Connect the connector.
   (2) Secure the pad assembly to the steering wheel assembly with the TORX® bolt.
   Specified Torque: 5.2 - 9.5 N·m



JBE00192-05029

7. Set the steering column upper cover to the steering column assembly.
8. Tighten the steering column assembly attaching bolts.
9. Connect the air bag connector. Clamp the wiring harness.
10. Install the steering column lower cover.
11. Install the instrument finish lower panel.



JBE00193-05030

CHECK AFTER INSTALLATION

1. Turn the steering wheel to the right and left sides, respectively, as far as it will go. Ensure that no malfunction exists.
2. Connect the negative (–) terminal of the battery cable to the battery terminal.
3. Ensure that the horn is set off by pushing the horn button.
4. Turn on the ignition switch. Ensure that the air bag warning lamp illuminates for six seconds.

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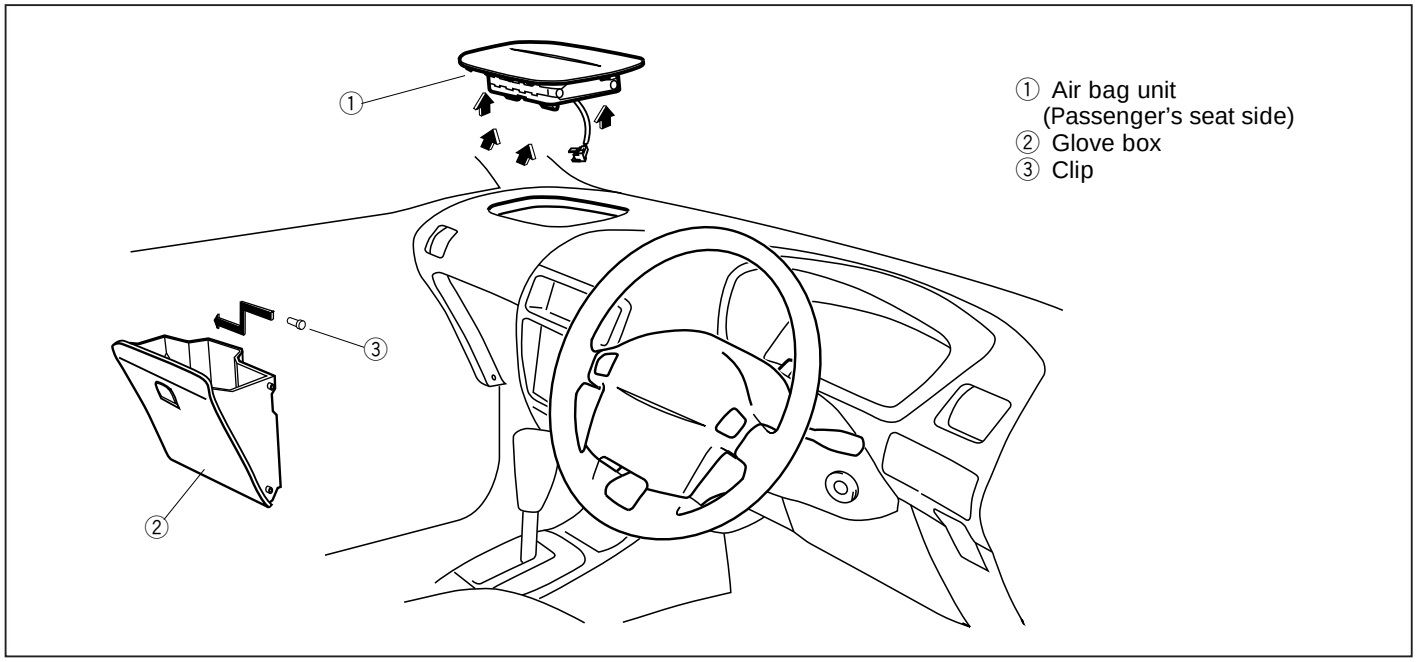
AIR BAG UNIT (FRONT PASSENGER'S SEAT SIDE)

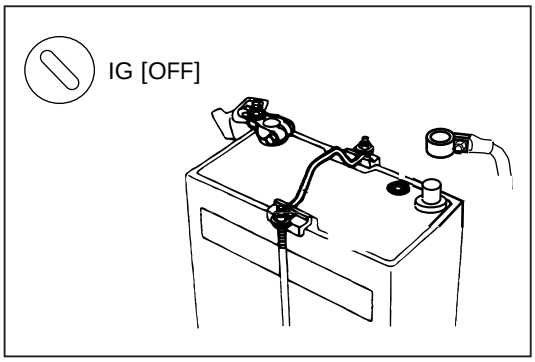
COMPONENTS



JBE00194-05031

REMOVAL

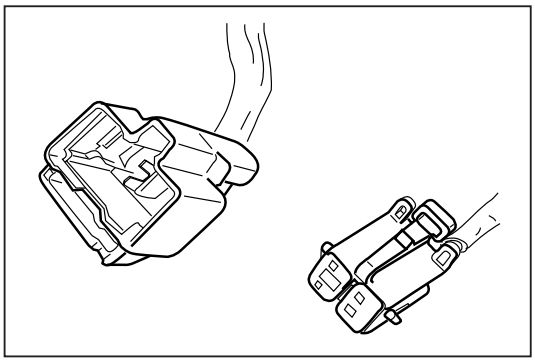
1. Turn off the ignition switch and detach the negative (–) terminal of the battery cable from the battery terminal.
2. Remove the grove box by removing a hinge pin.
3. Disconnect the connector which connects the wire harness of the air bag unit and the cowl wire.



JBE00195-05032

WARNING:

- Be sure to start the operation 60 seconds after the power supply is cut off. Failure to observe this warning may cause unexpected deployment of the air bag owing to impacts, etc. during the removal.
- Never bring your face, arms and body to the front of the air bag unit during the removal.
- If the air bag unit is dropped or damaged during the removal or the storage, be sure to dispose of the unit according to the disposal procedure. Be sure to mount a new unit to the vehicle.



JBE00196-05033

CAUTION:

- It should be noted that, when the negative (–) terminal of the battery is detached, the memory of the ECU control of the other system will be erased at the same time.

JBE00197-05034

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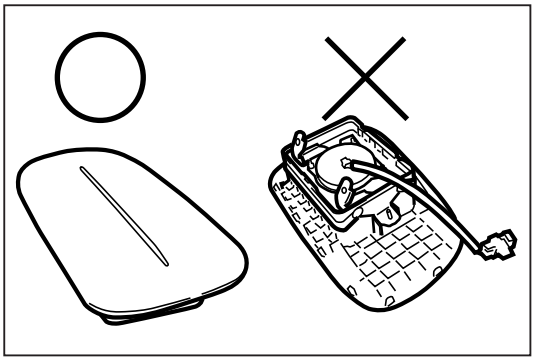
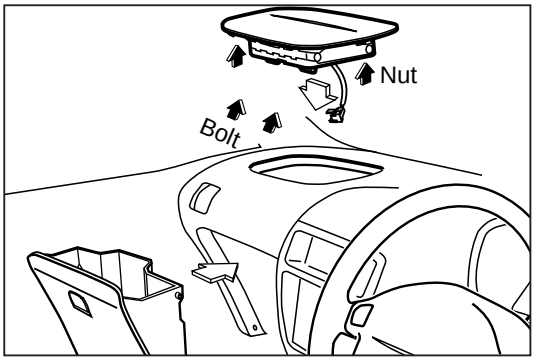
4. Remove the air bag unit assembly from the instrument panel by removing attaching bolts and nuts.
   WARNING:
   - Be sure to place the removed air bag unit with the pad surface facing upward. The unit placed with the pad surface facing downward is potentially hazard. Failure to observe this caution may cause unexpected deployment of the air bag, resulting in scattered air bag unit. Furthermore, store the unit at a low place close to the ground level where no heat source (80°C or more) exists in close proximity.


JBE00198-05035

INSTALLATION

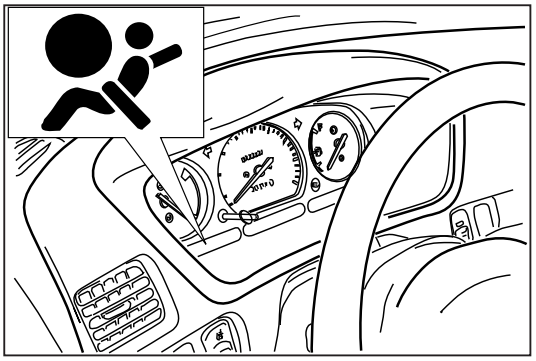
1. Install the air bag unit to the instrument panel and tighten the bolts and nuts.
   Specified Torque for the Bolt: 6.7 - 9.5 N·m
2. Connect the connector.
3. Install the grove box.



JBE00199-05036

CHECK AFTER INSTALLATION

1. Ensure that the pad of the air bag unit fits properly to the instrument panel.
2. Connect the negative (–) terminal of the battery cable to the battery terminal.
3. Turn on the ignition switch. Ensure that the air bag warning lamp illuminates for six seconds.


JBE00200-05037

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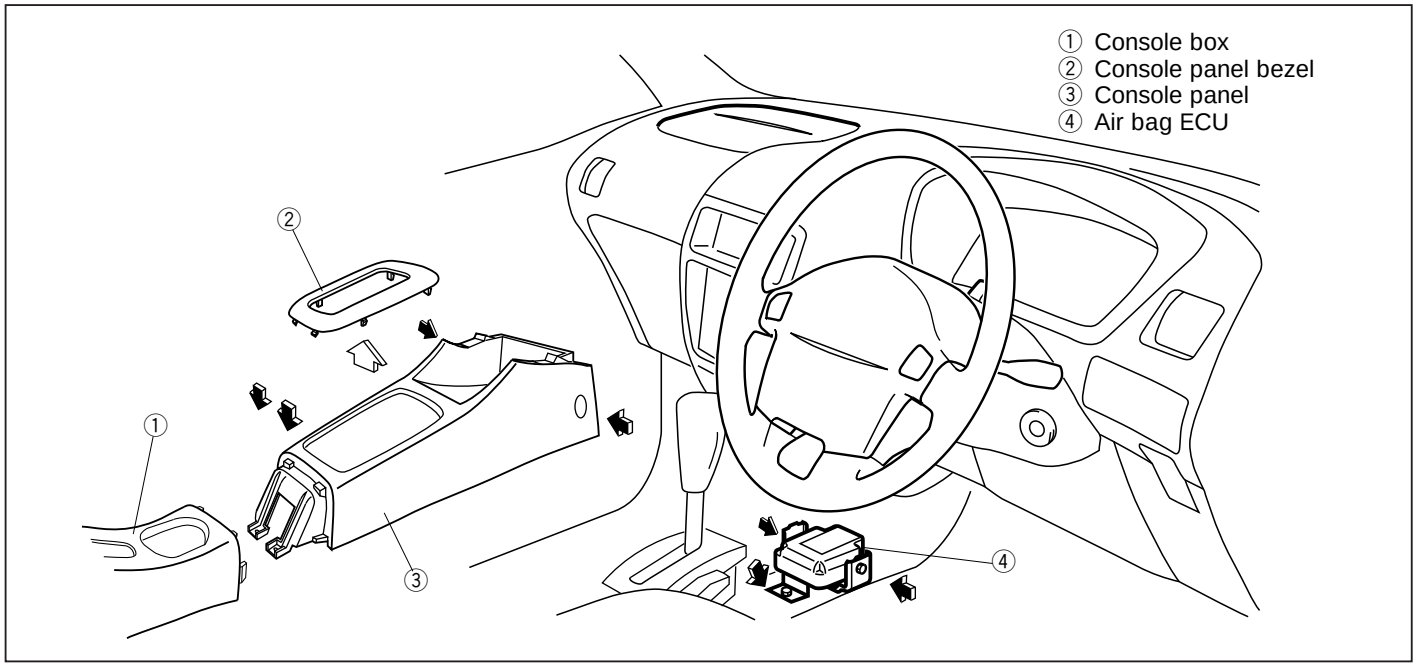
AIR BAG ECU

COMPONENTS



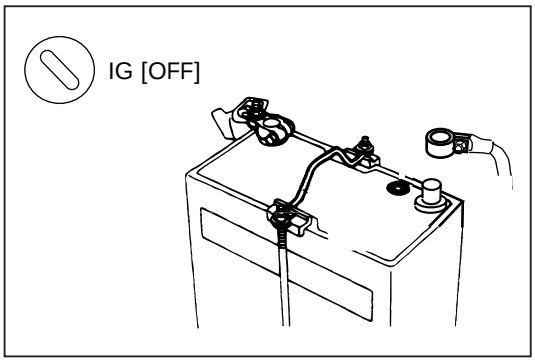
JBE00201-05038

REMOVAL

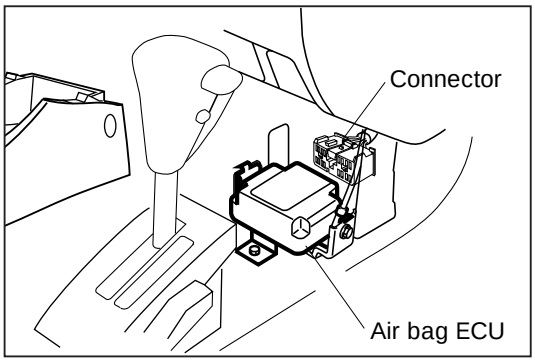
1. Turn off the ignition switch and detach the negative (–) terminal of the battery cable from the battery terminal.
   WARNING:
   - Be sure to start the operation 60 seconds after the power supply is cut off. Failure to observe this warning may cause unexpected deployment of the air bag owing to impacts, etc. during the removal.

   CAUTION:
   - It should be noted that, when the negative (–) terminal of the battery is detached, the memory of the ECU control of the other system will be erased at the same time.

2. Remove the rear console box by removing attaching screws.
3. Pull off the console panel bezel.
4. Remove the console panel by removing attaching bolts and clips.
5. Disconnect the connector from the air bag ECU.
6. Remove the air bag ECU by removing attaching bolts.
   WARNING:
   - Disconnect the connector in advance.



JBE00202-05039



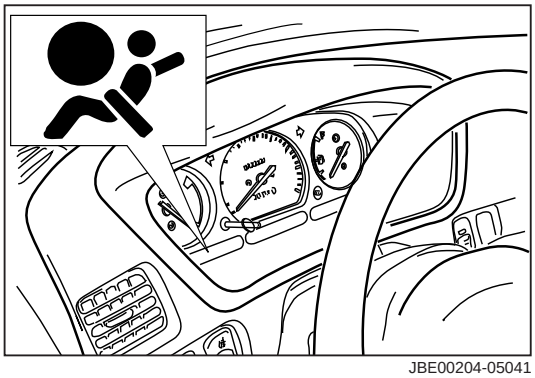
JBE0203-05040

INSTALLATION

1. Install the air bag ECU.
2. Connect the connector.
3. Install the console panel.

CHECK AFTER INSTALLATION

1. Connect the negative (–) terminal of the battery cable to the battery terminal.
2. Turn on the ignition switch. Ensure that the air bag warning lamp illuminates for six seconds.



JBE00204-05041

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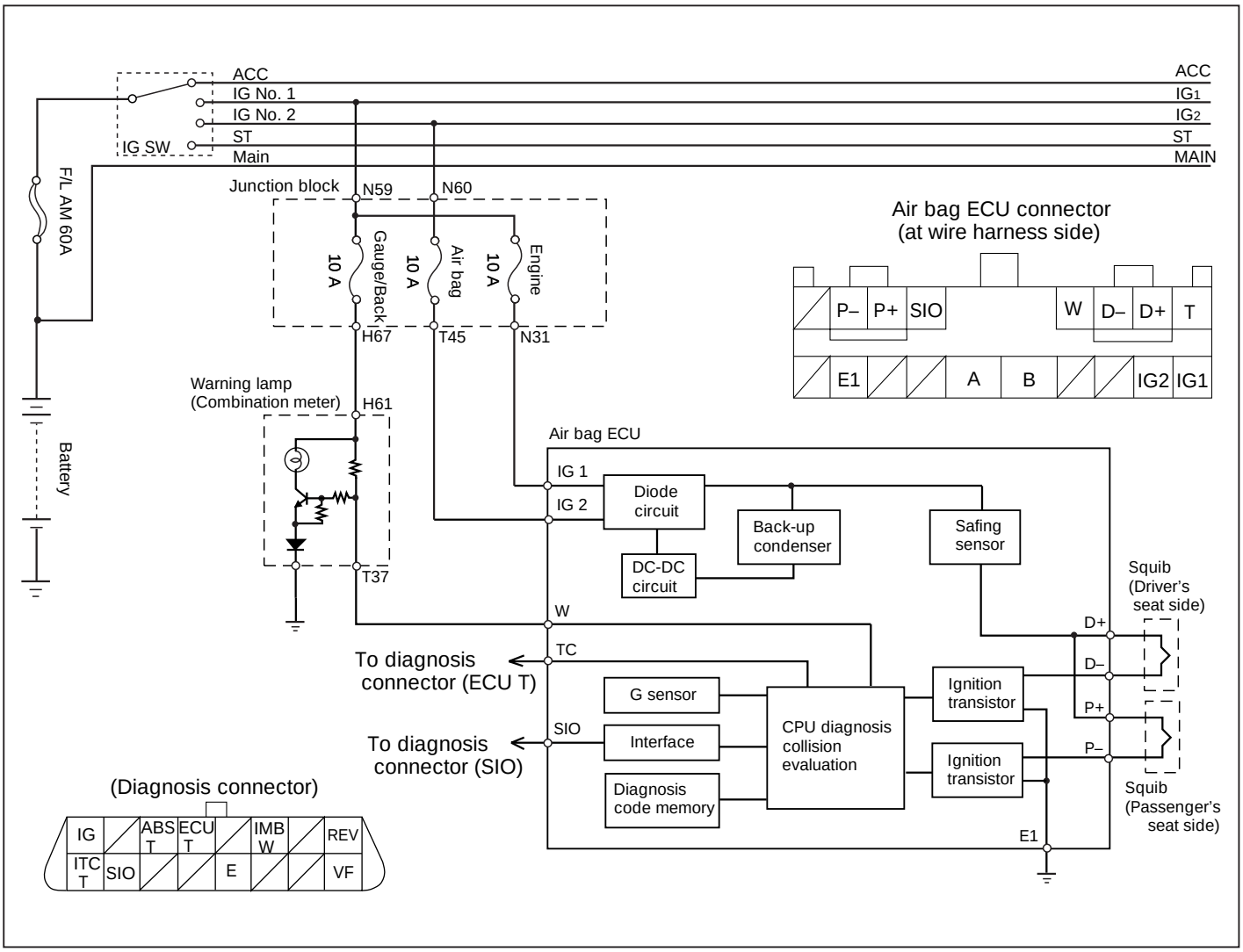
CIRCUIT DIAGRAM

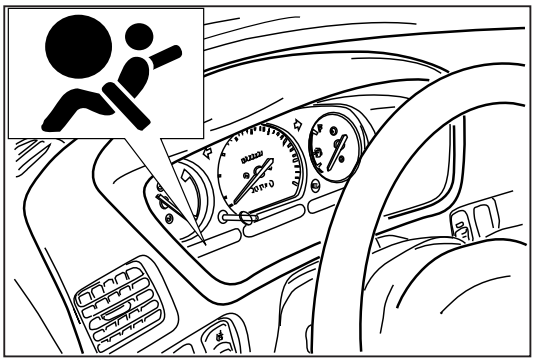


JBE00205-05042

DIAGNOSIS CHECK

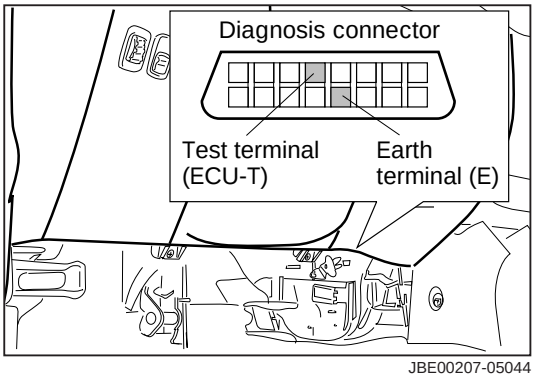
CONFIRMATION PROCEDURE FOR DIAGNOSIS CODES

1. Turn on the ignition switch.
2. If the air bag warning lamp goes on for approximately six seconds and goes out afterward, the system is functioning properly.
   NOTE:
   - If the lamp will not go on at this time, refer to page BE–63.



JBE00206-05043

3. If the warning lamp keeps illuminated for more than six seconds, it means a certain system malfunctioning is being detected. Proceed to the following operations.
4. Connect the test terminal (ECU-T) and the earth terminal (E) of check connector with a jump wire.
5. Confirm the diagnosis code by reading the number of flashing of the air bag warning lamp.



JBE00207-05044

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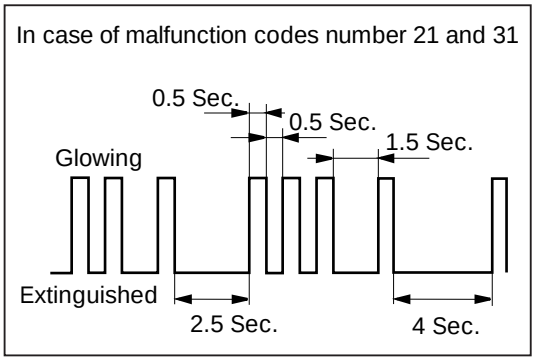
Reading of malfunction codes (diagnosis codes)

When two or more malfunction codes are outputted, the codes are indicated in the sequence of the code numbers, starting form a smaller number, with a four-second distinguished period interposed between codes.

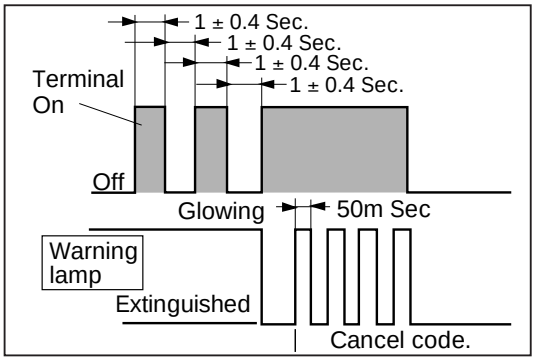
After a lapse of four seconds, the malfunction codes are indicated by the repetition of a 0.5-second glowing period and a 0.5-second extinguished period. If the code is a two-digit number, a 1.5-second extinguished period is interposed between the units digit and the tens digit.



JBE00208-05045

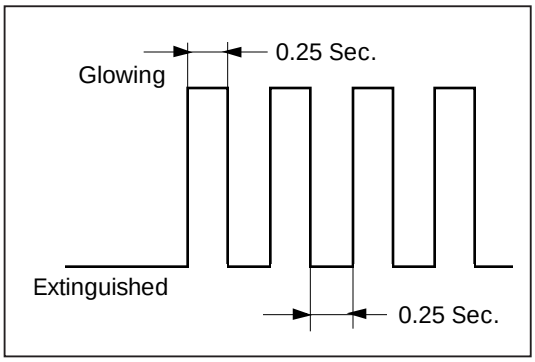
Canceling procedure for records of diagnosis codes

1. The diagnosis codes can be canceled by connecting repeatedly the test terminal (ECU-T) with the earth terminal (E) at the intervals shown in the figure.



JBE00209-05046

2. When the malfunction has been remedied and the system has resumed, the normal code shown in the figure is indicated.
   NOTE:
   - The cancellation procedure for the malfunction record can not be applied to the cancellation of the record of the malfunction for the ECU internal circuit. (Diagnosis codes number 61 and 62)



JBE00210-05047

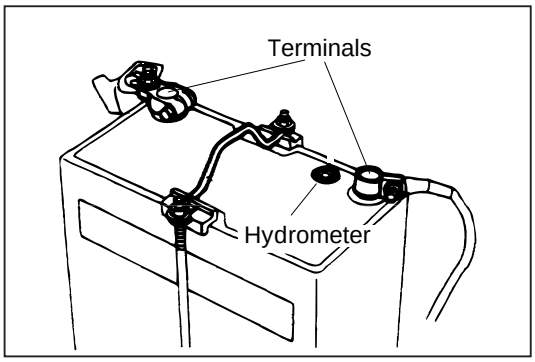
ABNORMAL ILLUMINATION OF WARNING LAMP

When warning lamp will not go on:

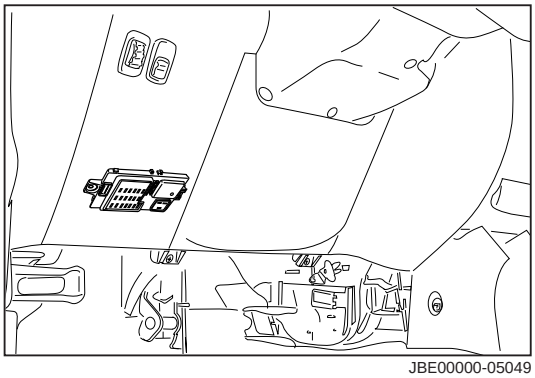
If the warning lamp will not go on when the ignition switch is turned on, check the following items.

(1) Battery for defects or insufficient charge
(2) Battery cable for poor connection
(3) Warning lamp bulb for being burnt out
(4) Gauge fuse for open wire
(5) Cowl wire harness between warning lamp and air bag ECU for abnormality
(6) Warning lamp relay for malfunction

NOTE:
- When the gauge fuse has open wire, other warning lamps will not go on.



JBE00211-05048



JBE00000-05049

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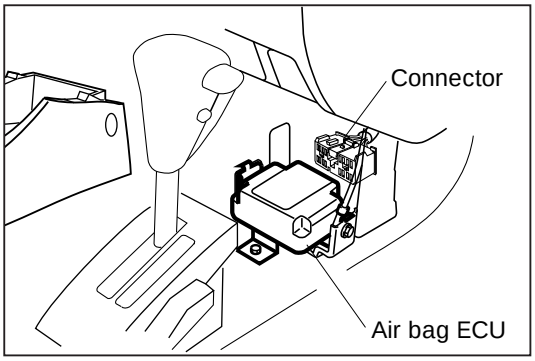
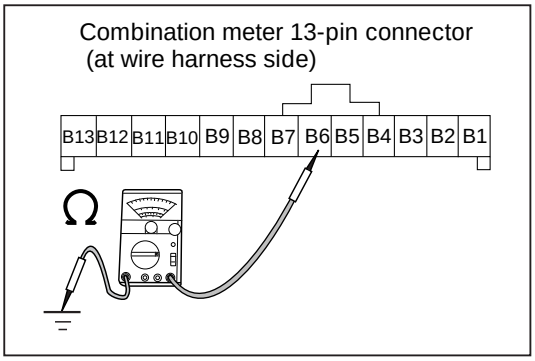
1. Check of cowl wire harness
   (1) Turn off the ignition switch and wait for 60 seconds.
   (2) Remove the console panel. Disconnect the connector at the vehicle wire harness side from the air bag ECU connector.
   (3) Turn on the ignition switch. Check to see if the warning lamp goes on.
   NOTE:
   • When there is open wire in the wire harness between the warning lamp circuit inside the combination meter and the ECU, the warning lamp remains illuminated.

   (4) If the warning lamp will not go on in the condition (3), it is likely that the harness of warning lamp is shorted. Remove the combination meter and disconnect the 13–pin connector. Measure the resistance of harness (cowl wire) across the terminal (B6) and body earth.
   (5) If it might be shorted, replace the harness. Then turn on the ignition switch. Check to see if the warning lamp goes on.

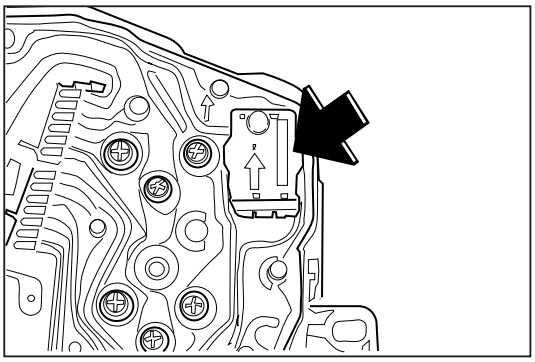


JBE00212-05050

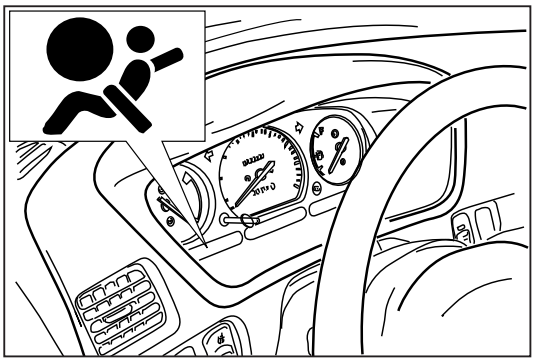


JBE00213-05051

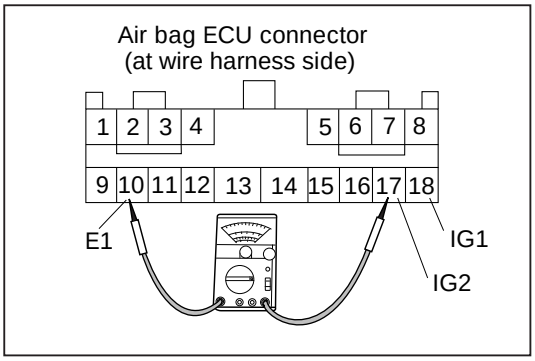
2. Check of air bag warning lamp relay
   If the air bag warning lamp will not go on in the condition (5) above, it means the relay is malfunctioning. Replace the relay.


JBE00214-05052

When warning lamp will not go out:
If the warning lamp will not go out even if about six seconds have elapsed after the ignition switch was turned on, malfunction is most likely taking place in the system. However, as for the following items given below, the malfunction codes can not be read by the reading procedure for the malfunction code already described before, and the warning lamp will remain illuminated. At this time, proceed to the following inspection.


JBE00215-05053

1. Malfunction of power supply circuit of air bag ECU
   (1) Turn off the ignition switch and wait for 60 seconds.
   (2) Remove the console panel. Disconnect the connector at the vehicle wire harness side from the air bag ECU.
   (3) Set the range of the circuit tester to the voltmeter mode. Connect the tester to the terminals of the connector at the wire harness side.
   (4) Switch on the ignition switch and take a reading of the voltage.
   NOTE:
   • If the specified voltage (12 V) is applied across the terminal 17 or 18 and the terminal 10, the power supply circuit is regarded as normal and proceed to the next step.
   • If the specified voltage is not applied, check the wiring route including the connector and fuse for open wire.



JBE00216-05054

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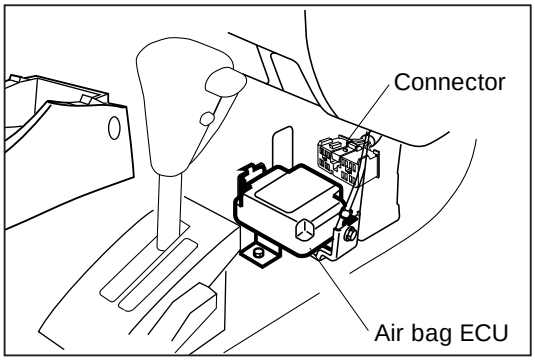
2. Check of warning lamp circuit

NOTE:

- If the warning lamp circuit has open wire, the warning lamp will remain illuminated. This malfunction is recorded as the malfunction code 16 of the air bag ECU.
- However, as long as the warning lamp circuit has open wire, the diagnosis code can not be indicated and the warning lamp remains illuminated.

JBE00217-05055

(1) Turn off the ignition switch and wait for 60 seconds.
(2) Remove the console panel. Disconnect the connector at the vehicle wire harness side from the air bag ECU.

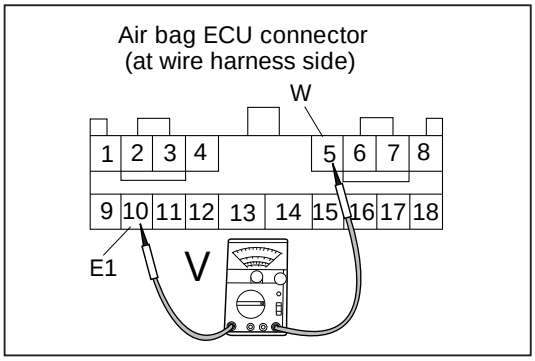


JBE00218-05056

(3) Set the range of the circuit tester to the voltmeter mode. Connect the tester to the terminals of the connector at the wire harness side.

NOTE:

- If the specified voltage (5.5 ± 0.5 V) is applied across the terminal 5 and the terminal 10 (body earth) circuits except the ECU are regarded as functioning normally.



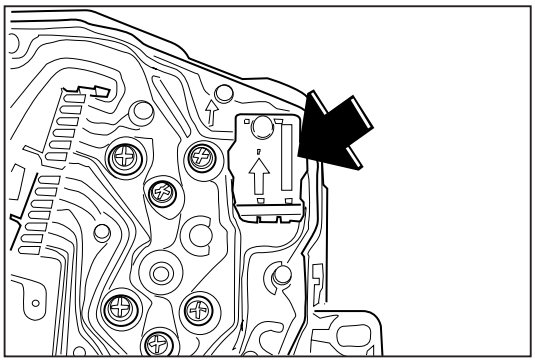
JBE00219-05057

3. Replacement of air bag warning lamp relay

(1) Remove the combination meter from the instrument panel.
(2) Check to see if there is open wire or damage at the circuit panel at the back side of the combination meter.
(3) Replace the air bag warning lamp relay inside the combination meter.
(4) Then, perform the check of (3) and check that the lamp goes out.

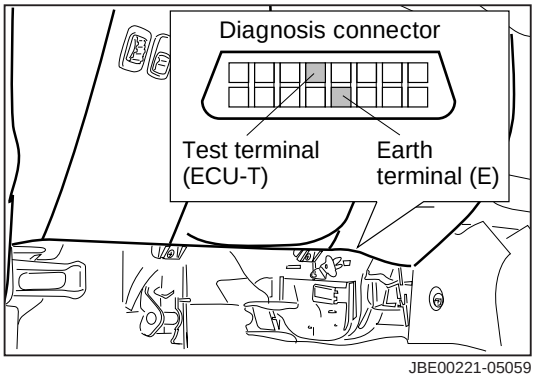
NOTE:

- After completion of repairing the malfunction, read out the malfunction codes and cancel them to complete the operation.



JBE00220-05058

(5) Connect the wire harness connector to the ECU as it was connected before. Perform code cancellation and re-reading. Make sure that the malfunction has been remedied.



JBE00221-05059

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TROUBLE SHOOTING

When proceeding with operations for a malfunctioning vehicle, it is imperative to confirm the malfunction phenomena actually before pinpointing the causes. In order to reproduce the malfunction phenomena, collecting information from the customer is of great importance.

WARNING:

- The aforesaid describes general notes. In the air bag system, there are some cases where the malfunction phenomena can not be reproduced due to the characteristics of the system. Therefore, any wrong operations during checks and repairs may cause the air bag to function accidentally and deploy. Please observe the notes and perform the operations according to the instructions given in the manual.

JBE00222-05060

LIST OF MALFUNCTION CODES

Code No.	Timing at time of Malfunctioning sections	Malfunction detection No.
11	At all times	Abnormal Power supply voltage
14	At all times	IG1 has open wire.
15	At all times	IG2 has open wire.
16	Initial period	Abnormal warning lamp illumination circuit
21	At all times	Squib of air bag at driver's seat side has open wire.
22	At all times	Circuit of squib of air bag at driver's seat side is shorted.
31	At all times	Squib of air bag at front passenger's seat side has open wire.
32	At all times	Circuit of squib of air bag at front passenger's seat side is shorted.
41	At all times	Upstream circuit of squib of air bag is grounded to earth.
42	At all times	Power supply voltage is applied to upstream circuit of squib of air bag.
61	Initial period	Squib was operated. (Air bag was deployed.)
62	Initial period/ At all times	Air bag ECU malfunctioning

JBE00223-05061

CAUTION:

- After carrying out the trouble shooting according to diagnosis codes, cancel the diagnosis codes by following the code canceling method described at page BE–63.
- Even though the malfunction has been remedied, the code is not canceled automatically.

JBE00224-05062

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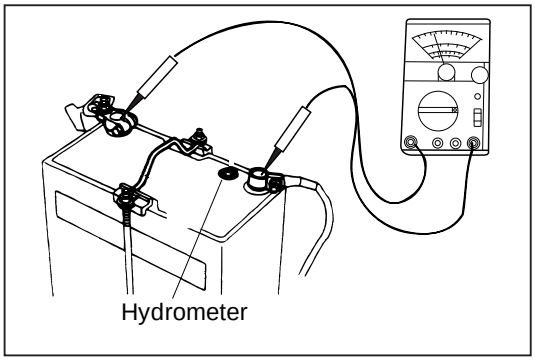
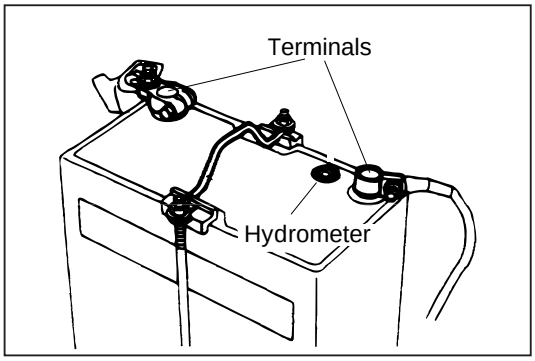
When diagnosis code 11,14 or 15 is indicated:
Possible cause for malfunction: Abnormal power supply voltage to the air bag system.

1. Battery check
   Turn off the ignition switch. Measure the voltage across the battery terminals and ensure that the voltage is 12 V or more.



JBE00225-05063

2. Check of charging circuit
   (1) After starting the engine, disconnect the battery cable terminal from the negative terminal of the battery.
   (2) Measure the voltage between the negative terminal of the disconnected battery cable and the battery positive terminal.

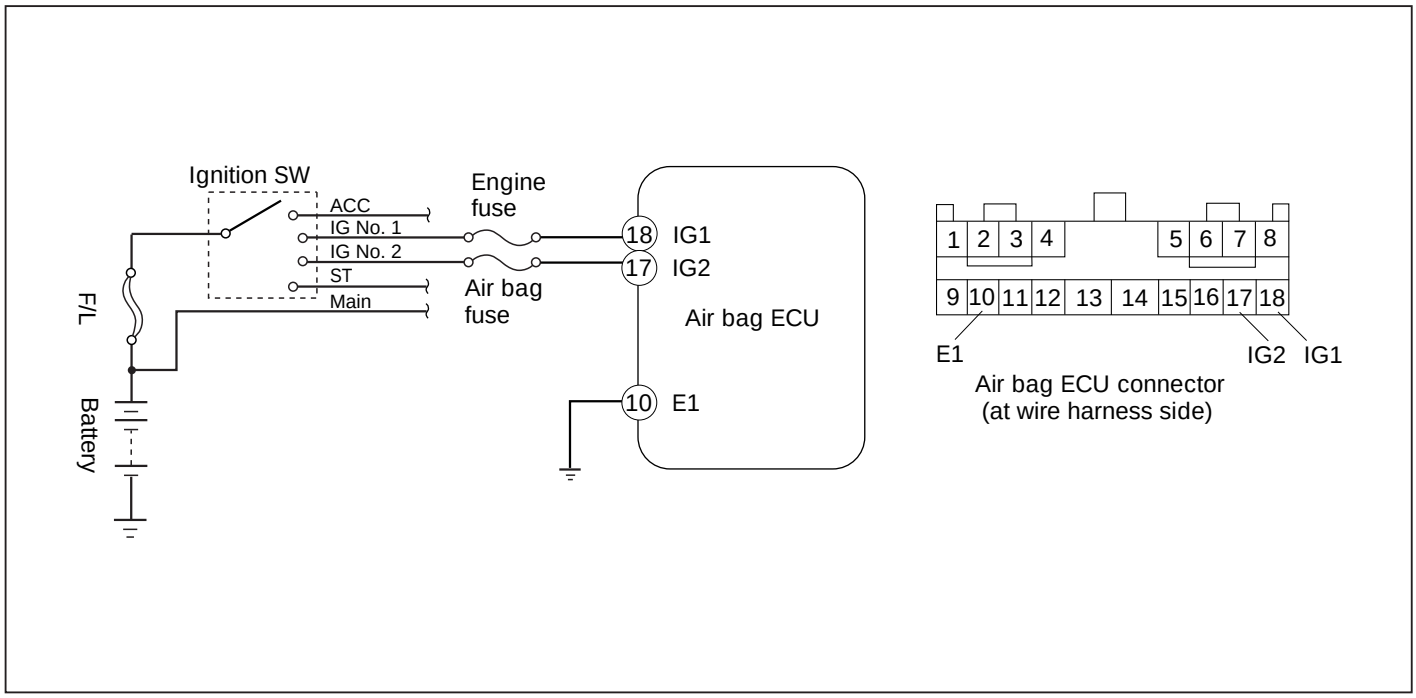


JBE00226-05064

   NOTE:
   • The voltage should be 14.5 V or more at the engine revolution speed of 2000 rpm.

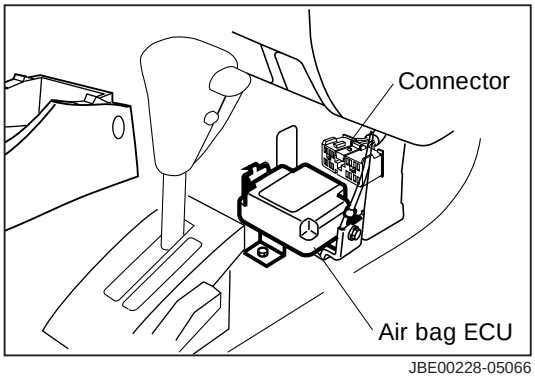
   (3) Check to see if the battery cable is connected properly.

3. Check of wire harness and fuse



JBE00227-05065

   (1) Turn off the ignition switch and wait for 60 seconds.
   (2) Remove the console panel. Disconnect the connector at vehicle wire harness side from the air bag ECU.



JBE00228-05066

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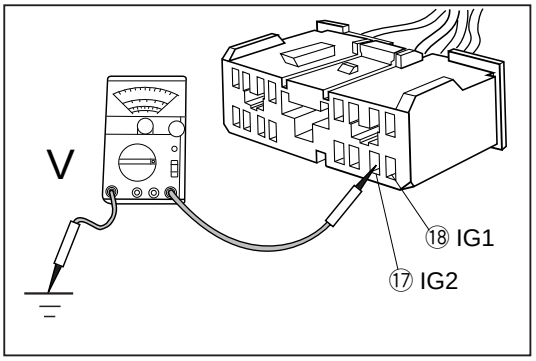
(3) Turn on the ignition switch.
With the circuit tester set to the voltmeter mode, connect the tester between the connector terminal at the vehicle wire harness side and body earth.
Between terminal 18 (IG1) and body earth:
Battery voltage
Between terminal 17 (IG2) and body earth:
Battery voltage

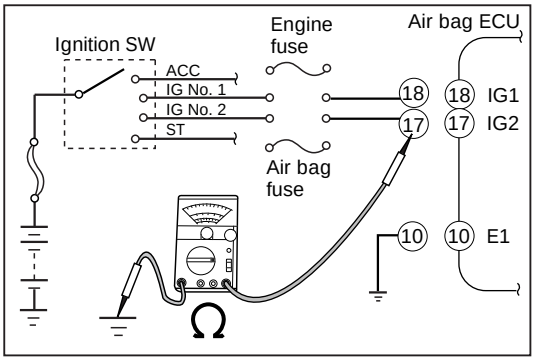
If the battery voltage is not applied to each terminal, pull off and check the air bag fuse and engine fuse.



JBE00229-05067

(4) If the fuse is melt down, connect the tester between the connector terminal at the vehicle wire harness side and body earth with the tester set to the ohmmeter range.
Between terminal 18 (IG1) and body earth:
No continuity exists.
Between terminal 17 (IG2) and body earth:
No continuity exists.

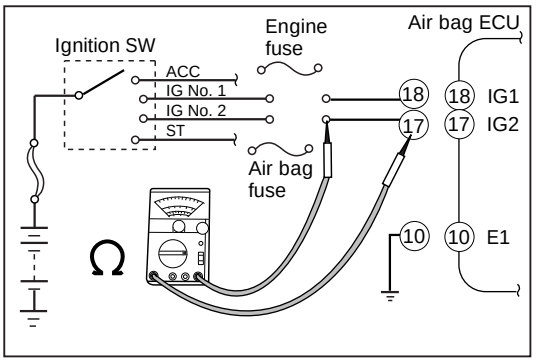
If it might be shorted, replace the harness. If not, re-check after replacing the fuse.



JBE00230-05068

(5) If the fuse is not melt down, connect the tester between the connector terminal at the vehicle wire harness side and fuse terminal with the tester set to the ohmmeter range.
Between terminal 18 (IG1) and Engine fuse terminal (at the fuse block): Continuity exists.
Between terminal 17 (IG2) and Air bag fuse terminal (at the fuse block): Continuity exists.

If it might have open wire, replace the harness. If not, re-check the battery and charging circuit.



JBE00231-05069

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When diagnosis code 16 is indicated:

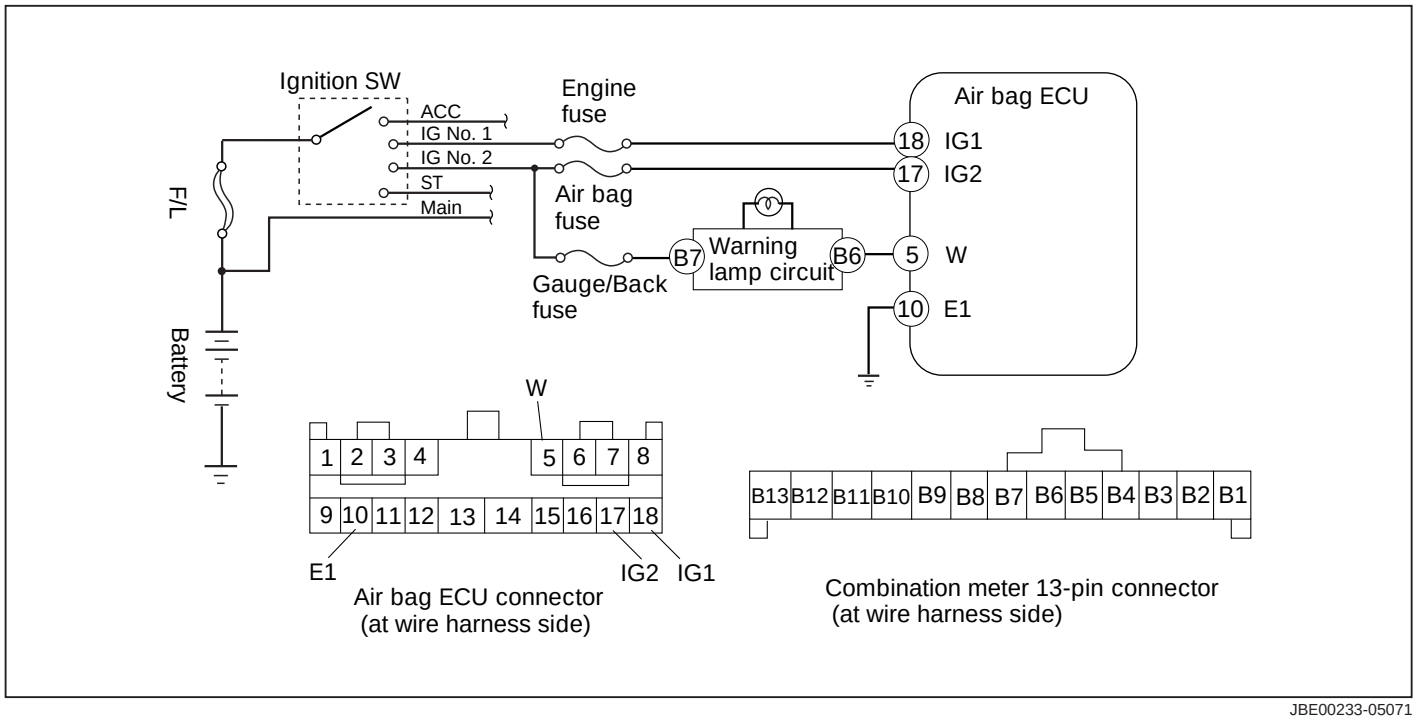
Possible cause for malfunction: Abnormality in warning lamp illuminating circuit

NOTE:

- When this code is memorized, it indicates that open wire has taken place in the warning lamp circuit even though it occurred temporarily. However, if this code is now indicated, it means the circuit (wire harnesses, connectors, etc.) has been remedied to the normal condition.

JBE00232-05070

1. Check of wire harness and connector

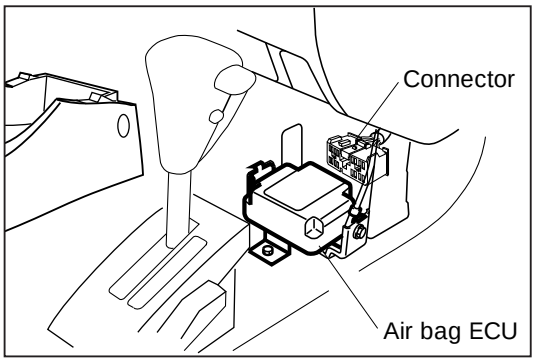


JBE00233-05071

(1) Turn off the ignition switch and wait for 60 seconds.

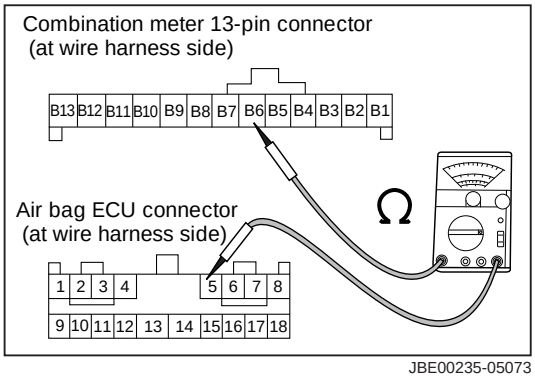
(2) Remove the console panel. Disconnect the connector at the vehicle wire harness side from the air bag ECU connector.

(3) Take out the combination meter from the instrument panel. Disconnect the 13-pin connector from the combination meter.



JBE00234-05072

(4) Connect a circuit tester to the wire harness connectors between the terminal (B6) to the combination meter side and the terminal (5) to the ECU side with the circuit tester set to the ohmmeter mode. Check continuity between these terminals. Give light vibration to the wire harness or connector between the air bag ECU and the combination meter by hand. Check to see if any change is observed in the ohmmeter.



JBE00235-05073

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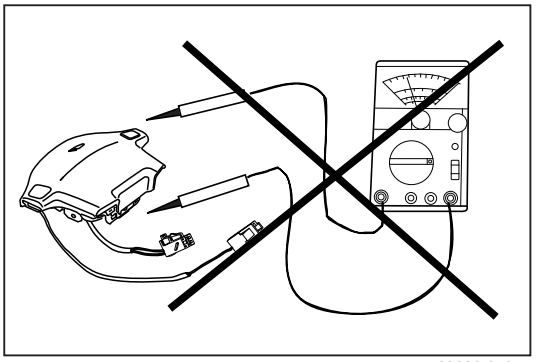
When diagnosis code 21 is indicated:

Possible cause for malfunction: Open wire in squib of air bag at driver's seat side

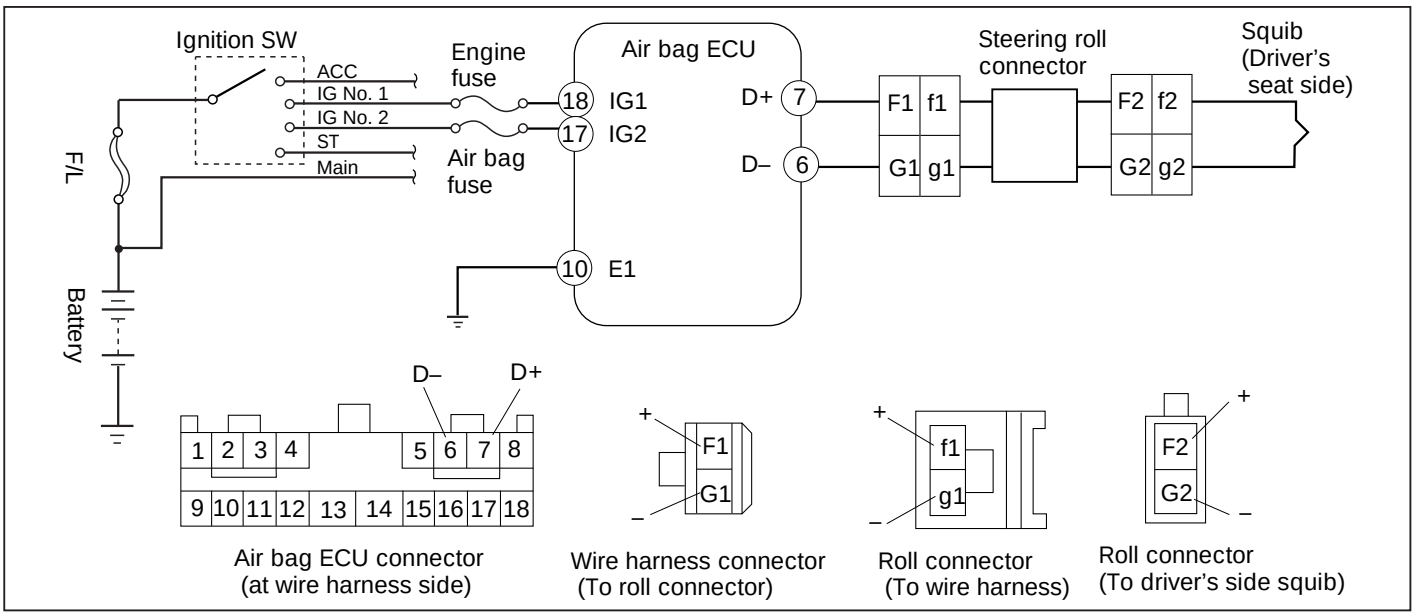
WARNING:

- The squib of the air bag consists of a filament of about 2 ohms. Therefore, there is the possibility that a current which is big enough to cause deployment flows when the circuit tester is connected in its ohmmeter mode.
- Hence, never measure the resistance of the squib easily just because the code 21 is indicated. This may cause the air bag to deploy, thus causing serious injuries to the operators and other people in the surrounding.



JBE00236-05074

1. Check of wiring harness and connector



JBE00237-05075

NOTE:

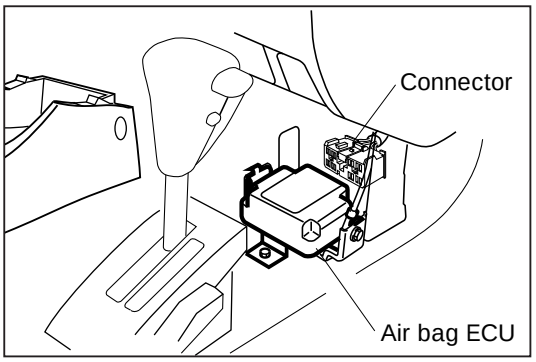
- When there is poor connection between the air bag ECU and the squib, the code 21 is indicated, too.

(1) Turn off the ignition switch and wait for 60 seconds.

(2) Remove the console panel. Disconnect the connector at the vehicle wire harness side from the air bag ECU.

NOTE:

- When the connector is disconnected from the air bag ECU, the connector terminals 6 and 7 at the harness side are shorted automatically by the short circuit bridge.

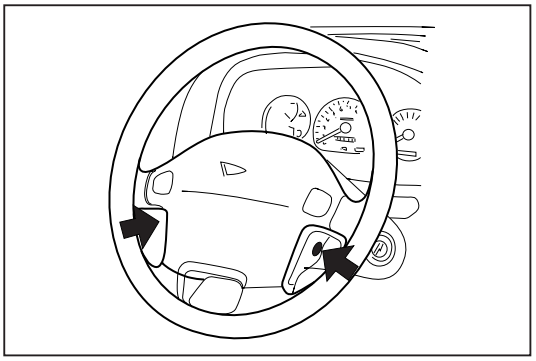


JBE00238-05076

(3) Remove the steering pad assembly (air bag unit) from the steering wheel.

CAUTION:

- The pad assembly is installed to the steering wheel by means of TORX® bolts.
- A pad assembly which was dropped previously can not be used again. Therefore, extreme care must be exercised as to its handling.



JBE00239-05077

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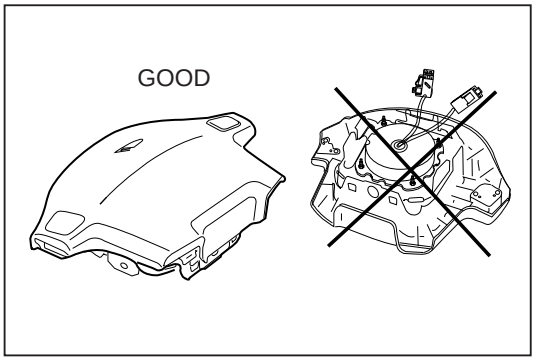
(4) Disconnect the pad assembly connector from the roll connector. Also disconnect the connector for the horn.

WARNING:

- When storing the steering pad assembly (air bag unit), be sure to place it with the pad surface facing upward on a flat place which is not exposed to direct sun rays. Sparks of welding, etc. shall be kept away from the storing place. Also, the storing place shall be away from the storing place for water, oil, grease, etc.

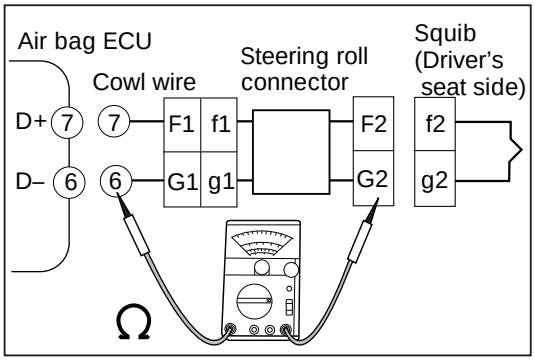


JBE00240-05078

(5) Connect the circuit tester to the roll connector terminal with the tester set to the ohmmeter range. Ensure that there is no open wire between the wire harness and the connector.

Between terminal 7 (D+) and F2 (+):
Continuity exists.

Between terminal 6 (D–) and G2 (–):
Continuity exists.



JBE00241-05079

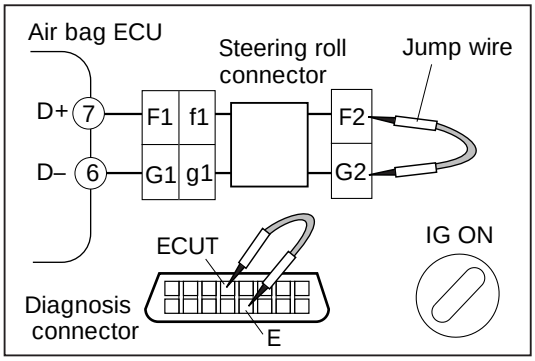
(6) If there is no open wire, connect both ends of the roll connector terminal with a jump wire to short them.

(7) Connect the connector at the vehicle wire harness side and the air bag ECU that were disconnected at Step (2).

(8) Turn on the ignition switch and take a reading of the diagnosis code.

CAUTION:

- If the code 22 (short circuit of squib circuit) is indicated, it proves indirectly that there is open wire in the squib of the steering pad assembly (air bag unit). Therefore, replace the steering pad assembly.
- After the replacement, cancel the diagnosis code and confirm that the code 21 is not outputted any more.



JBE00242-05080

2. Confirmation of open wire of squib

CAUTION:

- To check an electric circuit for open wire, it is an accepted practice to perform measurement with an ohmmeter. However, it is dangerous to use this method to check the squib for open wire, because this method may cause an accidental explosion. In the preceding step, it has been confirmed that there is no open wire in the circuits other than the squib. Before you proceed to the disposing procedure for the steering pad assembly described later, it is, however, necessary to prove directly that there is open wire in the squib. As for this procedure, refer to page BE–83.

JBE00243-05081

3. Installation of steering pad assembly

JBE00244-05082

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When diagnosis code 22 is indicated:

Possible cause for malfunction: Circuit of squib of air bag at driver's seat side is shorted.

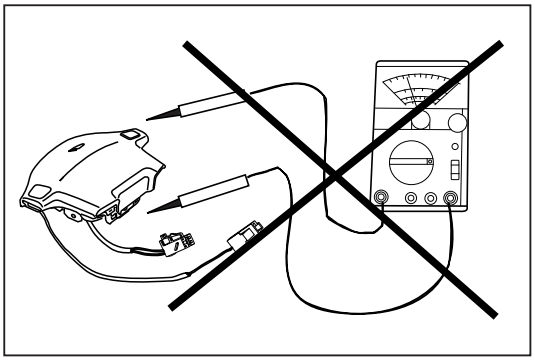
NOTE:

- The squib of the air bag consists of a filament of about 2 ohms. In order to detect open wire or short circuit in the squib circuit, a small amount of current is flown at all times from the air bag ECU. Therefore, when this code is indicated, it means that an abnormally large amount of current flowed in the squib circuit of the air bag at the driver's seat for a certain reason. Therefore, the ECU judges that the resistor of the squib (filament or wire harness) is shorted.

JBE00245-05083

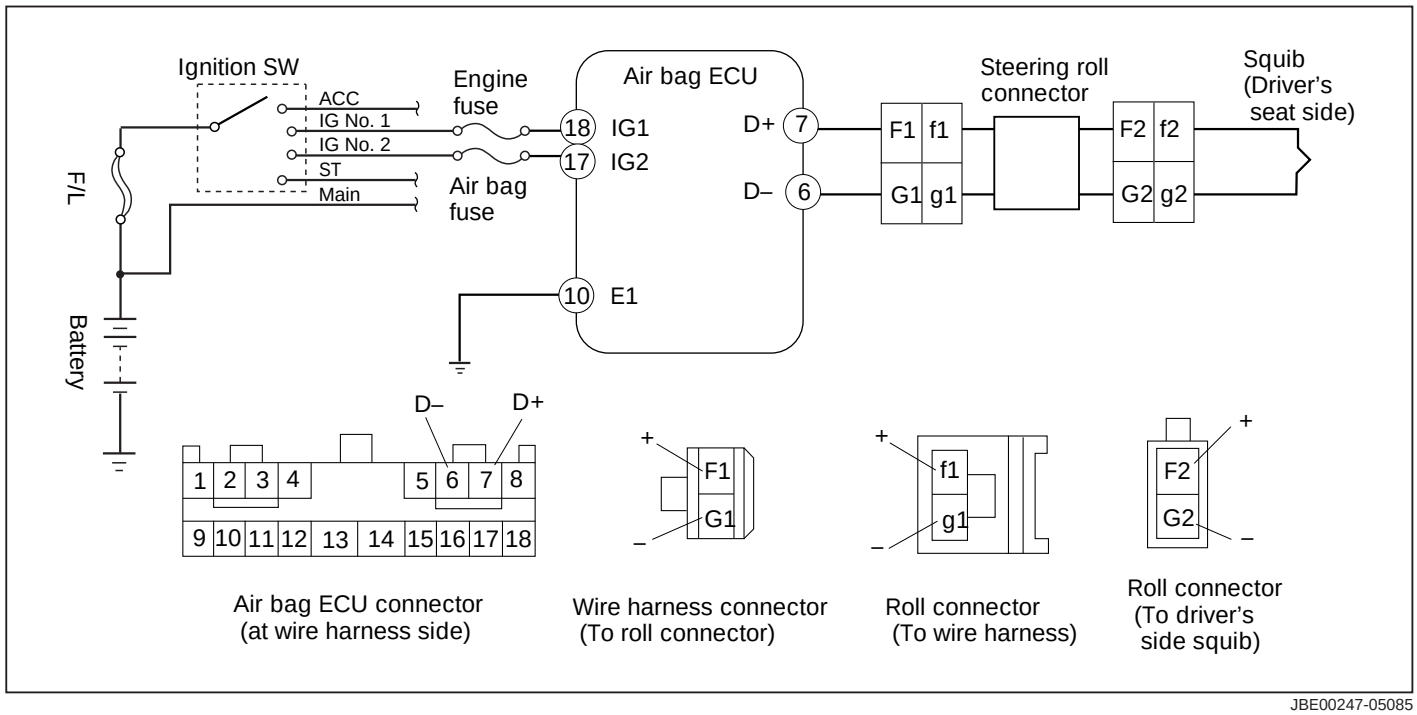
WARNING:

- Never measure directly the resistance of the squib to see if the squib is shorted or not, using a circuit tester. Failure to observe this warning may cause the air bag to deploy accidentally, thus causing injuries to the operators and other people in the surrounding.



JBE00246-05084

1. Check of wiring harness



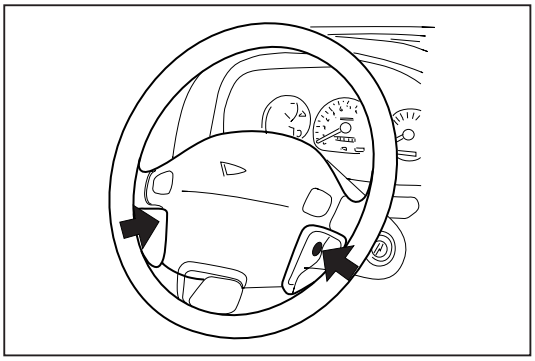
JBE00247-05085

(1) Turn off the ignition switch and wait for about 60 seconds.

(2) Remove the steering pad assembly (air bag unit) from the steering wheel.

CAUTION:

- A steering pad assembly which was dropped previously can not be used again. Therefore, extreme care must be exercised not to drop it.



JBE00248-05086

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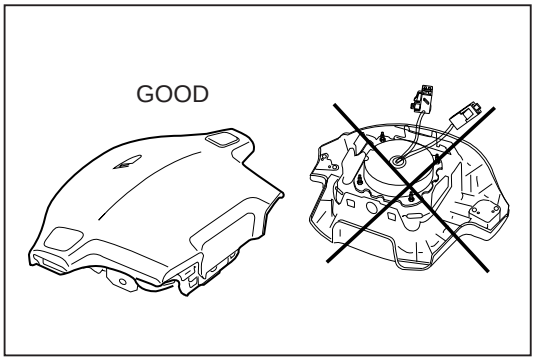
(3) Disconnect the connector of the steering pad assembly from the roll connector. Also disconnect the connector for the horn.

WARNING:

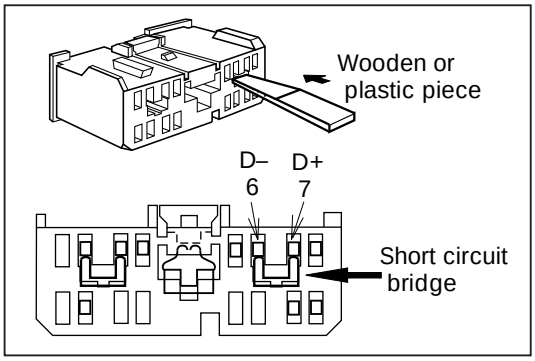
- When storing the steering pad assembly (air bag unit), be sure to place it with the pad surface facing upward on a flat place which is not exposed to direct sun rays. Also the storing place shall be away from water and rain.



JBE00249-05087

(4) Remove the console panel. Disconnect the connector at the vehicle wire harness side from the air bag ECU.

(5) Using a wooden or plastic piece, raise the short circuit bridge at the sections 6 and 7 of the connector at the vehicle wire harness side which was removed from the ECU. In this way, disconnect the shorted contact points.

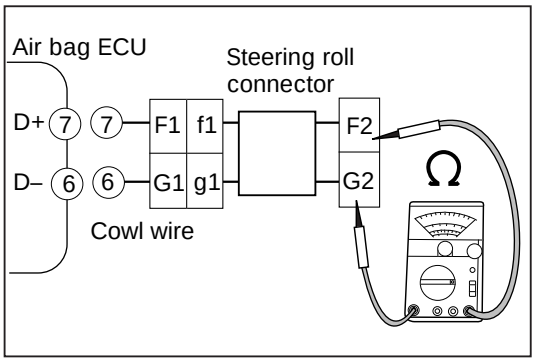


JBE00250-05088

(6) With the circuit tester set to the ohmmeter mode, connect the tester to the roll connector terminal. Check to see if any short circuit exists in the circuits from the air bag ECU to the roll connector via the wire harness.

Between terminal F2 (+) and G2 (–):

No continuity exists.



JBE00251-05089

(7) If the wiring harness is shorted, it is necessary to know whether the faulty point is attributable to the inside of the roll connector. To this end, disconnect the coupling connector of the roll connector and the wire cowl. Then, perform check with a circuit tester as was described in Item (6) above.

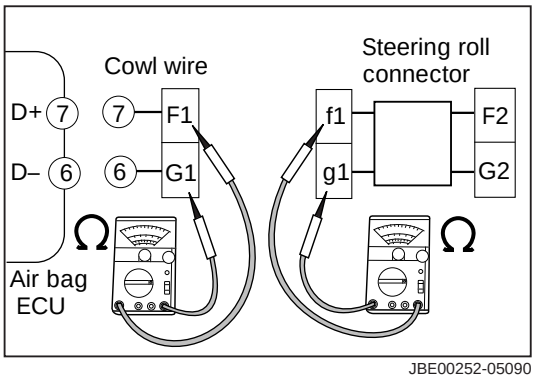
Between terminal F1 (+) and G1 (–):

No continuity exists.

Between terminal f1 (+) and g1 (–):

No continuity exists.

If a short circuit is found, replace the faulty part with a new one.



JBE00252-05090

NOTE:

- At this time, turn the steering wheel in a right-and-left direction and ensure that there is no change in the indication of the circuit tester.

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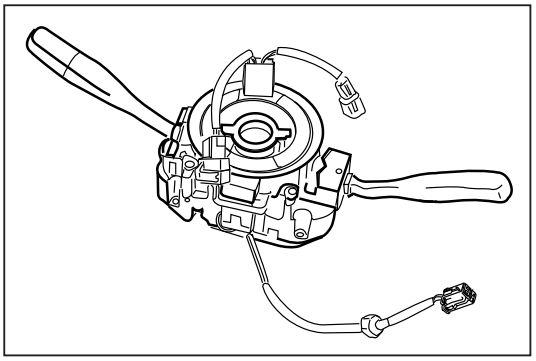
(8) Replacement of roll connector

WARNING:

- When replacing the roll connector, refer to BE-57. Failure to observe this warning may hamper the turning function of the steering wheel or cut the wiring of the roll connector. Therefore, extreme care must be paid.

NOTE:

- As for the steering wheel installation procedure, refer to the SR section of the service manual.



JBE00253-05091

(9) Replace the wire harness if it exhibits any fault.

NOTE:

- The wiring harness for the air bag can be identified by its external color of yellow.

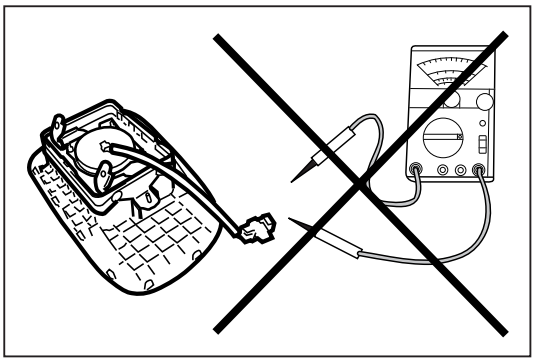
JBE0254-05092

When diagnosis code 31 is indicated:

Possible cause for malfunction: Squib of air bag at front passenger seat side has open wire.

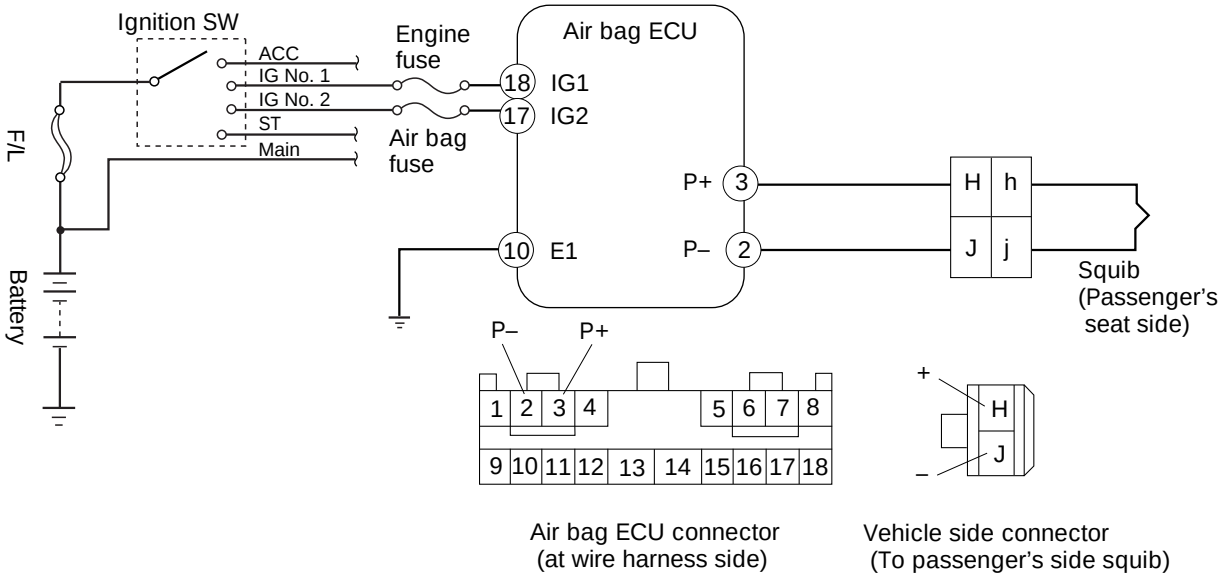
WARNING:

- The squib of the air bag consists of a filament of about 2 ohms. Therefore, there is the possibility that a current which is big enough to cause deployment flows when the circuit tester is connected in its ohmmeter mode.
- Hence, never measure the resistance of the squib easily just because the code 31 is indicated. This may cause the air bag to deploy accidentally, thus causing serious injuries to the operators and other people in the surrounding.



JBE00255-05093

1. Check of wiring harness and connector



JBE00256-05094

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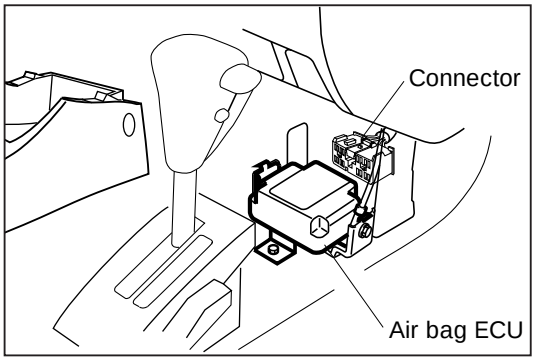
NOTE:
- When there is poor connection between the air bag ECU and the squib, the code 31 is indicated, too.

(1) Turn off the ignition switch and wait for 60 seconds.
(2) Remove the console box. Disconnect the connector at the vehicle wire harness side from the air bag ECU.

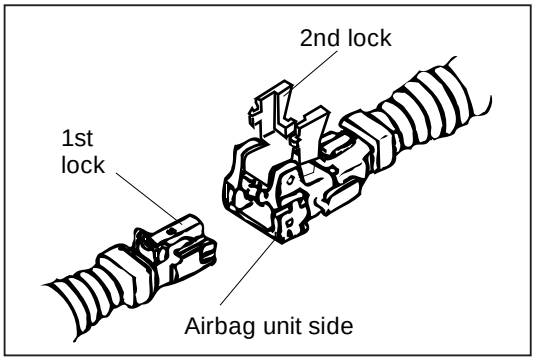
NOTE:
- When the connector is disconnected from the air bag ECU, the connector terminals 2 and 3 are shorted automatically by the short circuit bridge.



JBE00257-05095

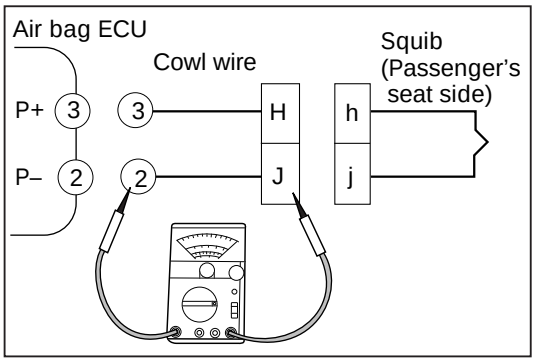
(3) Disconnect the connector which connects the wire harness of the air bag unit and the wire cowl.

NOTE:
- When the connector is disconnected from the air bag unit, the connector terminals (h) and (j) are shorted automatically by the short circuit bridge.



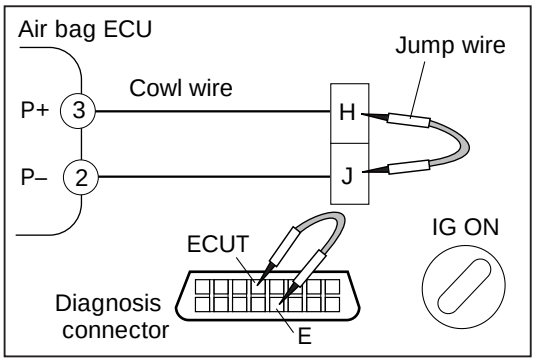
JBE00258-05096

(4) Connect the circuit tester to the connector terminal at the wire cowl side with the tester set to the ohmmeter range. Ensure that there is no open wire in the wire harness.
Between terminal 3 (P+) and H (+):
Continuity exists.
Between terminal 2 (P–) and J (–):
Continuity exists.



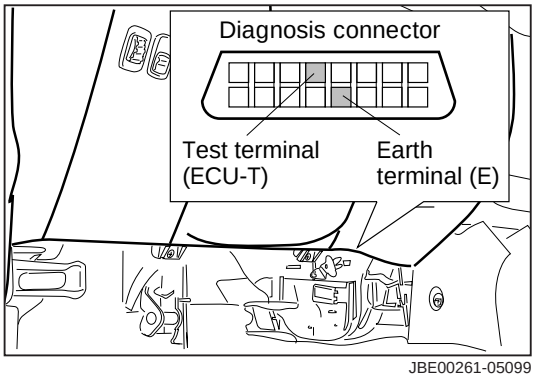
JBE00259-05097

(5) If there is no open wire, connect both ends of the connector terminal with a jump wire to short them.
(6) Connect the connector at the vehicle wire harness side and the air bag ECU connector that were disconnected at Step (2).
(7) Turn on the ignition switch and take a reading of the diagnosis code.



JBE00260-05098

CAUTION:
- If the code 32 (short circuit of squib circuit) is indicated, it proves indirectly that there is open wire in the squib of the air bag unit in the front passenger seat side. Therefore, replace the air bag unit.
- After the replacement, cancel the diagnosis code and confirm that the code 31 is not outputted any more.



JBE00261-05099

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2. Confirmation of open wire of squib
   CAUTION:
   - To check an electric circuit for open wire, it is an accepted practice to perform measurement with an ohmmeter. However, it is dangerous to use this method to check the squib for open wire, because this method may cause an accidental explosion. In the preceding step, it has been confirmed that there is no open wire in the circuits other than the squib. Before you proceed to the disposal procedure for the air bag unit described later, it is necessary to prove directly that there is open wire in the squib. As for this procedure, refer to page BE–83.

JBE00262-05100

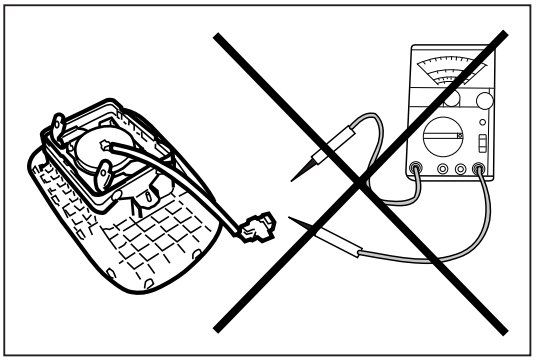
When diagnosis code 32 is indicated:

Possible cause for malfunction: Circuit of squib of air bag at front passenger seat side is shorted.

NOTE:
- The squib of the air bag consists of a filament of about 2 ohms. In order to detect open wire or short circuit in the squib circuit, a small amount of current is flown at all times from the air bag ECU. Therefore, when this code is indicated, it means that an abnormally large amount of current flowed in the squib circuit of the air bag in the driver's seat for a certain reason. Therefore, the ECU judges that the resistor of the squib (filament or wire harness) is shorted.

JBE00263-05101

WARNING:
- Never measure directly the resistance of the squib to see if the squib is shorted or not, using a circuit tester. Failure to observe this warning may cause the air bag to deploy accidentally, thus causing injuries to the operators and other people in the surrounding.



JBE00264-05102

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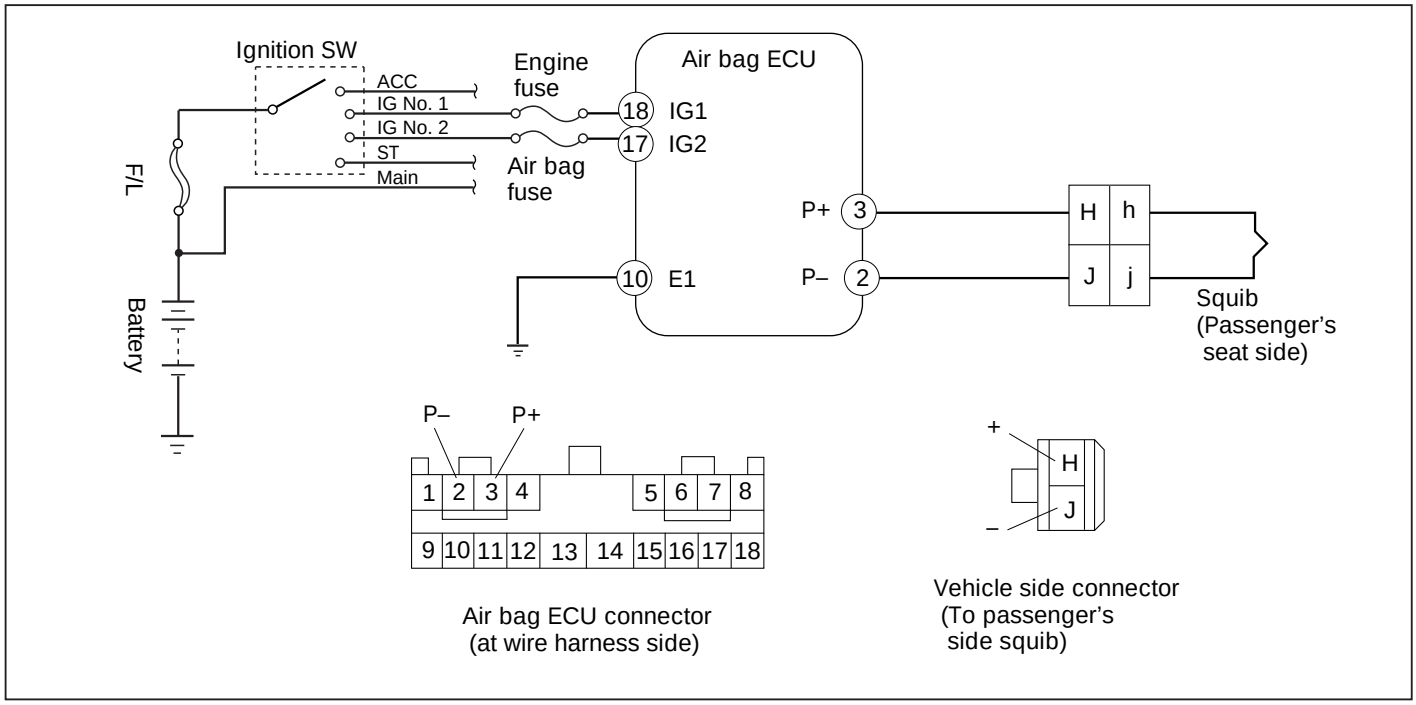
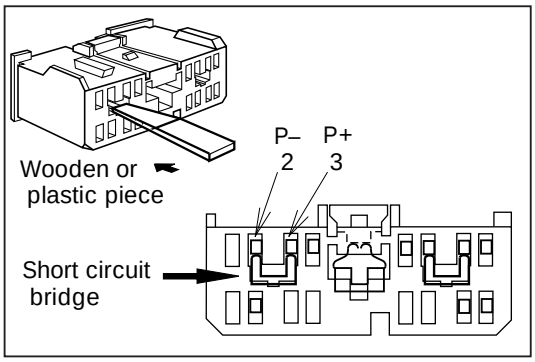
1. Check of wiring harness



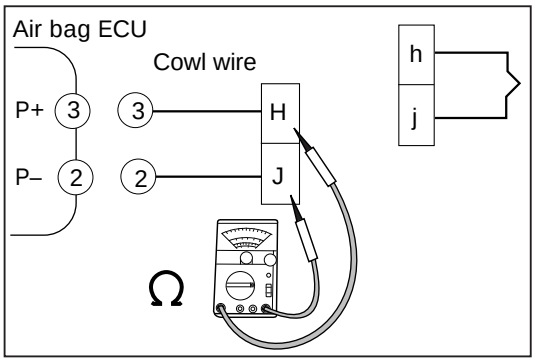
JBE00265-05103

(1) Turn off the ignition switch and wait for about 60 seconds.
(2) Remove the console panel. Disconnect the coupling of the connector of the air bag ECU and the connector at the vehicle wire harness side.
(3) Using a wooden or plastic piece, raise the short circuit bridge at the sections 2 and 3 of the connector at the vehicle wire harness side which were removed from the ECU. In this way, disconnect the shorted contact points.



JBE00266-05104

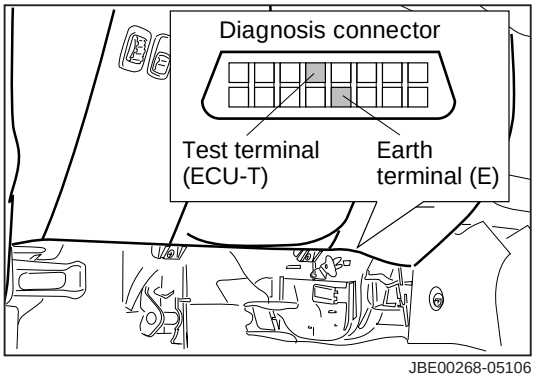
(4) Disconnect the connector which connects the wire harness of the air bag unit and the wire cowl.
(5) Connect the circuit tester to the connector terminal at the wire cowl side with the tester set to the ohmmeter range. Ensure that there is no short in the wire harness.
(6) If there is no short, disconnect the circuit tester. Connect the air bag ECU connector and the connector at the vehicle wire harness side as connected before.



JBE00267-05105

(7) Turn on the ignition switch and take a reading of the diagnosis code.

NOTE:
- If the code 31 (open wire of squib circuit) is not indicated, the air bag ECU is likely malfunctioning.
- After the replacement, cancel the diagnosis code and confirm that the code 31 is not outputted any more.



JBE00268-05106

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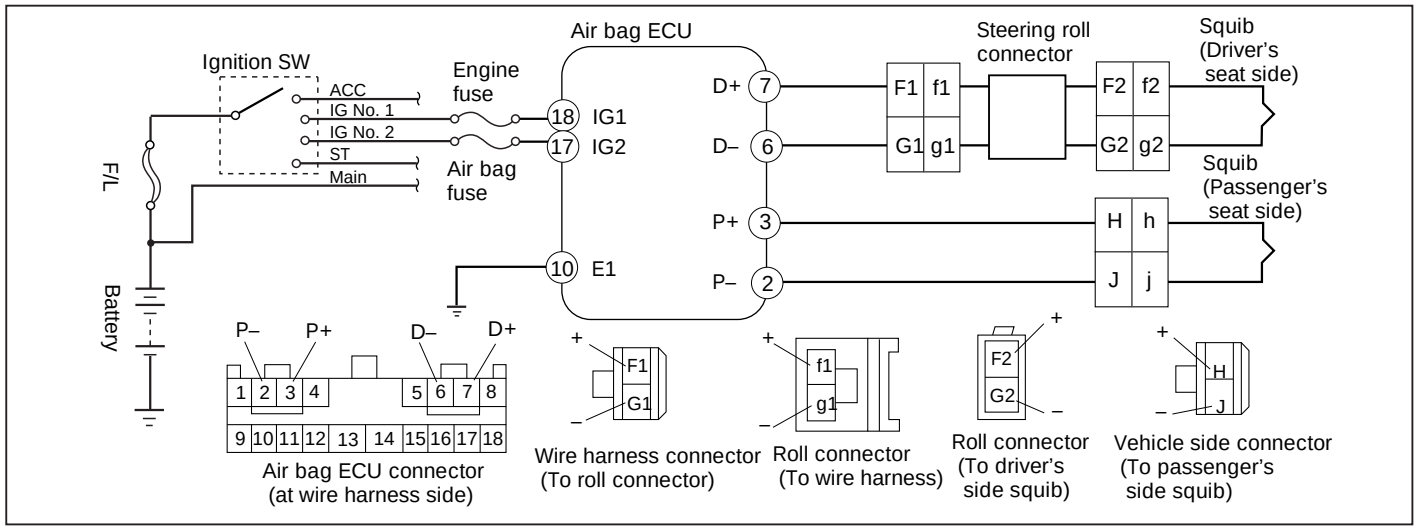
When diagnosis code 41 is indicated:

Possible cause for malfunction: Upstream circuit of squib of air bag at driver's seat side and/or passenger's seat side is grounded to earth.

NOTE:

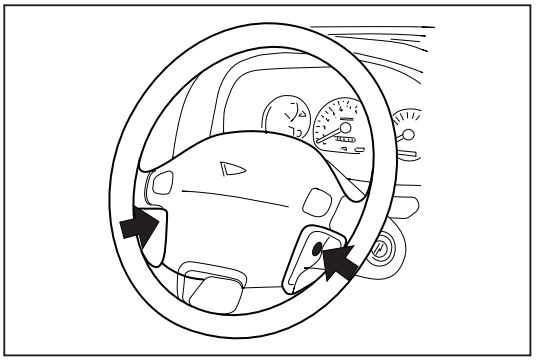
- When this code is indicated, it means that the squib circuit of the air bag is grounded for a certain reason.



JBE00269-05107

1. Check of wiring harness at the driver's seat side
   (1) Turn off the ignition switch and wait for about 60 seconds.
   (2) Remove the steering pad assembly (air bag unit) from the steering wheel.

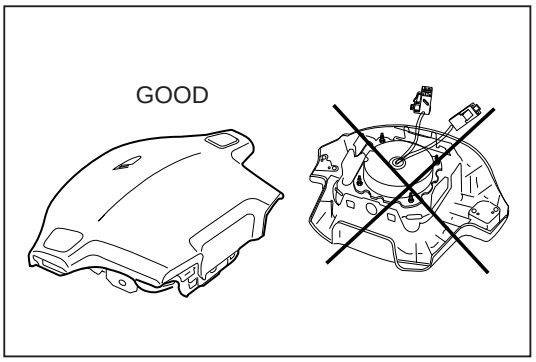
   CAUTION:
   - Any steering pad assembly which was dropped previously can not be used again. Therefore, extreme care must be exercised as to its handling.



JBE00270-05108

   (3) Disconnect the connector of the steering pad assembly from the roll connector. Also disconnect the connector for the horn.

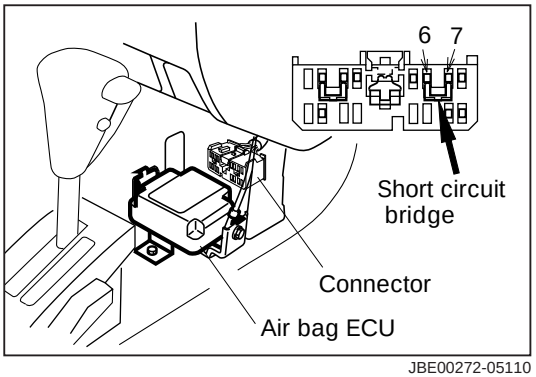
   WARNING:
   - When storing the steering pad assembly (air bag unit), be sure to place it with the pad surface facing upward on a flat place which is not exposed to direct sun rays. Sparks of welding, etc. shall be kept away from the storing place. Also the storing place shall be away from the storing place for oil, grease, etc.



JBE00271-05109

   (4) Disconnect the connector at the vehicle wire harness side from the air bag ECU connector.

   NOTE:
   - When the connector is disconnected from the air bag ECU, the connector terminals 6 and 7 (the squib circuit for the air bag of the driver's seat) are shorted automatically by the short circuit bridge.



JBE00272-05110

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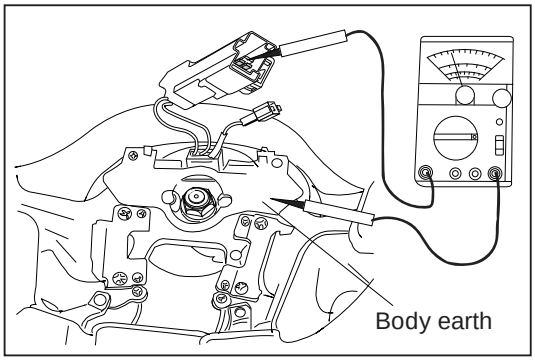
(5) Connect a circuit tester to the roll connector terminal and the body earth with the tester set to the ohmmeter range.

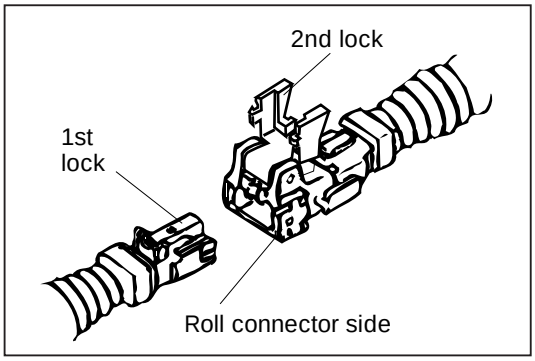
NOTE:

- The wire harness of both terminals of the roll connector is connected at the ECU side connector as was explained before. If there is continuity between the bodies at this item (5), disconnect the connection between both terminals by raising temporarily the short circuit bridge terminal of the ECU side connector with a wooden piece or the like. In this way, determine which terminal has been grounded.



JBE00273-05111

(6) If the wiring harness is shorted with the body earth, it is necessary to know whether the faulty point is attributable to the inside of the roll connector. To this end, disconnect the coupling connector of the roll connector and the wire cowl. Then, perform check with a circuit tester as was described in Item (5) above. If a short circuit is found, replace the faulty part with a new one.

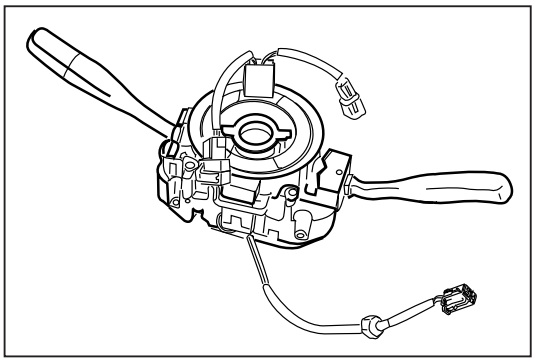


JBE00274-05112

(7) Replacement of roll connector

WARNING:

- When replacing the roll connector, refer to BE–57. Failure to observe this warning may hamper the turning function of the steering wheel or cut the wiring of the roll connector. Therefore, extreme care must be paid.



JBE00275-05113

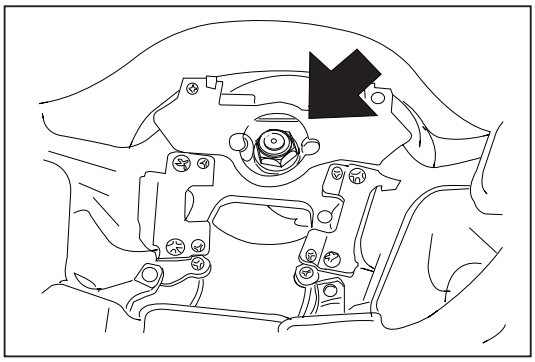
NOTE:

- As for the steering wheel installation procedure, refer to the SR section of the service manual.

(8) Replace the wiring harness if it exhibits any fault.

NOTE:

- The wiring harness for the air bag can be identified by its external color of yellow.

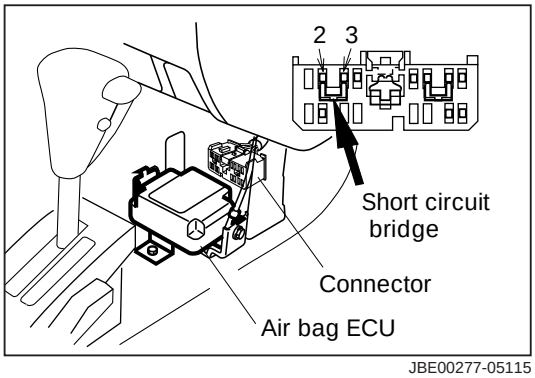


JBE00276-05114

2. Check of wiring harness at the passenger's seat side
   (1) Turn off the ignition switch and wait for about 60 seconds.
   (2) Disconnect the connector at the vehicle wire harness side from the air bag ECU.

NOTE:

- When the connector is disconnected from the air bag ECU, the connector terminals 2 and 3 (the squib circuit for the air bag in the passenger's seat) are shorted automatically by the short circuit bridge.



JBE00277-05115

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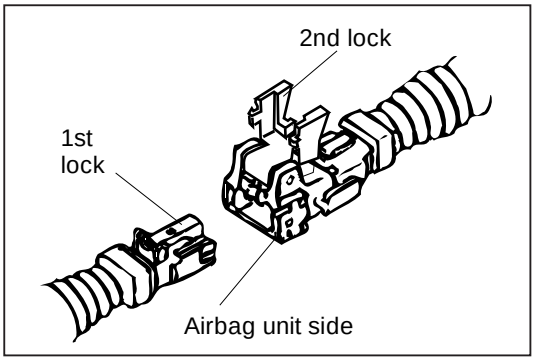
(3) Disconnect the connector which connects the wire harness of the air bag unit and the wire cowl.

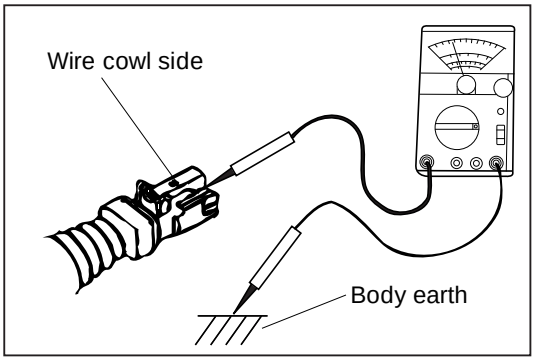


JBE00278-05116

(4) Connect a circuit tester between the connector terminal at the wire cowl side and the body earth with the tester set to the ohmmeter range.

NOTE:

- The wire harness of both terminals of the connector is connected at the ECU side connector as was explained before. If there is continuity between the bodies at this item (4), disconnect the connection between both terminals by raising temporarily the short circuit bridge terminal of the ECU side connector with a wooden piece or the like. In this way, determine which terminal has been grounded.

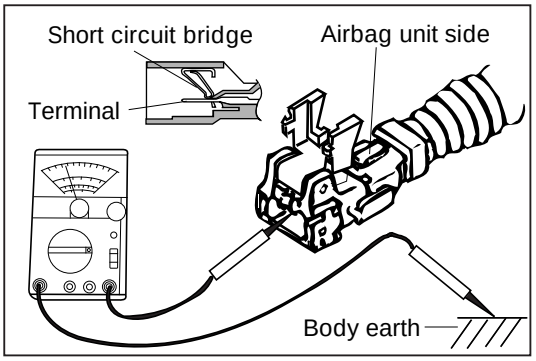


JBE00279-05117

(5) If there is no abnormality in the wire harness in the previous item (4), check to see if the connector terminal at the air bag side is connected with the body earth.

WARNING:

- Both terminals of the connector at the air bag side are connected with the short circuit bridge. Therefore, the tester probe terminal should be connected in such a way that this bridge may not be disconnected. If this short circuit bridge is disconnected and the tester voltage is applied to the terminals, the air bag may be deployed accidentally.



JBE00280-05118

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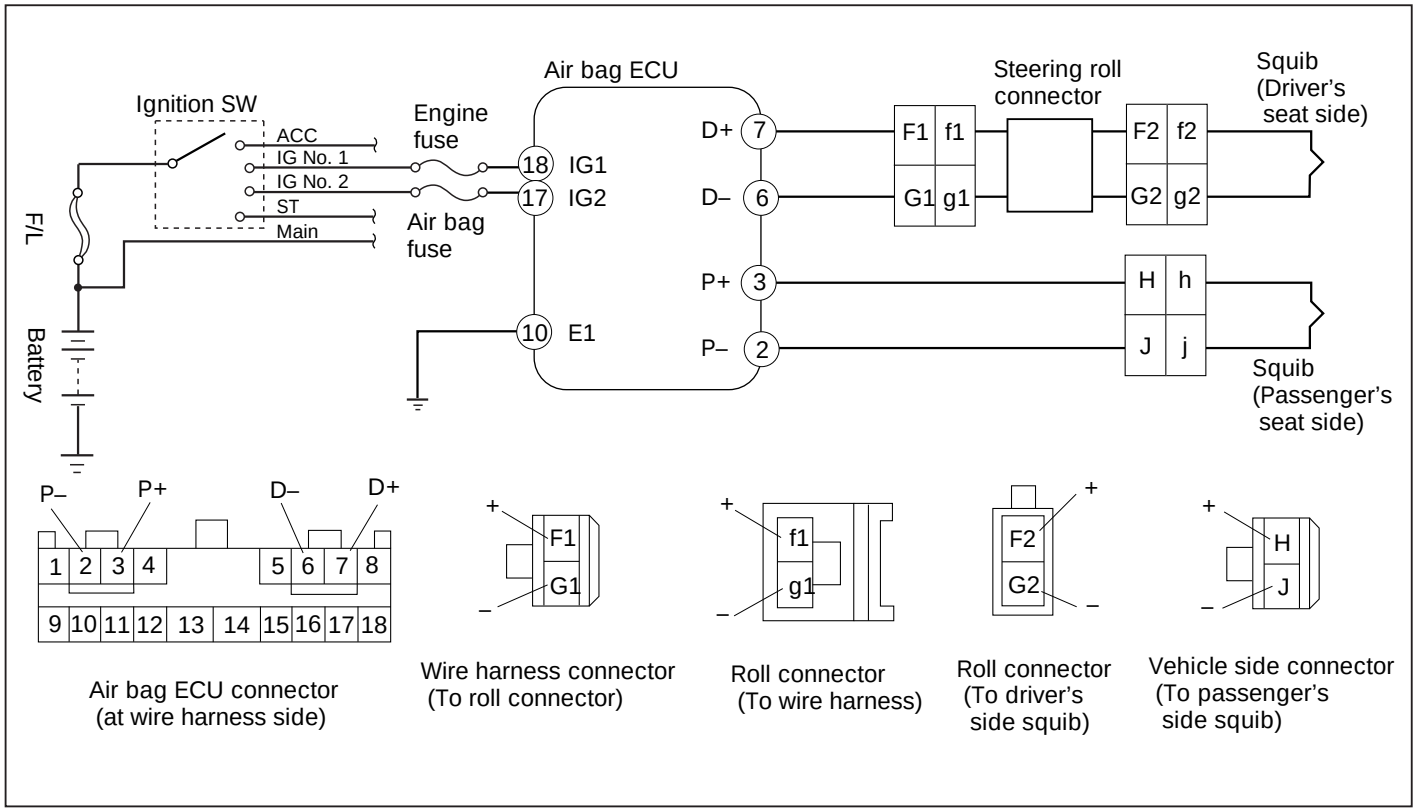
When diagnosis code 42 is indicated:

Possible cause for malfunction: Power supply voltage is applied to upstream circuit of squib of air bag at driver's seat side and/or passenger's seat side.

WARNING:

- When this code is indicated, it indicates that the upstream ignition driver is turned on for a certain reason. Under this condition, the air bag is deployed as soon as the safing sensor at the downstream circuit is turned on. Hence, when this code is indicated, immediately turn off the ignition key switch and proceed to the following steps.

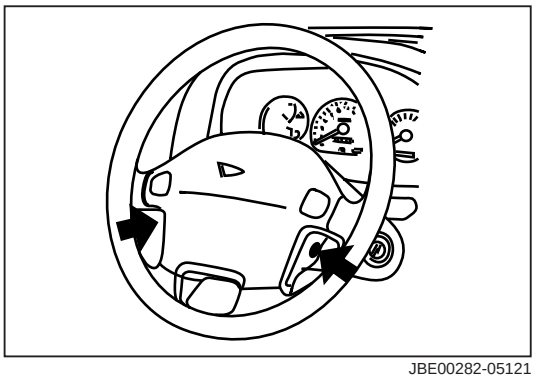
JBE00281-05119



JBE00000-05120

1. Checking procedure of air bag at the driver's seat side
   (1) Turn off the ignition switch and wait for about 60 seconds.
   (2) Remove the steering pad assembly (air bag unit) from the steering wheel.

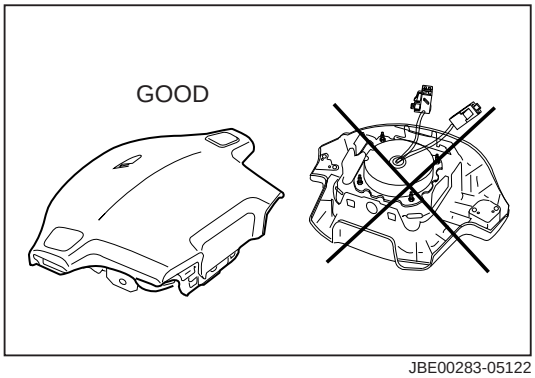
   CAUTION:
   - The steering pad assembly is installed to the steering wheel by means of TORX® bolts.
   - A steering pad assembly which was dropped previously can not be used again. Therefore, extreme care must be exercised as to its handling.



JBE00282-05121

   (3) Disconnect the connector of the steering pad assembly from the roll connector. Also disconnect the connector for the horn.

   WARNING:
   - When storing the steering pad assembly, be sure to place it with the pad surface facing upward on a flat place which is not exposed to direct sun rays. Sparks of welding, etc. shall be kept away from the storing place. Also the storing place shall be away from the storing place for oil, grease, etc.



JBE00283-05122

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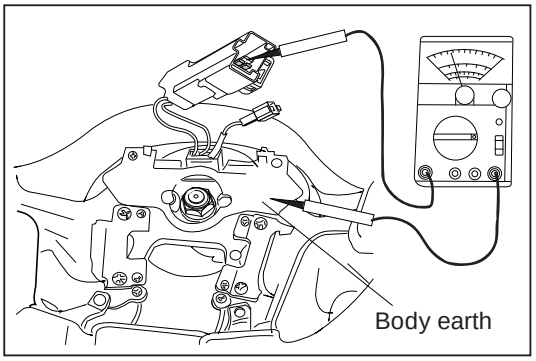
(4) With a circuit tester set to the voltmeter mode, connect the roll connector terminal and the body earth.
(5) Turn on the ignition switch. Check if the voltmeter registers approximately the battery voltage.
NOTE:
• Measure the voltage of each connector terminal.

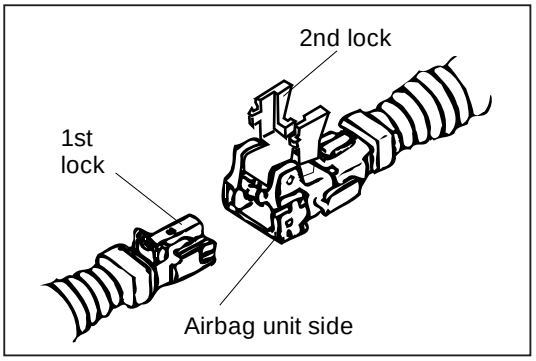
(6) Replacement of air bag ECU
NOTE:
• As for this procedure, refer to item 3, “Replacement of air bag ECU.”



JBE00284-05123

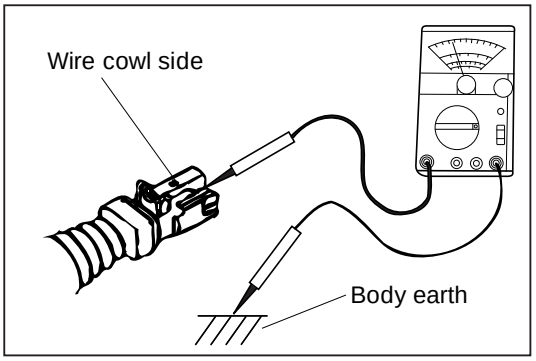
2. Checking procedure of air bag at the passenger’s seat side
(1) Turn off the ignition switch and wait for about 60 seconds.
(2) Disconnect the connector which connects the wire harness of the air bag unit and the wire cowl.

(3) Connect a circuit tester between the connector terminal at the wire cowl side and the body earth with the circuit tester set to the voltmeter mode.
(4) Turn on the ignition switch. Check if the voltmeter registers the battery voltage.
NOTE:
• Measure the voltage of each connector terminal.



JBE00285-05124

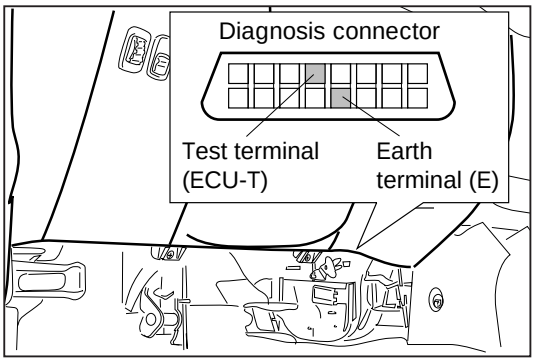
(5) Replacement of air bag ECU
NOTE:
• As for this procedure, refer to item 3, “Replacement of air bag ECU.”



JBE00286-05125

3. Replacement of air bag ECU
NOTE:
• The code 42 is indicated when the vehicle was subjected to a light impact which was not big enough to cause the air bag to deploy and, therefore, the upstream ignition circuit functioned temporarily. In such case, the ECU resumes the normal operation later. Hence, the ECU can be used again by canceling the code according to the diagnosis code canceling method. When the output of this code is attributable to causes other than the malfunctioning ECU, no voltage has been applied to the circuit during the check of the preceding item 1.(4), (5) or item 2.(3), (4).

(1) If the battery voltage is applied to the terminal during the check of the preceding item 1.(4), (5) or item 2.(3), (4), the ECU is regarded as malfunctioning. (The ECU can not resume its normal operation regardless of causes.) It is necessary to replace the air bag ECU.
(2) As for the replacing procedure of air bag ECU, refer to page BE–61.



JBE00287-05126

JBE00288-05127

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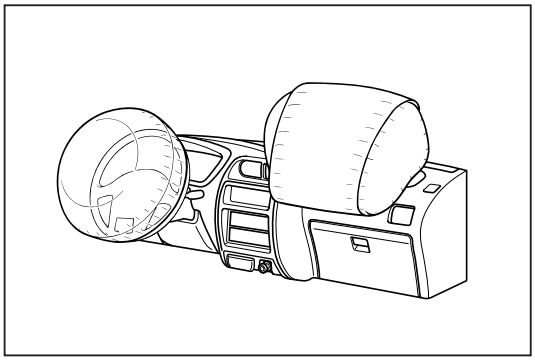
When diagnosis code 61 is indicated:

NOTE:

- This code is outputted when the air bag system were operated. This diagnosis code can not be canceled and the air bag ECU can not be used again. It is necessary to replace them.

WARNING:

- Refer to the disposal procedure for the air bag at “DISPOSAL PROCEDURE FOR AIR BAG.”



JBE00289-05128

When diagnosis code 62 is indicated:

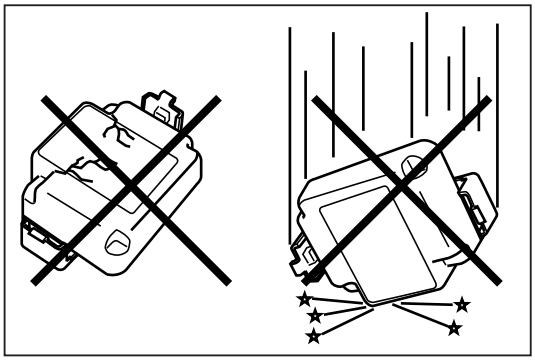
Possible cause for malfunction: Malfunction of ECU

NOTE:

- This code indicates that the ECU is malfunctioning. This diagnosis code can not be canceled. Therefore, the air bag ECU can not be used again. It is necessary to replace the air bag ECU.

CAUTION:

- The G sensor is built in the air bag ECU. If the ECU is dropped once, the reliability of CPU and G sensor can not be assured. Therefore, the air bag ECU can not be used again. Extreme care must be exercised as to its handling.



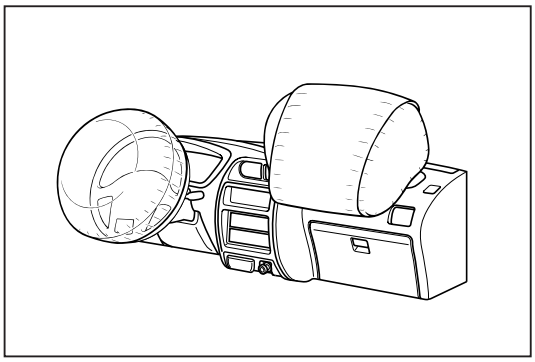
JBE00290-05129

DISPOSAL PROCEDURE FOR AIR BAG

Disposal of vehicles with air bag system

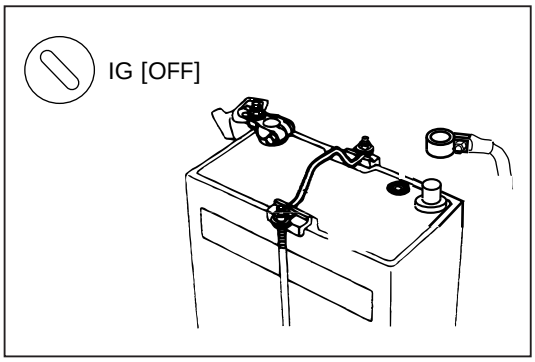
WARNING:

- When disposing the vehicles with the air bag system, deploy the air bag while it is mounted on the vehicle.



JBE00291-05130

1. Disposal procedure for air bag in driver’s seat
   (1) Turn off the ignition switch. Wait for 60 seconds.
   (2) Prepare a 12-V battery for automotive use.



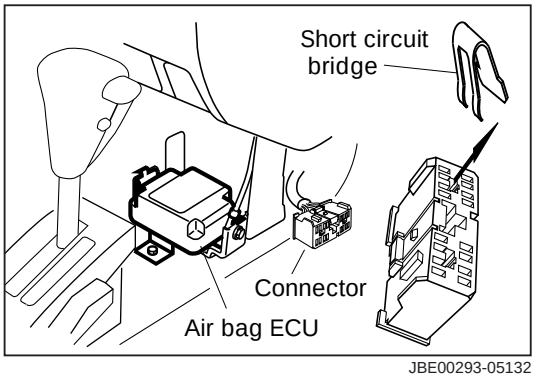
JBE00292-05131

   (3) Remove the console panel. Disconnect the connector at the vehicle wire harness side from the air bag ECU.
   (4) Using a pincette or a screwdriver having a slim end, remove the short circuit bride at the terminals 6 and 7 of the disconnected connector.
   (5) Prepare two wires for automotive use, each of which measures more than six meters long.

WARNING:

- Connect the end of one wire with the end of the other wire so that they may be shorted.

   (6) Connect the wires prepared in Step (5) above to the connector terminals 6 and 7.



JBE00293-05132

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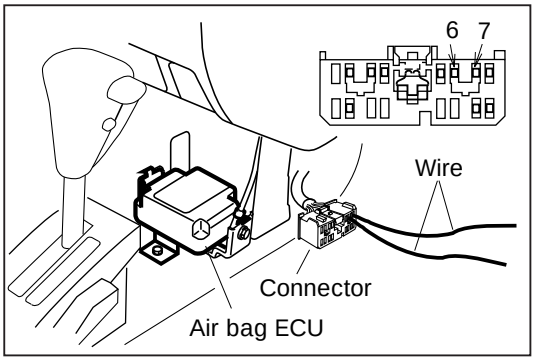
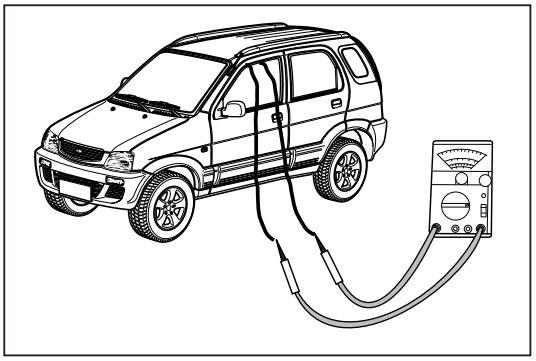
WARNING:
- This connecting operation to the connector should be performed by one person, not by a joint work of plural operators, so as to avoid mistakes.
- During this operation, there is the possibility that the air bag may be deployed accidentally. Therefore, be sure to give a warning to other persons so that they may get out of the vehicle or may be kept away from the area five meters from the vehicle.



JBE00294-05133

(7) The shorted section of the wires should be kept five meters or more away from the vehicle, as shown in the figure.

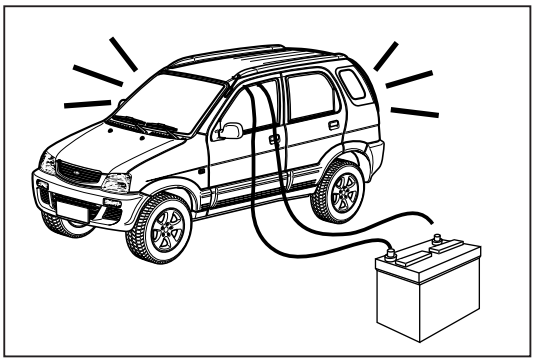
CAUTION:
- Be sure to give a warning to other persons about a big noise that will be emitted at the time of the air bag deployment.
- The window glass should be closed in advance.


JBE00295-05134

NOTE:
- Concerning the description of open wire of the squib–page BE–71 and BE–76, be sure to temporarily measure a resistance wires as right figure.

(8) Disconnect the wires that have been shorted. Connect one wire to the positive terminal of the battery; the other wire to the negative terminal of the battery, thereby deploying the air bag.

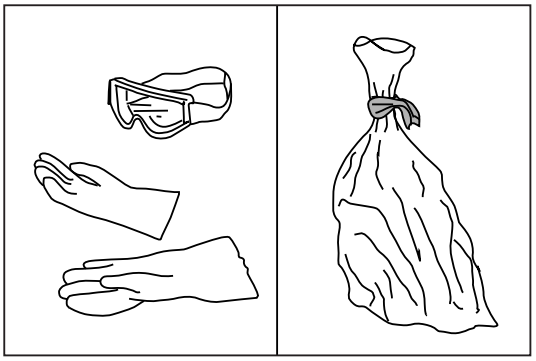
NOTE:
- There is no need for identifying the polarity of the battery.


JBE00296-05135

WARNING:
- Immediately after the deployment of the air bag, the vehicle interior is filled with gas. Therefore, start the operation after gas is diffused.
- Since the metal section of the gas generator is extremely hot, leave it at least for thirty minutes to allow it to cool naturally.

(9) After the deployed air bag cools down completely, it shall be sealed in a bag to be disposed.

WARNING:
- Be sure to wear protective goggles and gloves during this operation. After completion of the operation, gargle and wash your hands. If you feel any abnormality in your respiratory organs, follow the instruction of a doctor.


JBE00297-05137

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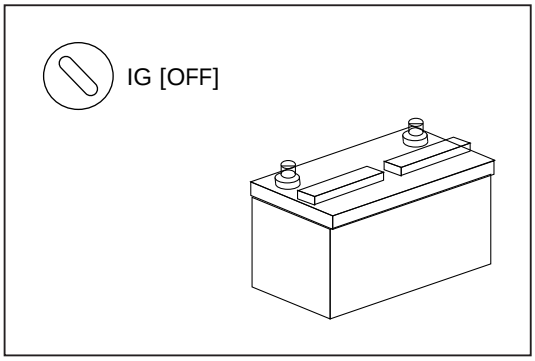
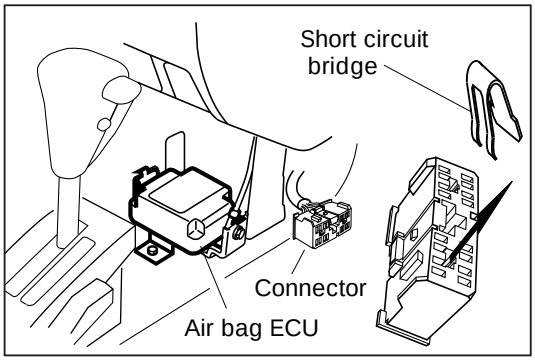
2. Disposal procedure of air bag at front passenger seat
   (1) Turn off the ignition switch. Wait for 60 seconds.
   (2) Prepare a 12-V battery for automotive use.



JBE00298-05138

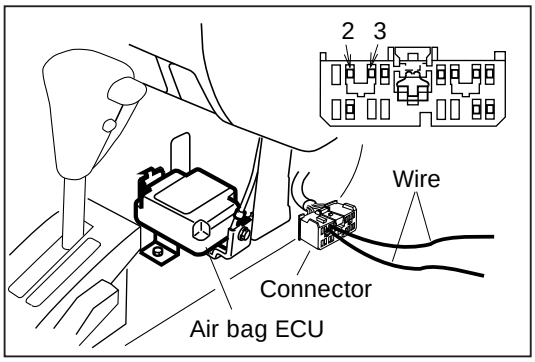
   (3) Remove the console panel. Disconnect the connector at the vehicle wire harness side from the air bag ECU connector.
   (4) Using a pincette or a screwdriver having a slim end, remove the short circuit bride at the terminals 2 and 3 of the disconnected connector.
   (5) Prepare two wires for automotive use, each of which measures more than six meters long. Connect the end of one wire with the end of the other wire so that they may be shorted.



JBE00299-05139

   (6) Connect the wires prepared in Step (5) above to the connector terminals 2 and 3.

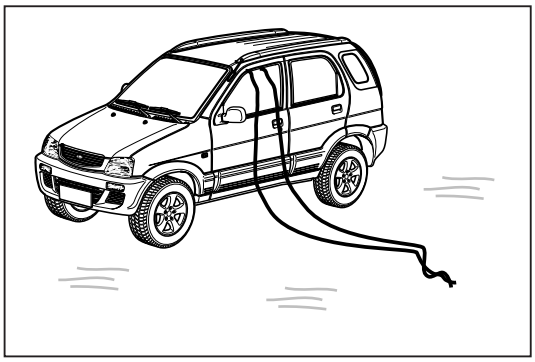
   WARNING:
   - This connecting operation to the connector should be performed by one person, not by a joint work of plural operators, so as to avoid mistakes.
   - During this operation, there is the possibility that the air bag may be deployed accidentally. Therefore, be sure to give a warning to other persons so that they may get out of the vehicle or may be kept away from the area five meters from the vehicle.



JBE00300-05140

   (7) The shorted section of the wires should be kept five meters or more away from the vehicle, as shown in the figure.

   CAUTION:
   - Be sure to give a warning to other persons about a big noise that will be emitted at the time of the air bag deployment.
   - The window glass should be closed in advance.


JBE00301-05141

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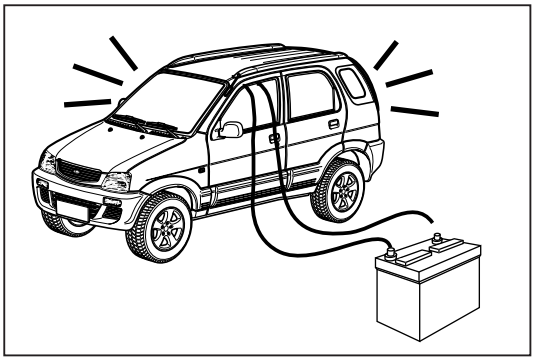
(8) Disconnect the wires that have been shorted. Connect one wire to the positive terminal of the battery; the other wire to the negative terminal of the battery, thereby deploying the air bag.

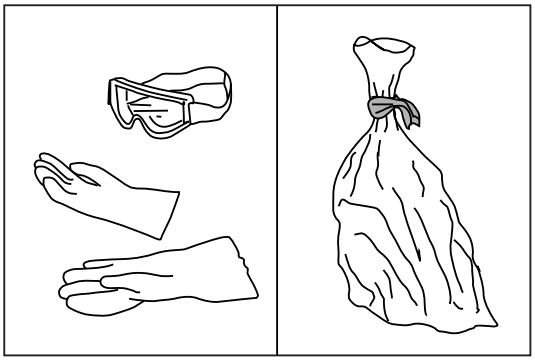
NOTE:
- There is no need for identifying the polarity of the battery.


JBE00302-05142

WARNING:
- Immediately after the deployment of the air bag, the vehicle interior is filled with gas. Therefore, start the operation after gas is diffused.
- Since the metal section of the gas generator is extremely hot, leave it at least for thirty minutes to allow it to cool naturally.

(9) After the deployed air bag cools down completely, it shall be sealed in a bag to be disposed.

WARNING:
- Be sure to wear protective goggles and gloves during this operation. After completion of the operation, gargle and wash your hands. If you feel any abnormality in your respiratory organs, follow the instruction of a doctor.


JBE00303-05144

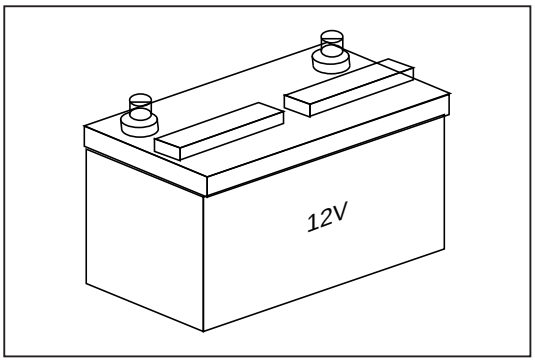
Disposal of air bag unit

CAUTION:
- It is the best to dispose the air bag when they are installed in the vehicle. However, if it is unavoidable to perform the pre-treatment for disposal for the unit itself, follow the procedure given below.

JBE00304-05145

NOTE:
- Items to be prepared

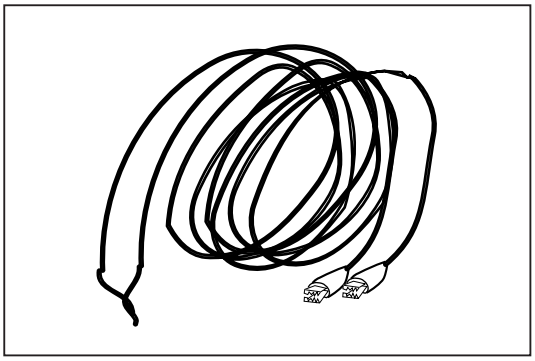
(1) 12-V battery for automotive use



JBE00305-05146

(2) Two wires for automotive use, each measuring at least 10 meters long
An alligator clip is connected to each end of these wires.

WARNING:
- Connect the end of one wire with the end of the other wire so that they may be shorted.
- No switch shall be installed to these wires so as to prevent accidents.


JBE00306-05147

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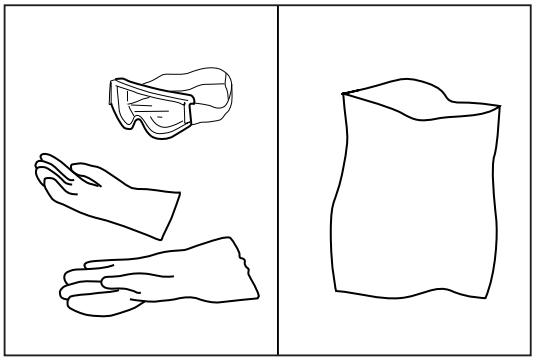
(3) Protective goggles and gloves
(4) A bag for disposal

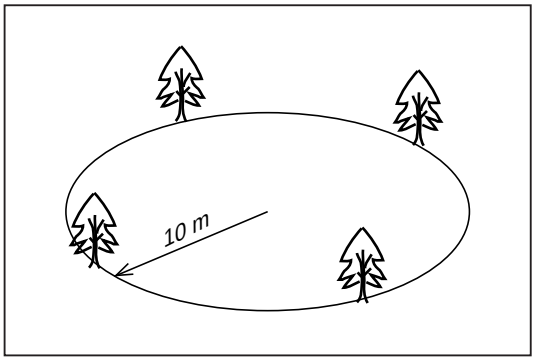


JBE00307-05148

(5) A spacious place whose radius is at least 10 meters

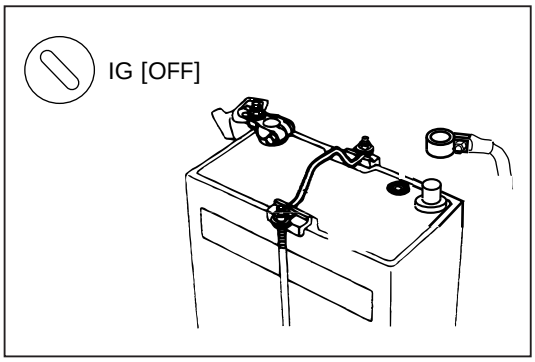
CAUTION:

- Do not perform the pre-treatment for disposal for the air bag on a windy or rainy day.



JBE00308-05149

1. Disposal procedure for air bag in driver's seat (steering wheel pad)
   (1) Turn off the ignition switch. Disconnect the negative terminal of the battery from the vehicle cable terminal.

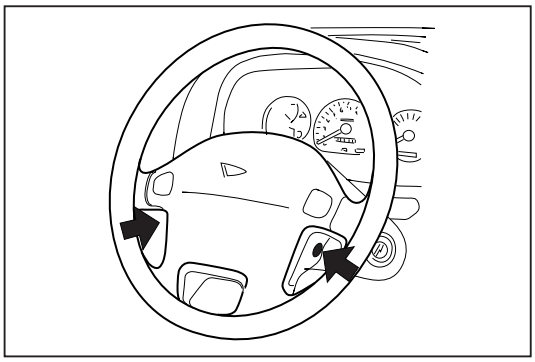


JBE00309-05150

   (2) Turn off the ignition switch and wait at least for 60 seconds. Remove the steering wheel pad assembly from the steering wheel.

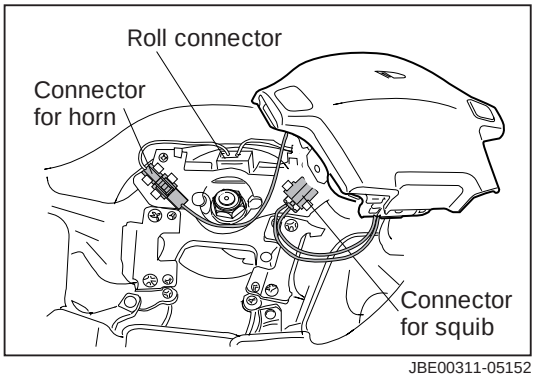
NOTE:

- The steering wheel pad assembly is installed to the steering wheel by means of TORX® bolts.



JBE00310-05151

   (3) Disconnect the connector of the steering wheel pad assembly from the roll connector. Disconnect the connector for horn.



JBE00311-05152

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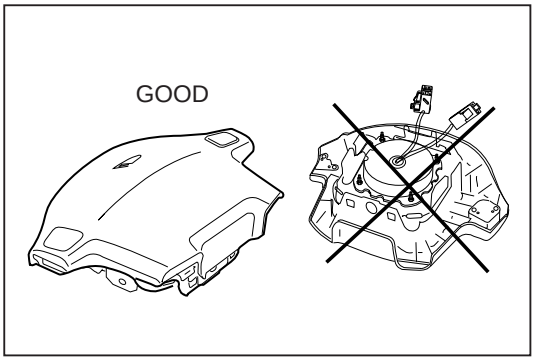
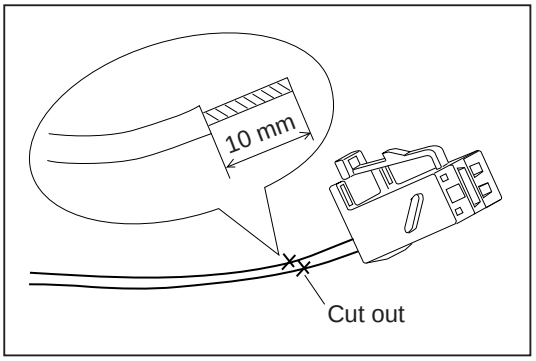
WARNING:
- When storing the steering pad assembly temporarily, be sure to place it with the pad surface facing upward on a flat place which is not exposed to direct sun rays. Also the storing place shall be away from water and rain.



JBE00312-05153

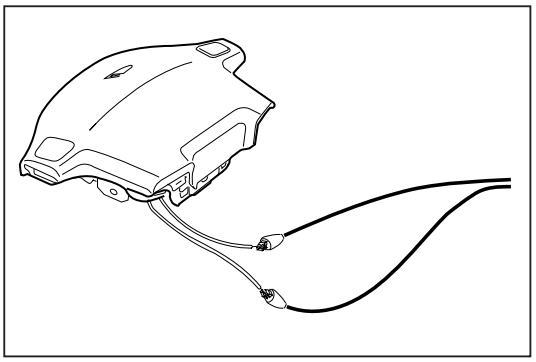
(4) Cut the wires at the squib connector of the steering pad assembly. Remove the covering of each end of the two cut wires about 10 mm.

WARNING:
- Connect the sections each other whose wire coverings have been removed so that they may be shorted.



JBE00313-05154

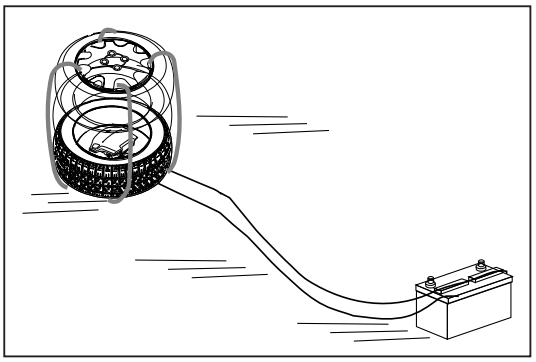
(5) Place the steering pad assembly at the center of the prepared place. At this time, the pad surface should face upward.
(6) Disconnect the shorted squib wires of the steering pad assembly. Connect the alligator clip attached to the end of the prepared 10m-long wire to each squib wire.



JBE00314-05155

(7) Place the prepared 12-V battery for automotive use at a corner of the place. Bring nearby the shorted ends of the wires which is extended from the steering pad assembly.

WARNING:
- Be sure to give a warning to other persons about a big noise that will be emitted at the time of the air bag deployment.



JBE00315-05156

(8) Disconnect the wire ends that have been shorted. Connect one wire to the positive terminal of the battery; the other wire to the negative terminal of the battery, thereby deploying the air bag.

NOTE:
- There is no need for identifying the polarity of the battery.

JBE00316-05157

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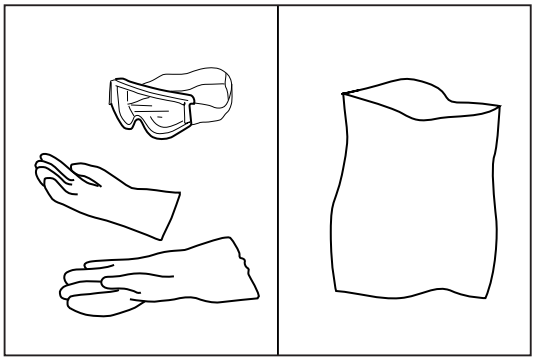
(9) Since the metal section of the gas generator is extremely hot, leave it at least for thirty minutes to allow it to cool naturally. After the deployed air bag cools down completely, it shall be sealed in a bag to be disposed.

WARNING:

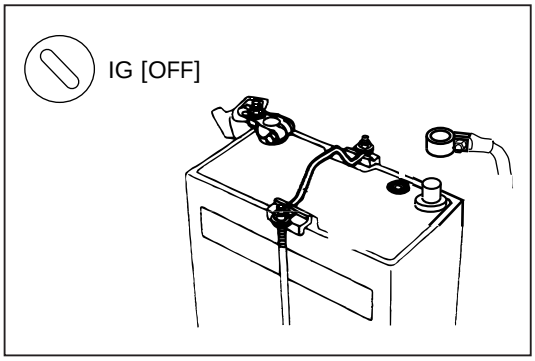
- Be sure to wear protective goggles and gloves during this operation. After completion of the operation, gargle and wash your hands. If you feel any abnormality in your respiratory organs, follow the instruction of a doctor.



JBE00317-05158

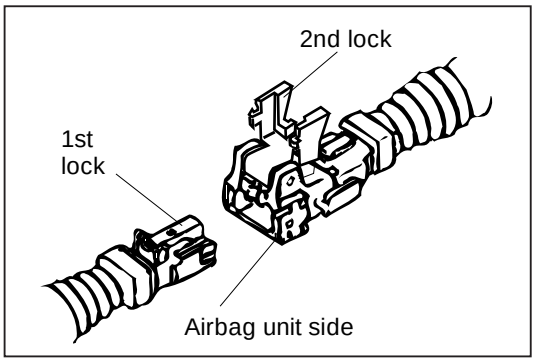
2. Disposal procedure of air bag in front passenger seat

(1) Turn off the ignition switch. Disconnect the vehicle battery cable terminal from the negative terminal of the battery.



JBE00318-05159

(2) Turn off the ignition switch and wait for 60 seconds. Disconnect the connector which connects the wire harness of the air bag unit and the wire cowl.

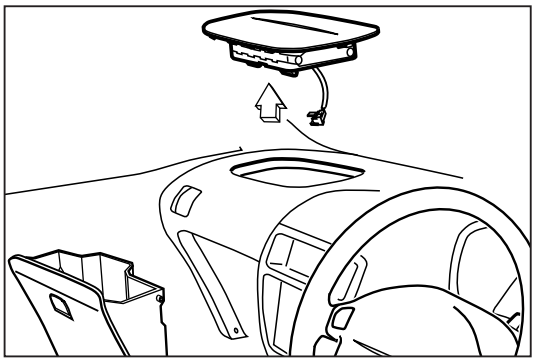


JBE00319-05160

(3) Remove the air bag unit assembly in the front passenger seat.

NOTE:

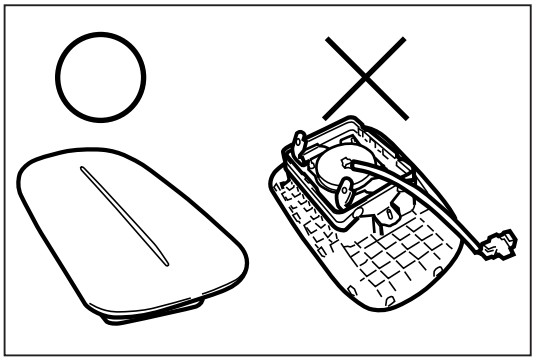
- Before removing the air bag unit assembly in the front passenger seat, remove the instrument panel. As for this procedure, refer to the section BO.



JBE00320-05161

WARNING:

- When storing the air bag unit assembly in the front passenger seat temporarily, be sure to place it with the pad surface facing upward on a flat place which is not exposed to direct sun rays. Also the storing place shall be away from water and rain.



JBE00321-05162

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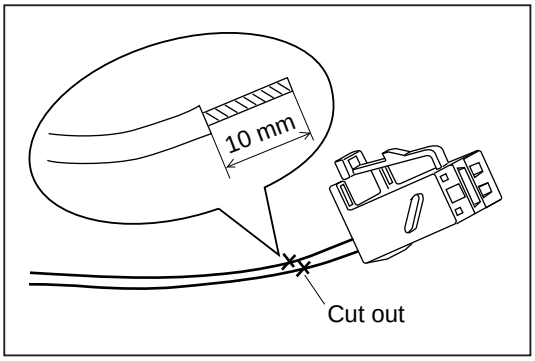
(4) Cut the wires at the squib connector of the air bag unit assembly. Remove the covering of the ends of the two cut wires about 10 mm.

WARNING:

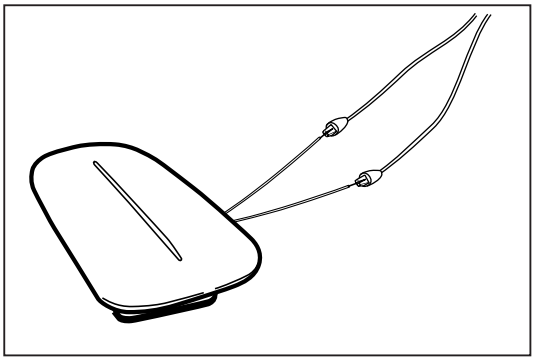
- Connect the sections each other whose wire coverings have been removed so that they may be shorted.



JBE00322-05163

(5) Place the air bag unit assembly at the center of the prepared place. At this time, the pad surface should face upward.

(6) Disconnect the shorted squib wires of the air bag unit assembly. Connect the alligator clip attached to the end of the prepared 10m-long wire to each squib wire.

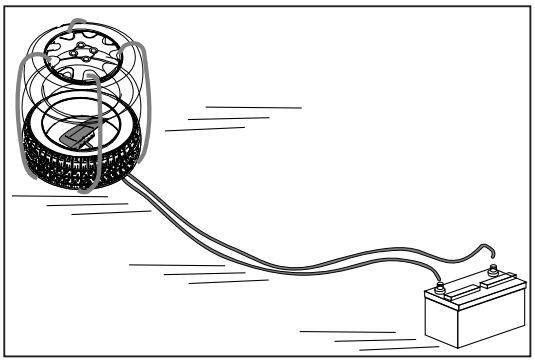


JBE00323-05164

(7) Place the prepared 12-V battery for automotive use at a corner of the place. Bring nearby the shorted ends of the wires which is extended from the air bag unit assembly.

WARNING:

- The pad assembly should be secured by piled up tires, as shown in the figure.
- Be sure to give a warning to other persons about a big noise that will be emitted at the time of the air bag deployment.



JBE00324-05165

(8) Disconnect the wire ends that have been shorted. Connect one wire to the positive terminal of the battery; the other wire to the negative terminal of the battery, thereby deploying the air bag.

NOTE:

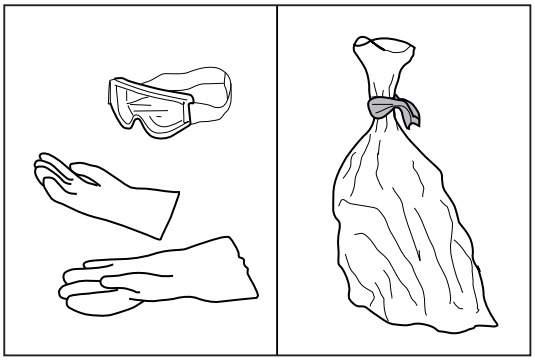
- There is no need for identifying the polarity of the battery.

JBE00325-05166

(9) Since the metal section of the gas generator is extremely hot, leave it at least for thirty minutes to allow it to cool naturally. After the deployed air bag cools down completely, it shall be sealed in a bag to be disposed.

WARNING:

- Be sure to wear protective goggles and gloves during this operation. After completion of the operation, gargle and wash your hands. If you feel any abnormality in your respiratory organs, follow the instruction of a doctor.



JBE00326-05167

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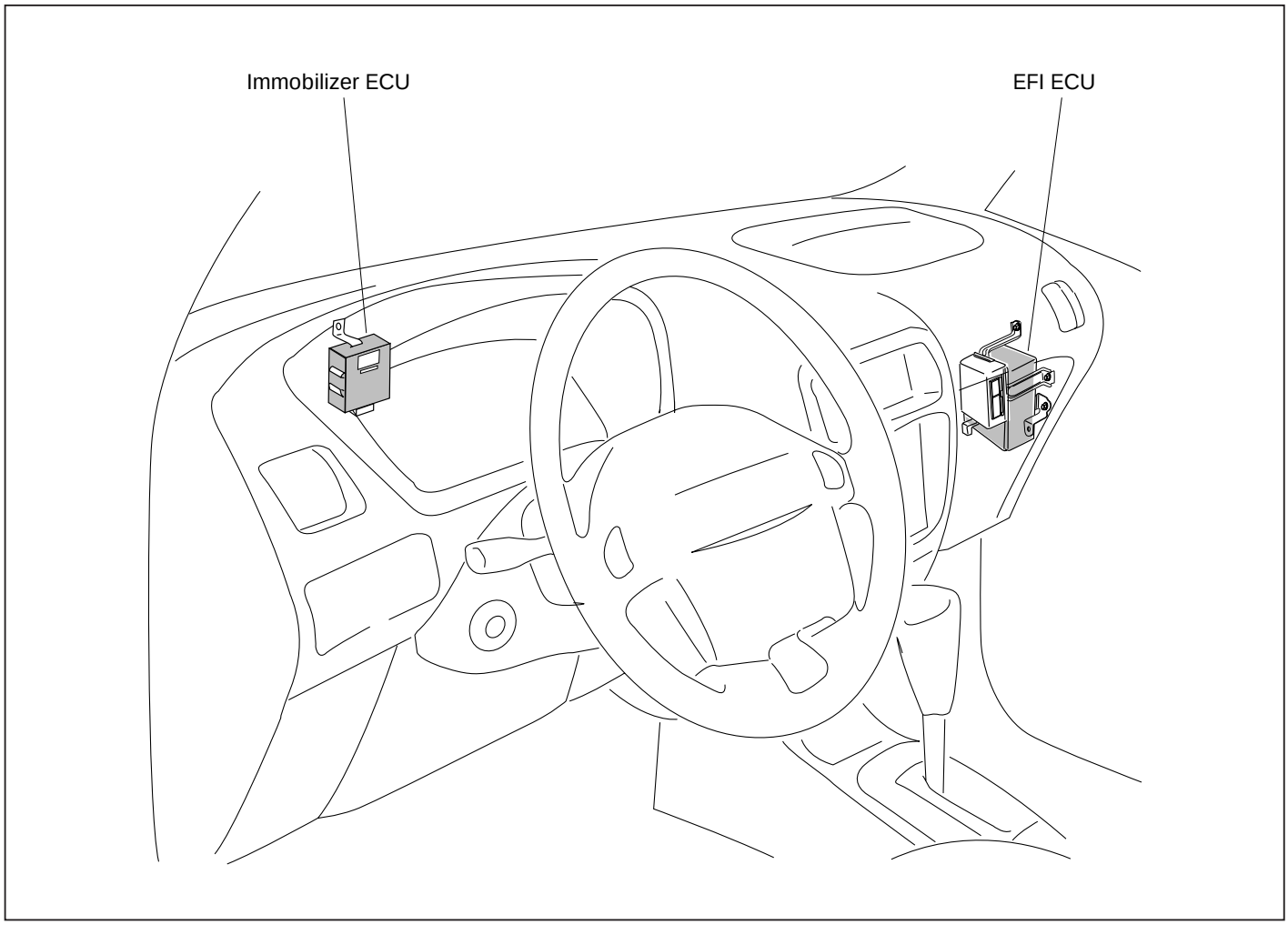
IMMOBILIZER SYSTEM

COMPONENTS LAYOUT



JBE00327-06001

OUTLINE

This system consists of a transponder-built-in key, an antenna coil, an immobilizer ECU and EFI ECU.
In the immobilizer system for EFI gasoline engine, if the key ID code can not be collated or the rolling code is not matched with each other, the EFI ECU stops the ignition and fuel injection, thereby stopping the engine operation. The key ID code is a transponder intrinsic code, whereas the rolling code takes a different value every time the engine is started. This code is renewed and memorized in the EFI ECU and immobilizer ECU as the rolling code for the next starting.

JBE00328-06002

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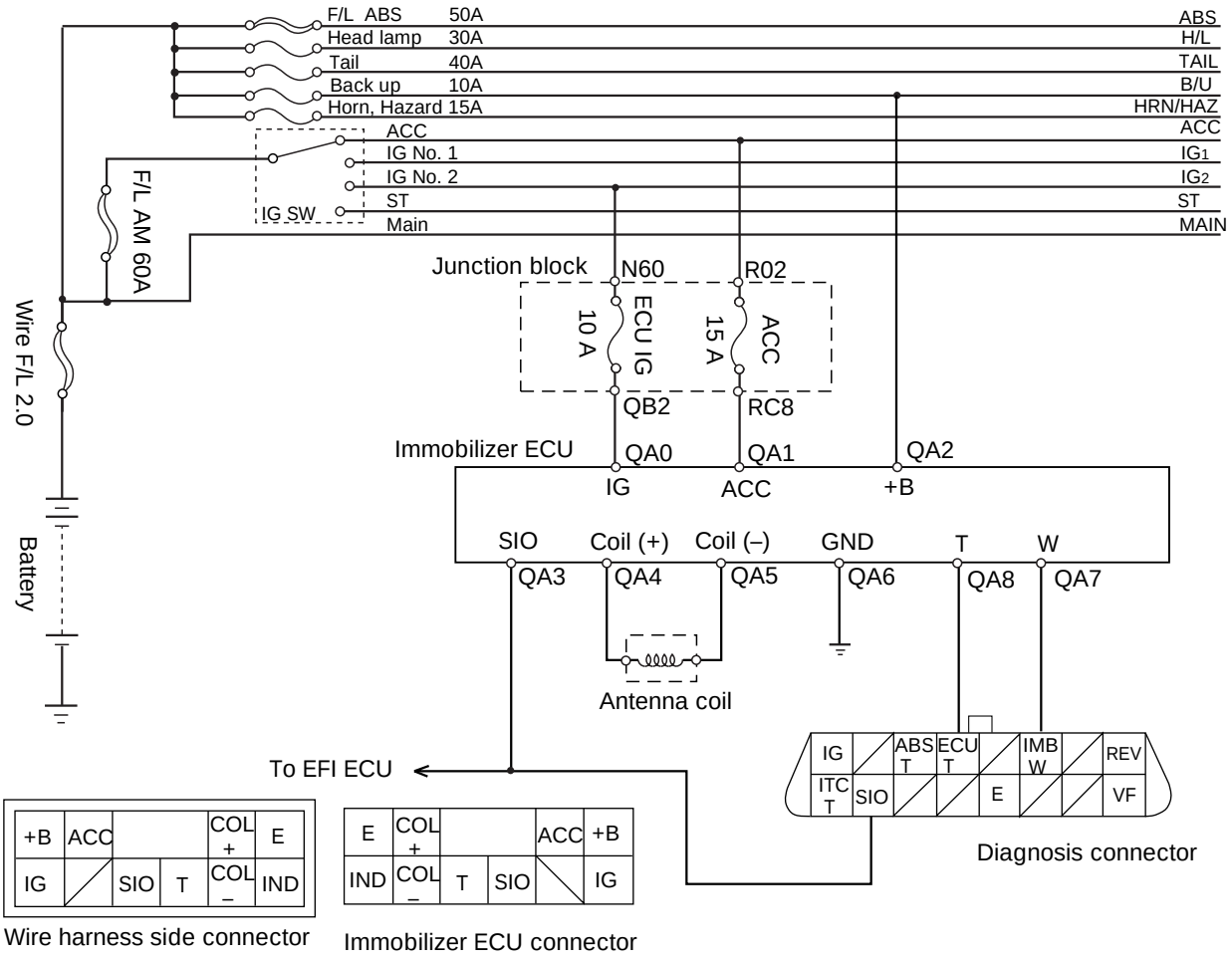
WIRING DIAGRAM



JBE00329-06003

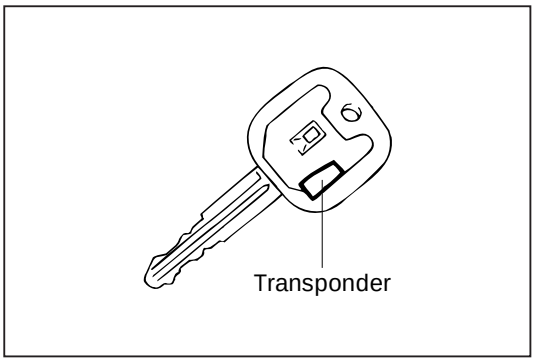
COMPONENTS

1. Ignition key

The vehicle with the immobilizer system is provided with three ignition keys; one black-covered **master key** and two gray-covered **sub keys**. The transponder is built in the cover of each of the three keys. Each key has a different recorded ID code.

In this system, the operation/releasing of the system can be performed by comparing and collating the ID code with the data memorized in the immobilizer ECU.

Although two sub keys are provided for the vehicle, up to three keys can be registered, as required, by means of the sub key registration function of the master key.



JBE00330-06004

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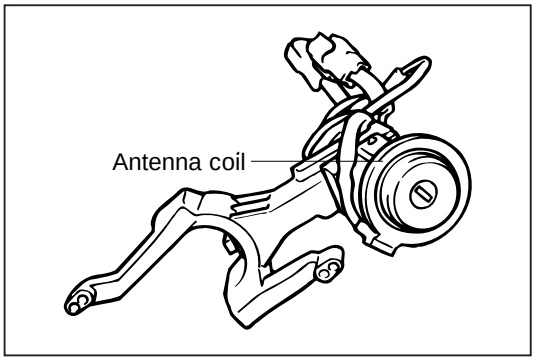
CAUTION:
- The master key has the following functions. Utmost care must be paid as to its handling.
  a. Using the master key (black cover), it is possible to perform the new registration and renewal of the sub keys.
  b. The black covered key is memorized as the master key at the time of factory shipment. However, if the immobilizer ECU memory has been cleared at time of repairs, etc., the key used first to start the engine will be registered as the master key in the immobilizer ECU.
     This point should be kept in mind.

JBE00331-06005

2. Antenna coil

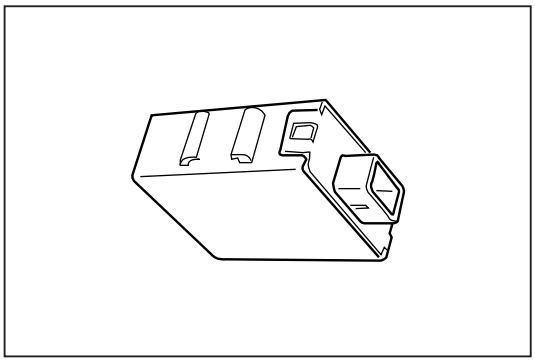
The antenna coil is provided at the circumference of the ignition key cylinder. The antenna coil energizes the transponder built in the ignition key. Also, the antenna coil receives the ID code that is sent from the transponder and will send it to the immobilizer ECU.
If any metal shielding, such as a key holder ring, exists between the ignition key and the antenna coil, or if there is open wire in the antenna coil or its circuit, it becomes impossible to read the ID code of the ignition key, thus being unable to start the engine.



JBE00332-06006

3. Immobilizer ECU

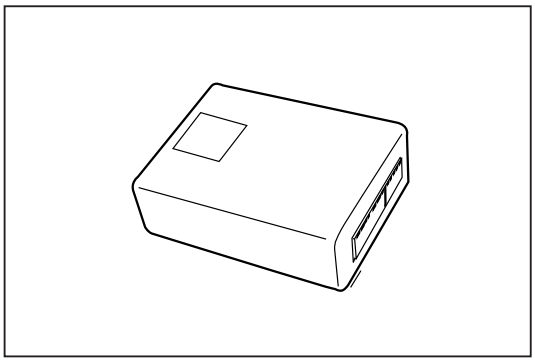
The immobilizer ECU collates the ID code sent from the key transponder with the ID code recorded in the immobilizer ECU. Only when the ID codes are matched with each other, the immobilizer ECU sends the signal of continuation of engine operation to the EFI ECU.
In order to memorize the ID code, the immobilizer ECU employs a non-volatile ROM that retains the memorized data even when the battery or backup fuse is disconnected.
Therefore, when you erase the ECU memory and register the master key ID code newly, you have to erase the memory, using the diagnosis system (DS-21).



JBE00333-06007

4. EFI ECU

In addition to the hitherto-employed functions as the conventional engine control unit, the EFI ECU has the functions as the immobilizer function whereby the ignition and fuel injection are stopped if the ID codes can not be collated in the immobilizer ECU or in instances where the rolling codes can not be collated between the immobilizer ECU and the EFI ECU.



JBE00334-06008

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TROUBLE-SHOOTING

TROUBLE-SHOOTING HINTS

Before checking the immobilizer system, check the diagnosis code of the EFI system to determine whether the malfunction is caused by the immobilizer system or by the EFI system.

CAUTION:
- In the immobilizer system, the system is composed with the same rolling code shared in common among the ignition key, immobilizer ECU and EFI ECU. Hence, if the immobilizer ECU and/or EFI ECU are replaced with that of another vehicle during the checking of the immobilizer ECU or EFI system, the immobilizer system will be regarded as malfunctioning. Therefore, do not replace the immobilizer ECU and/or EFI ECU with that of another vehicle unnecessarily.
- If you have to replace the immobilizer ECU and/or EFI ECU, erase the rolling codes memorized in the immobilizer ECU and EFI ECU. Then, register the ID code of the ignition key to the immobilizer ECU.
- Refer to service manual, Ref. No.9031.

DESCRIPTION

A self-diagnosis system is built in the ECU. If any abnormality should occur in the immobilizer system, the self- diagnosis system memorizes the malfunction phenomenon in the ECU in the form of malfunction code number.
When the test terminal of the check connector is connected with the ground terminal, the malfunction code number that has been memorized in the ECU will be indicated in a form of blinking of the check lamp in the SST.
This memorized malfunction code number is erased when the battery ground cable is disconnected from the negative (–) terminal of the battery or when the backup fuse in the relay block assembly is disconnected with the ignition key switch turned off.

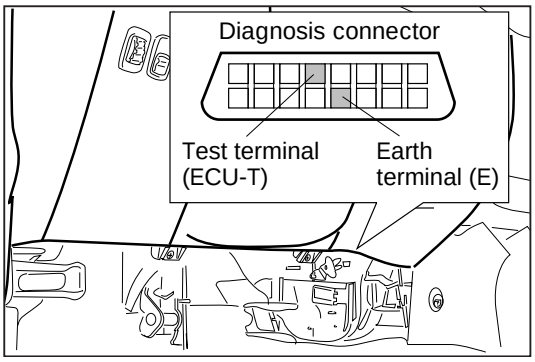
JBE00335-06009

READ OUT OF DIAGNOSIS CODE

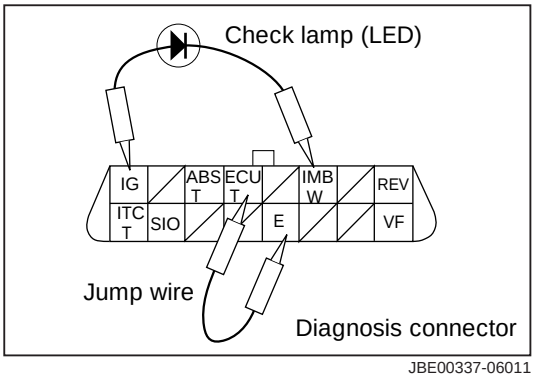
1. Connect the test terminal of the check connector with the ground terminal, using a jump wire.
2. Connect a check lamp between the terminals as illustration.
   NOTE:
   - Prepare the following SST.
     SST: 09991-87211-000

   CAUTION:
   - As for the check lamp, make sure to use a LED (light emitting diode) type. Bulb type check lamp is not suitable for this system.

3. Set the ignition switch to the ON position.
4. Read the diagnosis code by observing the number of blinking of the indicator lamp.



JBE00336-06010



JBE00337-06011

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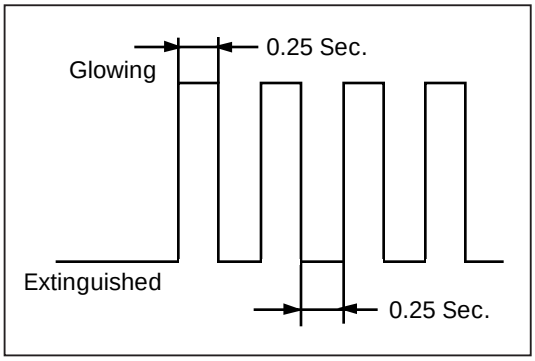
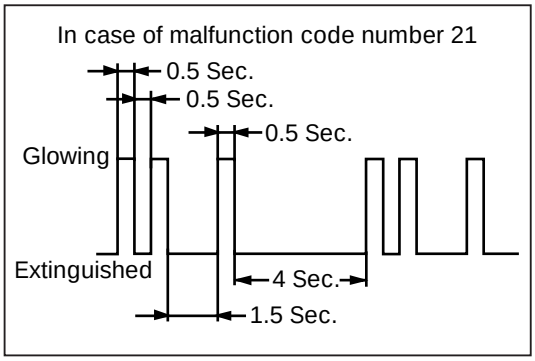
EXPLANATION OF DIAGNOSIS CODE

1. Indication of normal code
   The check lamp glows for 0.25 second, 0.25 second later after the ignition switch has been turned ON. After a lapse of 0.25 second, the check lamp again glows for 0.25 second. Then, this pattern will be repeated.

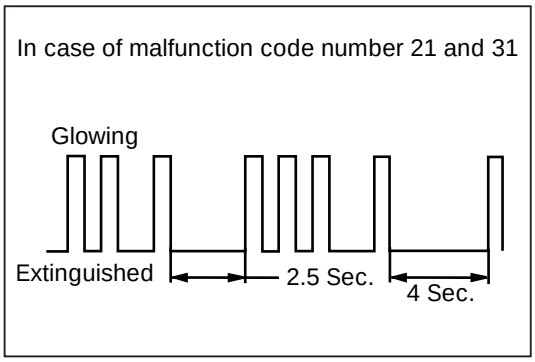


JBE00338-06012

2. Indication of malfunction code
   - When a single malfunction code is indicated:
     The diagnosis malfunction code is composed of two digits. Those two numbers are indicated by blinking of the check lamp. Four seconds later after the ignition switch has been turned on, the check lamp indicates first the number of the tens digit of the diagnosis code by blowing the same times as the number. The lamp glows for 0.5 second each time and then it is extinguished for 0.5 second. After a pause of 1.5 seconds, the check lamp indicates the number of the units digit of the diagnosis code by glowing the same times as the number.
     The lamp glows for 0.5 second each time and then it is extinguished for 0.5 second. Then, this pattern will be repeated after a pause of 4.0 seconds.



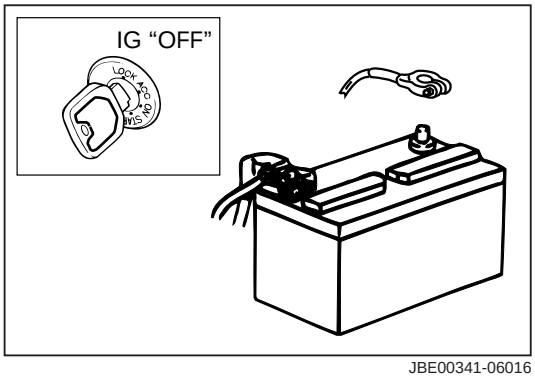
JBE00339-06013



JBE00340-06014

   - When plural malfunction codes are indicated:
     In cases where plural malfunction codes have been detected, the two-digit diagnosis codes are indicated in the sequence of the code number, starting from a smaller number. Each diagnosis code is indicated in above described pattern. A pause of 2.5 seconds occurs between the outputs of respective diagnosis codes, thus separating one from the others. After all of the plural diagnosis codes that have been detected are indicated, the check lamp is extinguished for four seconds. Then, the detected plural diagnosis codes will be indicated again.

3. Canceling of diagnosis code
   To erase the diagnosis codes memorized in the ECU after malfunctions have been repaired, disconnect the battery ground cable from the negative (–) terminal of the battery for at least 10 seconds with the ignition switch turned off.



JBE00341-06016

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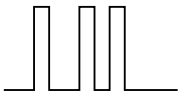
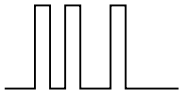
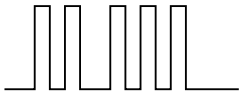
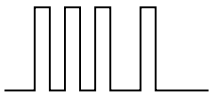
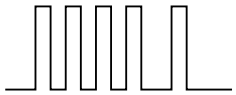
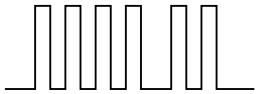
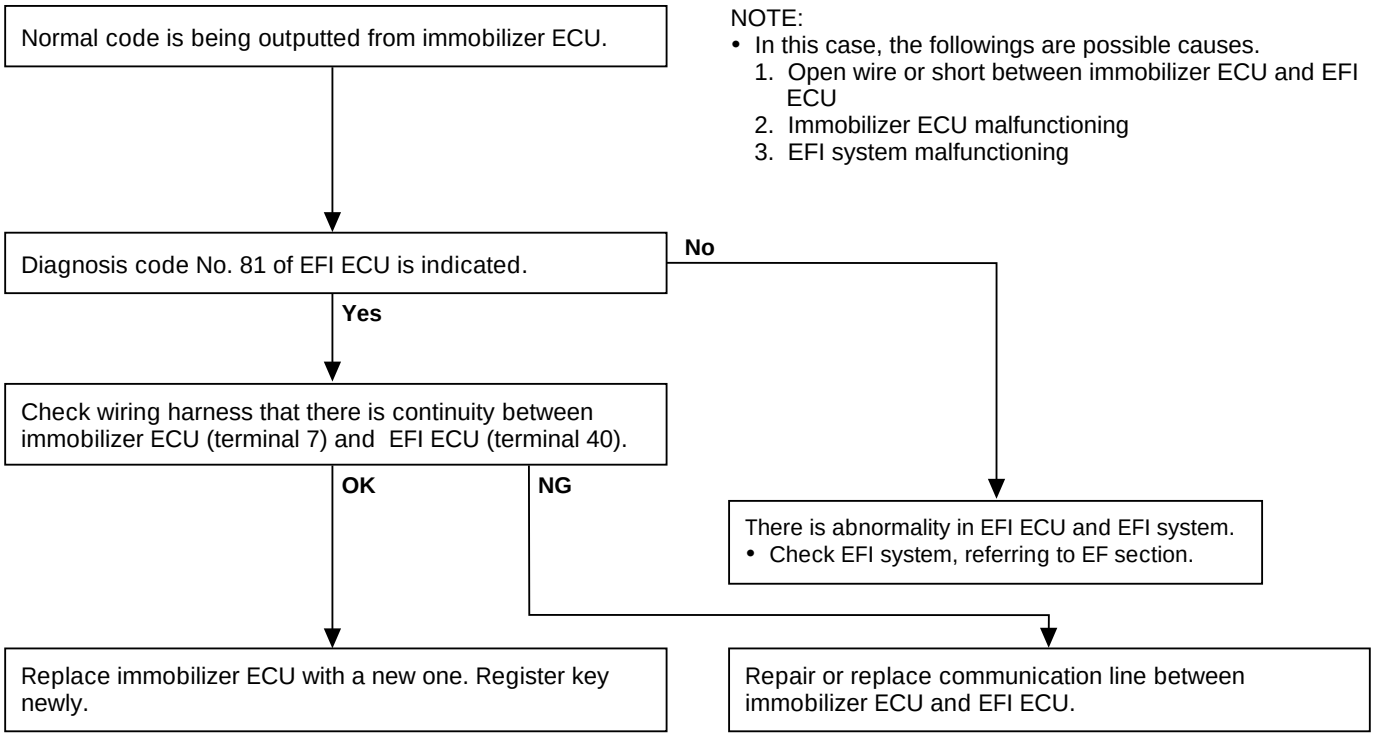
TABLE OF DIAGNOSIS CODES

Code No.	Number of glowing of check lamp	Diagnosis item	Diagnosis contents
12		Malfunction of transponder	When there is no reply from key transponder after the coil has energized key transponder. (This diagnosis code is cleared if ID code can be read normally next time.)
21		Unmatching of ID codes	When immobilizer ECU determines that an attempt was made to start engine, using an unregistered key:
23		Unregistered ID codes	When transponder code to immobilizer ECU is unregistered: (Code to backup RAM is not memorized.)
31		Abnormality of registration mode	At time of registration of sub key, terminal T is not connected to ground, or an attempt is made to make registration, using a sub key. (Code to backup RAM is not memorized.)
41		Faulty communication between immobilizer ECU and EFI ECU • Non-matching of codes	When a signal of non-matching of code is received at time of communication with EFI ECU:
42		Faulty communication between immobilizer ECU and EFI ECU • When there is no reply of code:	When reply of code has not been received within specified time from EFI ECU at time of communication with EFI ECU:

JBE00342-06020

TROUBLE SHOOTING ACCORDING TO DIAGNOSIS CODE

1. Normal code is outputted.



JBE00343-06021

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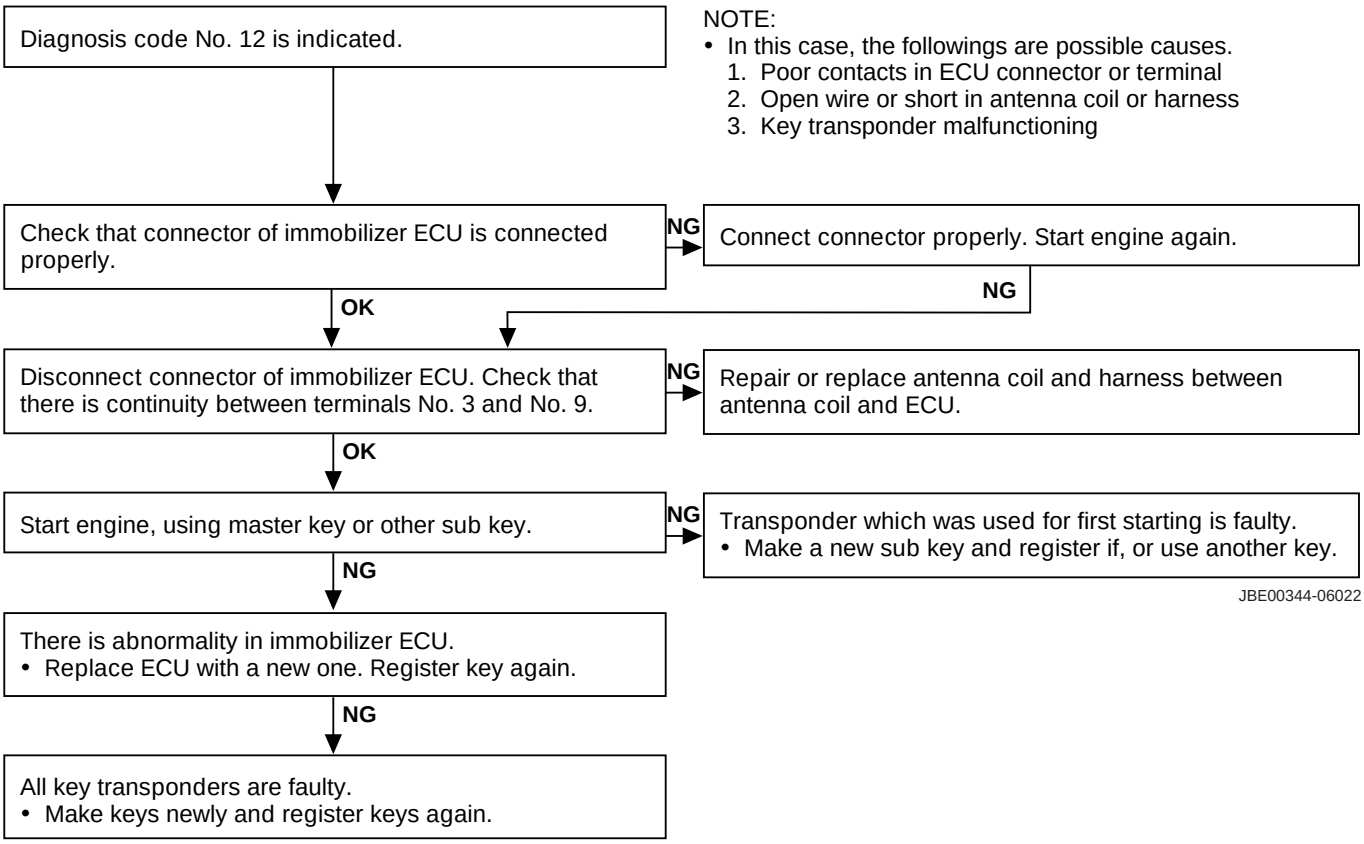
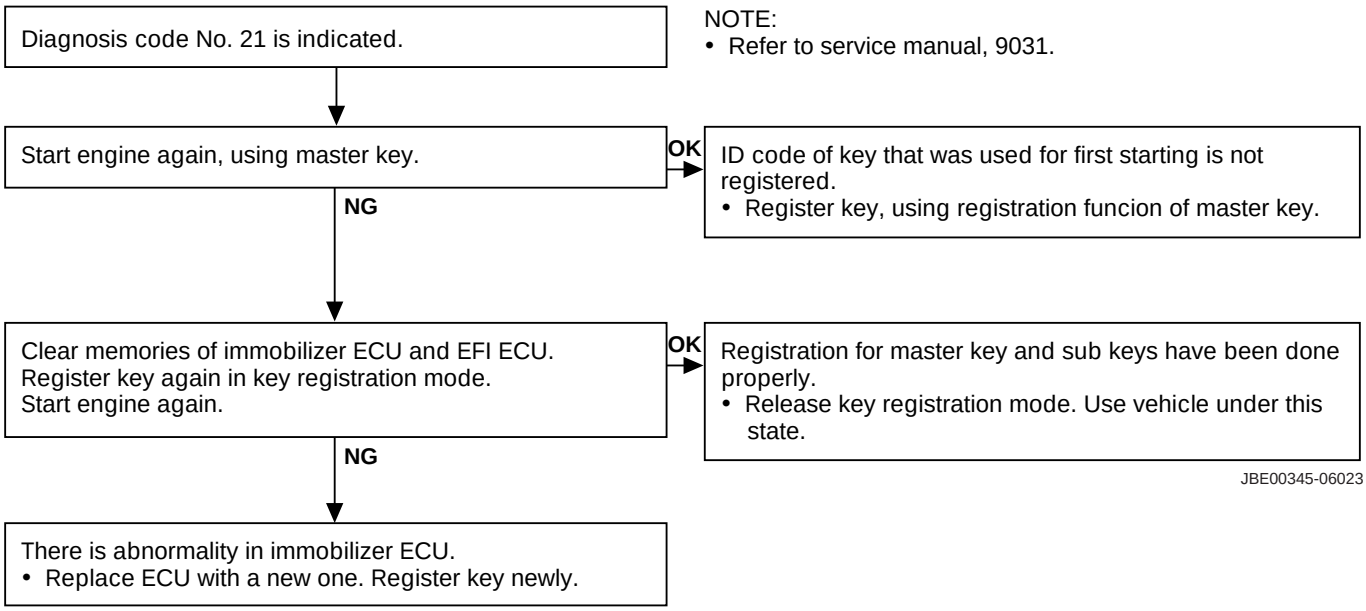
2. Diagnosis code No.12 is indicated.



JBE00344-06022

3. Diagnosis code No. 21 is indicated



JBE00345-06023

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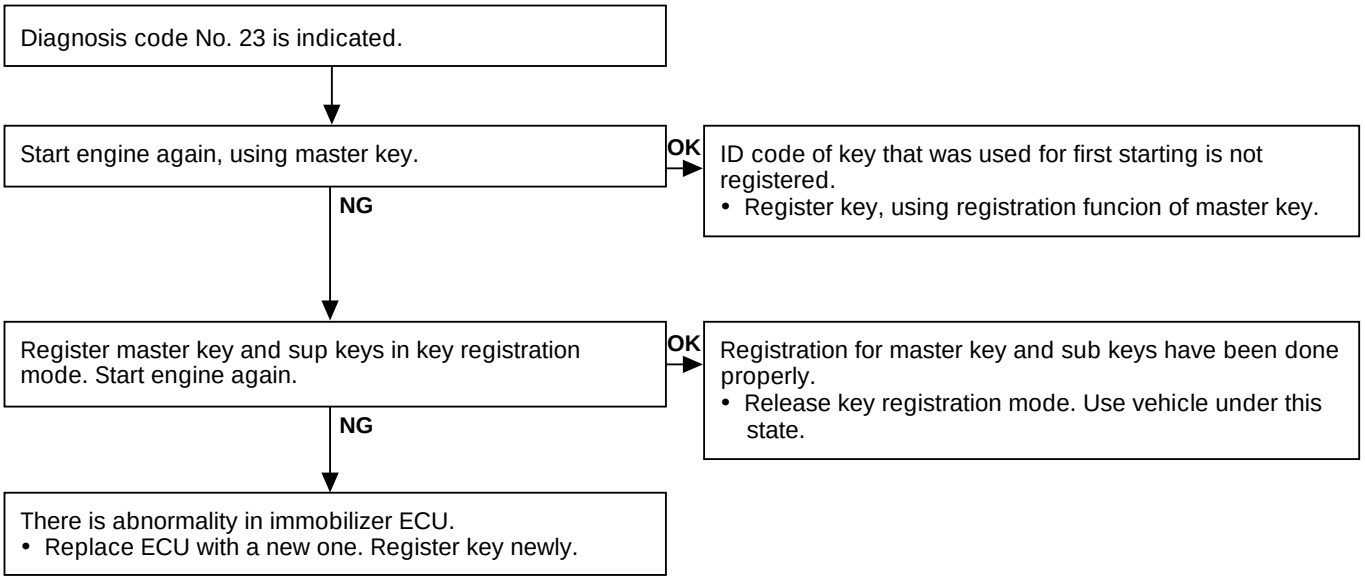
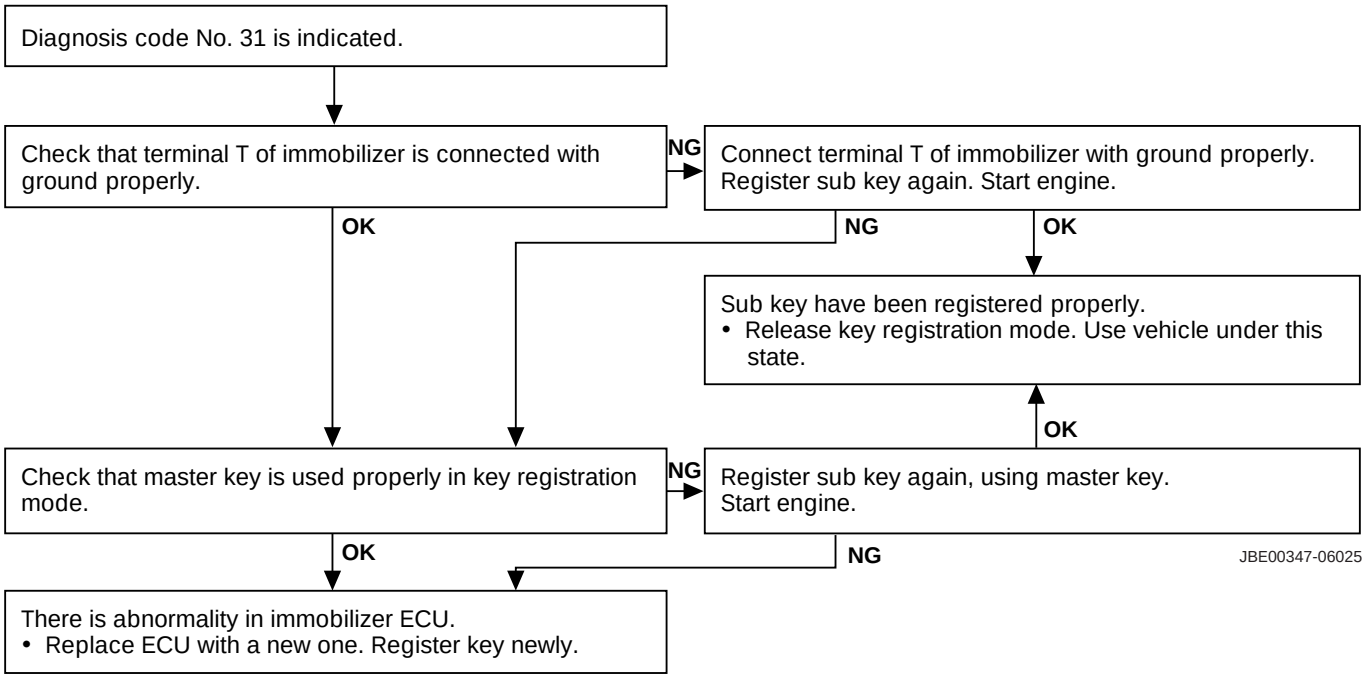
4. Diagnosis code No. 23 is indicated.



JBE00346-06024

5. Diagnosis code No. 31 is indicated.



JBE00347-06025

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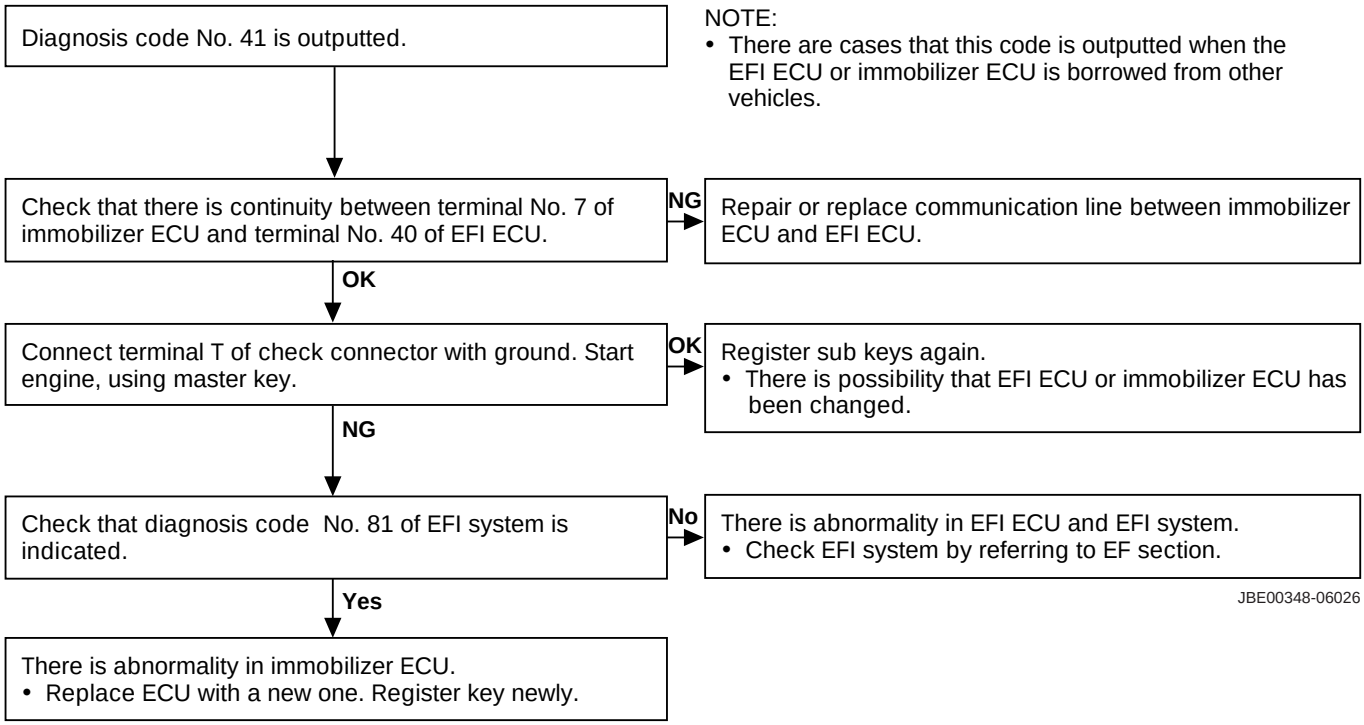
6. Diagnosis code No. 41 is outputted.



JBE00348-06026

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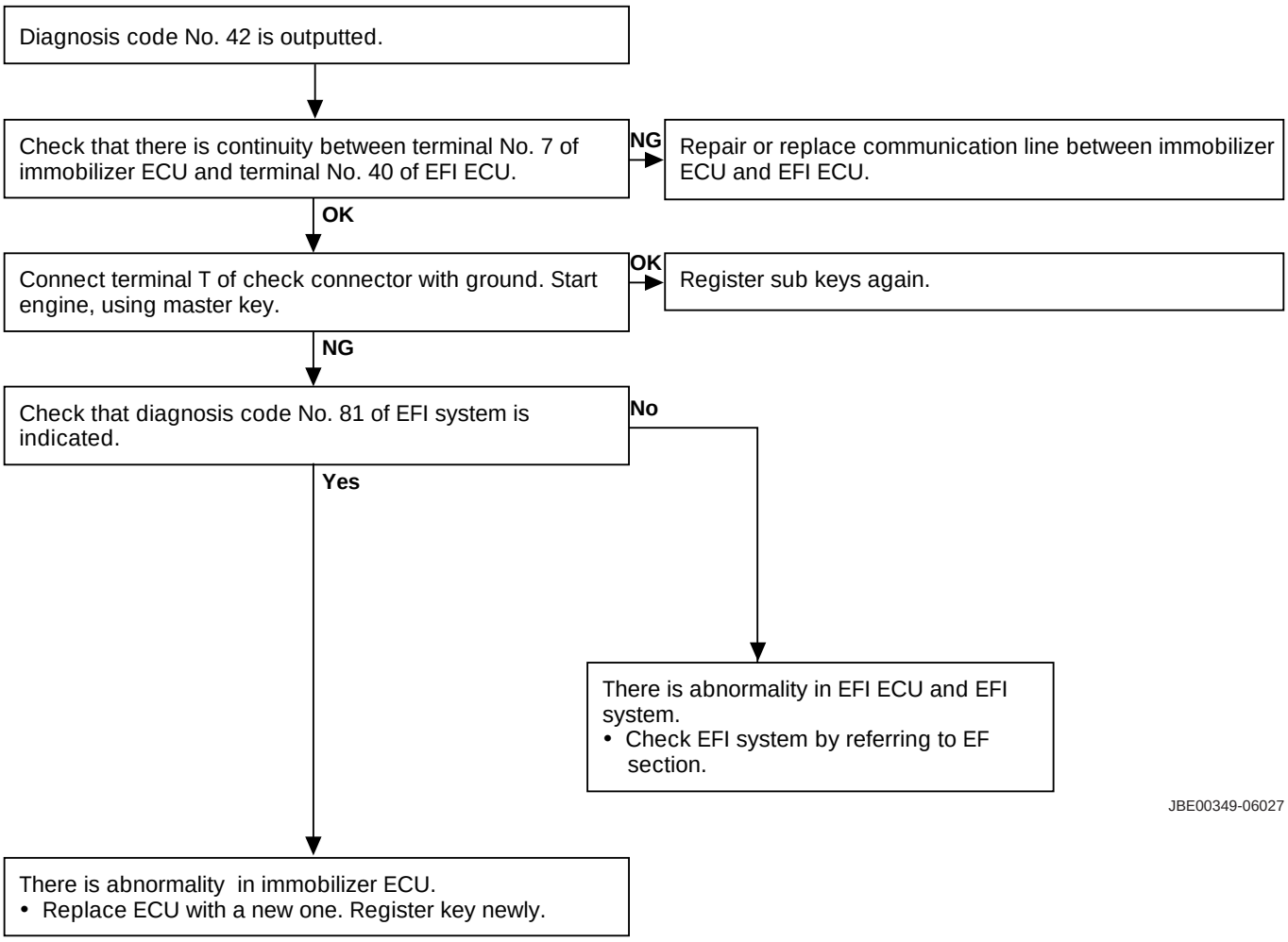
7. Diagnosis code No. 42 is outputted.



JBE00349-06027

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FUNCTION CHECK OF IMMOBILIZER SYSTEM

The function check of the immobilizer system can be performed by doing the following two checks.

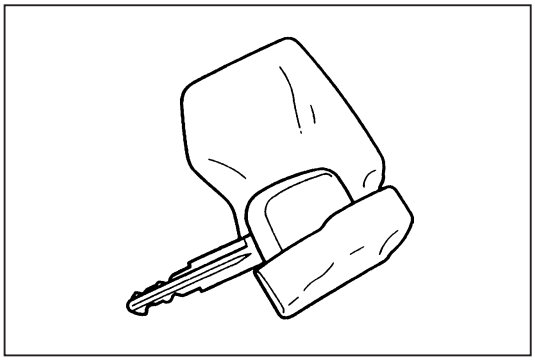
1. Ensure that the engine starts by using the master key and sub key.
2. Ensure that the engine will not start with a key without the transponder.

In the check 1., the system can be checked easily by using the master key and sub key.
Now we explain that the check can be made in the following method as one of the check method of 2.

JBE00350-06030

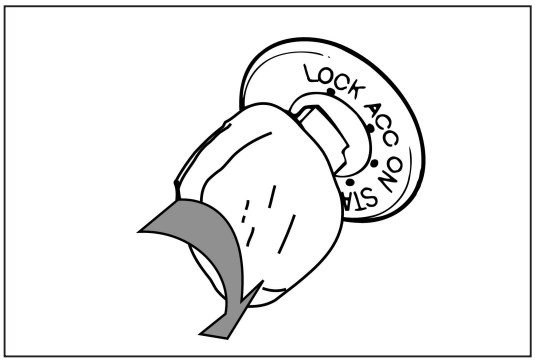
Checking procedure

1. Wind a piece of aluminum foil or the like at around the resin section of the key of the vehicle concerned.
   (The aluminum foil shuts off the magnetic field, thus preventing the transponder from being energized.)



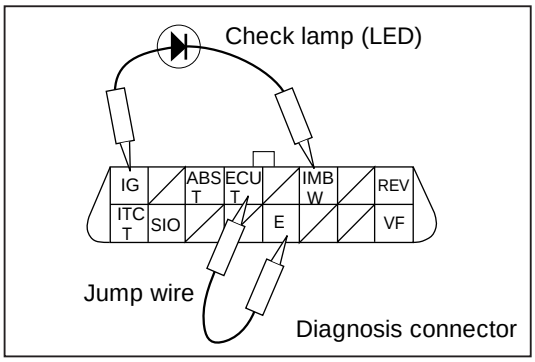
JBE00351-06031

2. Start the engine with the key wound up with the aluminum foil. Check that the engine will not start.



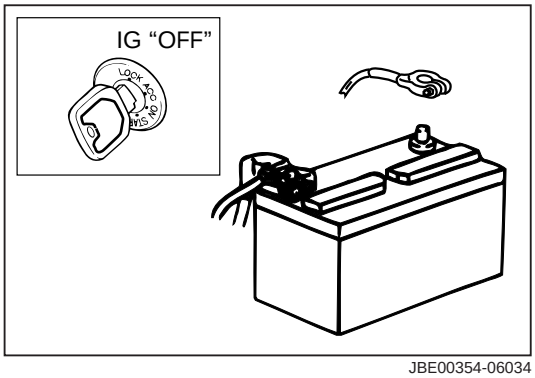
JBE00352-06032

3. Install the check lamp to the diagnosis connector.
   Connect the jump wire between Test terminal and earth terminal. Ensure that the diagnosis code No.12 is outputted.by the indicator lamp.



JBE00353-06033

4. After confirming the diagnosis code of immobilizer system and EFI system, erase the diagnosis code No. 81 memorized in the EFI ECU by removing the terminal (–) of the battery.



JBE00354-06034

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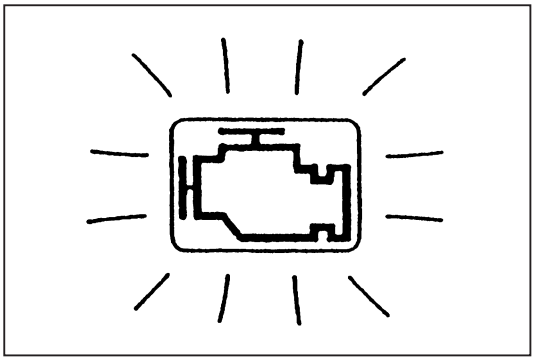
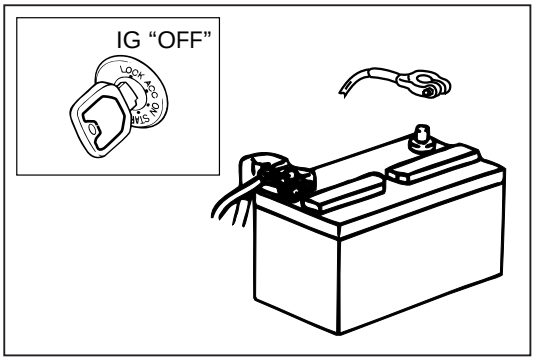
5. Ensure that the diagnosis code No.81 has been erased and that the normal code is being outputted. Remove the check lamp and jump wire from the diagnosis connector.



JBE00355-06035

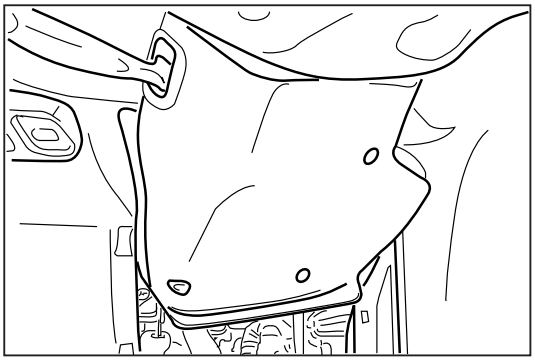
REPLACEMENT AND INSTALLATION OF ANTENNA COIL

1. Disconnect the battery ground cable from the negative (–) terminal of the battery.



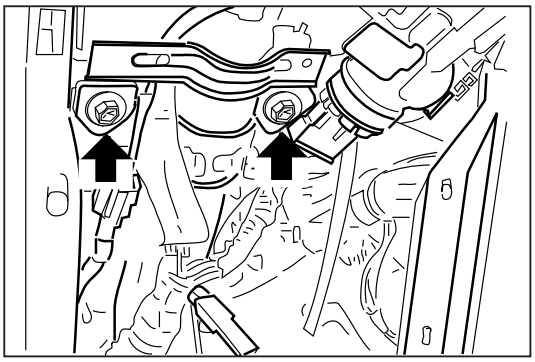
JBE00356-06036

2. Remove the instrument lower finish panel and steering column lower cover by loosening the attaching screws.
3. Loosen the steering column attaching bolts.
4. Remove the steering column upper cover.
5. Disconnect the connector of the antenna coil and remove the wire band.
6. Removal of antenna coil.
   (1) Loosen the antenna coil attaching screw.
   (2) Remove the antenna coil from the ignition key cylinder.
7 Attach a new antenna coil to the ignition key cylinder and tighten the attaching screw.
8. Attach a new wire band.



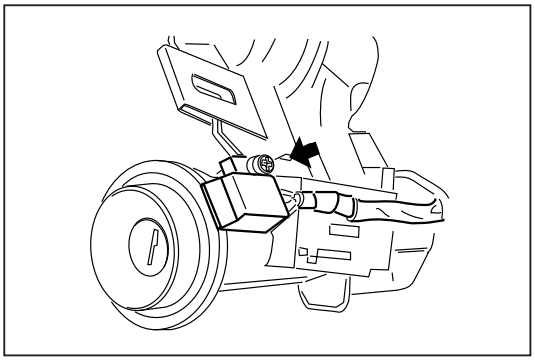
JBE00357-06037

9. Connect the connector of the antenna coil.
10. Install the steering column upper cover.
11. Tighten the steering column attaching bolts and nuts.
    Tightening Torque:
    Nut, lower side 9.8 - 15.7 N·m
    Bolt, upper side 14.7 - 21.6 N·m



JBE00358-06038

12. Install the steering column lower cover and instrument lower finish panel with attaching screws.
13. Connect the battery ground cable to the negative (–) terminal of the battery.



JBE00359-06039

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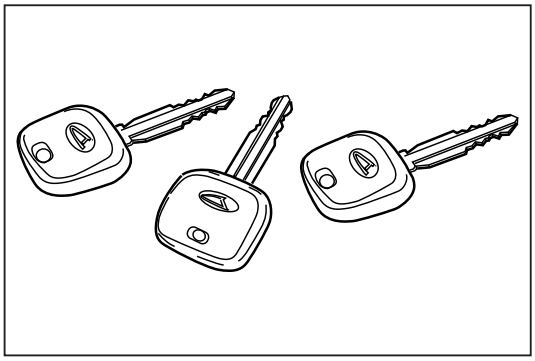
REGISTRATION OF SUB KEYS

The vehicle is provided with one master key and two sub keys. However, up to three sub keys can be memorized in the immobilizer ECU by using the sub key registration function of the master key.

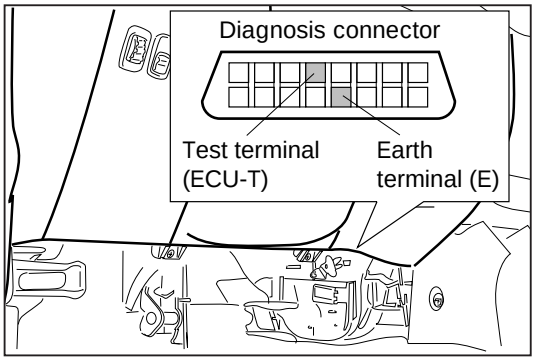
CAUTION:

- The master key (black) has the sub key registration function. Hence, be very careful not to lose or damage the master key.
- If the master key is lost or damaged, it is imperative to erase the memory of the immobilizer ECU and to re-register the master key and sub keys, using the diagnosis system (DS-21).



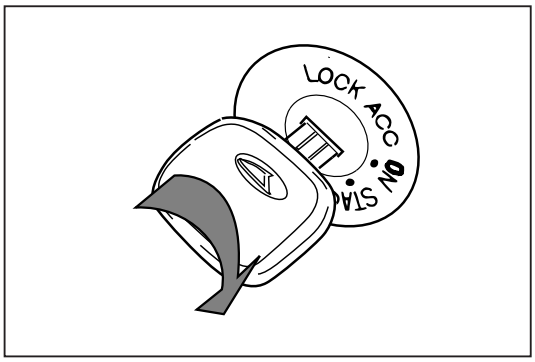
JBE00360-06040

(1) Connect the jump wire between test terminal and earth terminal.



JBE00361-06041

(2) Start the engine, using the master key.
When the engine starts, the key registration mode is assumed.
(3) Stop the engine. Within ten seconds after the engine stopped, start the engine with the sub key.
When the engine starts, this sub key is memorized in the immobilizer ECU.
(4) To register the next sub key, repeat the steps (1) through (3).



JBE00362-06042

CAUTION:

- In the key registration mode, the memories of all sub keys are erased. It is, therefore, imperative to register the all sub keys when a new key is added.

(5) After all sub keys have been registered, remove the jump wire from the diagnosis connector.
(6) Ensure that the engine starts with all keys.

JBE00363-06043

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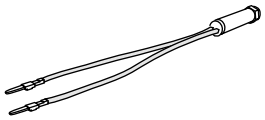
SSTs (Special service tools)

Shape	Part No.	Part name	Use	Remarks
	09991-87211-000	Diagnosis check wire	To read the diagnosis codes for checking ECU input/output signals	BE–94

JBE00364-07001

TIGHTENING TORQUE

Tightening component	Tightening torque		Remarks
	N·m	kgf-m	
Water temp. sender gauge × Cylinder block	24.5 - 34.3	2.5 - 3.5	
Fuel sender gauge × Fuel tank	1.5 - 2.5	0.15 - 0.26	
Steering column × Support brackect (Lower side)	9.8 - 15.7	1.0 - 1.6	Nut
Steering column × Support brackect (Upper side)	14.7 - 21.6	1.5 - 2.2	Bolt
Steering wheel × Steering shaft	27.5 - 41.2	2.8 - 4.2	
Steering wheel × Steering wheel pad assembly	5.2 - 9.5	0.53 - 0.97	TORX® bolt
Passenger's side air bag × Instrument panel	6.7 - 9.5	0.68 - 0.97	Bolt

JBE00365-07002

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DAIHATSU

TERIOS

J100

HARNESS & WIRING DIAGRAM

GENERAL DESCRIPTION ..... **HW– 2**
HANDLING PRECAUTION ..... **HW– 2**
WIRE SIZE & COLOR CODE ..... **HW– 3**
INSPECTION ..... **HW– 4**
OPERATION OF LOCK TYPE CONNECTOR ..... **HW– 6**
TERMINAL REMOVAL & INSTALLATION ..... **HW– 6**
ABBREVIATION CODE ..... **HW– 7**
CIRCUIT DIAGRAM ..... **HW– 9**
STARTER & ALTERNATOR ..... **HW– 9**
EFI SYSTEM **HW–10**
ABS SYSTEM **HW–11**
AIR BAG SYSTEM **HW–12**
IMMOBILIZER SYSTEM **HW–13**
ITC SYSTEM **HW–14**
COMBINATION METER **HW–15**
HEAD LAMP **HW–16**
TAIL LAMP **HW–17**
FRONT FOG LAMP, REAR FOG LAMP & STOP LAMP **HW–18**
TURN, HAZARD & HORN **HW–19**
BACK-UP LAMP **HW–20**
INTERIOR LAMP **HW–21**
HEATER & AIR CONDITIONER **HW–22**
POWER WINDOW **HW–23**
WIPER, WASHER & DEFOGGER **HW–24**
ACCESSORY (REAR VIEW MIRROR & CIGARETTE LIGHTER) **HW–25**
O/D OFF SWITCH & DIFFERENTIAL LOCK SWITCH **HW–26**
WIRING HARNESS **HW–27**
CONTENTS OF HARNESS DIAGRAM **HW–27**
WIRE, ENGINE **HW–28**
WIRE, ENGINE, No.2 ..... **HW–30**
WIRE, FRONT DOOR (DRIVER'S SEAT/RHD) **HW–32**
WIRE, FRONT DOOR (PASSENGER'S SEAT/RHD) **HW–34**
WIRE, FRONT DOOR (DRIVER'S SEAT/LHD) **HW–36**
WIRE, FRONT DOOR (PASSENGER'S SEAT/LHD) **HW–38**
WIRE, REAR DOOR **HW–40**
WIRE, BACK DOOR, No.1 ..... **HW–42**
WIRE, FLOOR (RHD) **HW–44**
WIRE, FLOOR (LHD) **HW–46**
WIRE, FLOOR, No.3 (RHD) **HW–48**
WIRE, FLOOR, No.3 (LHD) **HW–50**
WIRE, COWL, RH (EC/RHD, AUS) **HW–52**
WIRE, COWL, RH (General/RHD) **HW–54**
WIRE, COWL, RH (EC/LHD) **HW–56**
WIRE, COWL, RH (General/LHD) **HW–59**
WIRE, COWL, LH (EC/RHD, AUS) **HW–62**
WIRE, COWL, LH (General/RHD) **HW–65**
WIRE, COWL, LH (EC/LHD) **HW–68**
WIRE, COWL, LH (General/LHD) **HW–70**

JHW00001-00001

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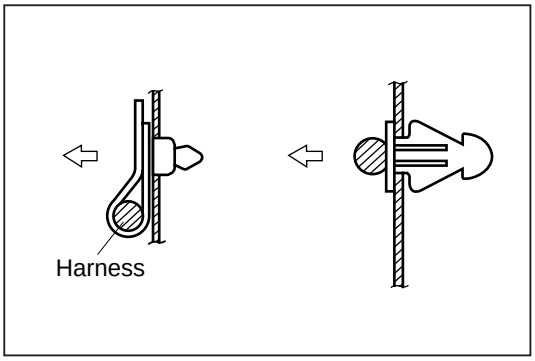
GENERAL DESCRIPTION

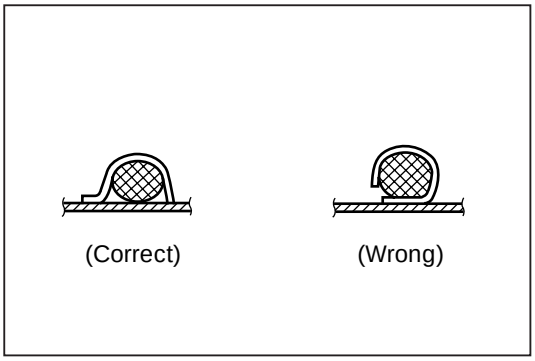
HANDLING PRECAUTION

General instructions

1. Never pull the connectors or step on them during the wire harness transport or assembly.
   (Prevention of pulling-out of terminals, connector cracks, deformation and so forth)
2. Care must be exercised to ensure that no scratch is made to the wire harness by burrs or edges during the wire harness transport or assembly.
   (Prevention of scratches to the outer trim, electrical insulators and so forth)
3. Clamping method
   In the case of resin clamps, ensure that the clamp section is fitted in the body hole.
   NOTE:
   - Ensure that the clamp will not be detached when it is pulled lightly in the arrow-headed direction.
     (Prevention of interference due to the detachment of the clamp)



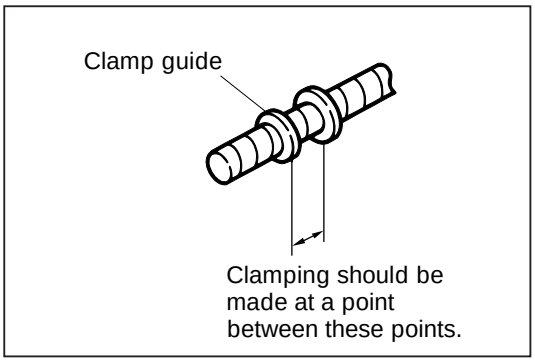
JHW00002-00002



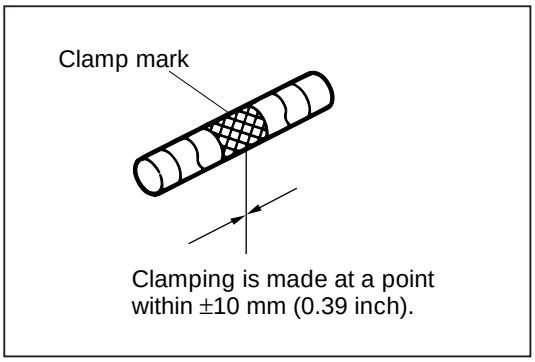
JHW00003-00003

   - In the case of metal sheet welded clamps, be sure to assemble the harness in such a way that the harness will not come in contact with the welded surface.
     (Prevention of wire harness damage due to welding burrs)
   - In case that the locating guide of the clamp position or the clamp mark is clamped, make sure that the clamp is located within the guide. As for the clamp at the clamp mark section, ensure that the clamping is made at a point within ±10 mm.

(Prevention of slackness or interference)



JHW00004-00004



JHW00005-00005

4. Terminals and connectors
   Perform the connection of connectors positively.
   - Connector with lock — Ensure that the locking is made.
   - Connector without lock — Connect the connector positively until it stops.

JHW00006-00006

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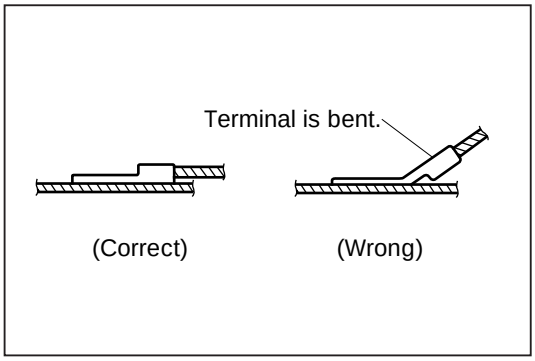
Retention by screws

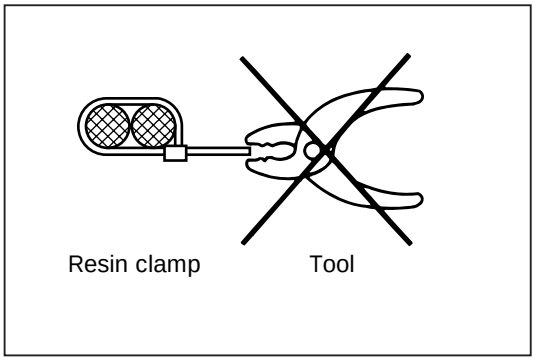
- When the tightening torque is specified, be sure to observe the specification strictly.
  (The tightening torque is posted in the table separately.)
- Ensure that the staked section may not come on the assembling surface.
- After completion of the tightening operation, lightly pull out the terminal. Ensure that there is no slackness.
- When performing other operations, care must be exercised to ensure that no connected connector is detached by pulling out the wire harness forcibly.



JHW00007-00007

5. Work procedure for tightening-up type resin clamps
   When the tightening-up type resin clamps are employed, do not use any pliers, cutting pliers or the like.

<Reason>
Prevention of clamps being cut or scratched



JHW00008-00008

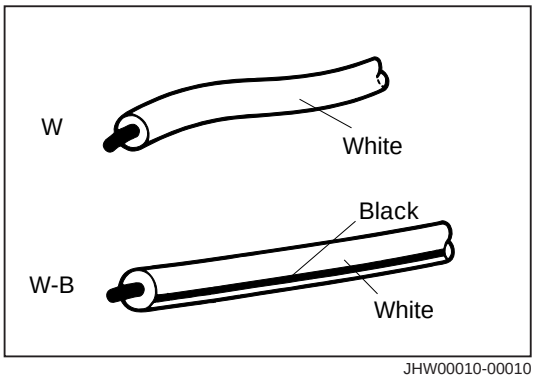
WIRE SIZE & COLOR CODE

- For identification purpose, each wire has its own color. Each color bears a code as described in the right table. These codes are used in the wiring diagram and will be helpful during trouble shooting.

Code	Gr	Br	B
Color	Gray	Brown	Black
Code	W	R	G
Color	White	Red	Green
Code	Y	L	O
Color	Yellow	Blue	Orange
Code	P	Lg	V
Color	Pink	Light green	Violet

JHW00009-00009

- The wire color comes in two kinds: single color and composite color. In the case of single color, the whole outer coat of the harness is of a single color.
  In the case of composite color, a fine line of the second color is drawn on the harness basic color.
  In this case, the code is composed of the basic color code which comes first and the second color code which comes after a hyphen.



JHW00010-00010

WARNING:

- The wire diameter and capacity of each harness have been determined to assure the normal operation of the electrical system.
- Hence, do not take power for accessories carelessly through the original wiring harness. Failure to observe this caution may cause system malfunction or fire.

JHW00011-00011

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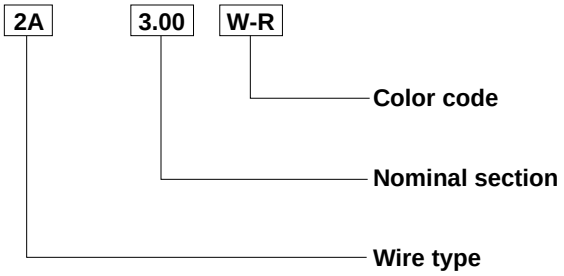


JHW00012-00012

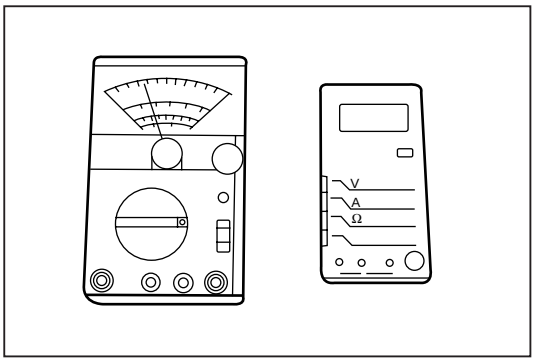
Nominal section	Section area (mm)	Diameter (mm)	Permissible current (A)
0.5	0.56	1.0	9
0.85	0.88	1.2	12
1.25	1.28	1.5	15
2.00	2.09	1.9	20
3.00	3.29	2.4	27

JHW00013-00013

INSPECTION

Tester (Volt/ohmmeter)

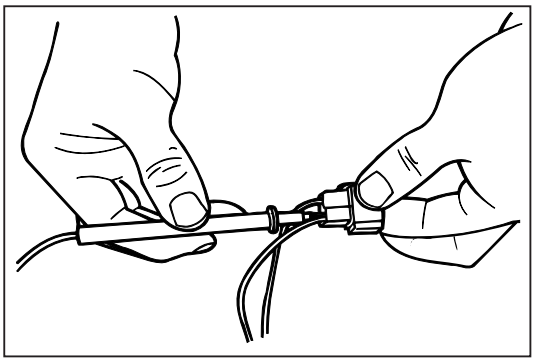
For the inspection, use a tester having an internal resistance of more than 10 kilo ohm/V.
Use of a tester with a low internal resistance may cause wrong measurement or secondary troubles.



JHW00014-00014

Conventional type connector

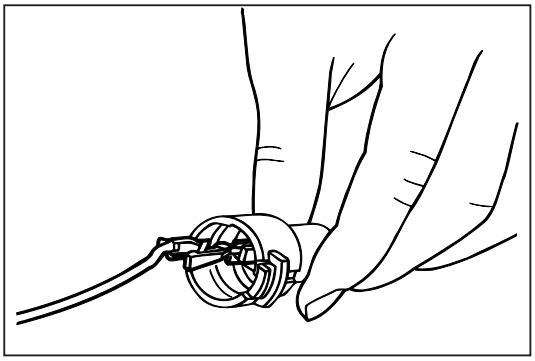
When resistance measurement and/or voltage measurement is conducted at the connector section, insert the measuring probe from the back of the connector, being very careful not to damage the harness-to-terminal connections.



JHW00015-00015

Water-proof type connector

When resistance measurement and/or voltage measurement is conducted at the connector section, bring the measuring probe into contact with the terminal at the connection side of the connector.
Be very careful not to apply excessive force to the terminal at the connector side. Failure to observe this caution may deform the terminal, causing poor continuity.
As an alternative method, insert a male or female terminal into the connector terminal or connect an adequate attachment.



JHW00016-00016

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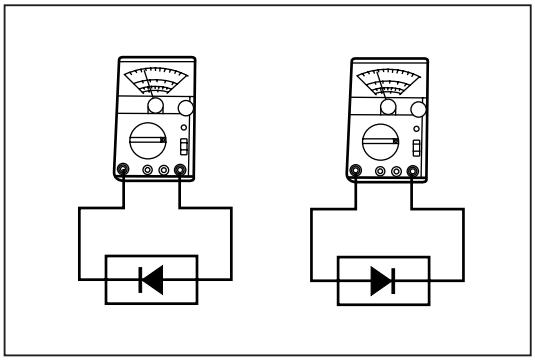
INSPECTION OF CIRCUIT WITH TESTER

If a diode is built in the circuit, perform continuity test by changing the polarities of the measuring terminals.
In case of a general type tester, ensure that continuity exists when the negative (–) lead of the tester is connected to the positive (+) side of the diode; the positive (+) lead of the tester to the negative (–) side of the diode. Also ensure that no continuity exists when the polarities are changed.



JHW00017-00017

Since some testers have different polarities, be sure to read the instruction manual of a tester to be used for the check before using it.

JHW00018-00018

The inspection procedure for light emitting diodes (LED) is the same as normal diodes. However, there may be cases where the LED emits no light, unless a tester with LED check mode is used. If an adequate tester is not available, apply the battery voltage to the LED and ensure that the LED emits light.

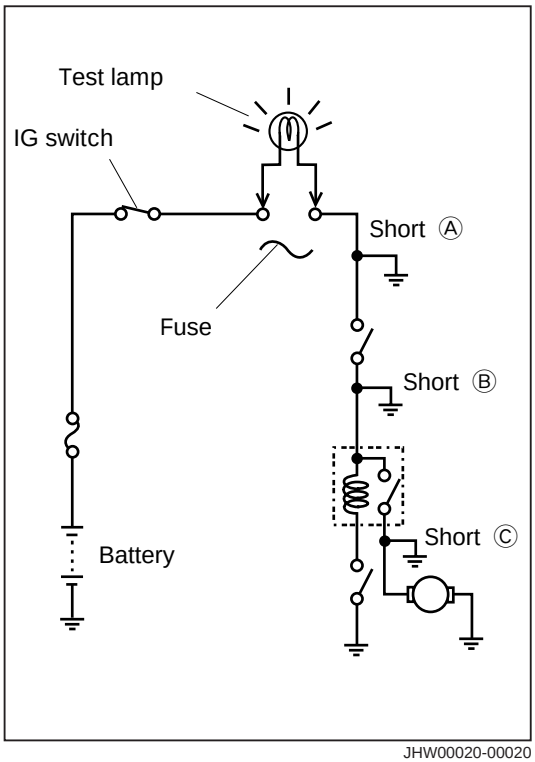
JHW00019-00019

INSPECTION OF SHORT CIRCUIT

(1) Remove a melt fuse or fusible link.
(2) Disconnect all connectors for loads being applied to the melt fuse.
(3) Connect a test lamp at the position where the melt fuse or fusible link was installed.
(4) Search for the short circuit by providing the minimum conditions which make the test lamp glow.
(5) Perform repairs or wiring harness replacement, as required.

Example

Short section	Connecting conditions
Ⓐ	Ignition switch is turned ON.
Ⓑ	Ignition switch and switch A are turned ON.
Ⓒ	Ignition switch, switch A and switch B are turned ON with relay energized.



JHW00020-00020

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OPERATION OF LOCK TYPE CONNECTOR

Disconnection

The lock type of the connector comes in a push release type, a pull release type, a spring lock type, an one-way lock type and so on.
After confirming the shape of the lock, unlock the lock. Disconnect the connector while holding the connector by hand.

NOTE:

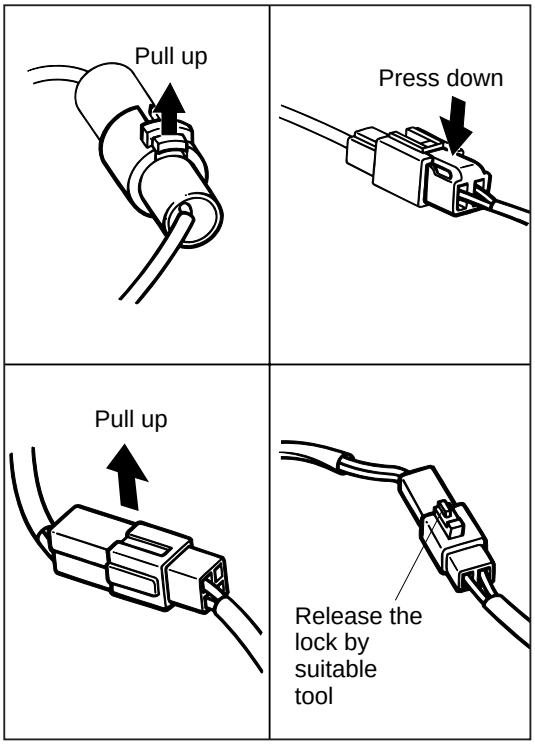
- Never pull the harness during the disconnection.
- Be sure to pull out the connector straight so as not to damage the terminal.

Connection

Perform the connection until the lock is completely engaged.
After the connection has been made, ensure that the lock is engaged positively.

NOTE:

- Be sure to connect the connector straight so as not to damage the terminal.



JHW00021-00021

NOTE:

- Disconnection and connection of each connector should be kept at a minimum level. If unnecessary disconnection or connection is repeated, it may cause unexpected troubles such as poor continuity and chattering.

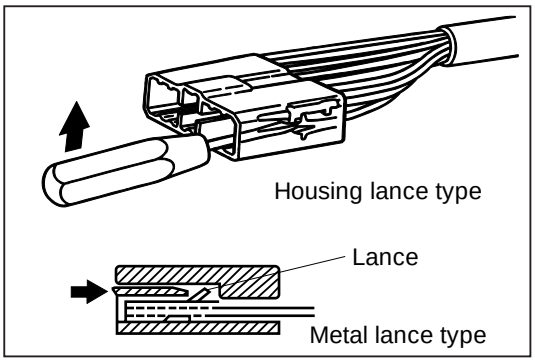
JHW00022-00022

TERMINAL REMOVAL & INSTALLATION

Removal of terminal

<Housing lance type>
Insert a miniature screwdriver through the opening section of the connector into between the locking lug and the terminal. While prying up the locking lug with the screwdriver, pull the terminal backward.

<Metal lance type>
While pushing the lance with the screwdriver, pull the terminal backward.

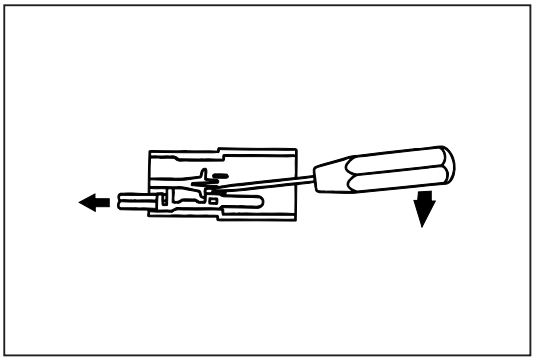


JHW00023-00023

Installation of terminal

<Housing lance type>
Push the terminal into the protruding section of the connector, until the lock is engaged completely. Lightly pull the harness to assure that the locking has been made completely.

<Metal lance type>
Insert the terminal into the connector, until lance is locked completely. Lightly pull the harness to assure that the locking has been made completely.



JHW00024-00024

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ABBREVIATION CODES

The abbreviation codes that appear in this service manual stand for the following, respectively.

ACC:	Accessory
ACT:	Actuator
A/C:	Air conditioner
ALT:	Alternator
AMP:	Amplifier
ANTN:	Antenna
AT, A/T:	Automatic transmission
BATT:	Battery
B/DR:	Back door
BK/LP, B/L:	Back-up lamp
BLR:	Blower
BNDR:	Binder
BRK:	Brake
BST:	Boost
B/U, B/UP:	Back-up
BUZ, BZR:	Buzzer
CAST:	Cassette, Cassette tape player
CHG:	Charge
CIG:	Cigarette lighter
CLA:	Clearance
CLT:	Clutch
COL:	Coil
COM:	Common, Combination
CON:	Connector
CON, CTR:	Control
CS:	Collision sensor
CTY:	Courtesy
CWL:	Cowl
DEF:	Defroster
DIF, DIFF:	Differential
DIM:	Dimmer
DIOD:	Diode
DIS:	Distributor
D/L:	Door lock
DR:	Door
ECU:	Electronic control unit
ENG, E/G:	Engine
ETH:	Earth
EVP:	Fuel evaporative control system
EXG:	Exhaust gas
FD:	Fender
FR:	Front
FRRH:	Front door (RH)
FRLH:	Front door (LH)
F/P:	Fuel pump
F.L, F/L:	Fusible link
FUL:	Fuel
F/WP:	Front wiper
F/WSH:	Front washer
GND:	Ground
HAZ, HZD:	Hazard
H BM:	High beam
H-LP:	Head lamp
HR, HL:	Horizontal (Right hand, Left hand)
HTD:	Heated
HTR:	Heater
H.M:	High mount
IDUP, I/UP:	Idle up
IG:	Ignition
ILM:	Illumination
IMB, IMMOBI:	Immobilizer
IND:	Indicator
INJ:	Injector
ITC:	Integrated timer controller
LEV:	Level, Leveling
LGHNG:	Lighting
LGT:	Light
LH:	Left hand
LOK:	Lock
LP:	Lamp
LTR:	Lighter
LUG:	Luggage
LVLIG:	Leveling
J/B:	Junction block
J/C:	Junction
MAG, MG:	Magnet
MAI:	Main
MAS:	Master
MET:	Meter
MGC:	Magnet clutch
MIR:	Mirror
MLT:	Multi-
MO, MTR:	Motor
NSS:	Neutral start switch
O/D:	Over drive
O/D CUT:	Over drive cut, over drive off
O/LEV:	Oil level
PK:	Parking
PKB:	Parking brake
PMNT:	Permanent
PRES:	Pressure

JHW00025-00025

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PSI:	Position
P/W:	Power window
PU:	Pulse
R/B:	Relay block
RDFN:	Radiator fan
RDI:	Radiator
RESSTR:	Resistor
REV:	Revolution
RLY:	relay
RH:	Right hand
RNG:	Range
RR:	Rear
RRLH:	Rear door (LH)
RRRH:	Rear door (RH)
RTL:	Retractable
R/TRN:	Rear turn signal lamp
R/WIP:	Rear wiper
SB:	Seat belt
SID:	Side
SLD, SOL:	Solenoid
SP, SPR:	Speaker
SPD:	Speed
SSR:	Sensor
ST:	Starter
SW:	Switch
T/F:	Transfer
THA:	Air thermometer
THEMSTR:	Thermistor
THRM:	Thermometer
THRTL:	Throttle
THW:	Water thermometer
TML, TMNL:	Terminal
TL:	Tail lamp
TRN:	Turn
U/L:	Unlock
ULSW:	Unlock switch
VR, VL:	Vertical (Right hand, Left hand)
VSV:	Vacuum switching valve
WIP:	Wiper
WRG, WRN:	Warning
WSH:	Washer
WTOW:	Wire to wire

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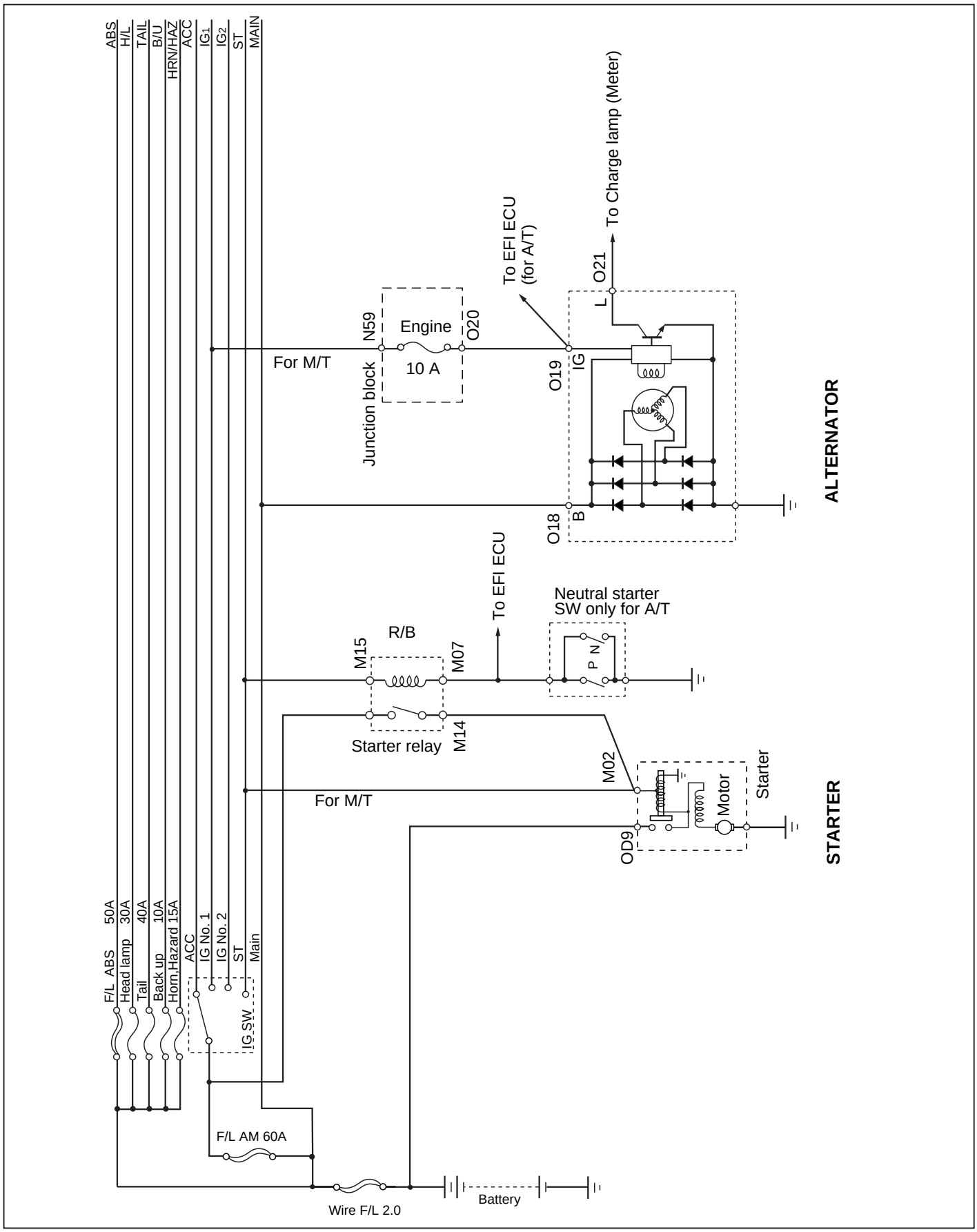
CIRCUIT DIAGRAM

STARTER & ALTERNATOR



JHW00027-00101

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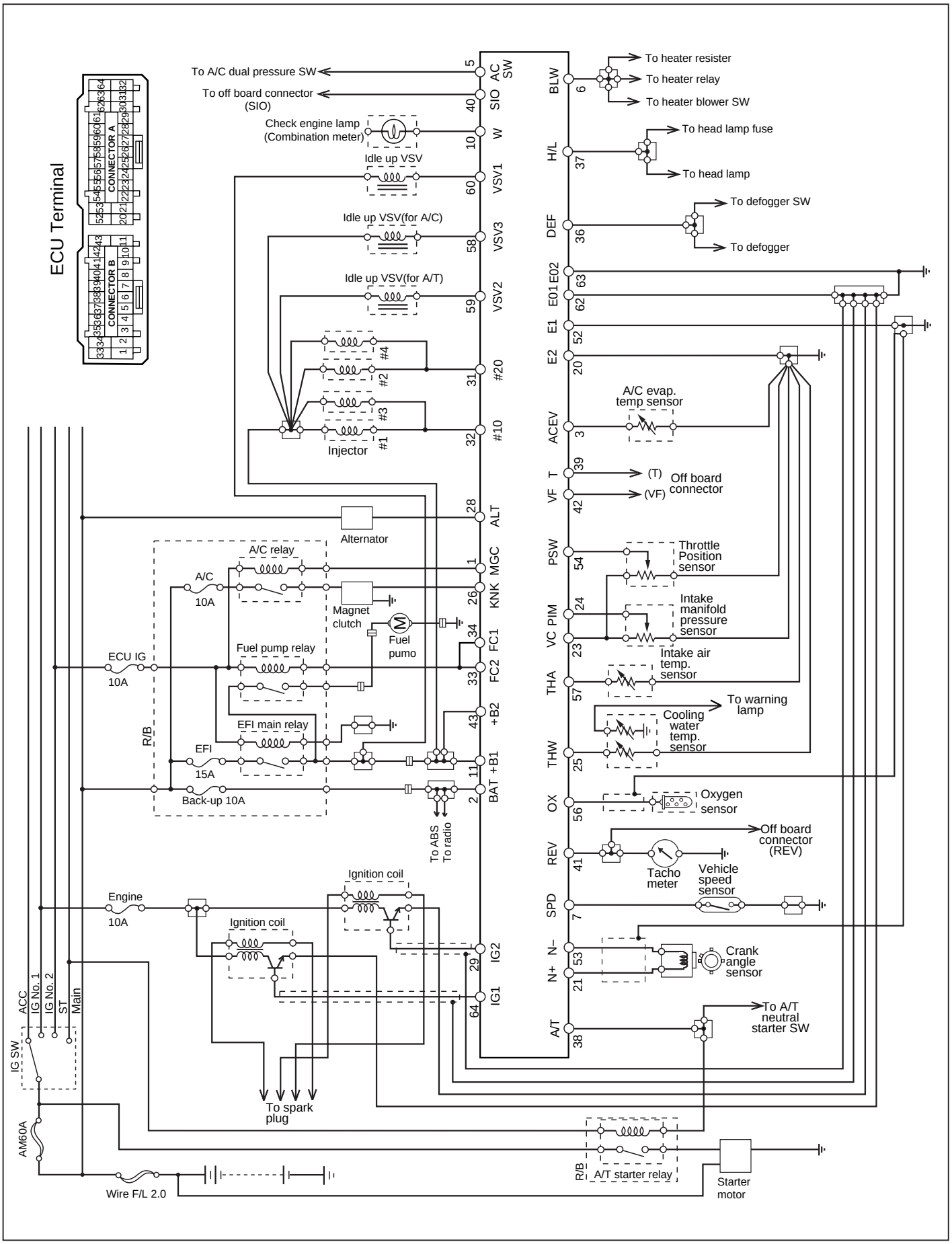
EFI SYSTEM



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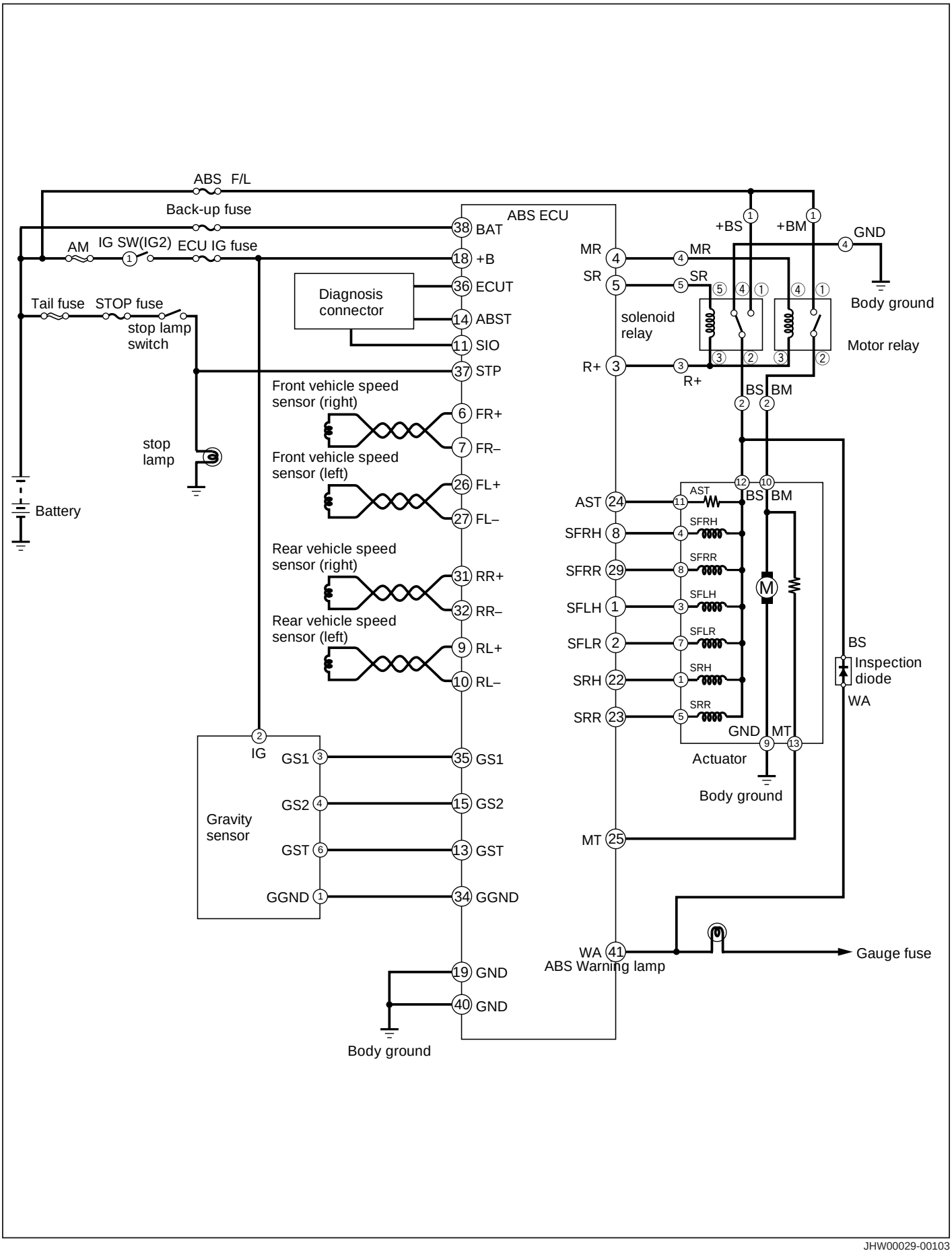
ABS SYSTEM



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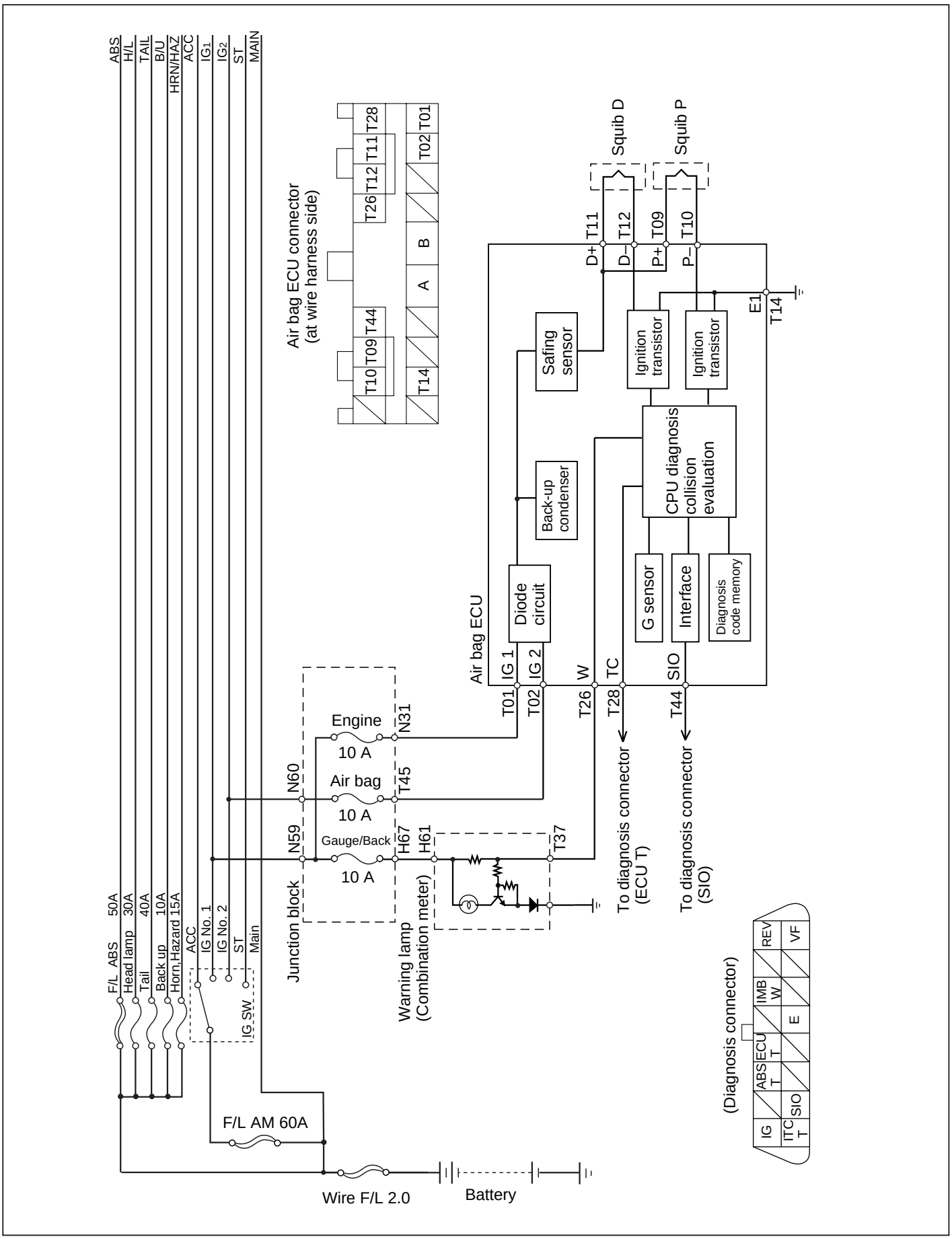
AIR BAG SYSTEM



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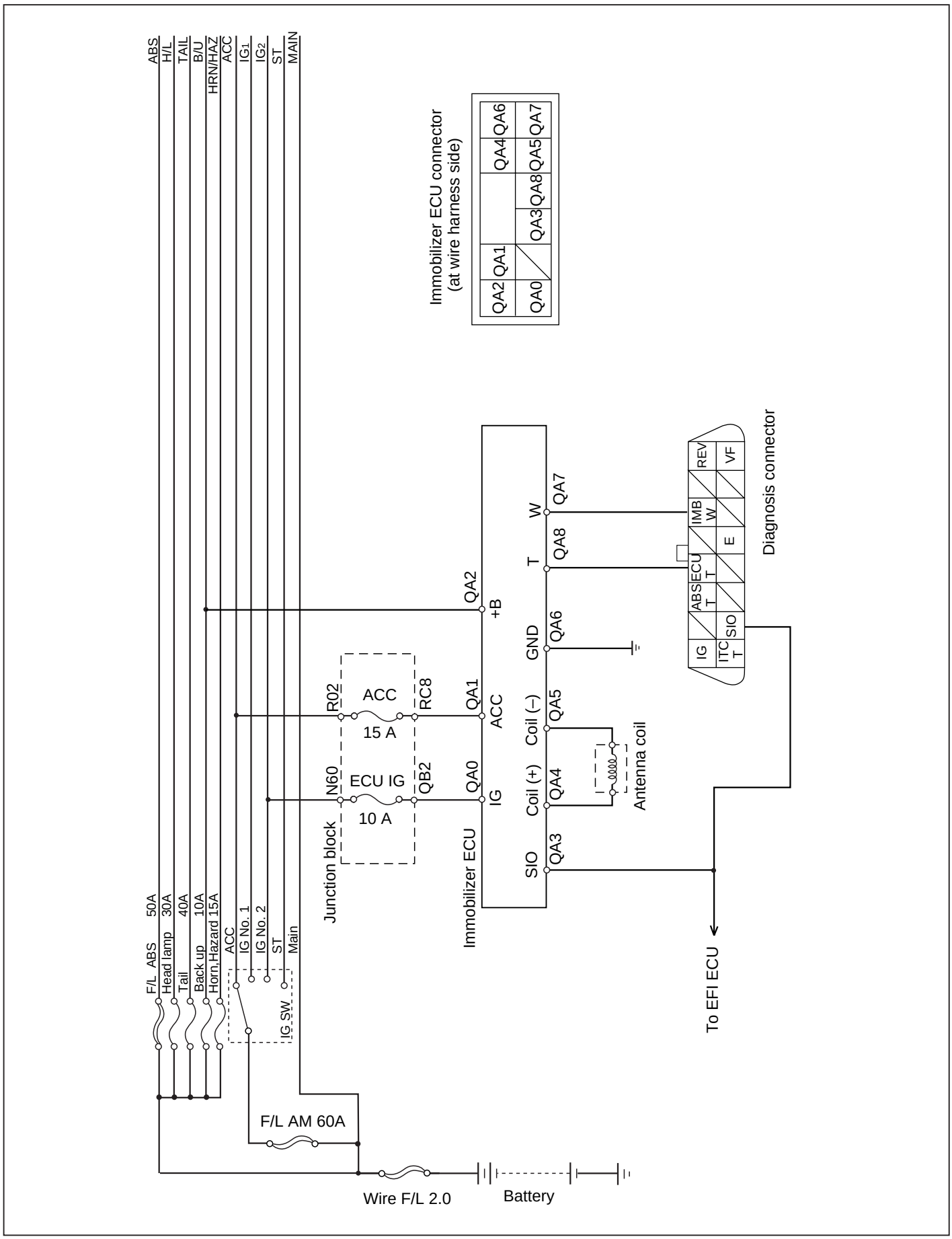
IMMOBILIZER SYSTEM



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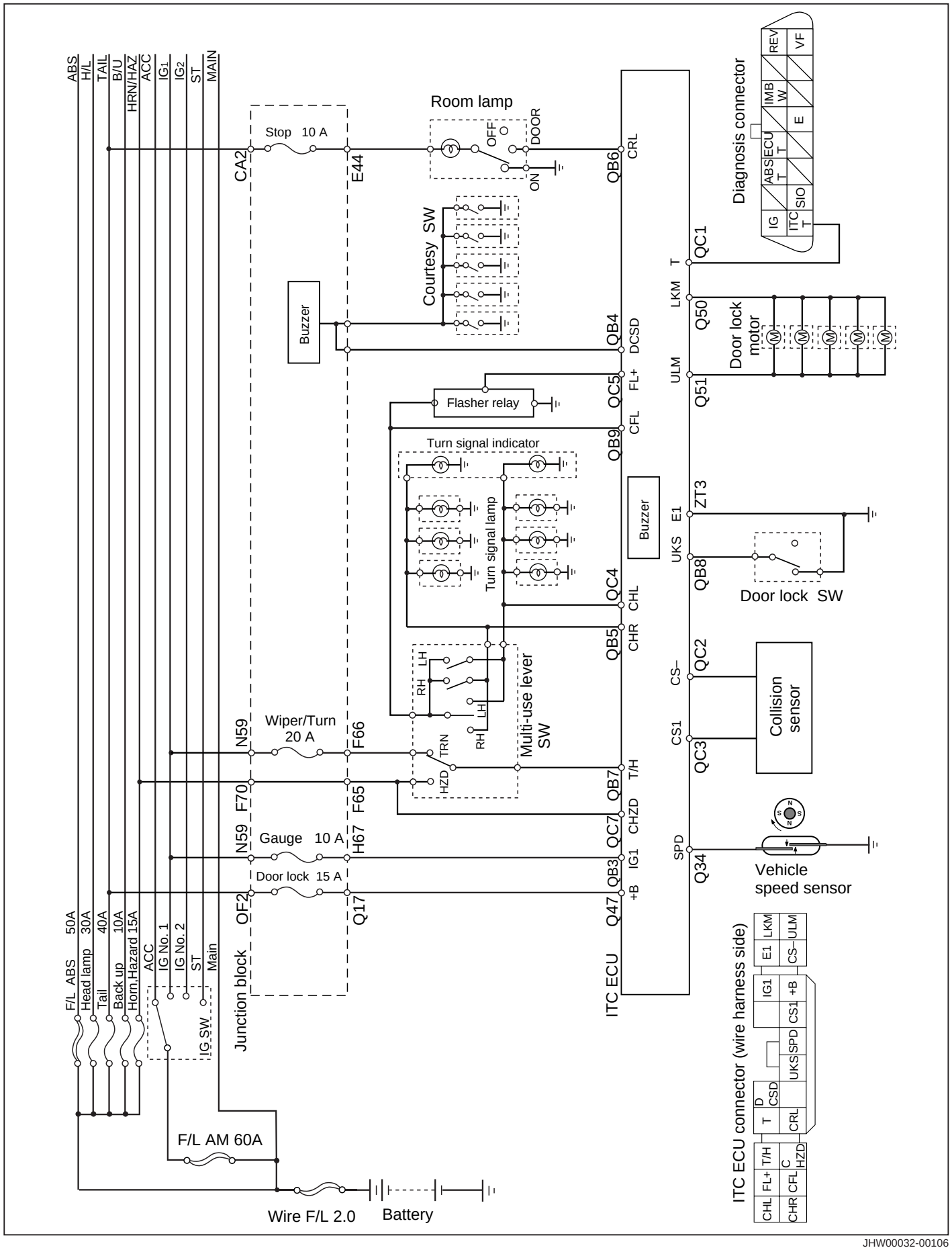
ITC SYSTEM



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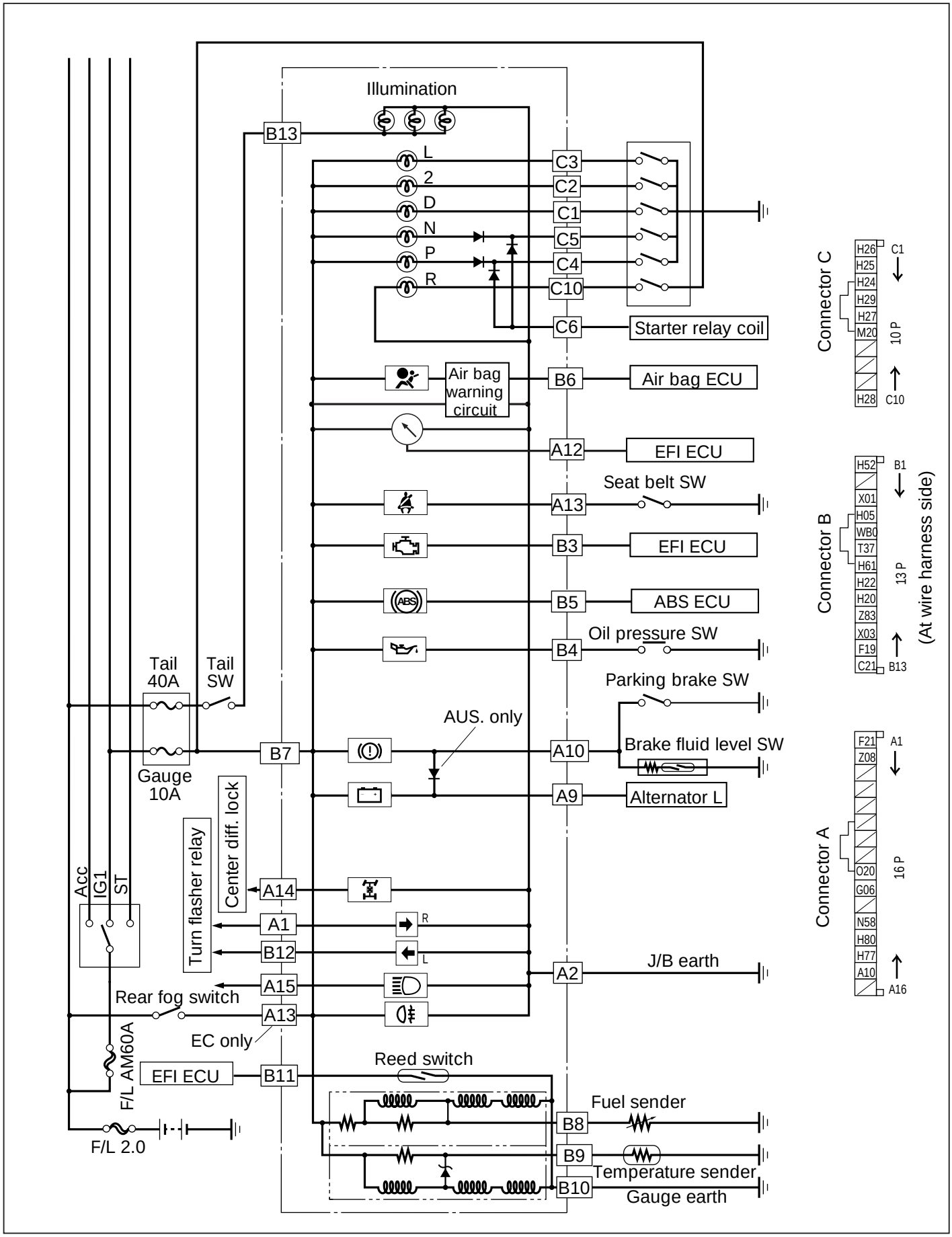
COMBINATION METER



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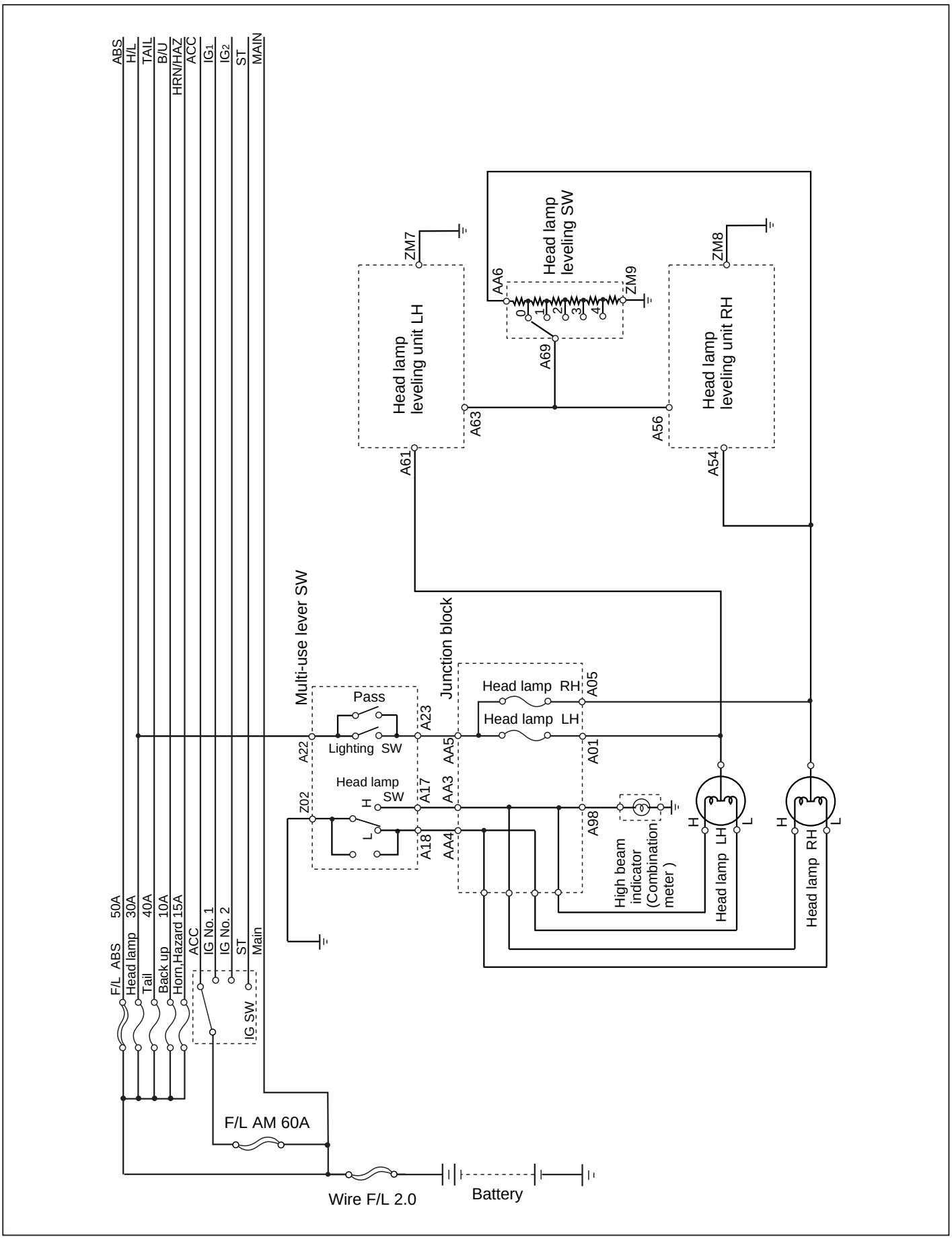
HEAD LAMP



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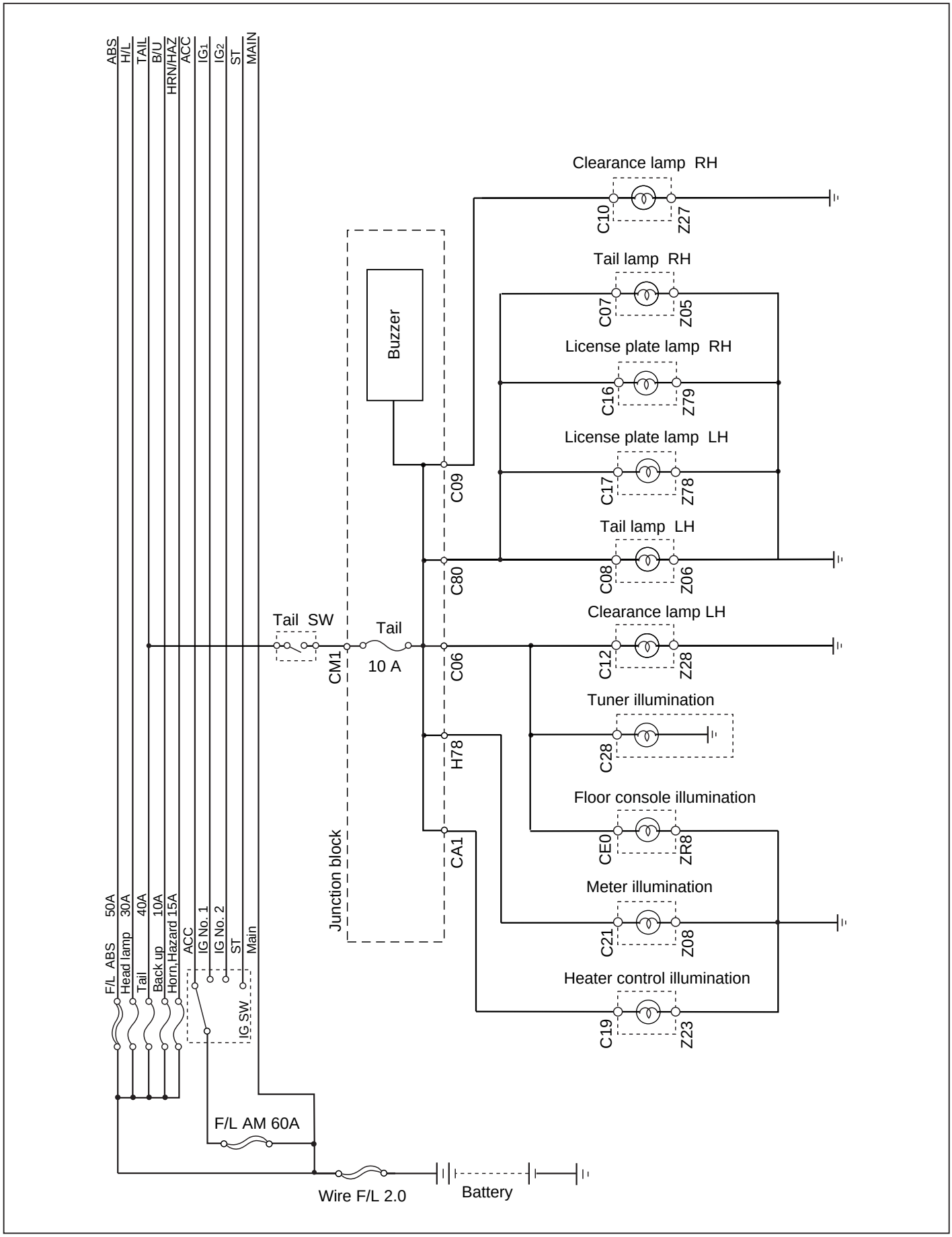
TAIL LAMP & LICENSE PLATE LAMP



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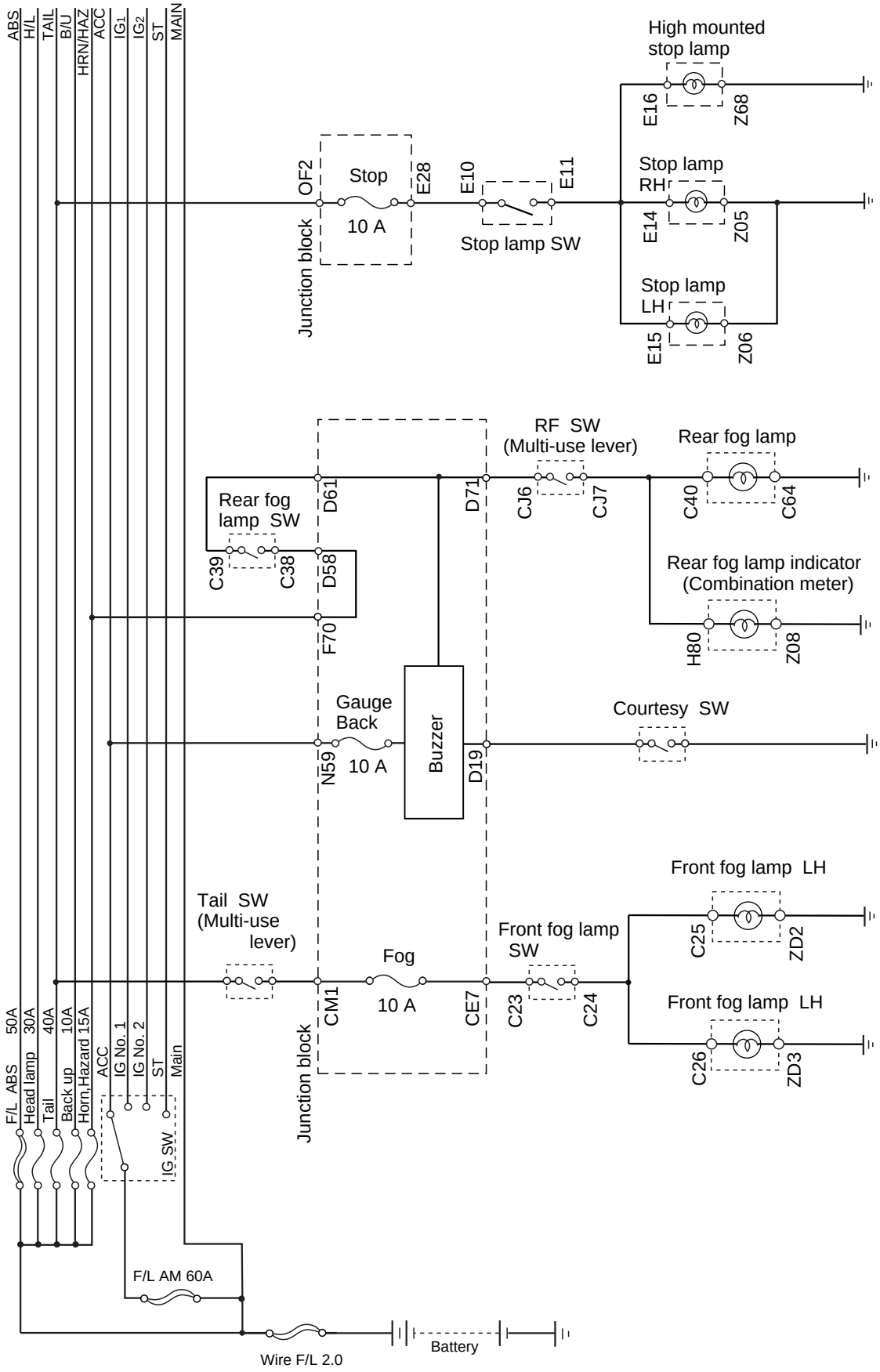
FRONT FOG LAMP, REAR FOG LAMP & STOP LAMP



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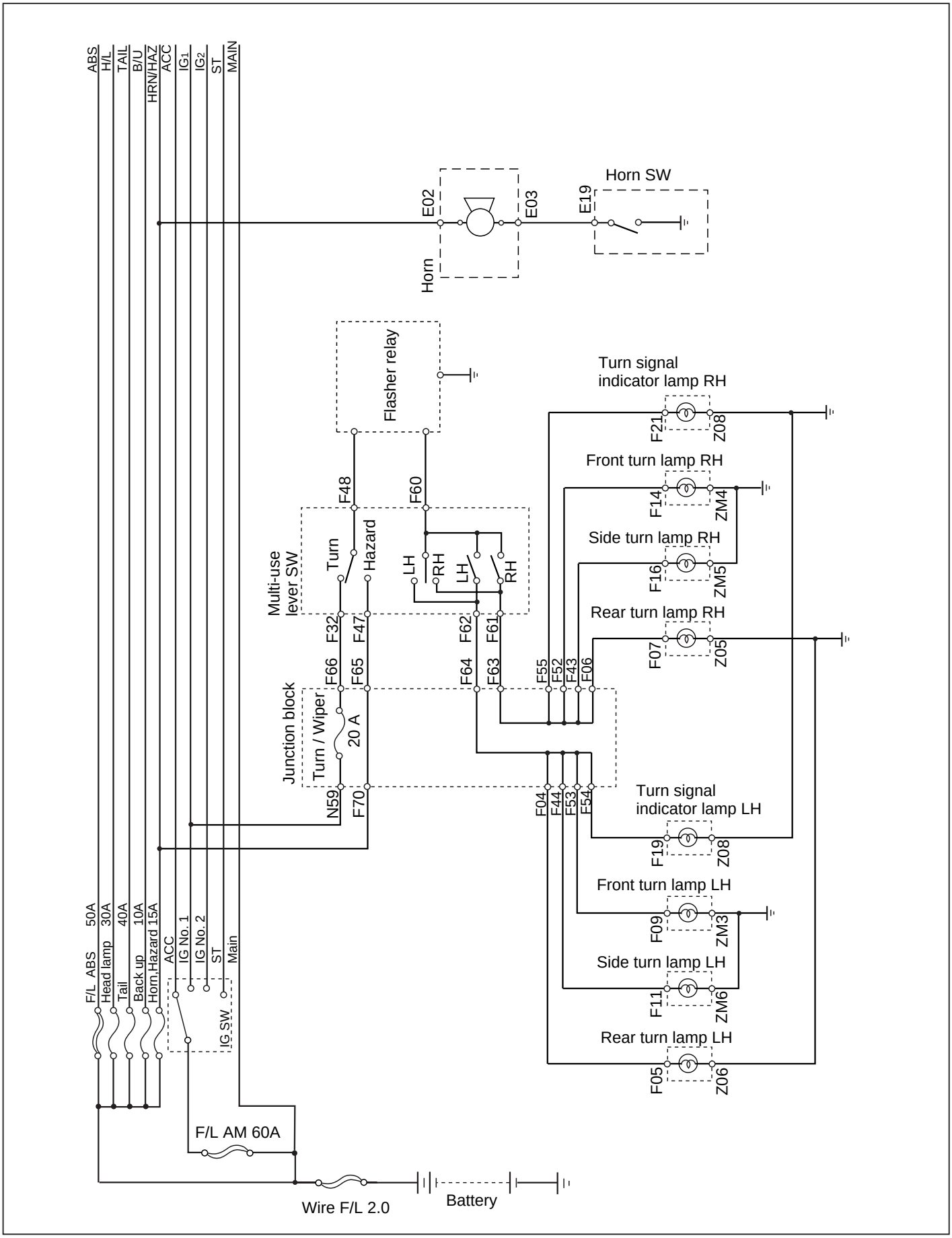
TURN, HAZARD & HORN



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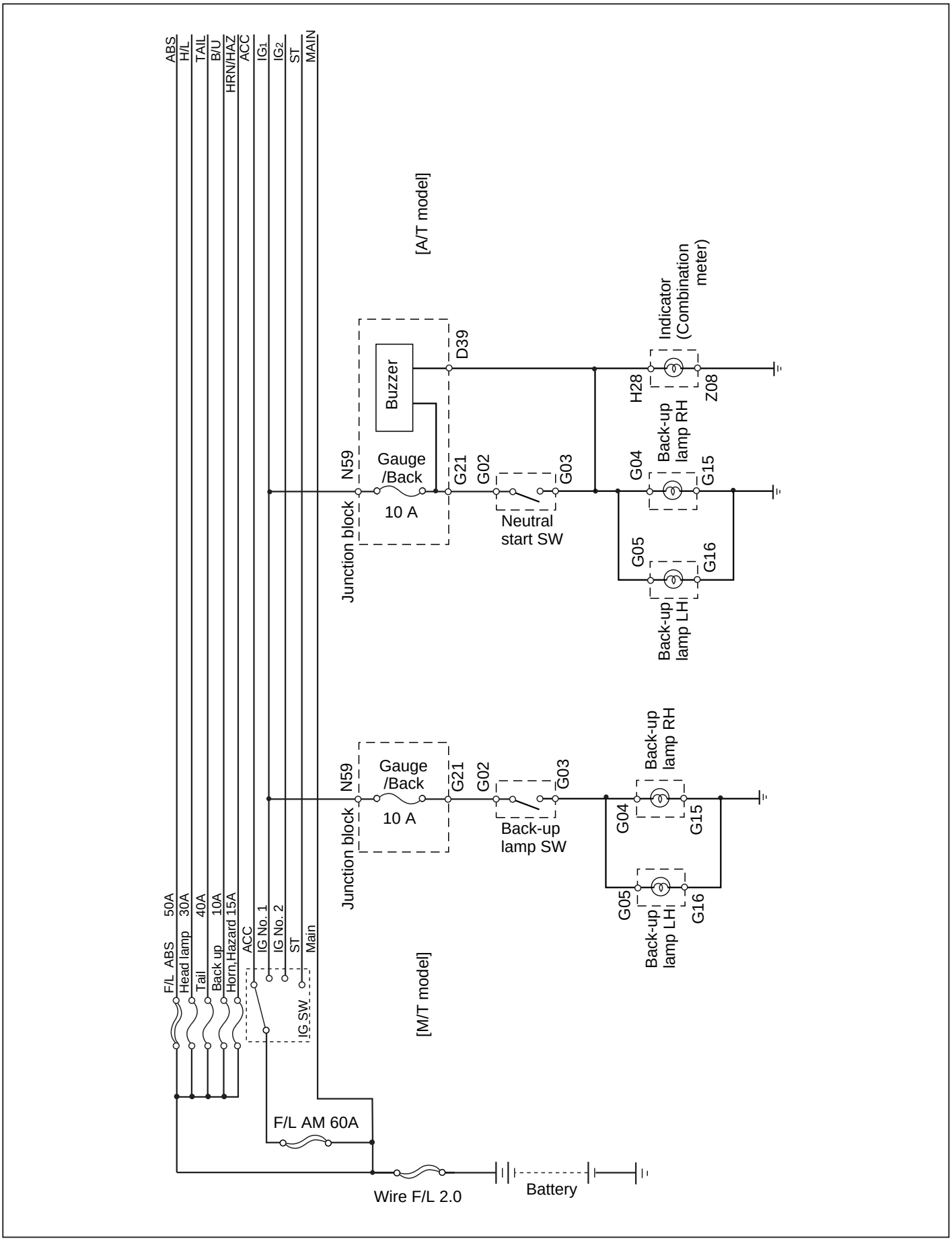
BACK-UP LAMP



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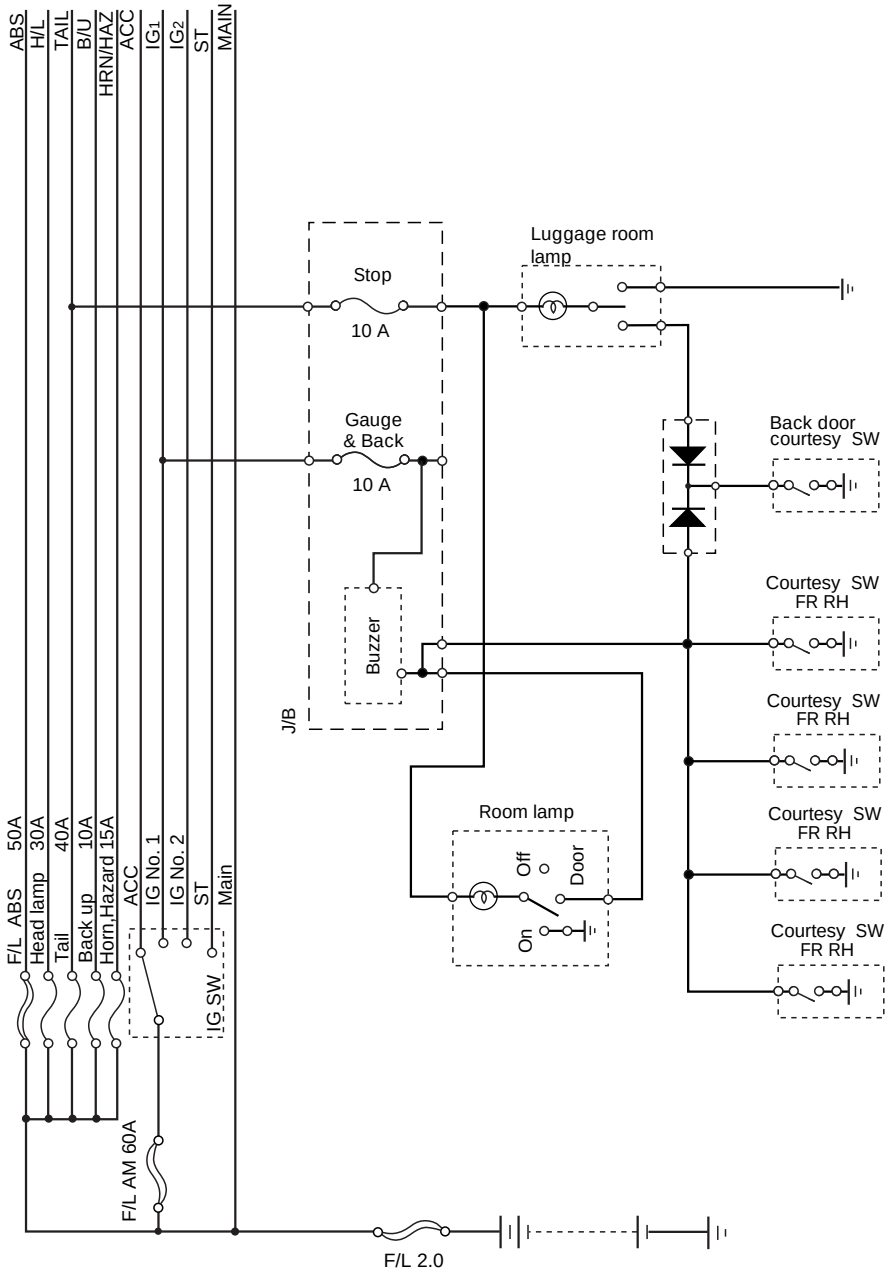
INTERIOR LAMP



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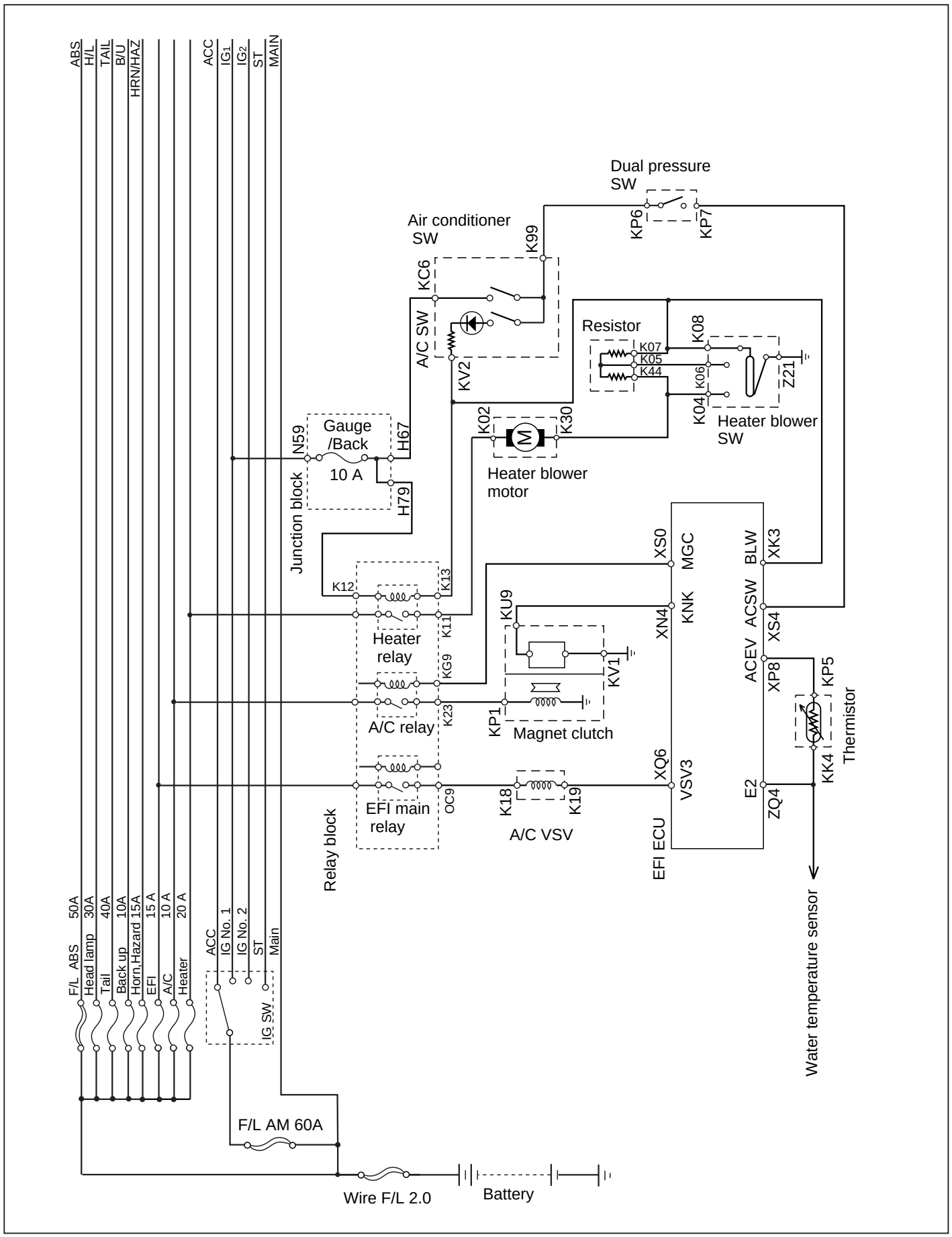
HEATER & AIR CONDITIONER



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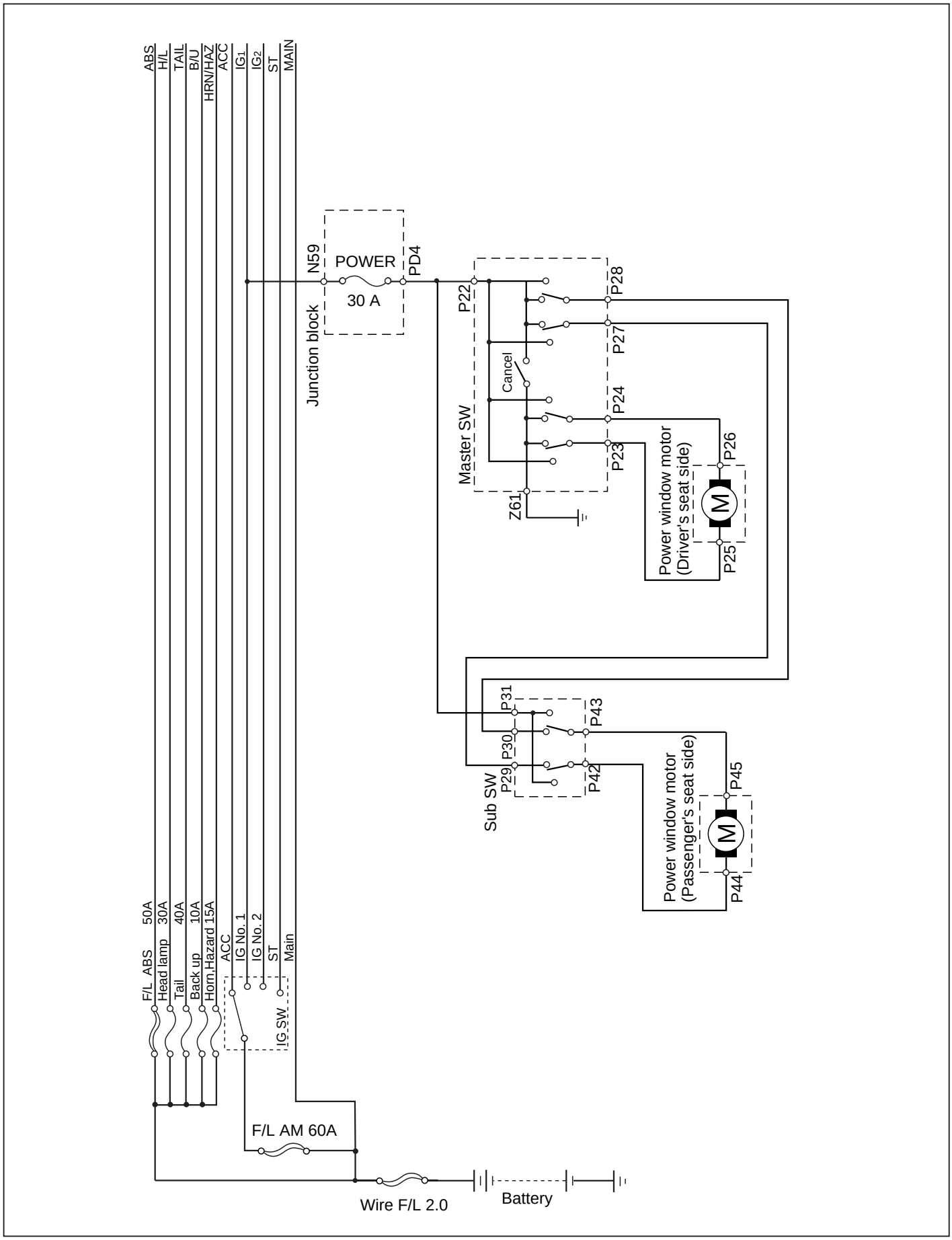
POWER WINDOW



JHW00041-00115

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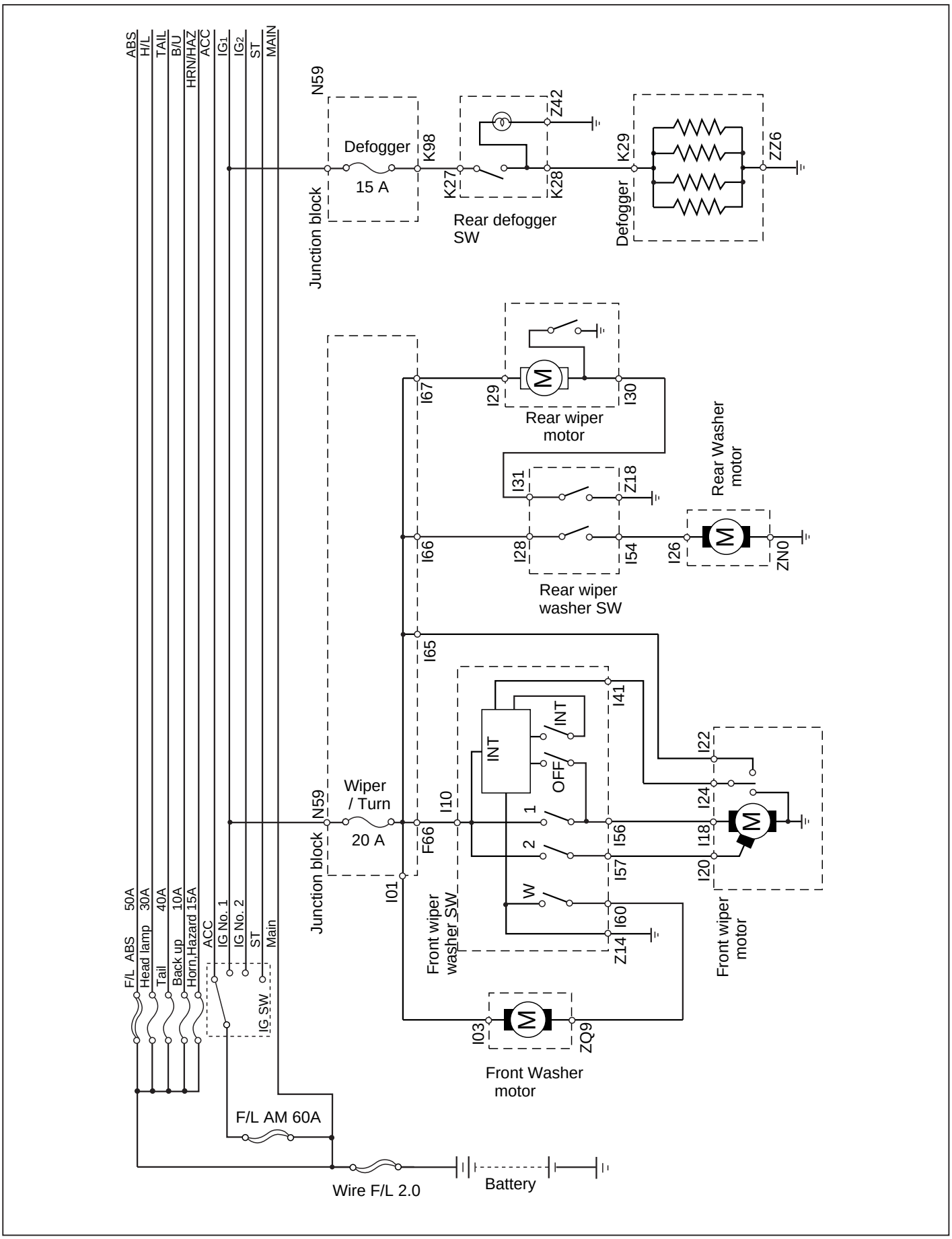
WIPER, WASHER & DEFOGGER



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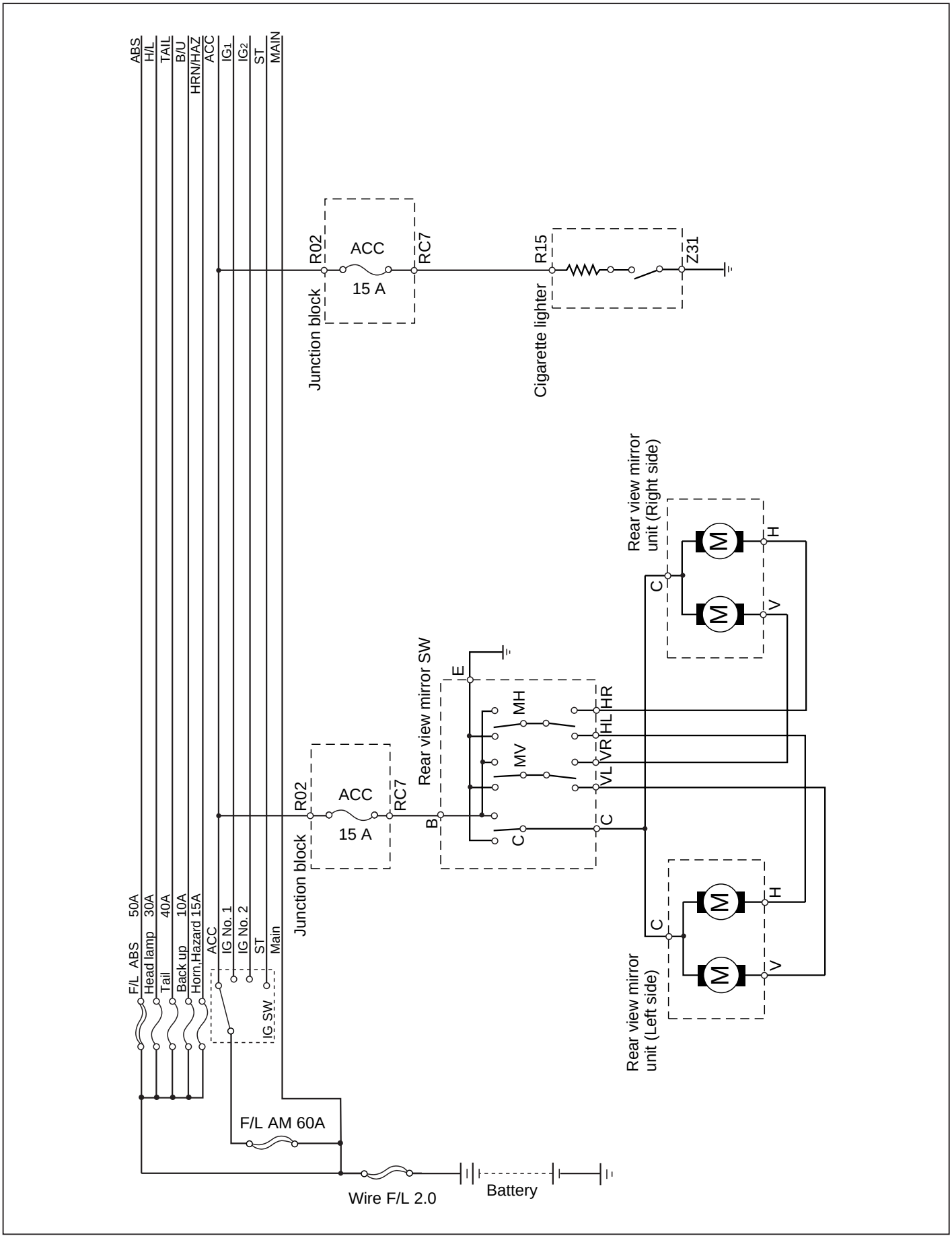
ACCESSORY (REAR VIEW MIRROR & CIGARETTE LIGHTER)



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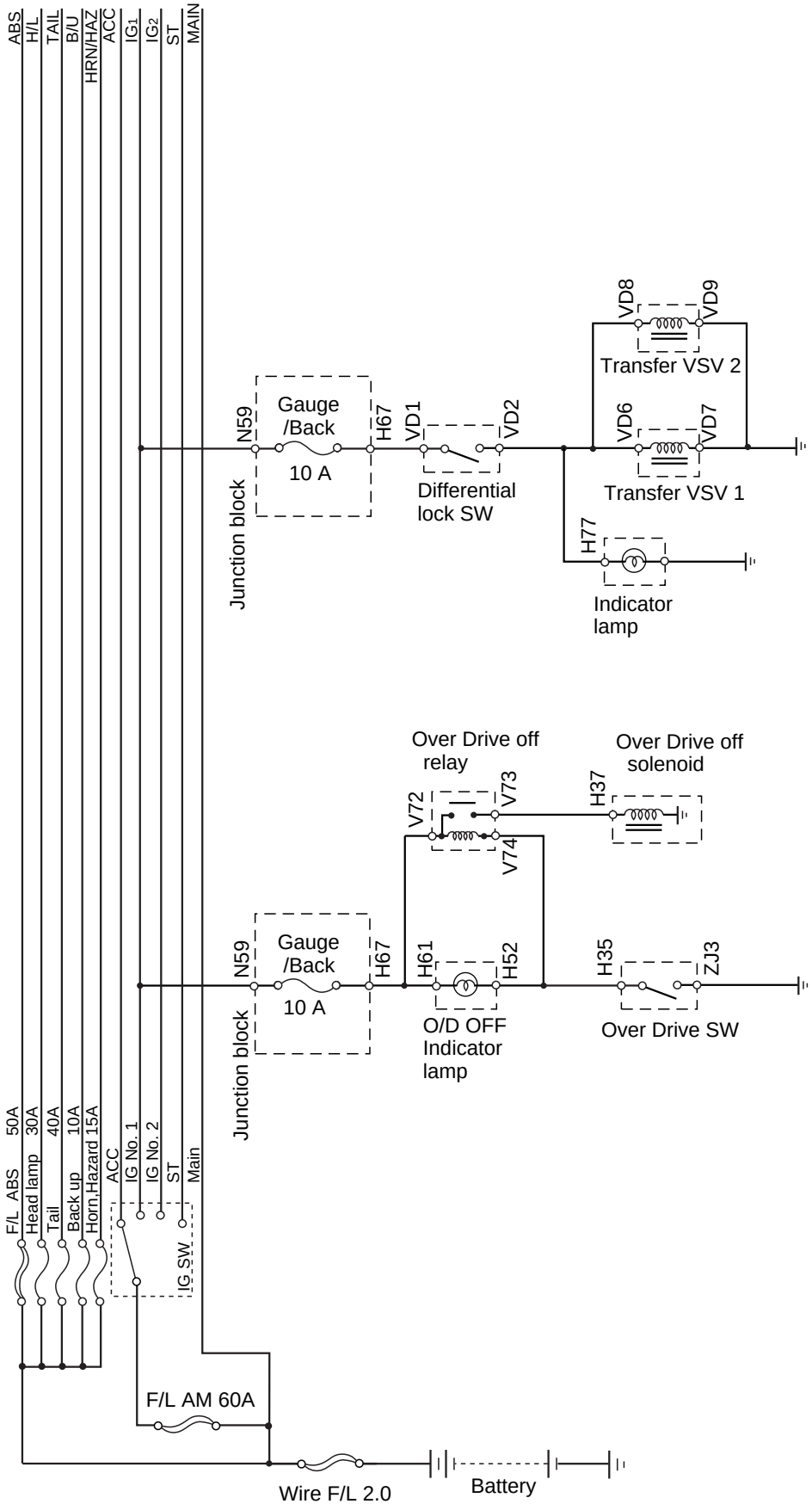
O/D OFF SWITCH & DIFFERENTIAL LOCK SWITCH



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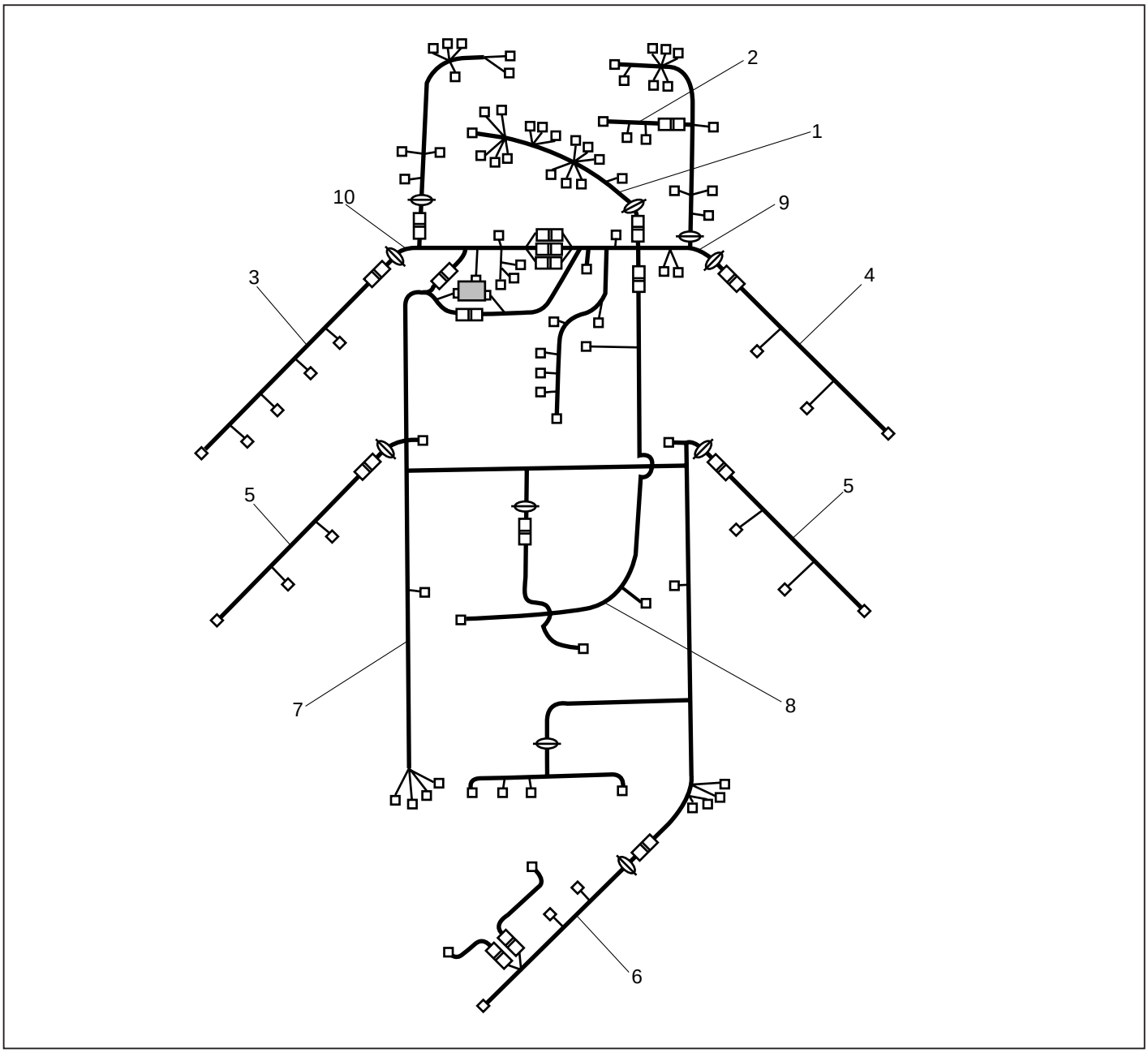
WIRING HARNESS



JHW00045-00200

CONTENTS OF HARNESS DIAGRAM

	WIRE NAME		WIRE NAME
1	WIRE, ENGINE	7	WIRE, FLOOR
2	WIRE, ENGINE, No.2	8	WIRE, FLOOR, No.3
3	WIRE, FRONT DOOR (DRIVER'S SIDE)	9	WIRE, COWL, RH
4	WIRE, FRONT DOOR (PASSENGER'S SIDE)	10	WIRE, COWL, LH
5	WIRE, REAR DOOR		
6	WIRE, BACK DOOR, No.1		

JHW00046-00201

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WIRE, ENGINE

From		To	
Location	Terminal	Terminal	Location
MET (CHG)	O20	O21	ALT (L)
E/G WP BNDR1 (01)	#BA	O19	ALT (IG)
E/G WP BNDR1 (01)	#BA	N76	J/B FUSE ENG (L1)
E/G WP BNDR1 (01)	#BA	N05	IG COIL (+)
E/G WP BNDR1 (01)	#BA	N53	IG COIL NO2 (+)
ALT (IG)	O19	XQ4	EFI ECU (ALTC)
MET THRM G (+)	H20	H21	THRM SENDER (+)
MET OIL PRES (–)	H05	H06	OIL PRESS SW (B)
E/G WP BNDR3 (01)	#DA	ZQ4	EFI ECU (E2)
E/G WP BNDR3 (01)	#DA	KK4	A/C THEMSTR (–)
MG CLT L SSR (B)	KU9	XN4	EFI ECU (KNK)
E/G BNDR1 (E01)	#0A	KV1	MG CLT L SSR (E)
A/C I/UP VSV (–)	K19	XQ6	EFI ECU (VSV3)
E/G J/C1 (E09)	#IJ	ZU2	IG COL SLD E (2)
E/G J/C1 (E06)	#1F	ZU4	IG COL SLD E (4)
IG COIL (–)	N07	XS5	EFI ECU (IG1)
IG COIL NO2 (–)	N54	XS6	EFI ECU (IG2)
EFI ECU (VC)	X38	X46	EFI PRES SSR (VC)
CAM POSI SSR (N +)	N66	XS1	EFI ECU (N +)
CAM POSI SSR (N –)	N74	XS2	EFI ECU (N –)
E/G BNDR1 (E01)	#0A	Z0B	CAM POSI SLD (E01)
EFI ECU (OX)	X27	X28	O2 SSR (+)
E/G BNDR1 (E01)	#0A	ZT6	O2 SSR SLD (E2)
EFI ECU (THW)	X29	X30	EFI TH W SSR (+)
E/G WP BNDR3 (01)	#DA	X31	EFI TH W SSR (–)
EFI ECU (THA)	X32	X33	EFI TH A SSR (+)
E/G WP BNDR3 (01)	#DA	X34	EFI TH A SSR (–)
EFI ECU (AUX1)	XP0	XT2	RESISTOR1 (+)
EFI ECU (PIM)	X43	X45	EFI PRES SSR (PIM)
E/G WP BNDR3 (01)	#DA	X44	EFI PRES SSR (–)
EFI ECU (PSW)	XL3	XT0	THRTL PSI SW (PSW)
E/G WP BNDR3 (01)	#DA	XT1	THRTL PSI SW (–)
E/G WP BNDR3 (01)	#DA	XT3	RESISTOR1 (–)
E/G BNDR1 (E01)	#0A	Z48	EFI ECU (EI)
EFI ECU (E01)	Z47	Z50	ENG EARTH (E)
E/G J/C1 (E02)	#1B	ZX6	EFI ECU (E02)
E/G J/C1 (E11)	#1L	XK7	EFI ECU (PST)
E/G J/C1 (E01)	#1A	Z50	ENG EARTH (E)
E/G BNDR1 (E01)	#0A	Z49	ENG EARTH (E)
EFI ECU (VSV1)	XH3	X09	I/UP VSV (–)
E/G WP BNDR2 (01)	#CA	X08	I/UP VSV (+)
E/G WP BNDR2 (01)	#CA	X50	FUL INJ NO1 (+)
E/G WP BNDR2 (01)	#CA	#HD	COWL R BNDR3 (04) for LHD vehicle
E/G WP BNDR2 (01)	#CA	#RL	COWL LH J/C9 (11) for RHD vehicle
FUL INJ NO2 (–)	X53	X96	EFI ECU (#20)
E/G WP BNDR2 (01)	#CA	X97	FUL INJ NO4 (+)
E/G WP BNDR2 (01)	#CA	X52	FUL INJ NO2(+)
E/G WP BNDR2 (01)	#CA	X54	FUL INJ NO3 (+)
FUL INJ NO1 (–)	X51	X56	EFI ECU (#10)
E/G J/C1 (E07)	#1G	N80	IG COIL NO1 (ECUE)
E/G J/C1 (E10)	#1K	N81	IG COIL NO2 (ECUE)
Connect to X38~X46		X99	THROTTLE SSR (VC)
Connect to X53~X96		X98	FUL INJ NO4 (–)
Connect to X51		X55	FUL INJ NO3 (–)
E/G WP BNDR2 (01)	#CA	XF2	I/UP VSV2 (+)
I/UP VSV2 (–)	XF3	X10	EFI ECU (VSV2)

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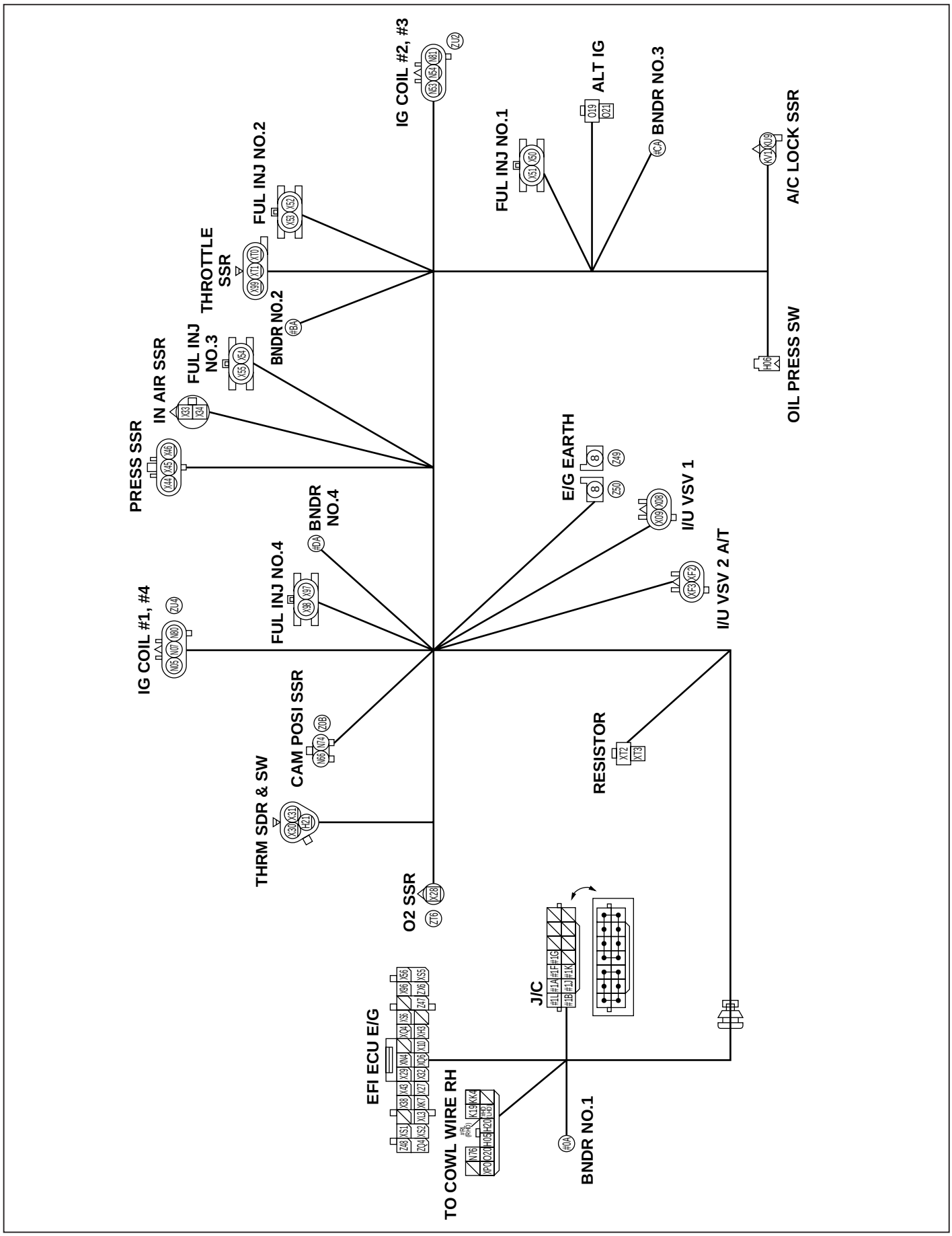
WIRE, ENGINE



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WIRE, ENGINE No. 2

From		To	
Location	Terminal	Terminal	Location
R/B (+B)	OC3	OD8	BATTERY (+)
R/B (+B)	OC3	O18	ALT (B)
BATTERY (–)	OD7	OE1	BATTERY – (BODY)
BATTERY (–)	OD7	OE0	BATTERY – (M/T)
BATTERY (+B)	OD2	OD9	STARTER (+B)
STARTER (ST)	M02	M14	ST RLY (L)
F/L 2.0	OB5	OR6	F/L 2.0

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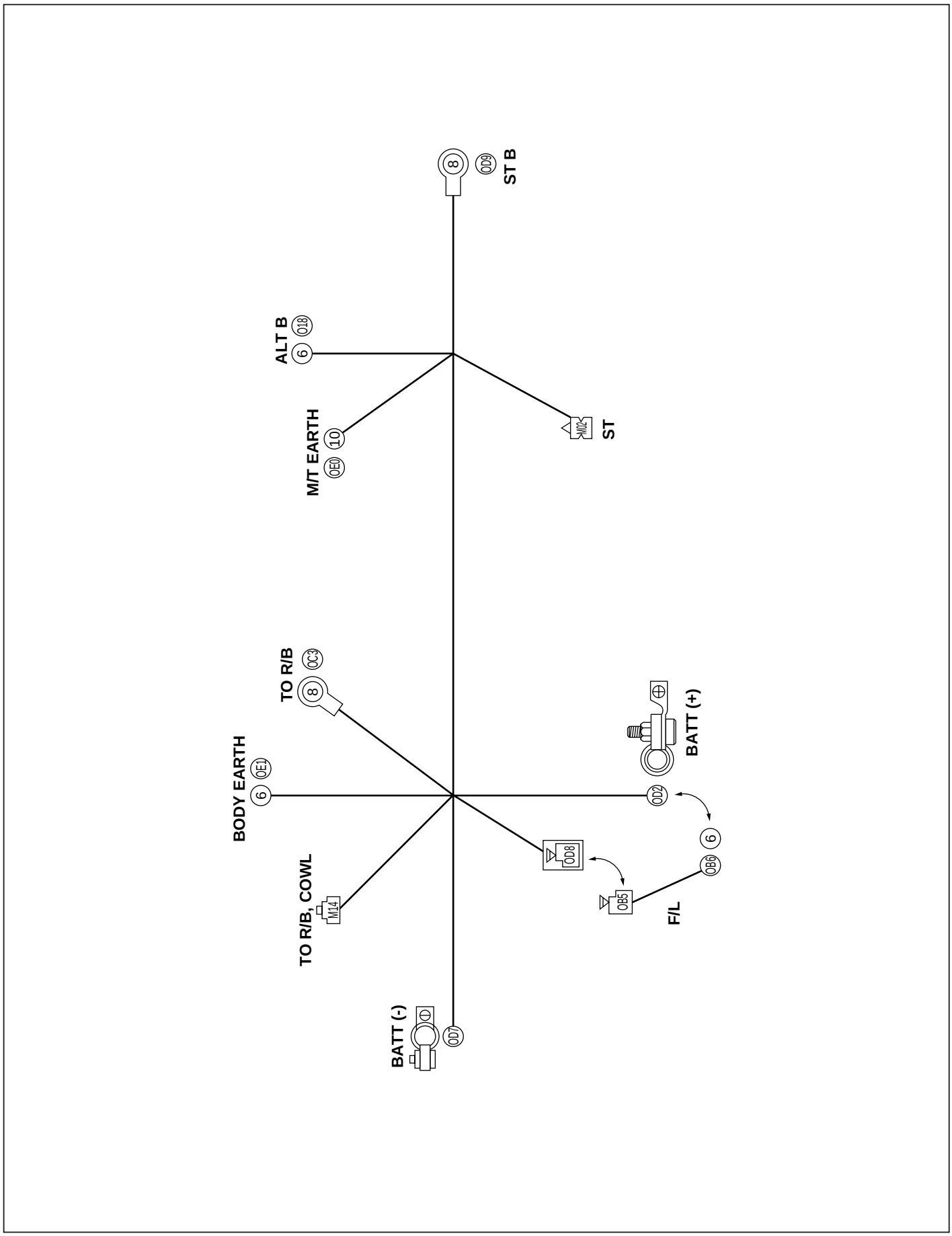
WIRE, ENGINE No. 2



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WIRE, FRONT DOOR (DRIVER'S SEAT SIDE/RHD)

From		To	
Location	Terminal	Terminal	Location
COWL RH J/C5 (08)	#GH	R26	E MIRROR RH (C)
E MIRROR SW (VR)	R19	R24	E MIRROR RH (V)
E MIRROR SW (HR)	R21	R25	E MIRROR RH (H)
RADIO (SPR +)	R10	R11	SP FR RH (+)
RADIO (SPR –)	R12	R13	SP FR RH (–)
D/L CTR RLY (ULSW)	Q02	Q25	D/LOCK SW (U/L +)
COWL RH J/C1 (E04)	#2D	ZS1	D/LOCK SW (E)
COWL LH J/C4 (14)	#FU	Q66	D/L MTR FR D (LOK +)
COWL LH J/C4 (15)	#FV	Q65	D/L MTR FR D (U/L +)
COWL RH J/C1 (E05)	#2E	Z61	P/W MAS SW (E)
COWL RH J/C3 (04)	#ED	P22	P/W MAS SW (B)
P/W MAS SW (M/U +)	P23	P25	P/W MTR FRRH (U +)
P/W MAS SW (M/D +)	P24	P26	P/W MTR FRRH (D +)
P/W MAS SW (PU +)	P27	P29	P/W SW FR P (U +)
P/W MAS SW (PD +)	P28	P30	P/W SW FR P (D +)
P/W MAS SW (RLU +)	P37	P39	P/W SW RRLH (U +)
P/W MAS SW (RLD +)	P38	P40	P/W SW RRLH (D +)
P/W MAS SW (RRU +)	P32	P34	P/W SW RRRH (U +)
P/W MAS SW (RRD +)	P33	P35	P/W SW RRRH (D +)

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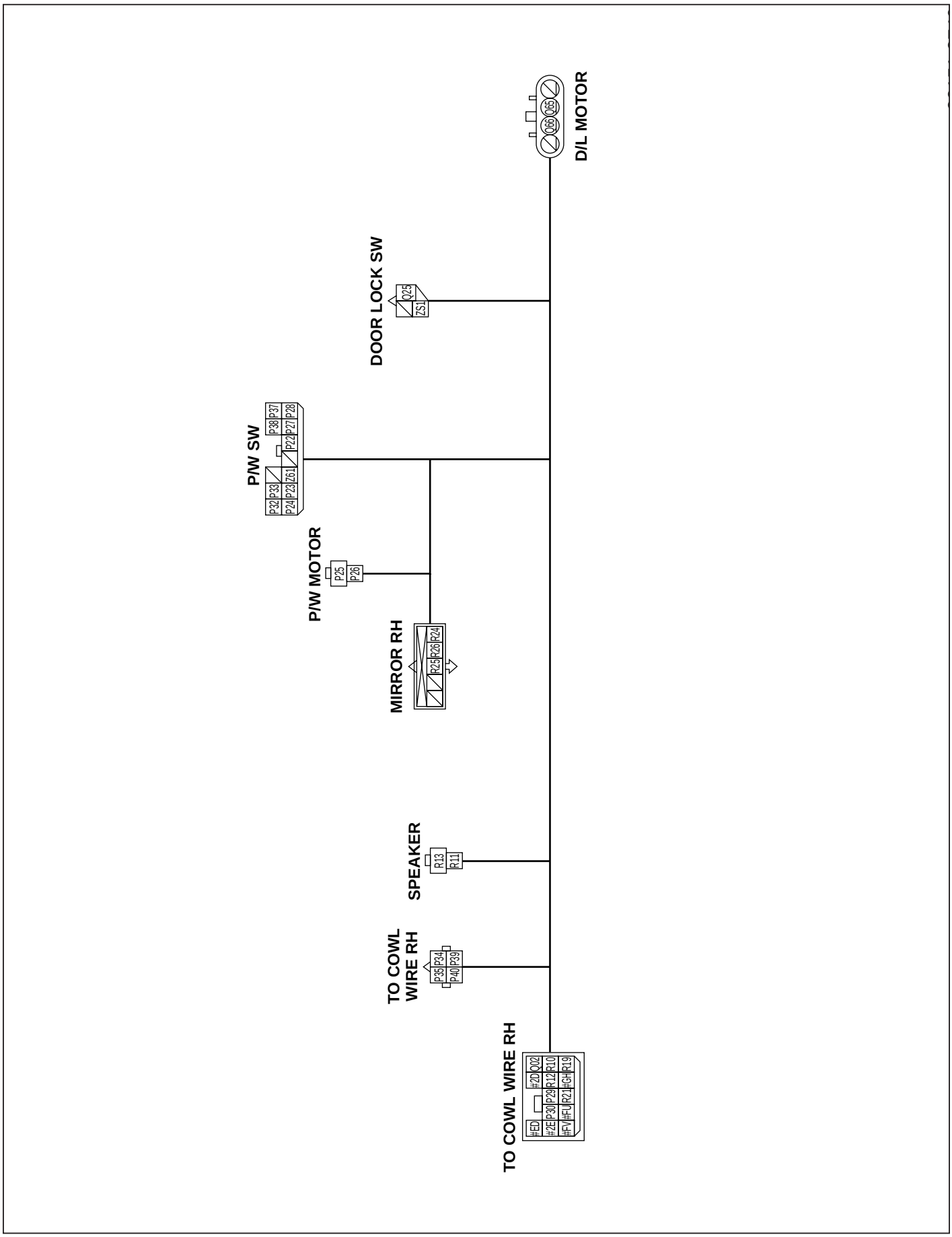
WIRE, FRONT DOOR (DRIVER'S SEAT SIDE/RHD)



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WIRE, FRONT DOOR (PASSENGER'S SEAT SIDE/RHD)

From		To	
Location	Terminal	Terminal	Location
COWL RH J/C5 (09)	#GJ	R27	E MIRROR LH (C)
E MIRROR SW (HL)	R20	R23	E MIRROR LH (H)
E MIRROR SW (VL)	R18	R22	E MIRROR LH (V)
RADIO (SPL –)	R08	R09	SP FR LH (–)
RADIO (SPL +)	R06	R07	SP FR LH (+)
COWL RH J/C4 (12)	#FM	Q28	D/L MTR FR P (LOK +)
COWL RH J/C4 (09)	#FJ	Q27	D/L MTR FR P (U/L +)
COWL RH J/C3 (05)	#EE	P31	P/W SW FR P (B)
P/W MAS SW (PU +)	P27	P29	P/W SW FR P (U +)
P/W MAS SW (PD +)	P28	P30	P/W SW FR P (D +)
P/W SW FR P (M/D +)	P43	P45	P/W MTR FR P (D +)
P/W SW FR P (M/U +)	P42	P44	P/W MTR FR P (U +)

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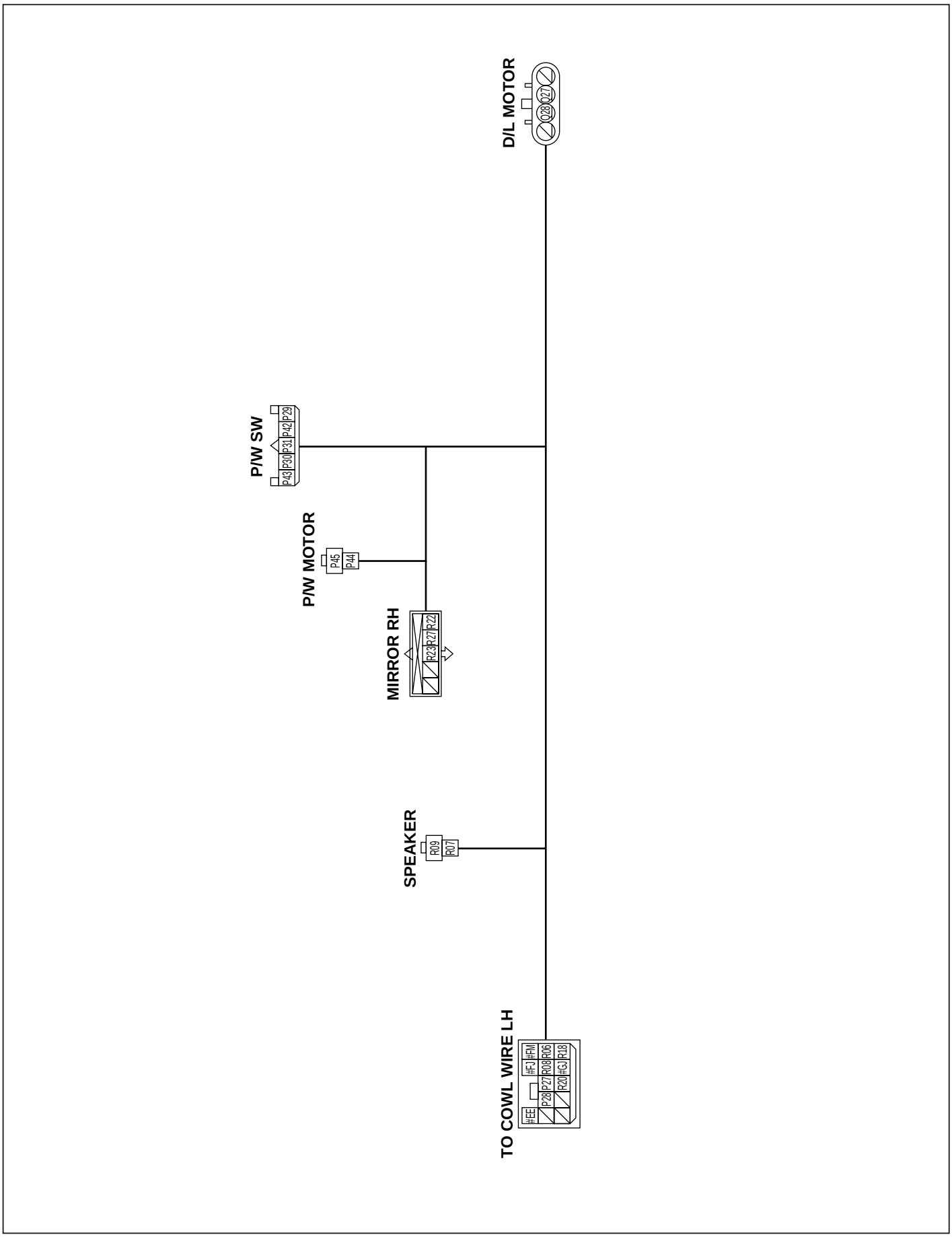
WIRE, FRONT DOOR (PASSENGER'S SEAT SIDE/RHD)



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WIRE, FRONT DOOR (DRIVER'S SEAT SIDE/LHD)

From		To	
Location	Terminal	Terminal	Location
CWL LH J/C3 (12)	#KM	R27	E MIRROR LH (C)
E MIRROR SW (HL)	R20	R23	E MIRROR LH (H)
E MIRROR SW (VL)	R18	R22	E MIRROR LH (V)
RADIO (SPL +)	R06	R07	SP FR LH (+)
RADIO (SPL –)	R08	R09	SP FR LH (–)
D/L CTR RLY (ULSW)	Q02	Q25	D/LOCK SW (U/L +)
COWL LH J/C1 (E04)	#6D	ZS1	D/LOCK SW (E)
COWL LH J/C3 (16)	#KQ	Q66	D/L MTR FR D (LOK +)
COWL LH J/C3 (15)	#KP	Q65	D/L MTR FR D (U/L +)
COWL LH J/C1 (E05)	#6E	Z61	P/W MAS SW (E)
COWL LH J/C4 (07)	#LG	P22	P/W MAS SW (B)
P/W MAS SW (M/U +)	P23	P25	P/W MTR FRRH (U +)
P/W MAS SW (M/D +)	P24	P26	P/W MTR FRRH (D +)
P/W MAS SW (PU +)	P27	P29	P/W SW FR P (U +)
P/W MAS SW (PD +)	P28	P30	P/W SW FR P (D +)

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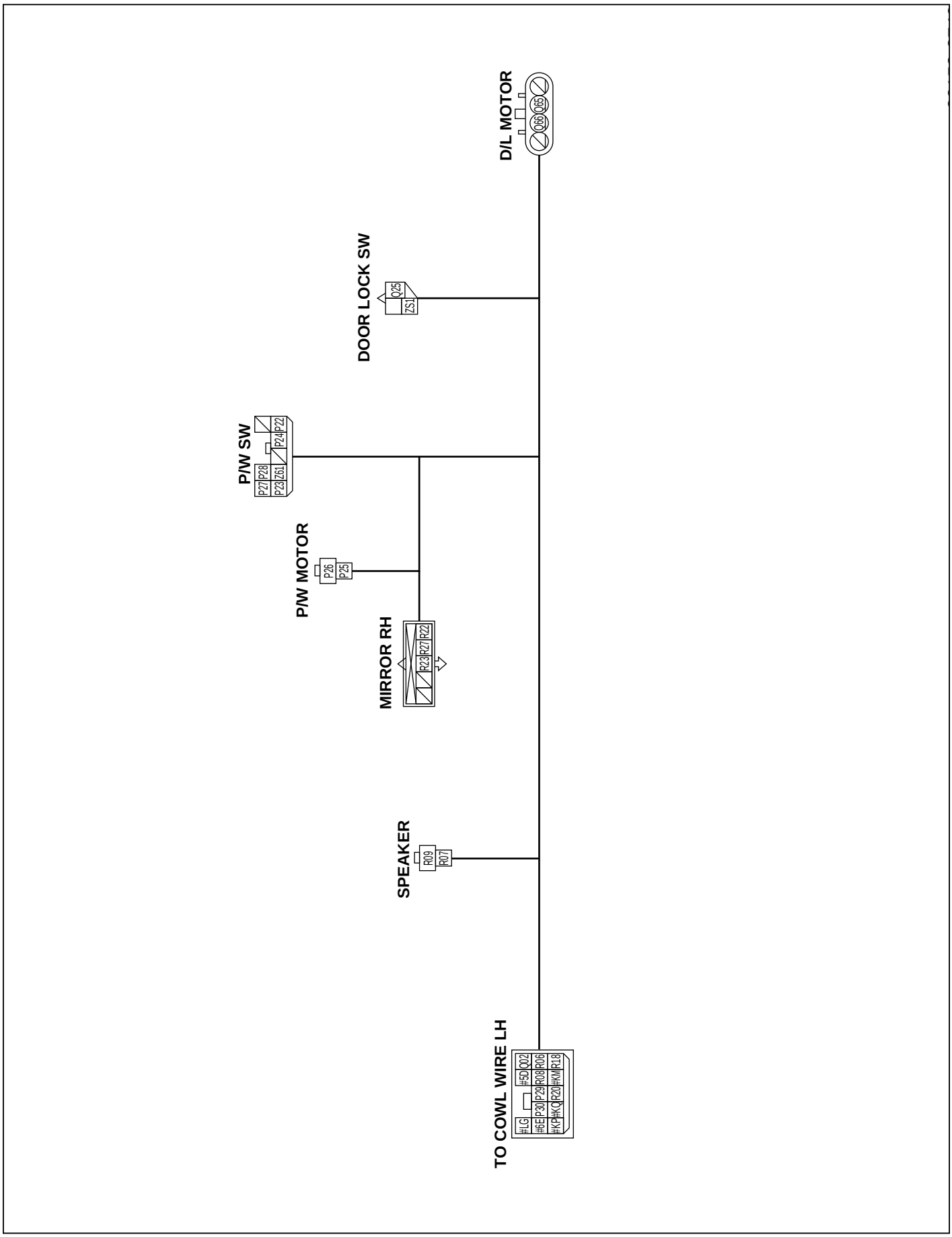
WIRE, FRONT DOOR (DRIVER'S SEAT SIDE/LHD)



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WIRE, FRONT DOOR (PASSENGER'S SEAT SIDE/LHD)

From		To	
Location	Terminal	Terminal	Location
COWL LH J/C3 (13)	#KN	R26	E MIRROR RH (C)
E MIRROR SW (VR)	R19	R24	E MIRROR RH (V)
E MIRROR SW (HR)	R21	R25	E MIRROR RH (H)
RADIO (SPR +)	R10	R11	SP FR RH (+)
RADIO (SPR –)	R12	R13	SP FR RH (–)
COWL LH J/C3 (09)	#KJ	Q28	D/L MTR FR P (LOK +)
COWL LH J/C3 (06)	#KF	Q27	D/L MTR FR P (U/L +)
COWL LH J/C4 (08)	#LH	P31	P/W SW FR P (B)
P/W MAS SW (PU +)	P27	P29	P/W SW FR P (U +)
P/W MAS SW (PD +)	P28	P30	P/W SW FR P (D +)
P/W SW FR P (M/D +)	P43	P45	P/W MTR FR P (D +)
P/W SW FR P (M/U +)	P42	P44	P/W MTR FR P (U +)

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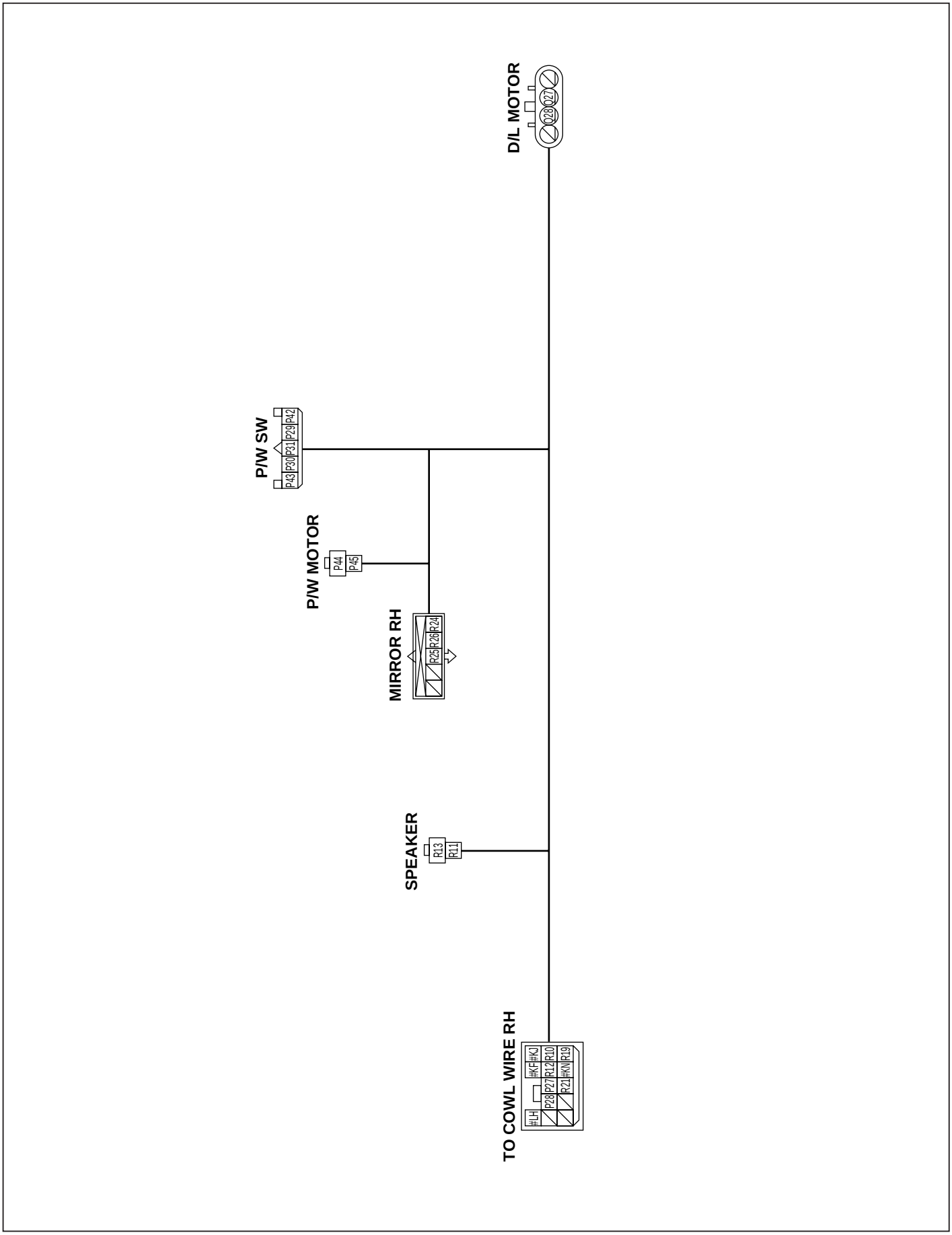
WIRE, FRONT DOOR (PASSENGER'S SEAT SIDE/LHD)



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WIRE, REAR DOOR

From		To	
Location	Terminal	Terminal	Location
FLOOR J/C2 (13)	#WN	Q30	D/L MTR RRRH (LOK +)
FLOOR J/C2 (09)	#WJ	Q29	D/L MTR RRRH (U/L +)
P/W MAS SW (RRU +)	P32	P34	P/W SW RRRH (U +)
P/W MAS SW (RRD +)	P33	P35	P/W SW RRRH (D +)
FLOOR J/C1 (09)	#SJ	P36	P/W SW RRRH (B)
P/W SW RRRH (M/U +)	P46	P48	P/W MTR RRRH (U +)
P/W SW RRRH (M/D +)	P47	P49	P/W MTR RRRH (D +)

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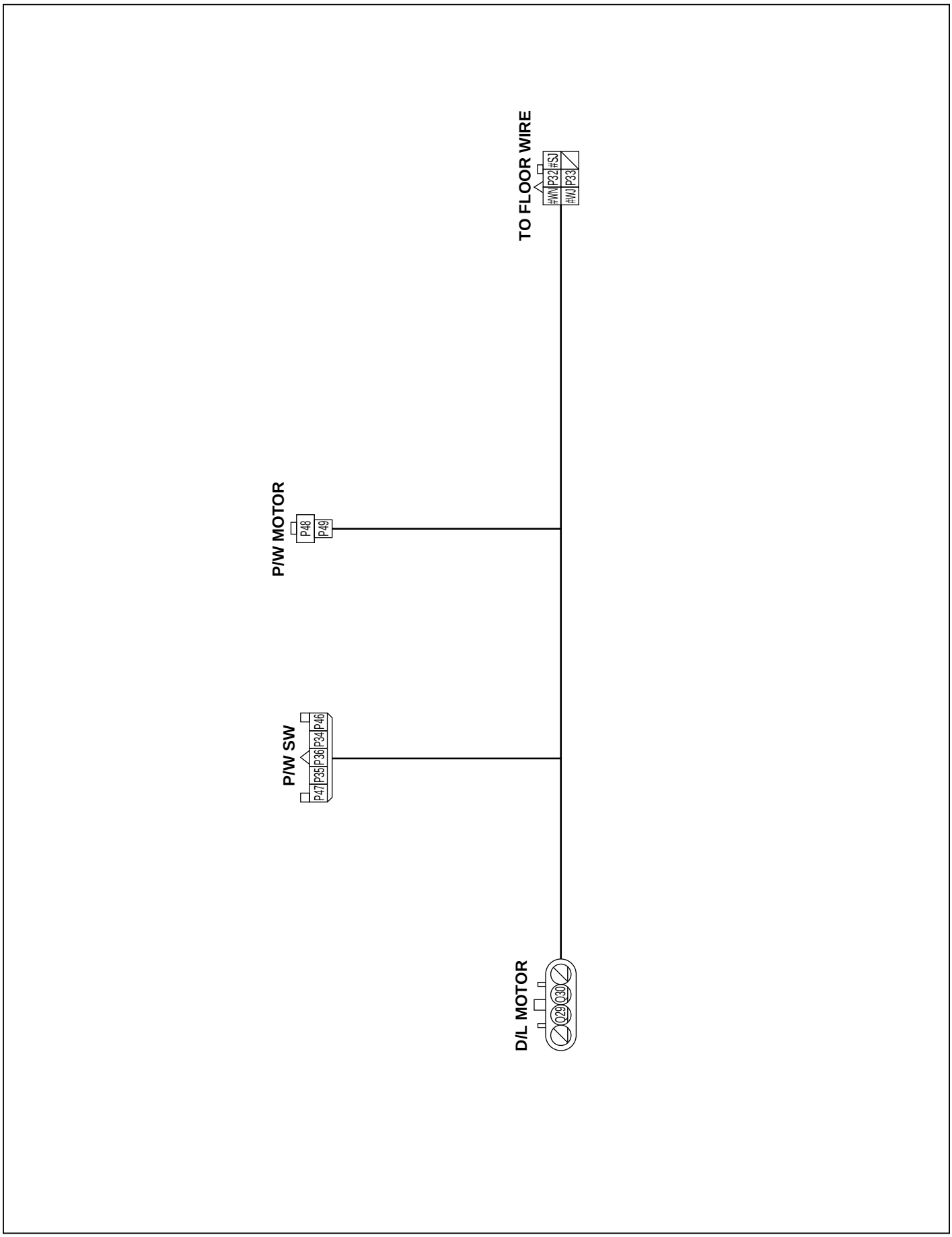
WIRE, REAR DOOR



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WIRE, BACK DOOR, No. 1

From		To	
Location	Terminal	Terminal	Location
FLOOR BNDR 2 (01)	#UA	E16	H. M. STOP LP (+)
BODY EARTH (RRRH)	Z07	Z68	H. M. STOP LP (–)
RR WIP MTR (+)	I29	I67	J/B F/WP TRN (L3)
RR WIP MTR (–)	I30	I31	RR WIP SW (B)
COWL LH J/C6 (05)	#NE	K29	DEF (+)
FLOOR BNDR1 (E01)	#AA	Z07	BODY EARTH (RRRH)
RADIO (SSR +)	R28	R32	RR SP RH (+)
RADIO (SSR –)	R29	R33	RR SP RH (–)
RADIO (SRL –)	R31	R35	RR SP LH (–)
RADIO (SRL +)	R30	R34	RR SP LH (+)
FLOOR J/C2 (12)	#WM	Q76	B/DR LOCK SW (LOK +)
FLOOR J/C 2 (08)	#WH	Q77	B/DR LOCK SW (U/L +)
FLOOR BNDR 2 (01)	#UA	E16	H. M. STOP LP (+)
BODY EARTH (RRRH)	Z07	Z68	H. M. STOP LP (–)
RR WIP MTR (+)	I29	I67	J/B F/WP-TRN (L3)
RR WIP MTR (–)	I30	I31	RR WIP SW (B)
COWL LH J/C6 (05)	#NE	K29	DEF (+)
FLOOR BNDR1 (E01)	#AA	K07	BODY EARTH (RRRH)
FLOOR J/C2 (12)	#WM	Q76	B/DR LOCK SW (LOK +)
FLOOR J/C2 (08)	#WH	Q77	B/DR LOCK SW (U/L +)

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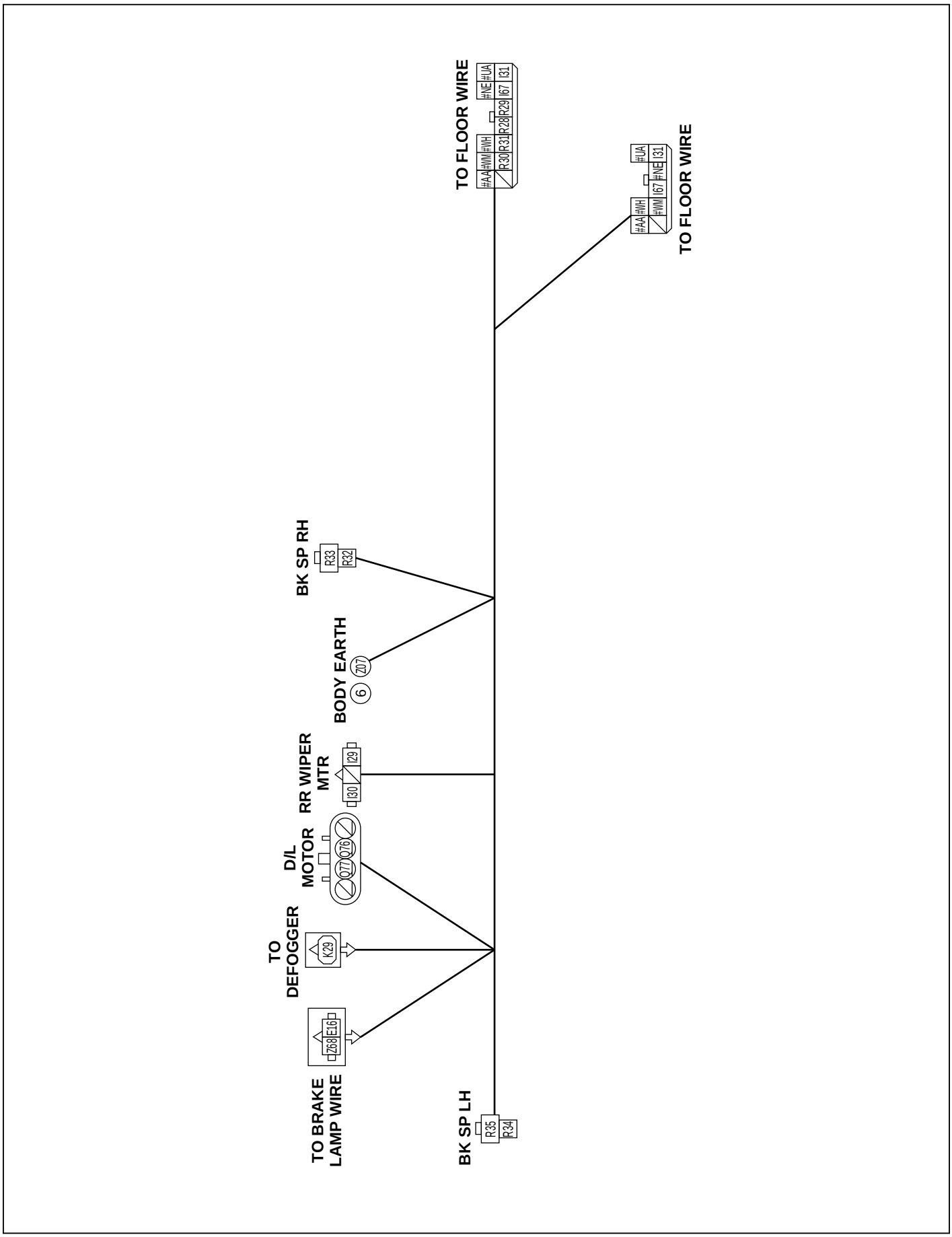
WIRE, BACK DOOR, No. 1



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WIRE, FLOOR (RHD)

From		To	
Location	Terminal	Terminal	Location
COWL RH J/C5 (12)	#GM	C40	RR FOG LP (+)
FLOOR BNDR1 (E01)	#AA	C64	RR FOG LP (–)
FLOOR BNDR3 (02)	#VB	D19	J/B CTY SW (+1)
FLOOR J/C1 (08)	#SH	C80	J/B TL LH (+)
FLOOR J/C1 (05)	#SE	C08	TAIL LP LH (+)
FLOOR J/C1 (06)	#SF	C16	LICENSE LP R (+)
FLOOR J/C1 (04)	#SD	C07	TAIL LP RH (+)
FLOOR BNDR1 (E01)	#AA	Z05	RR COM LP RH (–)
FLOOR BNDR1 (E01)	#AA	Z79	LICENSE LP R (–)
FLOOR BNDR1 (E01)	#AA	Z06	RR COM LP LH (–)
FLOOR J/C1 (06)	#SF	C16	LICENSE LP R (+)
FLOOR BNDR1 (E01)	#AA	Z79	LICENSE LP R (–)
FLOOR J/C1 (07)	#SG	C17	LICENSE LP L (+)
FLOOR BNDR1 (E01)	#AA	Z78	LICENSE LP L (–)
COWL LH J/C9 (06)	#RF	#UA	FLOOR BNDR2 (01)
FLOOR BNDR2 (01)	#UA	E14	STOP LP RH (+)
FLOOR BNDR2 (01)	#UA	E15	STOP LP LH (+)
FLOOR BNDR2 (01)	#UA	E33	H. M. STOP LP (SPR +)
FLOOR BNDR1 (E01)	#AA	Z69	H. M. STOP LP (SPR –)
FLOOR BNDR2 (01)	#UA	E16	H. M. STOP LP (+)
FLOOR BNDR1 (E01)	#AA	Z07	BODY EARTH (RRRH)
FLOOR BNDR3 (02)	#VB	D06	CTY SW FR RH (+)
FLOOR BNDR3 (02)	#VB	D08	CTY SW RR RH (+)
FLOOR BNDR3 (02)	#VB	D09	CTY SW RR LH (+)
FLOOR BNDR3 (02)	#VB	D07	CTY SW FR LH (+)
FLOOR J/C1 (01)	#SA	G03	BACK LP SW (–)
FLOOR J/C1 (02)	#SB	G04	BACK LP RH (+)
FLOOR J/C1 (03)	#SC	G05	BACK LP LH (+)
FLOOR BNDR1 (E01)	#AA	G15	BACK LP RH (–)
FLOOR BNDR1 (E01)	#AA	G16	BACK LP LH (–)
J/B R/TRN LP (LH +)	F04	F05	RR TRN LP LH (+)
J/B R/TRN LP (RH +)	F06	F07	RR TRN LP RH (+)
COWL LH J/C5 (06)	#MF	D67	LUG ROOM LMP (B)
FLOOR BNDR3 (02)	#VB	D68	LUG ROOM LMP (L)
FLOOR BNDR1 (E01)	#AA	ZB2	LUG ROOM LMP (E)
FLOOR BNDR3 (02)	#VB	D69	CTY SW BACK (+)
MET FUEL G (+)	H22	H23	FUEL SENDER (+)
FUEL SENDER (–)	H57	ZZ0	BODY EARTH (–)
FLOOR BNDR1 (E01)	#AA	Z40	SEAT BELT SW (–)
MET SB WRN (–)	H56	H58	SEAT BELT SW (+)
FLOOR BNDR1 (E01)	#AA	ZZ7	BODY EARTH (–)
RR WIP MTR (+)	I29	I67	J/B F/WP-TRN (L3)
RR WIP MTR (–)	I30	I31	RR WIP SW (B)
COWL LH J/C6 (05)	#NE	K29	DEF (+)
RADIO (SRR –)	R29	R33	RR SP RH (–)
RADIO (SRR +)	R28	R32	RR SP RH (+)
RADIO (SRL +)	R30	R34	RR SP LH (+)
RADIO (SRL –)	R31	R35	RR SP LH (–)
FLOOR J/C2 (13)	#WN	Q30	D/L MTR RRRH (LOK +)
FLOOR J/C2 (09)	#WJ	Q29	D/L MTR RRRH (U/L +)
FLOOR J/C2 (12)	#WM	Q76	B/DR LOCK SW (LOK +)
FLOOR J/C2 (08)	#WH	Q77	B/DR LOCK SW (U/L +)

From		To	
Location	Terminal	Terminal	Location
FLOOR J/C2 (11)	#WL	Q32	D/L MTR RRLH (LOK +)
FLOOR J/C2 (07)	#WG	Q31	D/L MTR RRLH (U/L +)
COWL RH J/C4 (13)	#FN	#WK	FLOOR J/C2 (10)
COWL RH J/C4 (10)	#FK	#WF	FLOOR J/C2 (06)
FLOOR J/C1 (11)	#SL	P41	P/W SW RRLH (B)
P/W MAS SW (RLU +)	P37	P39	P/W SW RRLH (U +)
P/W MAS SW (RLD +)	P38	P40	P/W SW RRLH (D +)
P/W MAS SW (RRU +)	P32	P34	P/W SW RRRH (U +)
P/W MAS SW (RRD +)	P33	P35	P/W SW RRRH (D +)
COWL RH J/C3 (10)	#EK	#SK	FLOOR J/C1 (10)
FLOOR J/C1 (09)	#SJ	P36	P/W SW RRRH (B)
FUSE ACC (L5)	RD1	RD2	ACC PLUG (B)
FLOOR BNDR1 (E01)	#AA	ZZK	ACC PLUG (E)
FUEL PUMP (E)	ZC6	ZZ7	BODY EARTH (–)
F/P RLY (L)	PD6	P06	FUEL PUMP (+)
COWL RH J/C1 (E03)	#2C	ZZ0	BODY EARTH (–)

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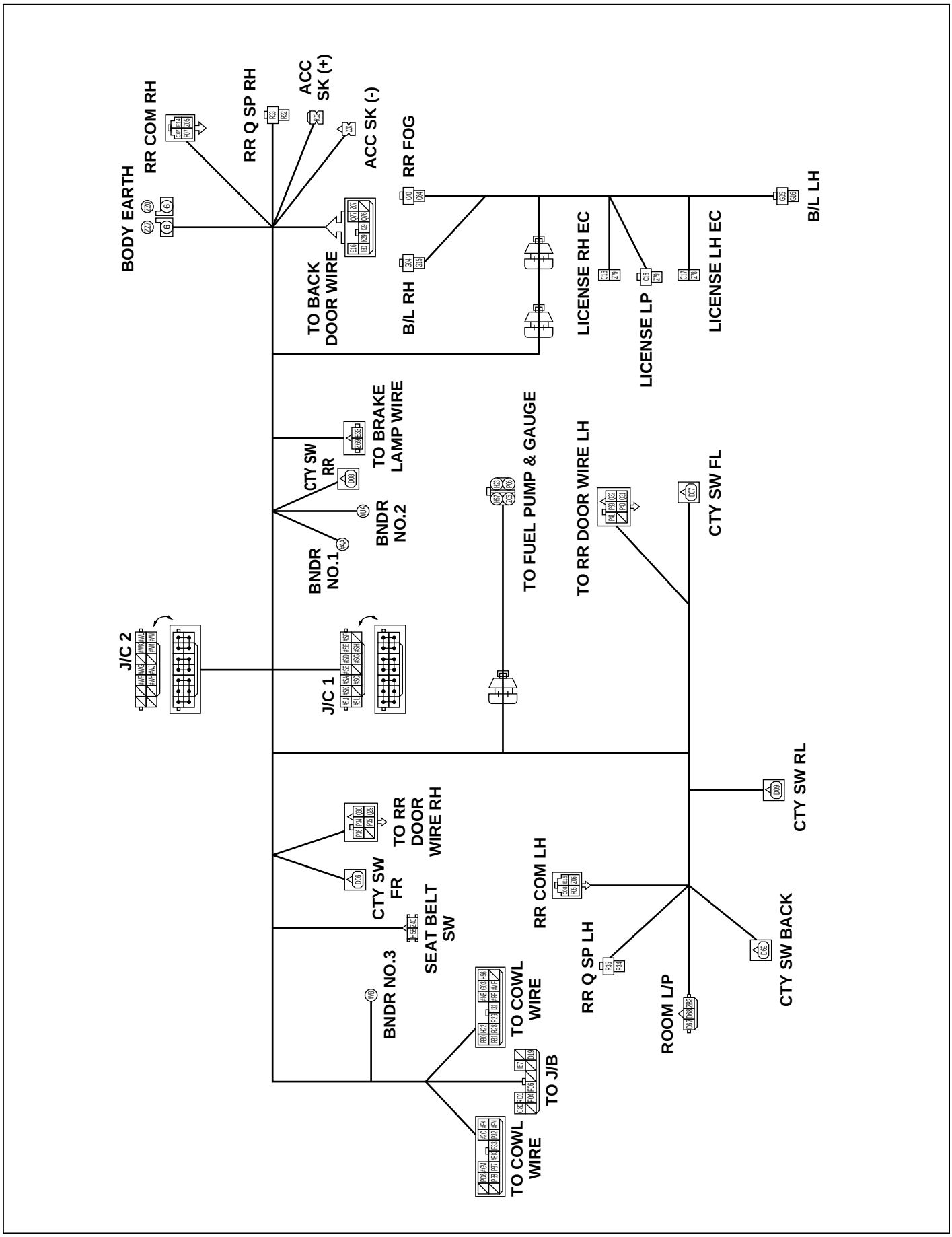
WIRE, FLOOR (RHD)



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WIRE, FLOOR (LHD)

From		To	
Location	Terminal	Terminal	Location
FLOOR BNDR3 (02)	#VB	D19	J/B CTY SW (+1)
COWL LH J/C4 (12)	#LM	C40	RR FOG LP (+)
FLOOR BNDR1 (E01)	#AA	C64	RR FOG LP (–)
FLOOR J/C1 (08)	#SH	C80	J/B TL LH (+)
FLOOR J/C1 (04)	#SD	C07	TAIL LP RH (+)
FLOOR J/C1 (06)	#SF	C16	LICENSE LP R (+)
FLOOR J/C1 (07)	#SG	C17	LICENSE LP L (+)
FLOOR J/C1 (05)	#SE	C08	TAIL LP LH (+)
FLOOR BNDR1 (E01)	#AA	Z05	RR COM LP RH (–)
FLOOR BNDR1 (E01)	#AA	Z79	LICENSE LP R (–)
FLOOR BNDR1 (E01)	#AA	Z78	LICENSE LP L (–)
FLOOR BNDR1 (E01)	#AA	Z06	RR COM LP LH (–)
COWL RH J/C3 (02)	#EB	#UA	FLOOR BNDR2 (01)
FLOOR BNDR2 (01)	#UA	E14	STOP LP RH (+)
FLOOR BNDR2 (01)	#UA	E15	STOP LP LH (+)
FLOOR J/C1 (06)	#SF	C16	LICENSE LP R (+)
FLOOR BNDR1 (E01)	#AA	Z79	LICENSE LP R (–)
FLOOR BNDR2 (01)	#UA	E33	H. M. STOP LP (SPR +)
FLOOR BNDR1 (E01)	#AA	Z69	H. M. STOP LP (SPR –)
FLOOR BNDR2 (01)	#UA	E16	H. M. STOP LP (+)
FLOOR BNDR1 (E01)	#AA	Z07	BODY EARTH (RRRH)
FLOOR BNDR3 (02)	#VB	D07	CTY SW FR LH (+)
FLOOR BNDR3 (02)	#VB	D06	CTY SW FR RH (+)
FLOOR BNDR3 (02)	#VB	D08	CTY SW RR RH (+)
FLOOR BNDR3 (02)	#VB	D09	CTY SW RR LH (+)
FLOOR J/C1 (01)	#SA	G03	BACK LP SW (–)
FLOOR J/C1 (02)	#SB	G04	BACK LP RH (+)
FLOOR BNDR1 (E01)	#AA	G15	BACK LP RH (–)
FLOOR J/C1 (03)	#SC	G05	BACK LP LH (+)
FLOOR BNDR1 (E01)	#AA	G16	BACK LP LH (–)
J/B R/TRN LP (LH +)	F04	F05	RR TRN LP LH (+)
J/B R/TRN LP (RH +)	F06	F07	RR TRN LP RH (+)
COWL RH J/C5 (07)	#GG	D67	LUG ROOM LMP (B)
FLOOR BNDR3 (02)	#VB	D68	LUG ROOM LMP (L)
FLOOR BNDR1 (E01)	#AA	ZB2	LUG ROOM LMP (E)
FLOOR BNDR3 (02)	#VB	D69	CTY SW BACK (+)
FUEL SENDER (–)	H57	ZZ0	BODY EARTH (–)
MET FUEL G (+)	H22	H23	FUEL SENDER (+)
RR WIP MTR (–)	I30	I31	RR WIP SW (B)
RR WIP MTR (+)	I29	I67	J/B F/WP-TRN (L3)
COWL RH J/C6 (05)	#XE	K29	DEF (+)
RADIO (SRL +)	R30	R34	RR SP LH (+)
RADIO (SRL –)	R31	R35	RR SP LH (–)
RADIO (SRR +)	R28	R32	RR SP RH (+)
RADIO (SRR –)	R29	R33	RR SP RH (–)
FLOOR J/C2 (I3)	#WN	Q30	D/L MTR RRRH (LOK +)
FLOOR J/C2 (09)	#WJ	Q29	D/L MTR RRRH (U/L +)
FLOOR J/C2 (12)	#WM	Q76	B/DR LOCK SW (LOK +)
FLOOR J/C2 (08)	#WH	Q77	B/DR LOCK SW (U/L +)
FLOOR J/C2 (11)	#WL	Q32	D/L MTR RRLH (LOK +)
FLOOR J/C2 (07)	#WG	Q31	D/L MTR RRLH (U/L +)
COWL LH J/C3 (10)	#KK	#WK	FLOOR J/C2 (10)

From		To	
Location	Terminal	Terminal	Location
COWL LH J/C3 (07)	#KG	#WF	FLOOR J/C2 (06)
FLOOR BNDR1 (E01)	#AA	ZZK	ACC PLUG (E)
FUSE ACC (L5)	RD1	RD2	ACC PLUG (B)
F/P RLY (L)	PD6	P06	FUEL PUMP (+)
FUEL PUMP (E)	ZC6	ZZ7	BODY EARTH (–)
COWL LH J/C1 (E03)	#6C	ZZ0	BODY EARTH (–)
FLOOR BNDR1 (01)	#AA	ZZ27	BODY EARTH (–)

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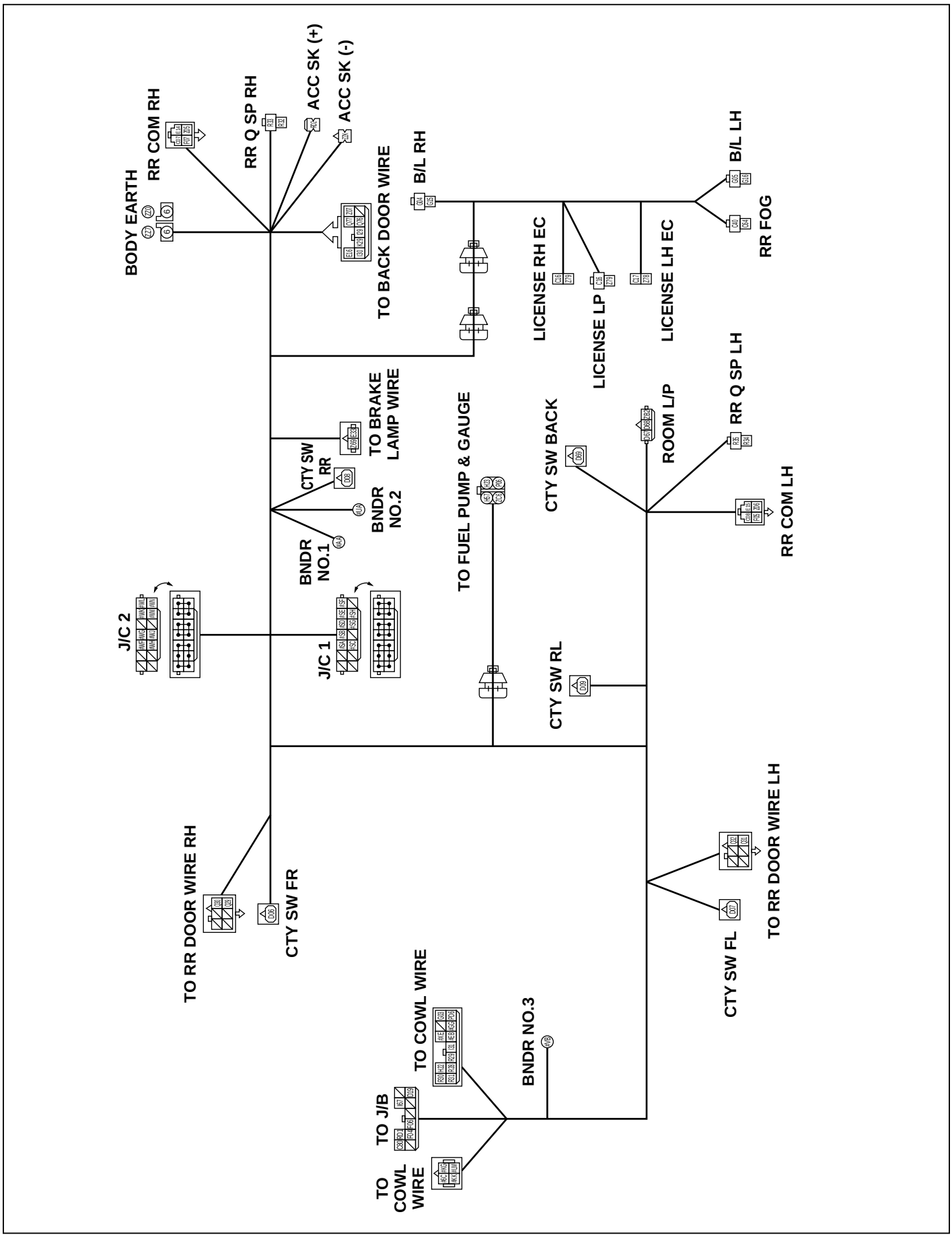
WIRE, FLOOR (LHD)



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WIRE, FLOOR, No. 3 (RHD)

From		To	
Location	Terminal	Terminal	Location
COWL LH J/C9 (07)	#RG	WT0	ABS ECU (BLS)
COWL LH J/C8 (13)	#QN	WT1	ABS ECU (WLAS)
ABS P SSR RL (–)	WA3	W66	ABS ECU (RL 0)
ABS P SSR RL (+)	WA2	W52	ABS ECU (RL 1)
ABS ECU (RR 1)	W50	W98	ABS P SSR RR (+)
ABS ECU (RR 0)	W64	W99	ABS P SSR RR (–)
COWL LH J/C5 (11)	#ML	WS9	ABS ECU (BAT)
ABS ECU (GND 1)	ZP0	ZY5	BODY EARTH (E)
ABS ECU (GND 2)	ZP1	ZY5	BODY EARTH (E)
ABS G SSR (GGND)	WQ6	WV5	ABS ECU (GGND)
ABS ECU (GST)	WP8	WQ1	ABS G SSR (GST)
ABS ECU (GS 2)	WQ0	WQ3	ABS G SSR (GS 2)
ABS ECU (GS 1)	WP9	WQ2	ABS G SSR (GS 1)
COWL LH J/C7 (11)	#PL	WQ5	ABS G SSR (+IG)
COWL LH J/C3 (13)	#KN	WW9	ABS ECU (EXI)
Connect to #PL~WQ5		W48	ABS ECU (IGN)
COWL LH J/C7 (06)	#PF	WV2	ABS ECU (TC)
COWL LH J/C6 (09)	#NJ	WV0	ABS ECU (SIO)
OFFBOARD CON (ABST)	VN9	WK6	ABS ECU (TS)

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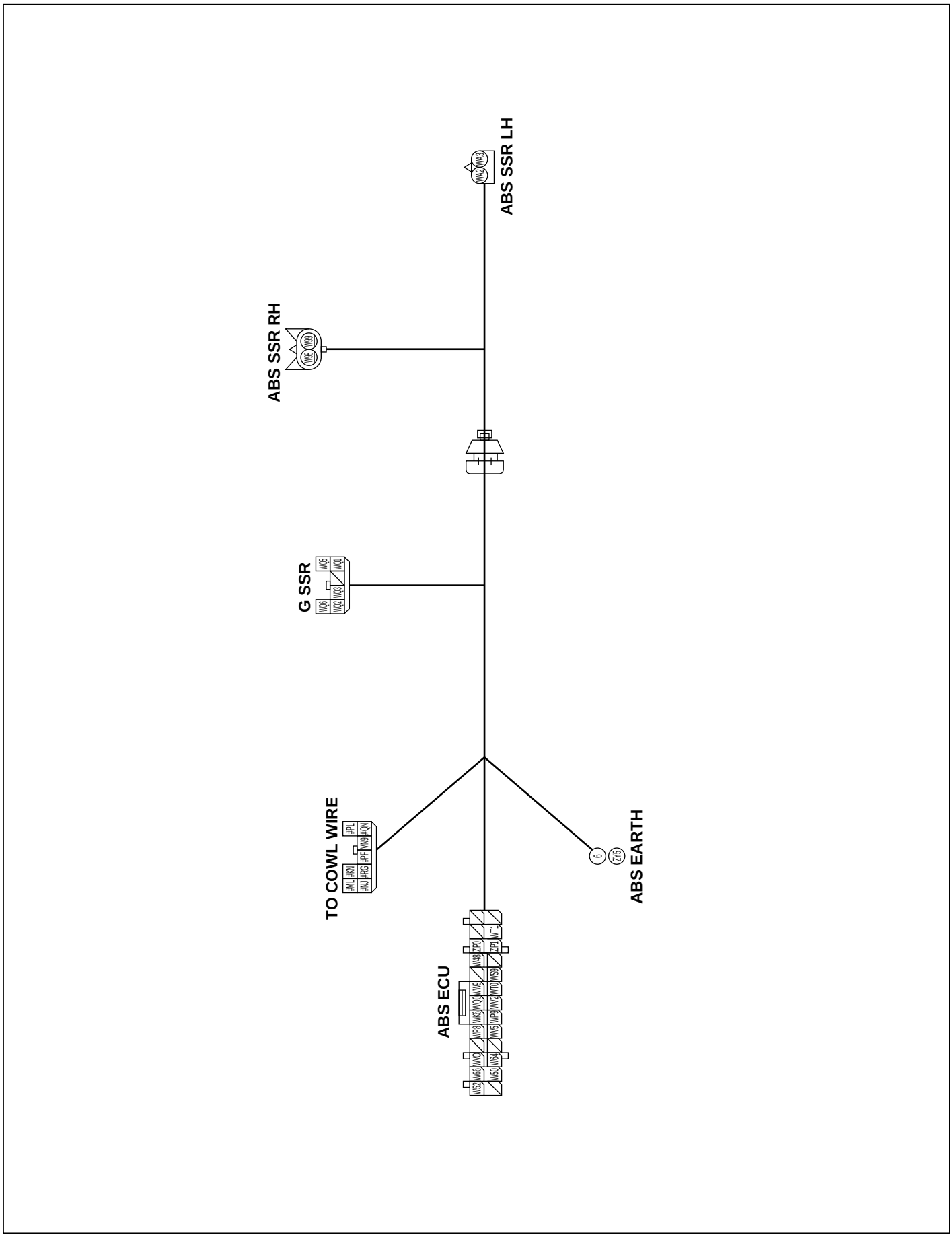
WIRE, FLOOR, No. 3 (RHD)



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WIRE, FLOOR, No. 3 (LHD)

From		To	
Location	Terminal	Terminal	Location
COWL RH J/C3 (03)	#EC	WT0	ABS ECU (BLS)
COWL RH J/C9 (02)	#ES	WT1	ABS ECU (WLAS)
ABS P SSR RL (–)	WA3	W66	ABS ECU (RL0)
ABS P SSR RL (+)	WA2	W52	ABS ECU (RL1)
ABS ECU (RR1)	W50	W98	ABS P SSR RR (+)
ABS ECU (RR0)	W64	W99	ABS P SSR RR (–)
COWL RH J/C5 (12)	#GM	WS9	ABS ECU (BAT)
ABS ECU (GND 1)	ZP0	ZY5	BODY EARTH (E)
ABS ECU (GND 2)	ZP1	ZY5	BODY EARTH (E)
ABS G SSR (GGND)	WQ6	WV5	ABS ECU (GGND)
ABS ECU (GST)	WP8	WQ1	ABS G SSR (GST)
ABS ECU (GS 2)	WQ0	WQ3	ABS G SSR (GS 2)
ABS ECU (GS 1)	WP9	WQ2	ABS G SSR (GS 1)
COWL RH J/C7 (11)	#YL	WQ5	ABS G SSR (+IG)
COWL RH J/C7 (06)	#YF	WV2	ABS ECU (TC)
COWL RH J/C6 (09)	#XJ	WV0	ABS ECU (SIO)
OFFBOARD CON (ABST)	VN9	WK6	ABS ECU (TS)
Connect to #YL~WQ5		W48	ABS ECU (IGN)

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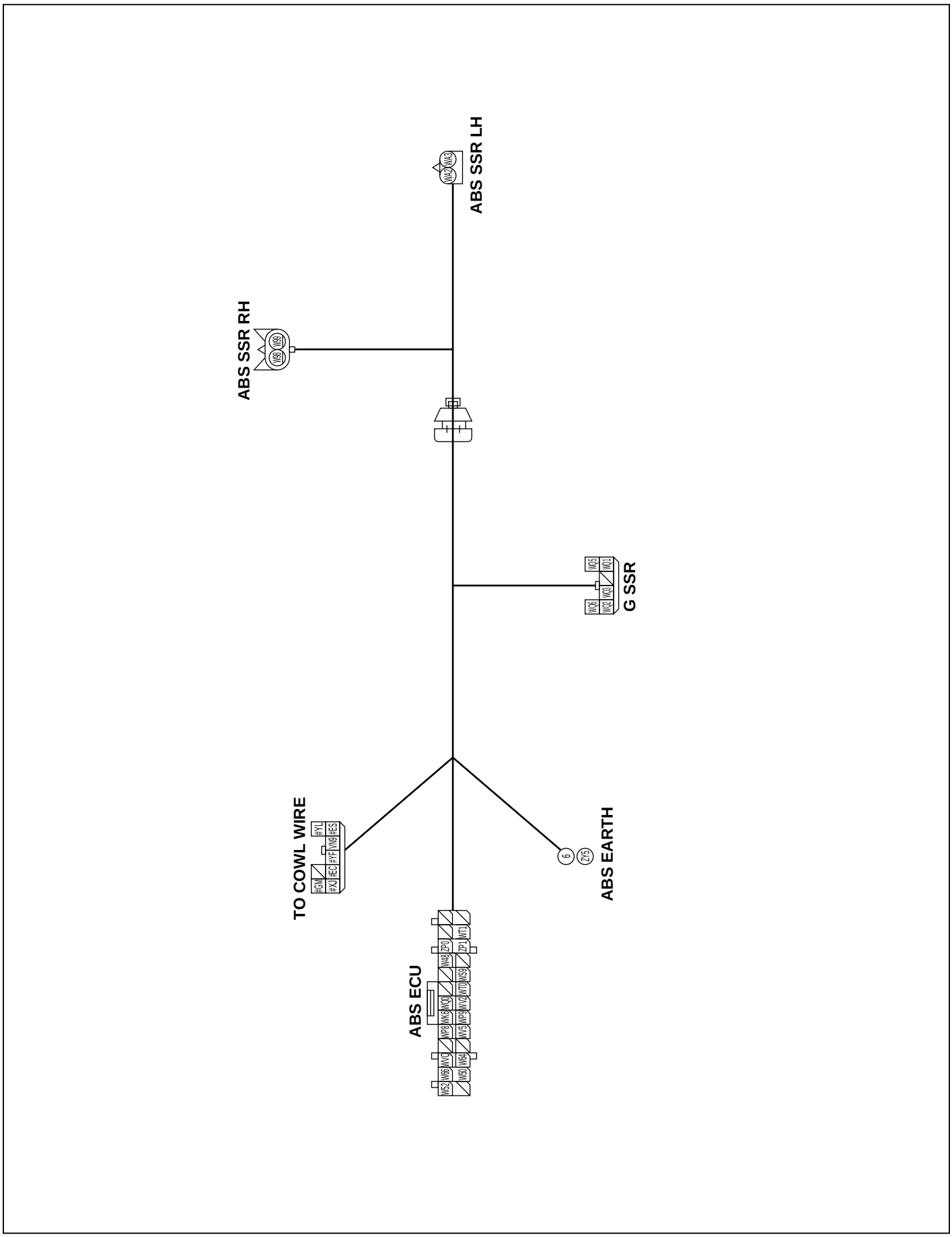
WIRE, FLOOR, No. 3 (LHD)



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WIRE, COWL, RH (EC/RHD AUS.)

From		To	
Location	Terminal	Terminal	Location
IG SW (AM)	O12	O31	F/L AM (L)
IG SW (ACC)	R01	R02	FUSE ACC (B)
IG SW (IG1)	N01	N59	J/B IG1 (+)
IG SW (IG2)	N30	N60	J/B IG2 (+)
M/FUSE TAIL (L)	OF1	OF2	J/B M/F TAIL (L)
J/B TL SW (+)	CA2	CE1	TAIL LP SW (B)
LGHTNG SW (B)	A22	O69	M/FUSE H/L (L)
TAIL LP SW (L)	CE2	CM1	J/B TL SW (–)
FUSE HORNHZD (L)	F69	F70	J/B HORN HZD (L)
J/B H–LP SW (–)	AA5	A23	LGHTNG SW (L)
J/B DIM (HI)	AA3	A17	DIM SW (HI)
J/B DIM (LO)	AA4	A18	DIM SW (LO)
R–LP RH (LO)	A08	A99	J/B H–LP LOR (–)
J/B H–LP HIR (–)	AA1	A07	H–LP RH (HI)
COWL RH J/C4 (01)	#FA	A05	FUSE H–LP RH (L)
COWL R BNDR1 (E04)	#4D	Z02	DIM SW (E)
COWL RH J/C5 (10)	#GK	CJ7	MLT SW R/FOG (–)
COWL RH J/C4 (02)	#FB	A06	H–LP RH (B)
MLT SW R/FOG (+)	CJ6	D71	JB R/FOG WNG (BZRB)
COWL RH J/C5 (11)	#GL	H80	MET RR FOG (IND +)
COWL RH J/C5 (12)	#GM	C40	RR FOG LP (+)
COWL RH J/C4 (04)	#FD	A54	H–LP LEV ACT (RH +)
COWL RH J/C4 (03)	#FC	AA6	H–LP LEV SW (+)
COWL RH J/C5 (01)	#GA	A56	H–LP LEV ACT (RH 0)
COWL RH J/C5 (03)	#GC	A69	H–LP LEV SW (LH 0)
COWL R BNDR1 (E10)	#4K	ZM9	H–LP LEV SW (LHE)
COWL RH J/C5 (02)	#GB	A63	H–LP LEV ACT (LH 0)
COWL RH J/C2 (E05)	#3E	ZM8	H–LP LEV ACT (RH E)
J/B CLA LP (RH +)	C09	C10	CLA LP RH (+)
COWL RH J/C2 (E02)	#3B	Z27	CLA LP RH (–)
COWL RH J/C5 (04)	#GD	E32	TRN SW (B)
COWL RH J/C5 (18)	#GZ	F47	MULTI SW (HAZ +)
COWL RH J/C5 (16)	#GX	F65	J/B TRN SW (+B)
COWL RH J/C5 (17)	#GY	QC7	ITC ECU (CHZD)
MULTI SW (HAZ –)	F48	QB7	ITC ECU (T/H)
J/B TRN SW (–)	F67	QC5	ITC ECU (FL +)
COWL R BNDR1 (E03)	#4C	Z63	J/B EARTH (1)
COWL RH J/C5 (15)	#GW	F60	TRN SW (RL +)
COWL RH J/C5 (13)	#GU	F68	J/B TRN SW (RLSW)
COWL RH J/C5 (14)	#GV	QB9	ITC ECU (CFL)
TRN SW (LH)	F62	F64	J/B TRN (LH)
TRN SW (RH)	F61	F63	J/B TRN (RH)
COWL RH J/C5 (05)	#GE	F66	J/B TRN SW (IG)
SID TRN LP R (+)	F16	F43	J/B S/TRN LP (RH+)
SID TRN LP R (+)	F14	F52	J/B F/TRN LP (RH)
COWL RH J/C2 (E01)	#3A	ZM5	SID TRN LP R (–)
COWL RH J/C2 (E02)	#3B	ZK4	FR TRN LP RH(–)
HORN RH (+)	E02	E43	J/B HORN (+B)
HORN RH (–)	E03	E19	HORN SW (+)
COWL LH J/C3 (07)	#KG	G08	BRK O/LEV SW (+)
COWL RH J/C2 (E03)	#3C	Z11	BRK O/LEV SW (–)
IG SW (ST)	M01	M15	ST RLY (COL +)

From		To	
Location	Terminal	Terminal	Location
COWL LH J/C8 (08)	#QH	M07	ST RLY (COL –)
STARTER (ST)	M02	M14	ST RLY (L)
FR WSH SW (L)	I60	ZQ9	FR WSH MTR (–)
COWL R BNDR1 (E05)	#4E	Z14	BODY EARTH (CTIR)
FR WIP MTR (S)	I24	I41	INT RLY (INT)
COWL RH J/C5 (06)	#GF	I10	FR WIP SW (+)
FR WIP MTR (LO)	I18	I56	FR WIP SW (1)
FR WIP MTR (HI)	I20	I57	FR WIP SW (2)
COWL RH J/C5 (07)	#GG	R17	E MIRROR SW (C)
COWL R BNDR1 (E11)	#4L	ZN2	E MIRROR SW (E)
COWL RH J/C5 (09)	#GJ	R27	E MIRROR LH (C)
COWL RH J/C5 (08)	#GH	R26	E MIRROR RH (C)
E MIRROR SW (VR)	R19	R24	E MIRROR RH (V)
E MIRROR SW (VL)	R18	R22	E MIRROR LH (V)
E MIRROR SW (HL)	R20	R23	E MIRROR LH (H)
E MIRROR SW (HR)	R21	R25	E MIRROR RH (H)
COWL LH J/C7 (02)	#PB	R16	E MIRROR SW (B)
RADIO (SPR +)	R10	R11	SP FR RH (+)
RADIO (SPR –)	R12	R13	SP FR RH (–)
COWL L J/C10 (09)	#LT	Q25	D/LOCK SW (U/L +)
COWL LH J/C2 (E04)	#7D	ZS1	D/LOCK SW (E)
COWL RH J/C4 (12)	#FM	Q28	D/L MTR FR P (LOK +)
COWL RH J/C4 (13)	#FN	#WK	FLOOR J/C2 (10)
COWL RH J/C4 (10)	#FK	#WF	FLOOR J/C2 (06)
COWL RH J/C4 (09)	#FJ	Q27	D/L MTR FR P (U/L +)
COWL RH J/C4 (08)	#FH	Q51	ITC ECU (ULM)
COWL RH J/C4 (11)	#FL	Q50	ITC ECU (LKM)
COWL RH J/C3 (06)	#EF	PD4	FUSE P/W (L)
COWL RH J/C3 (05)	#EE	P31	P/W SW FR P (B)
P/W MAS SW (PU +)	P27	P29	P/W SW FR P (U +)
COWL RH J/C1 (E05)	#2E	Z61	P/W MAS SW (E)
COWL RH J/C3 (04)	#ED	P22	P/W MAS SW (B)
P/W MAS SW (FD +)	P28	P30	P/W SW FR P (D +)
MAG CLT (+)	KP1	K23	A/C RLY (L)
A/C I/UP VSV (–)	K19	XQ6	EFI ECU (VSV3)
COWL RH J/C4 (05)	#FE	K18	A/C I/UP VSV (+)
COWL RH J/C4 (06)	#FF	OC9	EFI MAIN RLY (L)
A/C RLY (COL –)	KG9	XS0	EFI ECU (MGC)
COWL LH J/C4 (12)	#LM	K13	HTR RLY (COL –)
HTR BLR MTR (+)	K02	K11	HTR RLY (L)
J/B F/GGE–BK (L)	H79	K12	HTR RLY (COL +)
COWL RH J/C3 (01)	#EA	#KL	COWL LH J/C3 (11)
COWL RH J/C3 (02)	#EB	VD6	DIFLOCK VSV1 (+)
COWL RH J/C3 (03)	#EC	VD8	DIF LOCK VSV2 (+)
COWL R BNDR1 (E06)	#4F	VD9	DIFLOCK VSV2 (–)
COWL R BNDR1 (E07)	#4G	VD7	DIFLOCK VSV1 (–)
IMMOBI ECU (COL +)	QA4	QB0	IMMOBI ANTN (COL +)
IMMOBI ECU (COL –)	QA5	QB1	IMMOBI ANTN (COL –)
COWL LH J/C5 (07)	#MG	C90	FUSE BK/UP (L)
J/B FS ECU IG (B1)	N52	OC8	EFI MAIN RLY (COL +)
COWL RH J/C2 (E03)	#3C	ZS7	RB EFI M RLY (E)
COWL RH J/C4 (07)	#FG	#RH	COWL LH J/C9 (08)

From		To	
Location	Terminal	Terminal	Location
F/P RLY (L)	PD6	P06	FUEL PUMP (+)
F/P RLY (COL –)	PD7	XU4	EFI ECU (FC1)
ABS P SSR FR (+)	WA4	W67	ABS ECU (FR1)
ABS P SSR FR (–)	WA5	W53	ABS ECU (FR0)
COWL R BNDR1 (E08)	#4H	ZG3	ABS MAI RLY (SWNG)
COWL RH J/C2 (E04)	#3D	ZN9	ABS MTR (–)
ABS ACT (MT)	WK1	WS5	ABS ECU (MS)
COWL R BNDR4 (02)	#JB	WK2	ABS ACT (BS)
ABS MTR RLY (L)	WS4	WW1	ABS ACT (BM)
COWL R BNDR3 (02)	#HB	WS0	ABS MAI RLY (SWNO)
COWL RH J/C3 (08)	#EH	WS1	ABS MTR RLY (COL +)
COWL R BNDR3 (03)	#HC	WS3	ABS MTR RLY (B)
COWL R BNDR4 (01)	#JA	WG2	ABS DIODE (–)
COWL LH J/C8 (12)	#QM	WG1	ABS DIODE (+)
ABS MTR RLY (COL –)	WS2	WS6	ABS ECU (PCO)
ABS MAI RLY (COL –)	WR7	WS7	ABS ECU (REL)
COWL RH J/C3 (09)	#EJ	WV3	ABS ECU (R +)
ABS ECU (AST)	WV4	WW2	ABS ACT (AST)
ABS ACT (SFRH)	WW3	WX1	ABS ECU (SFRH)
ABS ACT (SFLH)	WW4	WX2	ABS ECU (SFLH)
ABS ACT (SRH)	WW5	WX3	ABS ECU (SRH)
ABS ACT (SFRR)	WW6	WX4	ABS ECU (SFRR)
ABS ACT (SFLR)	WW7	WX5	ABS ECU (SFLR)
ABS ACT (SRR)	WW8	WX6	ABS ECU (SRR)
COWL RH J/C3 (07)	#EG	WR8	ABS MAI RLY (COL +)
COWL R BNDR3 (01)	#HA	OC6	F/L ABS (L)
COWL R BNDR4 (03)	#JC	WR9	ABS MAI RLY (SWC)
COWL R BNDR1 (E01)	#4A	#8A	COWL L BNDR1 (E01)
COWL RH J/C1 (E02)	#2B	#4B	COWL R BNDR1 (E02)
COWL RH J/C1 (E01)	#2A	#3A	COWL RH J/C2 (E01)
COWL RH J/C1 (E03)	#2C	ZZ7	BODY EARTH (–)
COWL LH J/C9 (05)	#RE	E11	STOP LP SW (–)
STOP LP SW (+)	E10	E28	FUSE STOP (L)
P/W MAS SW (RRD +)	P33	P35	P/W SW RRRH (D +)
P/W MAS SW (RRU +)	P32	P34	P/W SW RRRH (U +)
P/W MAS SW (RLD +)	P38	P40	P/W SW RRLH (D +)
P/W MAS SW (RLU +)	P37	P39	P/W SW RRLH (U +)
COWL LH J/C4 (15)	#FV	Q65	D/L MTR FR D (U/L +)
COWL LH JC4 (14)	#FU	Q66	D/L MTR FR D (LOK +)
COWL RH J/C3 (15)	#EP	P36	P/W SW RRRH (B)
IG SW (AM)	O12	O31	F/L AM (L)
IG SW (ACC)	R01	R02	FUSE ACC (B)
IG SW (IG1)	N01	N59	J/B IG1 (+)
IG SW (IG2)	N30	N60	J/B IG2 (+)

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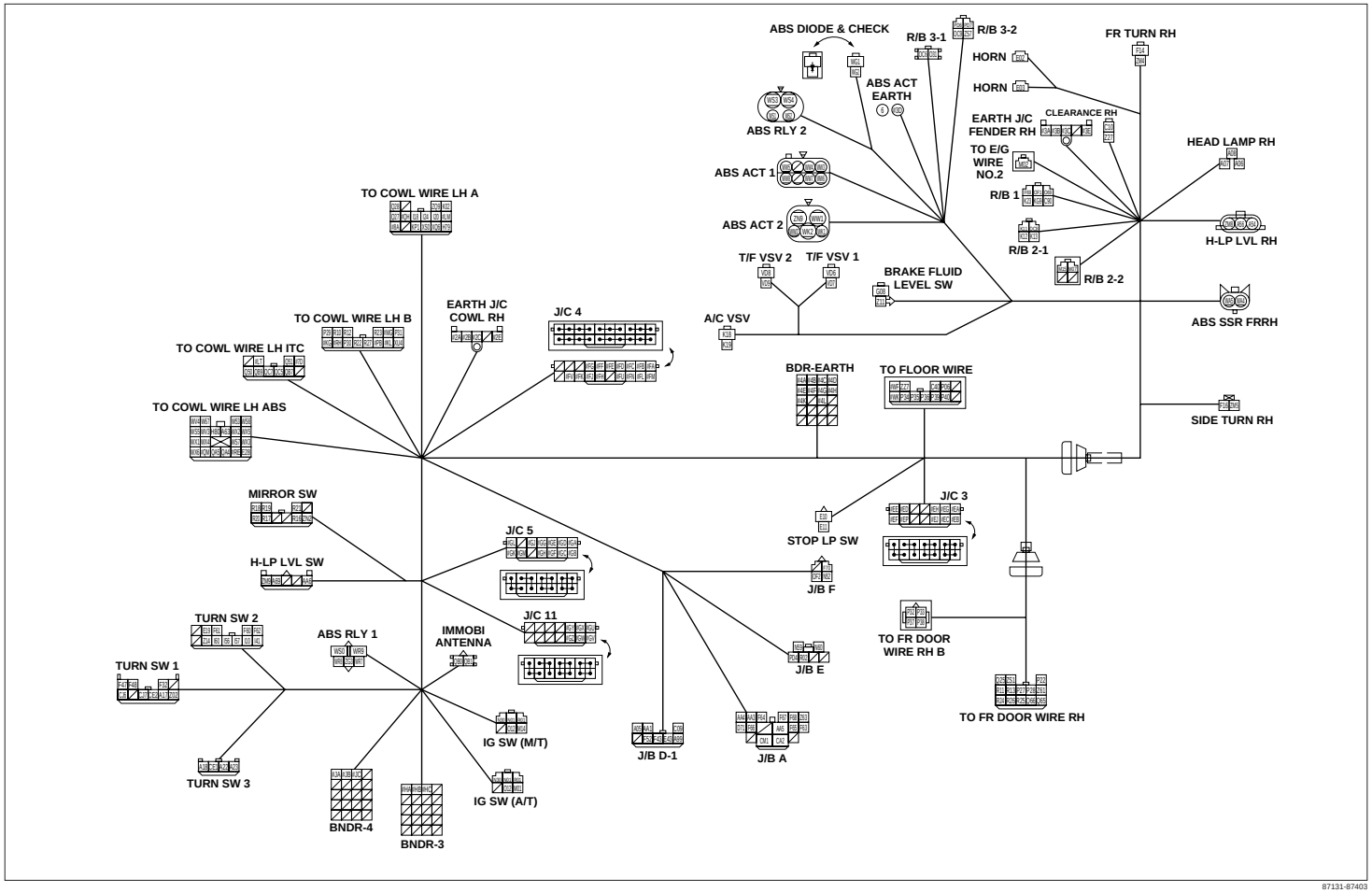
WIRE, COWL, RH (EC/RHD AUS.)



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WIRE, COWL, RH (General/RHD)

From		To	
Location	Terminal	Terminal	Location
IG SW (AM)	O12	O31	F/L AM (L)
IG SW (ACC)	R01	R02	FUSE ACC (B)
IG SW (IG1)	N01	N59	J/B IG1 (+)
IG SW (IG2)	N30	N60	J/B IG2 (+)
M/FUSE TAIL (L)	OF1	OF2	J/B M/F TAIL (L)
J/B TL SW (+)	CA2	CE1	TAIL LP SW (B)
LGHTNG SW (B)	A22	O69	M/FUSE H/L (L)
TAIL LP SW (L)	CE2	CM1	J/B TL SW (–)
FUSE HORNHZD (L)	F69	F70	J/B HORN HZD (L)
J/B H–LP SW (–)	AA5	A23	LGHTNG SW (L)
J/B DIM (HI)	AA3	A17	DIM SW (HI)
J/B DIM (LO)	AA4	A18	DIM SW (LO)
H–LP RH (LO)	A08	A99	J/B H–LP LOR (–)
J/B H–LP HIR (–)	AA1	A07	H–LP RH (HI)
COWL RH J/C4 (01)	#FA	A05	FUSE H–LP RH (L)
COWL R BNDR1 (E04)	#4D	Z02	DIM SW (E)
COWL RH J/C4 (02)	#FB	A06	H–LP RH (B)
COWL LH J/C5 (03)	#MC	C25	FR FOG LP RH (+)
COWL RH J/C2 (E05)	#3E	ZD2	FR FOG LP RH (–)
J/B CLA LP (RH +)	C09	C10	CLA LP RH (+)
COWL RH J/C2 (E02)	#3B	Z27	CLA LP RH (–)
COWL RH J/C5 (04)	#GD	F32	TRN SW (B)
COWL R BNDR1 (E03)	#4C	Z63	J/B EARTH (1)
TRN SW (LH)	F62	F64	J/B TRN (LH)
TRN SW (RH)	F61	F63	J/B TRN (RH)
COWL RH J/C5 (05)	#GE	F66	J/B TRN SW (IG)
SID TRN LP R (+)	F16	F43	J/B S/TRN LP (RH +)
FR TRN LP RH (+)	F14	F52	J/B F/TRN LP (RH)
COWL RH J/C2 (E01)	#3A	ZM5	SID TRN LP R (–)
COWL RH J/C2 (E02)	#3B	ZM4	FR TRN LP RH (–)
HORN RH (+)	E02	E43	J/B HORN (+B)
HORN RH (–)	E03	E19	HORN SW (+)
COWL LH J/C3 (07)	#KG	G08	BRK O/LEV SW (+)
COWL RH J/C2 (E03)	#3C	Z11	BRK O/LEV SW (–)
STARTER (ST)	M02	M14	ST RLY (L)
IG SW (ST)	M01	M15	ST RLY (COL +)
COWL LH J/C8 (08)	#QH	M07	ST RLY (COL –)
FR WSH SW (L)	I60	ZQ9	FR WSH MTR (–)
FR WIP MTR (S)	I24	I41	INT RLY (INT)
COWL RH J/C5 (06)	#GF	I10	FR WIP SW (+)
FR WIP MTR (LO)	I18	I56	FR WIP SW (1)
FR WIP MTR (HI)	I20	I57	FR WIP SW (2)
COWL RH J/C5 (07)	#GG	R17	E MIRROR SW (C)
COWL R BNDR1 (E11)	#4L	ZN2	E MIRROR SW (E)
COWL RH J/C5 (09)	#GJ	R27	E MIRROR LH (C)
COWL RH J/C5 (08)	#GH	R26	E MIRROR RH (C)
E MIRROR SW (VR)	R19	R24	E MIRROR RH (V)
E MIRROR SW (VL)	R18	R22	E MIRROR LH (V)
E MIRROR SW (HL)	R20	R23	E MIRROR LH (H)
E MIRROR SW (HR)	R21	R25	E MIRROR RH (H)
COWL LH J/C7 (02)	#PB	R16	E MIRROR SW (B)
RADIO (SPR +)	R10	R11	SP FR RH (+)

From		To	
Location	Terminal	Terminal	Location
RADIO (SPR –)	R12	R13	SP FR RH (–)
COWL RH J/C4 (12)	#FM	Q28	D/L MTR FR P (LOK +)
COWL RH J/C4 (13)	#FN	#WK	FLOOR J/C2 (10)
COWL RH J/C4 (10)	#FK	#WF	FLOOR J/C2 (06)
COWL RH J/C4 (09)	#FJ	Q27	D/L MTR FR P (U/L +)
COWL RH J/C3 (06)	#EF	PD4	FUSE P/W (L)
COWL RH J/C3 (05)	#EE	P31	P/W SW FR P (B)
COWL RH J/C3 (04)	#ED	P22	P/W MAS SW (B)
COWL RH J/C1 (E05)	#2E	Z61	P/W MAS SW (E)
P/W MAS SW (PU +)	P27	P29	P/W SW FR P (U +)
P/W MAS SW (PD +)	P28	P30	P/W SW FR P (D +)
MAG CLT (+)	KP1	K23	A/C RLY (L)
A/C I/UP VSV (–)	K19	XQ6	EFI ECU (VSV3)
COWL RH J/C4 (05)	#EF	K18	A/C I/UP VSV (+)
COWL RH J/C4 (06)	#FF	OC9	EFI MAIN RLY (L)
A/C RLY (COL –)	KG9	XS0	EFI ECU (MGC)
COWL LH J/C4 (12)	#LM	K13	HTR RLY (COL –)
HTR BLR MTR (+)	K02	K11	HTR RLY (L)
J/B F/GGE–BK (L)	H79	K12	HTR RLY (COL +)
COWL RH J/C3 (01)	#EA	#KL	COWL LH J/C3 (11)
COWL RH J/C3 (02)	#EB	VD6	DIFLOCK VSV1 (+)
COWL RH J/C3 (03)	#EC	VD8	DIFLOCK VSV2 (+)
COWL R BNDR1 (E06)	#4F	VD9	DIFLOCK VSV2 (–)
COWL R BNDR1 (E07)	#4G	VD7	DIFLOCK VSV1 (–)
J/B FS ECUIG (B1)	N52	OC8	EFI MAIN RLY (COL +)
COWL RH J/C2 (E03)	#3C	ZS7	RB EFI M RLY (E)
COWL LH J/C5 (07)	#MG	C90	FUSE BK/UP (L)
COWL RH J/C4 (07)	#FG	#RH	COWL LH J/C9 (08)
F/P RLY (L)	PD6	P06	FUEL PUMP (+)
F/P RLY (COL –)	PD7	XU4	EFI ECU (FC1)
ABS P SSR FR (+)	WA4	W67	ABS ECU (FR1)
ABS P SSR FR (–)	WA5	W53	ABS ECU (FR0)
COWL R BNDR1 (E08)	#4H	ZG3	ABS MAI RLY (SWNC)
COWL RH J/C2 (E04)	#3D	ZN9	ABS MTR (–)
ABS ACT (MT)	WK1	WS5	ABS ECU (MS)
COWL R BNDR4 (02)	#JB	WK2	ABS ACT (BS)
ABS MTR RLY (L)	WS4	WW1	ABS ACT (BM)
COWL R BNDR3 (02)	#HB	WS0	ABS MAI RLY (SWNO)
COWL RH J/C3 (08)	#EH	WS1	ABS MTR RLY (COL +)
COWL R BNDR3 (03)	#HC	WS3	ABS MTR RLY (B)
COWL R BNDR4 (01)	#JA	WG2	ABS DIODE (–)
COWL LH J/C8 (12)	#QM	WG1	ABS DIODE (+)
ABS MTR RLY (COL –)	WS2	WS6	ABS ECU (PCO)
ABS MAI RLY (COL –)	WR7	WS7	ABS ECU (REL)
COWL RH J/C3 (09)	#EJ	WV3	ABS ECU (R +)
ABS ECU (AST)	WV4	WW2	ABS ACT (AST)
ABS ACT (SFRH)	WW3	WX1	ABS ECU (SFRH)
ABS ACT (SFLH)	WW4	WX2	ABS ECU (SFLH)
ABS ACT (SRH)	WW5	WX3	ABS ECU (SRH)
ABS ACT (SFRR)	WW6	WX4	ABS ECU (SFRR)
ABS ACT (SFLR)	WW7	WX5	ABS ECU (SFLR)
ABS ACT (SRR)	WW8	WX6	ABS ECU (SRR)

From		To	
Location	Terminal	Terminal	Location
COWL RH J/C3 (07)	#EG	WR8	ABS MAI RLY (COL +)
COWL R BNDR3 (01)	#HA	OC6	F/L ABS (L)
COWL R BNDR4 (03)	#JC	WR9	ABS MAI RLY (SWC)
COWL R BNDR1 (E01)	#4A	#8A	COWL L BNDR1 (E01)
COWL RH J/C1 (E02)	#2B	#4B	COWL R BNDR1 (E02)
COWL RH J/C1 (E01)	#2A	#3A	COWL RH J/C2 (E01)
COWL RH J/C1 (E03)	#2C	ZZ7	BODY EARTH (–)
IG SW (AM)	O12	O31	F/L AM (L)
IG SW (ACC)	R01	R02	FUSE ACC (B)
IG SW (IG1)	N01	N59	J/B IG1 (+)
IG SW (IG2)	N30	N60	J/B IG2 (+)
P/W MAS SW (RRD +)	P33	P35	P/W SW RRRH (D +)
P/W MAS SW (RRU +)	P32	P34	P/W SW RRRH (U +)
P/W MAS SW (RLD +)	P38	P40	P/W SW RRLH (D +)
P/W MAS SW (RLU +)	P37	P39	P/W SW RRLH (U +)
COWL LH J/C4 (15)	#FV	Q65	D/L MTR FR D (U/L +)
COWL LH J/C4 (14)	#FU	Q66	D/L MTR FR (LOK +)
COWL RH J/C3 (15)	#EP	P36	P/W SW RRRH (B)
COWL L J/C10 (09)	#LT	Q25	D/LOCK SW (U/L +)
COWL LH J/C2 (E04)	#7D	ZS1	D/LOCK SW (E)
COWL RH J/C4 (08)	#FH	Q51	ITC ECU (ULM)
COWL RH J/C4 (11)	#FL	Q50	ITC ECU (LKM)
COWL RH J/C5 (18)	#GZ	F47	MULTI SW (HAZ +)
COWL RH J/C5 (16)	#GX	F65	J/B TRN SW (+B)
COWL RH J/C5 (17)	#GY	QC7	ITC ECU (CHZD)
MULTI SW (HAZ –)	F48	QB7	ITC ECU (T/H)
J/B TRN SW (–)	F67	QC5	ITC ECU (FL +)
COWL RH J/C5 (15)	#GW	F60	TRN SW (RL +)
COWL RH J/C5 (13)	#GU	F68	J/B TRN SW (RLSW)
COWL RH J/C5 (14)	#GV	QB9	ITC ECU (CFL)
COWL LH J/C9 (05)	#RE	E11	STOP LP SW (–)
STOP LP SW (+)	E10	E28	FUSE STOP (L)

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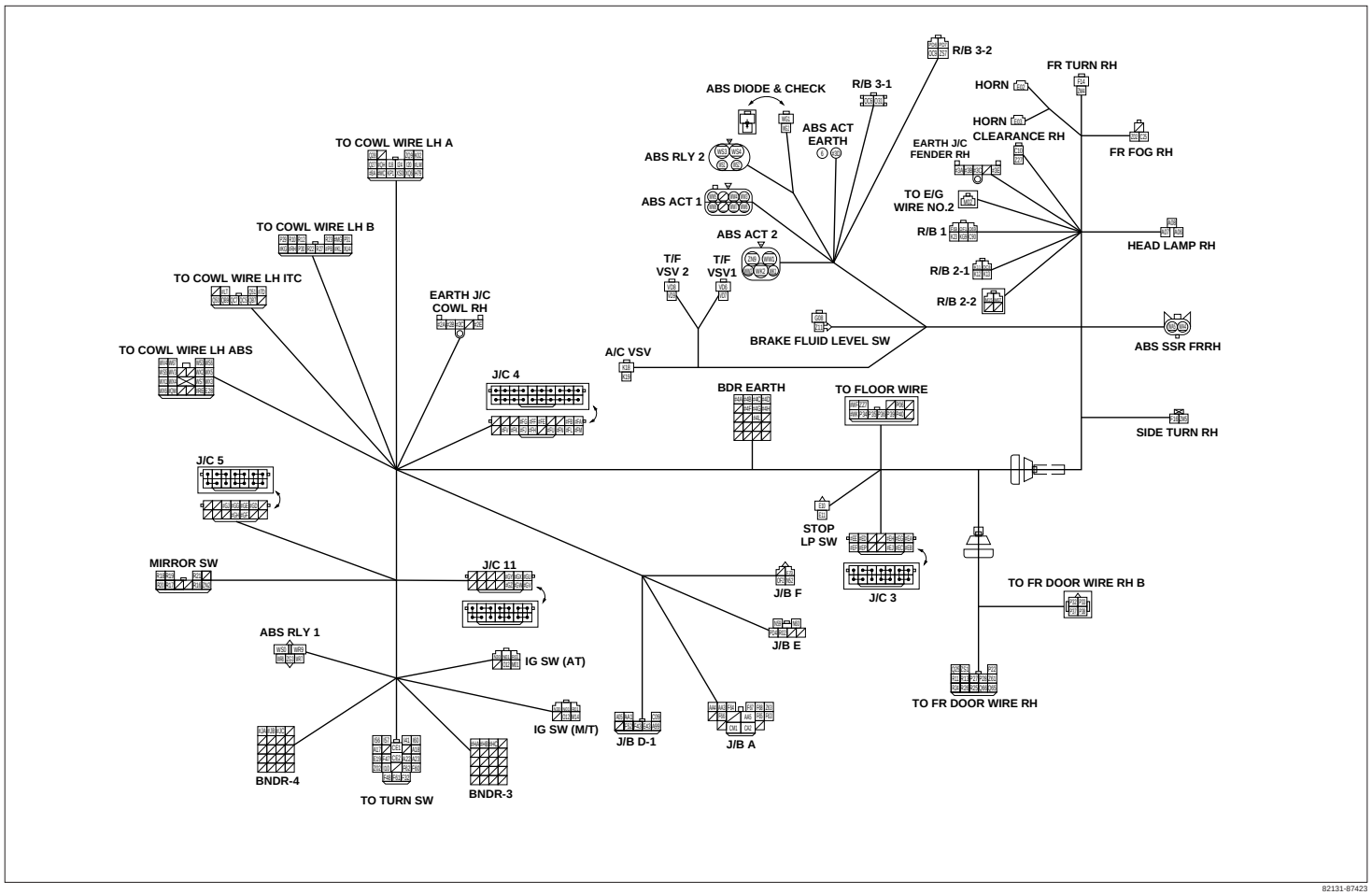
WIRE, COWL, RH (General/RHD)



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WIRE, COWL, RH (EC/LHD)

From		To	
Location	Terminal	Terminal	Location
IG SW (AM)	O12	O31	F/L AM (L)
LGHTNG SW (B)	A22	O69	M/FUSE H/L (L)
M/FUSE TAIL (L)	OF1	OF2	J/B M/F TAIL (L)
FUSE HORNHZD (L)	F59	F70	J/B HORN HZD (L)
IG SW (AM)	O12	O31	F/L AM (L)
HI BEAM IND (+)	A10	A98	J/B H BM IND (+)
H-LP RH (LO)	A08	A99	J/B H-LP LOR (–)
J/B H-LP HIR (–)	AA1	A07	H-LP RH (HI)
COWL RH J/C5 (02)	#GB	A06	H-LP (B)
COWL RH J/C5 (01)	#GA	A05	FUSE H-LP RH (L)
COWL LH J/C4 (11)	#LL	H80	MET RR FOG (IND +)
RR FOG SW (+)	C38	D58	J/B KEY SW (+)
RR FOG SW (–)	C39	D61	J/B K/WNG (BUZB)
COWL LH J/C4 (02)	#LB	A56	H-LP LEV ACT (RH 0)
COWL RH J/C5 (04)	#GD	A54	H-LP LEV ACT (RH +)
COWL RH J/C2 (E03)	#3C	ZM8	H-LP LEV ACT (RH E)
COWL RH J/C8 (13)	#ZN	C28	RADIO (ILM +)
J/B MTR ILM (B)	CA1	C19	HTR CON ILM (+)
MET (ILM +)	C21	H78	J/B MET ILM (+)
COWL R BNDR2 (E03)	#5C	Z23	HTR CON ILM (E)
COWL R BNDR1 (E03)	#4C	Z08	MET EARTH (E)
COWL RH J/C2 (E02)	#3B	Z27	CLA LP RH (–)
COWL RH J/C8 (12)	#ZM	C10	CLA LP RH (+)
COWL RH J/C8 (11)	#ZL	C09	J/B CLA LP (RH +)
COWL RH J/C8 (14)	#ZP	CE0	FLOOR ILM (+)
COWL R BNDR2 (E05)	#5E	ZR8	FLOOR ILM (–)
COWL RH J/C (01)	#EA	E11	STOP LP SW (–)
STOP LP SW (+)	E10	E28	FUSE STOP (L)
COWL RH J/C3 (02)	#EB	#UA	FLOOR BNDR2 (01)
COWL RH J/C5 (06)	#GF	D02	ROOM LP (+)
COWL RH J/C5 (05)	#GE	E44	J/B F/STOP (L2)
FLOOR J/C1 (01)	#SA	G03	BACK LP SW (–)
BACK LP SW (+)	G02	G21	J/B BACK LP (SW +)
BACK LP SW (+)	G02	G21	J/B BACK LP (SW +)
COWL RH J/C8 (01)	#ZA	G03	BACK LP SW (–)
FLOOR J/C1 (01)	#SA	#ZB	COWL RH J/C8 (02)
COWL RH J/C8 (04)	#ZD	H28	MET A/T IND (R +)
COWL RH J/C8 (03)	#ZC	D39	J/B R/WNG (BUZ +)
TRN IND LH (+)	F19	F54	J/B TRN IND (LH)
SID TRN LP R (+)	F16	F43	J/B S/TRN LP (RH +)
FR TRN LP RH (+)	F14	F52	J/B F/TRN LP (RH)
TRN IND RH (+)	F21	F55	J/B TRN IND (RH)
COWL RH J/C2 (E02)	#3B	ZM4	FR TRN LP RH (–)
COWL RH J/C2 (E01)	#3A	ZM5	SID TRN LP R (–)
HORN RH (–)	E03	E19	HORN SW (+)
HORN RH (+)	E02	E43	J/B HORN (+B)
COWL RH J/C5 (07)	#GG	D67	LUG ROOM LMP (B)
E/G J/C1 (E05)	#1E	#2A	COWL RH J/C1 (E01)
E/G WP BNDR1 (01)	#BA	N76	J/B FUSE ENG (L1)
MET (CHG)	O20	O21	ALT (L)
MET THRM G (+)	H20	H21	THRM SENDER (+)
MET FUEL G (+)	H22	H23	FUEL SENDER (+)

From		To	
Location	Terminal	Terminal	Location
COWL RH J/C6 (02)	#XB	XQ2	EFI ECU (REV)
COWL RH J/C6 (01)	#XA	N58	MET (REV)
COWL RH J/C6 (03)	#XC	VN5	OFFBOARD CON (REV)
COWL RH J/C4 (01)	#FA	H67	J/B MET (+)
COWL RH J/C4 (02)	#FB	H61	MET (IG)
MET OIL PRES (–)	H05	H06	OIL PRES SW (B)
COWL RH J/C3 (05)	#EE	G06	MET BRK WNG (–)
COWL RH J/C3 (06)	#EF	G08	BRK O/LEV SW (+)
COWL RH J/C3 (07)	#EG	G07	PK BRK SW (+)
COWL R BNDR2 (E07)	#5G	ZJ3	O/D CUT SW (E)
COWL RH J/C8 (06)	#ZF	H35	O/D CUT SW (B)
COWL RH J/C8 (05)	#ZE	H52	O/D OFF IND (DI –)
COWL RH J/C8 (07)	#ZG	V74	O/D CUT RLY (COLL)
O/D CUT SOL (+)	H37	V73	O/D CUT RLY (L)
COWL RH J/C4 (04)	#FD	V72	O/D CUT RLY (B)
STARTER (ST)	M02	M14	ST RLY (L)
MET A/T IND (L)	H24	H62	A/T NSS (L)
MET A/T IND (2)	H25	H63	A/T NSS (2)
MET A/T IND (D)	H26	H64	A/T NSS (D)
MET A/T IND (N)	H27	H65	A/T NSS (N)
MET A/T IND (P)	H29	H66	A/T NSS (P)
COWL RH J/C8 (09)	#ZJ	M20	A/T IND DIOD (B)
COWL RH J/C8 (08)	#ZH	M07	ST RLY (COL –)
COWL R BNDR2 (E09)	#5J	Z53	A/T NSS (E)
IG SW (ST)	M01	M15	ST RLY (COL +)
J/B F/WSH MO (+)	I01	I03	FR WSH MTR (+)
FR WSH SW (L)	I60	ZQ9	FR WSH MITR (–)
FR WIP MTR (HI)	I20	I57	FR WIP SW (2)
FR WIP MTR (LO)	I18	I56	FR WIP SW (1)
FR WIP MTR (S)	I24	I41	INT RLY (INT)
FR WIP MTR (+B)	I22	I65	J/B F/WP-TRN (L1)
RR WSH SW (B)	I28	I66	J/B F/WP-TRN (L2)
RR WIP MTR (–)	I30	I31	RR WIP SW (B)
COWL R BNDR1 (E04)	#4D	Z18	RR WIP SW (E)
RR WSH MTR (+)	I26	I54	RR WSH SW (L)
COWL RH J/C2 (E05)	#3E	ZN0	RR WSH MTR (E)
DEF SW (B)	K27	K98	J/B FUSE DEF (L)
COWL R BNDR1 (E05)	#4E	Z42	DEF SW (E)
COWL RH J/C6 (04)	#XD	K28	DEF SW (L)
COWL RH J/C6 (05)	#XE	K29	DEF (+)
COWL LH J/C3 (13)	#KN	R26	E MIRROR RH (C)
E MIRROR SW (VR)	R19	R24	E MIRROR RH (V)
E MIRROR SW (HR)	R21	R25	E MIRROR RH (H)
COWL RH J/C7 (01)	#YA	RC8	FUSE ACC (L3)
COWL RH J/C7 (02)	#YB	R16	E MIRROR SW (B)
FUSE ACC (L2)	RC7	R15	CIG LTR (+)
COWL R BNDR2 (E06)	#5F	Z31	CIG LGT (E)
RADIO (SPL –)	R08	R09	SP FR LH (–)
RADIO (SPL +)	R06	R07	SP FR LH (+)
RADIO (SRL +)	R30	R34	RR SP LH (+)
RADIO (SRL –)	R31	R35	RR SP LH (–)
RADIO (SRR +)	R28	R32	RR SP RH (+)

From		To	
Location	Terminal	Terminal	Location
RADIO (SRR –)	R29	R33	RR SP RH (–)
FUSE ACC (L1)	RC6	R04	RADIO (+B)
COWL RH J/C5 (10)	#GK	C30	RADIO (B/UP)
COWL RH J/C1 (E05)	#2E	Z30	RADIO (E)
RADIO (SPR +)	R10	R11	SP PR RH (+)
RADIO (SPR –)	R12	R13	SP FR RH (–)
COWL LH J/C3 (09)	#KJ	Q28	D/L MTR FR P (LOK +)
COWL LH J/C3 (06)	#KF	Q27	D/L MTR FR P (U/L +)
COWL LH J/C4 (08)	#LH	P31	P/W SW FR P (B)
P/W MAS SW (PU +)	P27	P29	P/W SW FR P (U +)
P/W MAS SW (PD +)	P28	P30	P/W SW FR P (D +)
HTR BLR MTR (+)	K02	K11	HTR RLY (L)
COWL RH J/C4 (11)	#FL	K13	HTR RLY (COL –)
A/C RLY (COL –)	KG9	XS0	EFI ECU (MGC)
MAG CLT (+)	KP1	K23	A/C RLY (L)
COWL R BNDR3 (01)	#HA	OC9	EFI MAIN RLY (L)
COWL R BNDR3 (05)	#HE	K18	A/C I/UP VSV (+)
A/C I/UP VSV (–)	K19	XQ6	EFI ECU (VSV3)
E/G WP BNDR3 (05)	#DE	KK4	A/C THEMSTR (–)
A/C THEMSTR (+)	KP5	XP8	EFI ECU (ACEV)
COWL RH J/C4 (08)	#FH	K44	HTR RESSTR (+)
COWL RH J/C4 (07)	#FG	K04	HTR BLR SW (H)
HTR RESSTR (M & M1)	K05	K06	HTR BLR SW (M, M1)
COWL RH J/C4 (12)	#EM	XK3	EFI ECU (BLW)
COWL RH J/C4 (10)	#FK	K08	HTR BLR SW (L)
COWL RH J/C1 (E04)	#2D	Z21	HTR BLR SW (E)
J/B F/GGE-BK (L)	H79	K12	HTR RLY (COL +)
COWL RH J/C4 (05)	#FE	KC6	A/C SW (+B)
COWL RH J/C4 (13)	#FN	KV2	A/C SW IND (–)
A/C D/PRS SW (–)	KP7	XS4	EFI ECU (ACSW)
A/C D/PRS SW (+)	KP6	K99	A/C SW (–)
COWL RH J/C4 (06)	#FF	K30	HTR BLR MTR (–)
COWL RH J/C4 (09)	#FJ	K07	HTR RESSTR (L)
COWL RH J/C4 (03)	#FC	VD1	DIFLOCK SW (B)
COWL RH J/C3 (11)	#EL	VD8	DIFLOCK VSV2 (+)
COWL R BNDR1 (E06)	#4F	VD9	DIFLOCK VSV2 (–)
COWL R BNDR1 (E07)	#4G	VD7	DIFLOCK VSV (–)
COWL RH J/C3 (12)	#EM	H77	DIFLOCK IND (+)
COWL RH J/C3 (09)	#EJ	VD2	DIFLOCK SW (L)
COWL RH J/C3 (10)	#EK	VD6	DIFLOCK VSV (+)
COWL RH J/C7 (09)	#YJ	QB2	J/B IMMB ECU (IG)
COWL RH J/C7 (10)	#YK	QA0	IMMOBI ECU (IG)
COWL RH J/C5 (08)	#GH	C90	FUSE BK/UP (L)
COWL RH J/C5 (11)	#GL	QA2	IMMOBI ECU (+B)
COWL RH J/C7 (03)	#YC	QA1	IMMOBI ECU (ACC)
IMMOBI ECU (COL +)	QA4	QB0	IMMOBI ANTN (COL +)
IMMOBI ECU (COL –)	QA5	QB1	IMMOBI ANTN (COL –)
COWL R BNDR1 (E09)	#4J	QA6	IMMOBI ECU (E)
OFFBOARD CON (ABST)	VN9	WK6	ABS ECU (TS)
COWL R BNDR2 (E02)	#5B	ZS4	OFFBOARD CON (E)
IMMOBI ECU (IND)	QA7	VN7	OFFBOARD CON (IMBW)
COWL RH J/C6 (08)	#XH	VL0	OFFBOARD CON (SIO)

From		To	
Location	Terminal	Terminal	Location
COWL RH J/C7 (05)	#YE	VN8	OFFBOARD CON (ECUT)
OFFBOARD CON (VF)	VN6	X21	EFI ECU (VF)
J/B FUSE ENG (L2)	N78	VL2	OFFBOARD CON (IG)
COWL RH J/C6 (07)	#XG	XT8	EFI ECU (SIO)
COWL RH J/C7 (04)	#YD	XS3	EFI ECU (T)
COWL RH J/C6 (10)	#XK	QA3	IMMOBI ECU (SIO)
A/B ECU (SIO)	#TL	#XL	COWL RH J/C6 (11)
COWL RH J/C6 (09)	#XJ	WV0	ABS ECU (SIO)
A/B ECU (TC)	#TJ	#YH	COWL RH J/C7 (08)
COWL RH J/C7 (07)	#YG	QA8	IMMOBI ECU (T)
COWL RH J/C7 (06)	#YF	WV2	ABS ECU (TC)
OBD2	#TK	T28	A/B ECU (T)
OBD2 (SIO)	#TM	T44	A/B ECU (SIO)
MET (EFI)	X01	X02	EFI ECU (W)
EFI ECU (AUX1)	XP0	XT2	RESISTOR1 (+)
E/G WP BNDR2 (01)	#CA	#HD	COWL R BNDR3 (04)
COWL R BNDR3 (02)	#HB	XR4	EFI ECU (+B1)
COWL R BNDR3 (03)	#HC	XV0	EFI ECU (+B2)
F/P RLY (COL –)	PD7	XU4	EFI ECU (FC1)
COWL RH J/C2 (E03)	#3C	ZS7	RB EFI M RLY (E)
COWL RH J/C5 (09)	#GJ	XR3	EFI ECU (BAT)
J/B FS ECUIG (B1)	N52	OC8	EFI MAIN RLY (COL +)
F/P RLY (L)	PD6	P06	FUEL POMP (+)
COWL RH J/C1 (E02)	#2B	Z83	MET SPD (E)
COWL RH J/C6 (06)	#XF	XH6	EFI ECU (DEF)
COWL RH J/C5 (03)	#GC	XH7	EFI ECU (H/L)
COWL R BNDR2 (E11)	#5L	XR9	EFI ECU (FAN)
COWL RH J/C8 (10)	#ZK	XQ5	EFI ECU (A/T)
A/B ECU (IG2)	#TA	T45	FUSE A/B (L1)
FUSE A/B (L)	#TB	T02	A/B ECU (IG2)
A/B ECU (IG1)	#TH	N31	J/B FUSE ENG (L)
FUSE E/G (L)	#TG	T01	A/B ECU (IG1)
A/B ECU (W)	#TE	T37	MET (A/B)
MET A/B IND (–)	#TF	T26	A/B ECU (W)
COWL L J/C1 (E05)	#TD	T14	A/B ECU (E1)
A/B ECU (E1)	#TC	#2C	COWL RH J/C1 (E03)
A/B ECU (D +)	T11	T24	A/B SQUIB (D +)
A/B ECU (D –)	T12	T25	A/B SQUIB (D –)
A/B ECU (PS +)	T09	T42	A/B SQUIB (P +)
A/B ECU (PS –)	T10	T43	A/B SQUIB (P –)
COWL R BNDR1 (E01)	#4A	#8A	COWL L BNDR1 (E01)
COWL RH J/C1 (E02)	#2B	#4B	COWL R BNDR1 (E02)
COWL RH J/C1 (E01)	#2A	#3A	COWL RH J/C2 (E01)
COWL RH J/C1 (E03)	#2C	#5A	COWL R BNDR2 (E01)
COWL RH J/C2 (E05)	#3E	ZS1	D/LOCK SW (E)
J/B HAZ SW (RH)	F49	QB5	ITC ECU (CHR)
J/B HAZ SW (LH)	F50	QC4	ITC ECU (CHL)
COWL RH J/C4 (15)	#FW	QB3	ITC ECU (IG1)
FUSE D/LOCK (L)	Q17	Q47	ITC ECU (+B)
COWL RH J/C2 (E06)	#3F	ZT3	ITC ECU (E1)
OFFBOARD CON (ITCT)	VP3	QC1	ITC ECU (T)
ITC ECU (CS1)	QC3	QC8	ALL RNG SSR (+)

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From		To	
Location	Terminal	Terminal	Location
ITC ECU (CS –)	QC2	QC9	ALL RNG SSR (–)
D/LOCK SW (U/L +)	Q25	QB8	ITC ECU (UKS)
COWL RH J/C4 (18)	#FZ	X03	MET (SPSR)
COWL RH J/C4 (17)	#FY	X04	EFI ECU (SPD)
COWL RH J/C4 (16)	#FX	Q34	ITC ECU (SPD)
ROOM LP (DR)	D03	QB6	ITC ECU (CRL)
J/B CTY SW (+2)	D72	QB4	ITC ECU (DCSD)
COWL R J/C 11 (02)	#NN	QB9	ITC ECU (CFL)
COWL R J/C 11 (05)	#NR	QC7	ITC ECU (CHZD)
J/B TRN SW (–)	F67	QC5	ITC ECU (FL +)
MULTI SW (HAZ –)	F48	QB7	ITC ECU (T/H)
COWL LH J/C3 (05)	#KE	Q51	ITC ECU (ULM)
COWL LH J/C3 (08)	#KH	Q50	ITC ECU (LKM)
A/B ECU (IG2)	#TA	T45	FUSE A/B (L1)
FUSE A/B (L)	#TB	T02	A/B ECU (IG2)
A/B ECU (IG1)	#TH	N31	J/B FUSE ENG (L)
FUSE E/G (L)	#TG	T01	A/B ECU (IG1)
A/B ECU (W)	#TE	T37	MET (A/B)
MET A/B IND (–)	#TF	T26	A/B ECU (W)
COWL L J/C1 (E05)	#TD	T14	A/B ECU (E1)
A/B ECU (D +)	T11	T24	A/B SQUIB (D +)
A/B ECU (E1)	#TC	#2D	COWL RH J/C (E04)
A/B ECU (D –)	T12	T25	A/B SQUIB (D –)
COWL LH J/C7 (08)	#PH	#TJ	A/B ECU (TC)
COWL LH J/C6 (11)	#NL	#TL	A/B ECU (SIO)
OBD2 (ECUT)	#TK	T28	A/B ECU (T)
OBD2 (SIO)	#TM	T44	A/B ECU (SIO)
ABS P SSR FR (+)	WA4	W67	ABS ECU (FR1)
ABS P SSR FR (–)	WA5	W53	ABS ECU (FR0)
COWL RH J/C5 (12)	#GM	WS9	ABS ECU (BAT)
COWL RH J/C2 (E04)	#3D	ZN9	ABS MTR (–)
ABS ACT (MT)	WK1	WS5	ABS ECU (MS)
COWL R BNDR5 (01)	#GR	WK2	ABS ACT (BS)
ABS MTR RLY (L)	WS4	WW1	ABS ACT (BM)
COWL R BNDR4 (03)	#FT	WS0	ABS MAI RLY (SWNO)
COWL RH J/C9 (04)	#EU	WS1	ABS MTR RLY (COL +)
COWL R BNDR4 (02)	#FS	WS3	ABS MTR RLY (B)
COWL R BNDR5 (03)	#GT	WG2	ABS DIODE (–)
COWL RH J/C9 (03)	#ET	WG1	ABS DIODE (+)
COWL RH J/C9 (01)	#ER	WB0	MET ABS IND (–)
ABS MTR RLY (COL –)	WS2	WS6	ABS ECU (PCO)
COWL RH J/C3 (03)	#EC	WT0	ABS ECU (BLS)
ABS MAI RLY (COL –)	WR7	WS7	ABS ECU (REL)
COWL RH J/C9 (06)	#EW	WV3	ABS ECU (R +)
ABS ECU (AST)	WV4	WW2	ABS ACT (AST)
ABS ACT (SRFRH)	WW3	WX1	ABS ECU (SFRH)
ABS ACT (SRH)	WW5	WX3	ABS ECU (SRH)
ABS ACT (SFLH)	WW4	WX2	ABS ECU (SFLH)
ABS ACT (SFRR)	WW6	WX4	ABS ECU (SFRR)
ABS ACT (SFLR)	WW7	WX5	ABS ECU (SFLR)
ABS ACT (SRR)	WW8	WX6	ABS ECU (SRR)
COWL RH J/C (11)	#YL	W48	ABS ECU (IGN)

From		To	
Location	Terminal	Terminal	Location
COWL R BNDR1 (E08)	#4H	ZG3	ABS MAI RLY (SWNC)
ABS P SSR FL (+)	WA0	W65	ABS ECU (FL1)
ABS P SSR FL (–)	WA1	W51	ABS ECU (FL0)
COWL R BNDR4 (01)	#FR	OC6	F/L ABS (L)
COWL RH J/C9 (05)	#EV	WR8	ABS MAI RLY (COL +)
COWL R BNDR5 (02)	#GS	WR9	ABS MAI RLY (SWC)
COWL RH J/C9 (02)	#ES	WT1	ABS ECU (WLAS)
COWL RH J/C3 (13)	#EN	WW9	ABS ECU (EX1)

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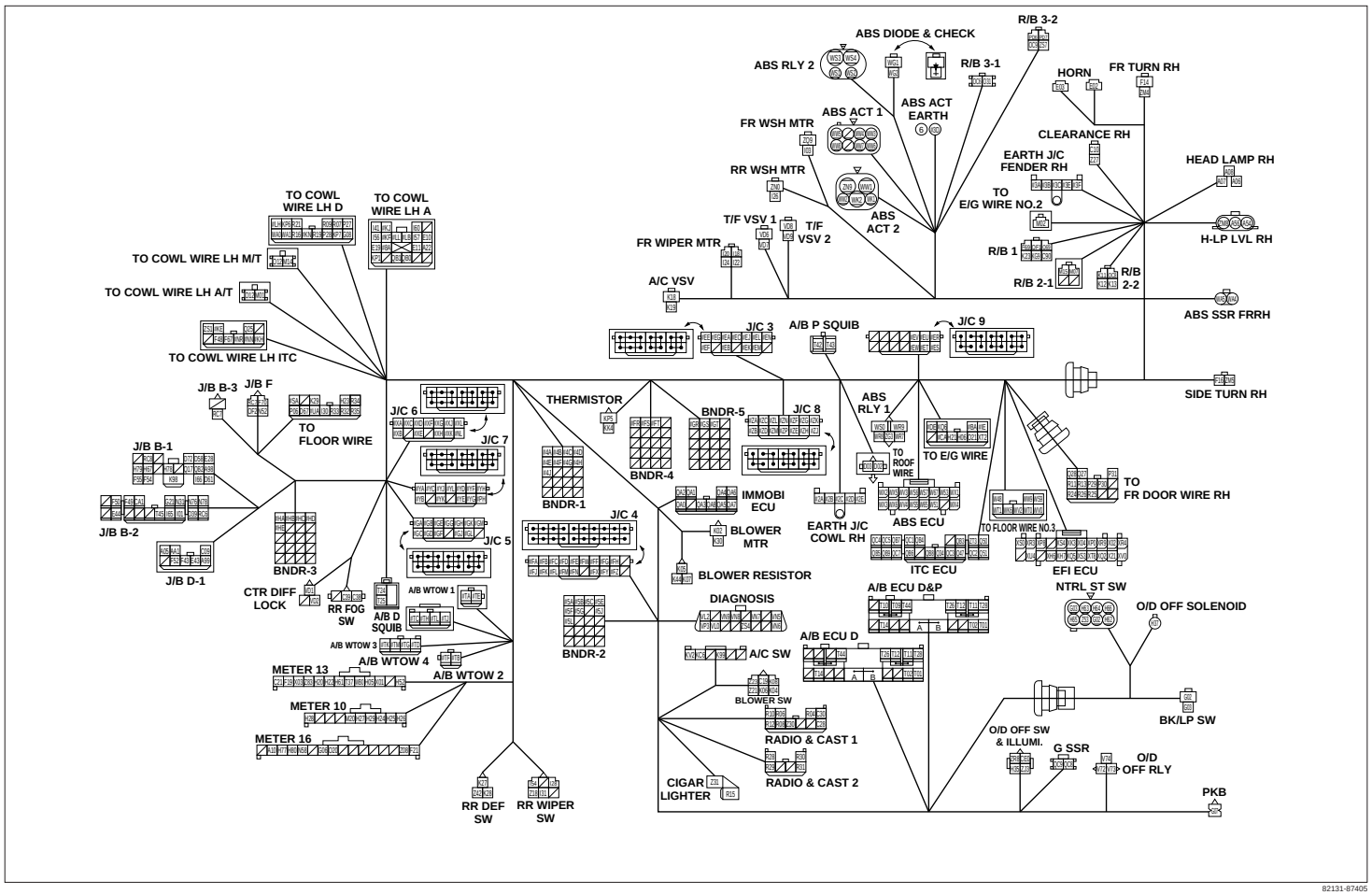
WIRE, COWL, RH (EC/LHD)



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WIRE, COWL, RH (General/LHD)

From		To	
Location	Terminal	Terminal	Location
IG SW (AM)	O12	O31	F/L AM (L)
LGHTNG SW (B)	A22	O69	M/FUSE H/L (L)
M/FUSE TAIL (L)	OF1	OF2	J/B M/F TAIL (L)
FUSE HORNHZD (L)	F69	F70	J/B HORN HZD (L)
IG SW (AM)	O12	O31	F/L AM (L)
HI BEAM IND (+)	A10	A98	J/B H BM IND (+)
H-LP RH (LO)	A08	A99	J/B H-LP LOR (–)
J/B H-LP HIR (–)	AA1	A07	H-LP RH (HI)
COWL RH J/C5 (02)	#GB	A06	H-LP RH (B)
COWL RH J/C5 (01)	#GA	A05	FUSE H-LP RH (L)
COWL RH J/C8 (13)	#ZN	C28	RADIO (ILM +)
J/B HTR ILM (B)	CA1	C19	HTR CON ILM (+)
MET(ILM +)	C21	H78	J/B MET ILM (+)
COWL R BNDR2 (E03)	#5C	Z23	HTR CON ILM (E)
COWL R BNDR1 (E03)	#4C	Z08	MET EARTH (E)
COWL RH J/C2 (E02)	#3B	Z27	CLA LP RH (–)
COWL RH J/C8 (12)	#ZM	C10	CLA LP RH (+)
COWL RH J/C8 (11)	#ZL	C09	J/B CLA LP (RH +)
COWL RH J/C8 (14)	#ZP	CE0	FLOOR ILM (+)
COWL R BNDR2 (E05)	#5E	ZR8	FLOOR ILM (–)
COWL RH J/C3 (01)	#EA	E11	STOP LP SW (–)
STOP LP SW (+)	E10	E23	FUSE STOP (L)
COWL RH J/C (02)	#EB	#UA	FLOOR BNDR2 (01)
COWL RH J/C5 (06)	#GF	D02	ROOM LP (+)
COWL RH J/C5 (05)	#GE	E44	J/B F/STOP (L2)
FLOOR J/C1 (01)	#SA	G03	BACK LP SW (–)
BACK LP SW (+)	G02	G21	J/B BACK LP (SW +)
BACK LP SW (+)	G02	G21	J/B BACK LP (SW +)
COWL RH J/C8 (01)	#ZA	G03	BACK LP SW (–)
FLOOR J/C1 (01)	#SA	#ZB	COWL RH J/C8 (02)
COWL RH J/C8 (04)	#ZD	H28	MET A/T (ND (R +))
COWL RH J/C8 (03)	#ZC	D39	J/B R/WNG (BUZ +)
TRN IND LH (+)	F19	F54	J/B TRN IND (LH)
SID TRN LP R (+)	F16	F43	J/B S/TRN LP (RH +)
FR TRN LP RH (+)	F14	F52	J/B F/TRN LP (RH)
TRN IND RH (+)	F21	F55	J/B TRN IND (RH)
COWL RH J/C2 (E02)	#3B	ZM4	FR TRN LP RH (–)
COWL RH J/C2 (E01)	#3A	ZM5	SID TRN LP R (–)
HORN RH (–)	E03	E19	HORN SW (+)
HORN RH (+)	E02	E43	J/B HORN (+B)
COWL RH J/C5 (07)	#GG	D67	LUG ROOM LMP (B)
E/G J/C1 (E05)	#1E	#2A	COWL RH J/C1 (E01)
E/G WP BNDR1 (01)	#BA	N76	J/B FUSE ENG (L1)
MET (CHG)	O20	O21	ALT (L)
MET THRM G (+)	H20	H21	THRM SENDER (+)
MET FUEL G (+)	H22	H23	FUEL SENDER (+)
COWL RH J/C6 (02)	#XB	XQ2	EFI ECU (REV)
COWL RH J/C6 (01)	#XA	N58	MET (REV)
COWL RH J/C6 (03)	#XC	VN5	OFFBOARD CON (REV)
COWL RH J/C4 (01)	#FA	H67	J/B MET (+)
COWL RH J/C4 (02)	#FB	H61	MET (IG)
MET OIL PRES (–)	H05	H06	OIL PRES SW (B)

From		To	
Location	Terminal	Terminal	Location
COWL RH J/C (05)	#EE	G06	MET BRK WNG (–)
COWL RH J/C3 (06)	#EF	G08	BRK O/LEV SW (+)
COWL RH J/C3 (07)	#EG	G07	PK BRK SW (+)
COWL R BNDR2 (E07)	#5G	ZJ3	O/D CUT SW (E)
COWL RH J/C8 (06)	#ZF	H35	O/D CUT SW (B)
COWL RH J/C8 (05)	#ZE	H52	O/D OFF IND (DI –)
COWL RH J/C8 (07)	#ZG	V74	O/D CUT RLY (COLL)
O/D CUT SOL (+)	H37	V73	O/D CUT RLY (L)
COWL RH J/C4 (04)	#FD	V72	O/D CUT RLY (B)
STARTER (ST)	M02	M14	ST RLY (L)
MET A/T IND (L)	H24	H62	A/T NSS (L)
MET A/T IND (2)	H25	H63	A/T NSS (2)
MET A/T IND (D)	H26	H64	A/T NSS (D)
MET A/T IND (N)	H27	H65	A/T NSS (N)
MET A/T IND (P)	H29	H66	A/T NSS (P)
COWL RH J/C8 (09)	#ZJ	M20	A/T IND DIOD (B)
COWL RH J/C8 (08)	#ZH	M07	ST RLY (COL –)
COWL R BNDR2 (E09)	#5J	Z53	A/T NSS (E)
IG SW (ST)	M01	M15	ST RLY (COL +)
J/B F/WSH MO (+)	I01	I03	FR WSH MTR (+)
FR WSH SW (L)	I60	ZQ9	FR WSH MTR (–)
FR WIP MTR (HI)	I20	I57	FR WIP SW (2)
FR WIP MTR (LO)	I18	I56	FR WIP SW (1)
FR WIP MTR (S)	I24	I41	INT RLY (INT)
FR WIP MTR (+B)	I22	I65	J/B F/WP-TRN (L1)
RR WSH SW (B)	I28	I66	J/B F/WP-TRN (L2)
RR WIP MTR (–)	I30	I31	RR WIP SW (B)
COWL R BNDR1 (E04)	#4D	Z18	RR WIP SW (E)
RR WSH MTR (+)	I26	I54	RR WSH SW (L)
COWL RH J/C2 (E05)	#3E	ZN0	RR WSH MTR (E)
DEF SW (B)	K27	K98	J/B FUSE DEF (L)
COWL R BNDR1 (E05)	#4E	Z42	DEF SW (E)
COWL RH J/C6 (04)	#XD	K28	DEF SW (L)
COWL RH J/C6 (05)	#XE	K29	DEF (+)
COWL LH J/C3 (13)	#KN	R26	E MIRROR RH (C)
E MIRROR SW (VR)	R19	R24	E MIRROR RH (V)
E MIRROR SW (HR)	R21	R25	E MIRROR RH (H)
COWL RH J/C7 (01)	#YA	RC8	FUSE ACC (L3)
COWL RH J/C7 (02)	#YB	R16	E MIRROR SW (B)
FUSE ACC (L2)	RC7	R15	CIG LTR (+)
COWL R BNDR2 (E06)	#5F	Z31	CIG LGT (E)
RADIO (SPL –)	R08	R09	SP FR LH (–)
RADIO (SPL +)	R06	R07	SP FR LH (+)
RADIO (SPL +)	R30	R34	RR SP LH (+)
RADIO (SRL –)	R31	R35	RR SP LH (–)
RADIO (SRR +)	R28	R32	RR SP RH (+)
RADIO (SRR –)	R29	R33	RR SP RH (–)
FUSE ACC (L1)	RC6	R04	RADIO (+B)
COWL RH J/C5 (10)	#GK	C30	RADIO (B/UP)
COWL RH J/C1 (E05)	#2E	Z30	RADIO (E)
RADIO (SPR +)	R10	R11	SP FR RH (+)
RADIO (SPR –)	R12	R13	SP FR RH (–)

From		To	
Location	Terminal	Terminal	Location
COWL LH J/C3 (09)	#KJ	Q28	D/L MTR FR P (LOK +)
COWL LH J/C3 (06)	#KF	Q27	D/L MTR FR P (U/L +)
COWL LH J/C4 (08)	#LH	P31	P/W SW FR P (B)
P/W MAS SW (PU +)	P27	P29	P/W SW FR P (U +)
P/W MAS SW (PD +)	P28	P30	P/W SW FR P (D +)
HTR BLR MTR (+)	K02	K11	HTR RLY (L)
COWL RH J/C4 (11)	#FL	K13	HTR RLY (COL –)
A/C RLY (COL –)	KG9	XS0	EFI ECU (MGC)
MAG CLT (+)	KP1	K23	A/C RLY (L)
COWL R BNDR3 (01)	#HA	OC9	EFI MAIN RLY (L)
COWL R BNDR3 (05)	#HE	K18	A/C I/UP VSV (+)
A/C I/UP VSV (–)	K19	XQ6	EFI ECU (VSV3)
E/G WP BNDR3 (05)	#DE	KK4	A/C THEMSTR (–)
A/C THEMSTR (+)	KP5	KP8	EFI ECU (ACEV)
COWL RH J/C4 (08)	#FH	K44	HTR RESSTR (+)
COWL RH J/C4 (07)	#FG	K04	HTR BLR SW (H)
HTR RESSTR (M & M1)	K05	K06	HTR BLR SW (M, M1)
COWL RH J/C4 (12)	#FM	XK3	EFI ECU (BLW)
COWL RH J/C4 (10)	#FK	K08	HTR BLR SW (L)
COWL RH J/C1 (E04)	#2D	Z21	HTR BLR SW (E)
J/B F/GGE-BK (L)	H79	K12	HTR RLY (COL +)
COWL RH J/C4 (05)	#FE	KC6	A/C SW (+B)
COWL RH J/C4 (13)	#FN	KV2	A/C SW IND (–)
A/C D/PRS SW (–)	KP7	XS4	EFI ECU (ACSW)
A/C D/PRS SW (+)	KP6	K99	A/C SW (–)
COWL RH J/C4 (06)	#FF	K30	HTR BLR MTR (–)
COWL RH J/C4 (09)	#FJ	K07	HTR RESSTR (L)
COWL RH J/C4 (03)	#FC	VD1	DIFLOCK SW (B)
COWL RH J/C3 (11)	#EL	VD8	DIFLOCK VSV2 (+)
COWL R BNDR1 (E06)	#4F	VD9	DIFLOCK VSV2 (–)
COWL R BNDR1 (E07)	#4G	VD7	DIFLOCK VSV1 (–)
COWL RH J/C3 (12)	#EM	H77	DIFLOCK IND (+)
COWL RH J/C3 (09)	#EJ	VD2	DIFLOCK SW (L)
COWL RH J/C3 (10)	#EK	VD6	DIFLOCK VSV (+)
COWL RH J/C5 (08)	#GH	C90	FUSE BK/UP (L)
COWL RH J/C7 (09)	#YJ	QB2	J/B IMMB ECU (IG)
OFFBOARD CON (ABST)	VN9	WK6	ABS ECU (TS)
COWL R BNDR2 (E02)	#5B	ZS4	OFFBOARD CON (E)
COWL RH J/C6 (08)	#XH	VL0	OFFBOARD CON (SIO)
COWL RH J/C7 (05)	#YE	VN8	OFFBOARD CON (ECUT)
OFFBOARD CON (VF)	VN6	X21	EFI ECU (VF)
J/B FUSE ENG (L2)	N78	VL2	OFFBOARD CON (IG)
COWL RH J/C6 (07)	#XG	XT8	EFI ECU (SIO)
COWL RH J/C7 (04)	#YD	XS3	EFI ECU (T)
COWL RH J/C6 (09)	#XJ	WV0	ABS ECU (SIO)
COWL RH J/C7 (06)	#YF	WV2	ABS ECU (TC)
MET (EFI)	X01	X02	EFI ECU (W)
EFI ECU (AUX1)	XP0	XT2	RESISTOR1 (+)
E/G WP BNDR2 (01)	#CA	#HD	COWL R BNDR3 (04)
COWL R BNDR3 (02)	#HB	XR4	EFI ECU (+B1)
COWL R BNDR3 (03)	#HC	XV0	EFI ECU (+B2)
F/P RLY (COL –)	PD7	XU4	EFI ECU (FC1)

From		To	
Location	Terminal	Terminal	Location
COWL RH J/C2 (E03)	#3C	ZS7	RB EFI M RLY (E)
COWL RH J/C5 (09)	#GJ	XR3	EFI ECU (BAT)
J/B FS ECUIG (B1)	N52	OC8	EFI MAIN RLY (COL +)
F/P RLY (L)	PD6	P06	FUEL PUMP (+)
COWL RH J/C1 (E02)	#2B	Z83	MET SPD (E)
COWL RH J/C6 (06)	#XF	XH6	EFI ECU (DEF)
COWL RH J/C5 (03)	#GC	XH7	EFI ECU (H/L)
COWL R BNDR2 (E11)	#5L	XR9	EFI ECU (FAN)
COWL RH J/C8 (10)	#ZK	XQ5	EFI ECU (A/T)
COWL R BNDR1 (E01)	#4A	#8A	COWL L BNDR1 (E01)
COWL RH J/C1 (E02)	#2B	#4B	COWL R BNDR12 (E02)
COWL RH J/C1 (E01)	#2A	#3A	COWL RH J/C2 (E01)
COWL RH J/C1 (E03)	#2C	#5A	COWL R BNDR2 (E01)
COWL RH J/C2 (E05)	#3E	ZS1	D/LOCK SW (E)
J/B HAZ SW (RH)	F49	QB5	ITC ECU (CHR)
J/B HAZ SW (LH)	F50	QC4	ITC ECU (CHL)
COWL RH J/C4 (15)	#FW	QB3	ITC ECU (IG1)
FUSE D/LOCK (L)	Q17	Q47	ITC ECU (+B)
COWL RH J/C2 (E06)	#3F	ZT3	ITC ECU (E1)
OFFBOARD CON (ITCT)	VP3	QC1	ITC ECU (T)
ITC ECU (CS1)	QC3	QC8	ALL RNG SSR (+)
ITC ECU (CS –)	QC2	QC9	ALL RNG SSR (–)
D/LOCK SW (U/L +)	Q25	QB8	ITC ECU (UKS)
COWL RH J/C4 (18)	#FZ	X03	MET (SPSR)
COWL RH J/C4 (17)	#FY	X04	EFI ECU (SPD)
COWL RH J/C4 (16)	#FX	Q34	ITC ECU (SPD)
ROOM LP (DR)	D03	QB6	ITC ECU (CRL)
J/B CTY SW (+2)	D72	QB4	ITC ECU (DCSD)
COWL R J/C11 (02)	#NN	QB9	ITC ECU (CFL)
COWL R J/C11 (05)	#NR	QC7	ITC ECU (CHZD)
J/B TRN SW (–)	F67	QC5	ITC ECU (FL +)
MULTI SW (HAZ –)	F48	QB7	ITC ECU (T/H)
COWL LH J/C3 (05)	#KE	Q51	ITC ECU (ULM)
COWL LH J/C3 (08)	#KH	Q50	ITC ECU (LKM)
COWL LH J/C5 (03)	#MC	C25	FR FOG LP RH (+)
COWL RH J/C2 (E06)	#3F	ZD2	FR FOG LP RH (–)
FUSE FOG (L)	CE7	C23	FR FOG LP SW (B)
COWL LH J/C5 (01)	#MA	C24	FR FOG LP SW (L)
COWL LH J/C5 (02)	#MB	C26	FR FOG LP LH (+)
ABS P SSR FR (+)	WA4	W67	ABS ECU (FR1)
ABS P SSR FR (–)	WA5	W53	ABS ECU (FR0)
COWL RH J/C5 (12)	#GM	WS9	ABS ECU (BAT)
COWL RH J/C2 (E04)	#3D	ZN9	ABS MTR (–)
ABS ACT (MT)	WK1	WS5	ABS ECU (MS)
COWL R BNDR5 (01)	#GR	WK2	ABS ACT (BS)
ABS MTR RLY (L)	WS4	WW1	ABS ACT (BM)
COWL R BNDR4 (03)	#FT	WS0	ABS MAI RLY (SWNO)
COWL RH J/C9 (04)	#EU	WS1	ABS MTR RLY (COL +)
COWL R BNDR4 (02)	#FS	WS3	ABS MTR RLY (B)
COWL R ENDR5 (03)	#GT	WG2	ABS DIODE (–)
COWL RH J/C9 (03)	#ET	WG1	ABS DIODE (+)
COWL RH J/C9 (01)	#ER	WB0	MET ABS IND (–)

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From		To	
Location	Terminal	Terminal	Location
ABS MTR RLY (COL –)	WS2	WS6	ABS ECU (PCO)
COWL RH J/C3 (03)	#EC	WT0	ABS ECU (BLS)
ABS MAI RLY (COL –)	WR7	WS7	ABS ECU (REL)
COWL RH J/C9 (06)	#EW	WV3	ABS ECU (R +)
ABS ECU (AST)	WV4	WW2	ABS ACT (AST)
ABS ACT (SFRH)	WW3	WX1	ABS ECU (SFRH)
ABS ACT (SRH)	WW5	WX3	ABS ECU (SRH)
ABS ACT (SFLH)	WW4	WX2	ABS ECU (SFLH)
ABS ACT (SFRR)	WW6	WX4	ABS ECU (SFRR)
ABS ACT (SFLR)	WW7	WX5	ABS ECU (SFLR)
ABS ACT (SRR)	WW8	WX6	ABS ECU (SRR)
COWL RH J/C7 (11)	#YL	W48	ABS ECU (IGM)
COWL R BNDR1 (E08)	#4H	ZG3	ABS MAI RLY (SWNC)
ABS P SSR FL (+)	WA0	W65	ABS ECU (FL1)
ABS P SSR FL (–)	WA1	W51	ABS ECU (FL0)
COWL R BNDR4 (01)	#FR	OC6	F/L ABS (L)
COWL RH J/C9 (05)	#EV	WR8	ABS MAI RLY (COL +)
COWL R BNDR5 (02)	#GS	WR9	ABS MAI RLY (SWC)
COWL RH J/C9 (02)	#ES	WT1	ABS ECU (WLAS)
COWL RH J/C3 (13)	#EN	WW9	ABS ECU (EX1)

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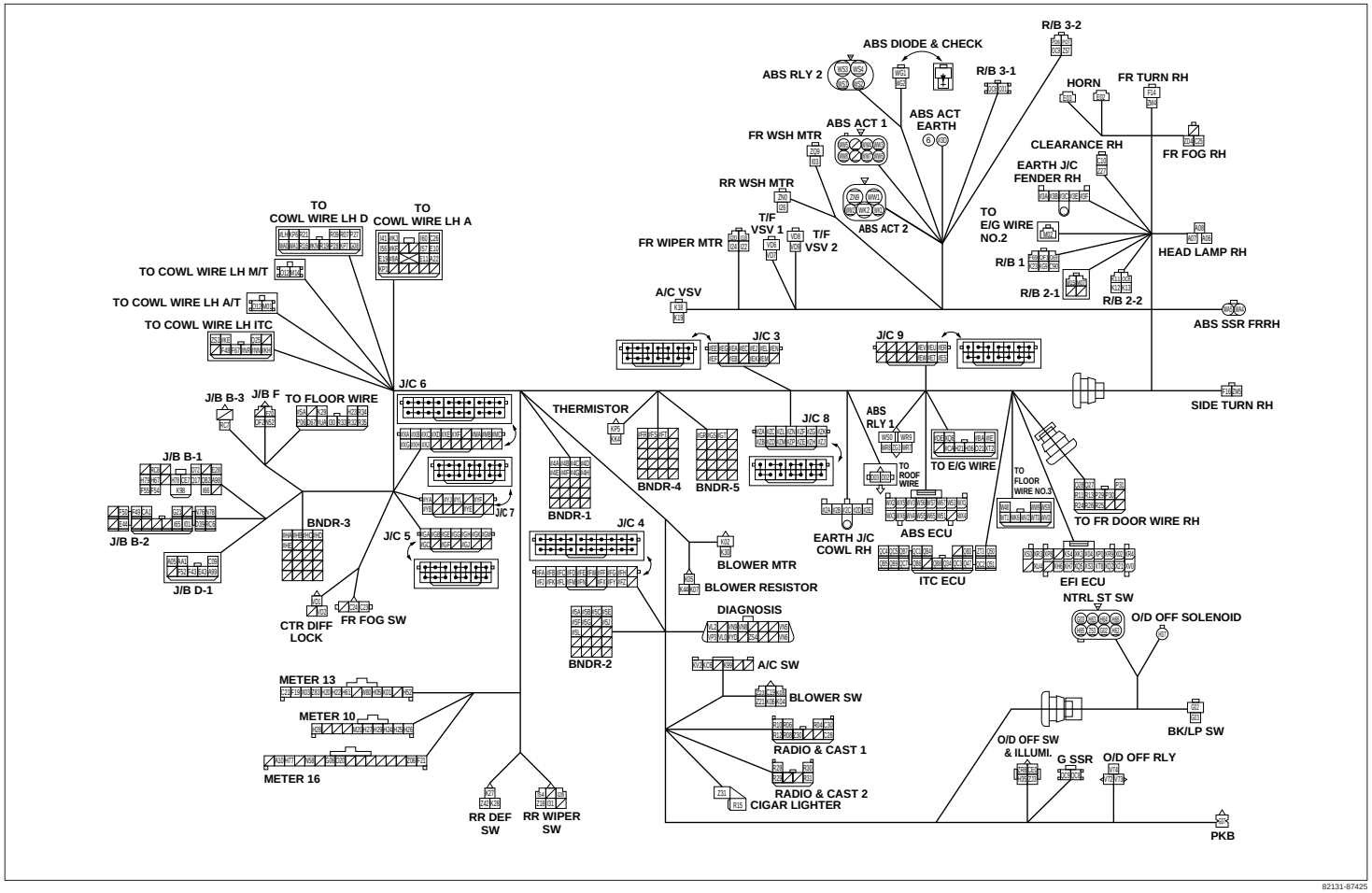
WIRE, COWL, RH (General/LHD)



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WIRE, COWL, LH (EC/RHD & AUS.)

From		To	
Location	Terminal	Terminal	Location
COWL LH J/C9 (02)	#RB	A02	H-LP LH (B)
COWL LH J/C9 (01)	#RA	A01	FUSE H-LP LH (L)
J/B H-LP LOL (–)	AA0	A04	H-LP LH (LO)
J/B H-LP HIL (–)	AA2	A03	H-LP LH (HI)
HI BEAM IND (+)	A10	A98	J/B H BM IND (+)
RR FOG SW (+)	C38	D58	J/B KEY SW (+)
RR FOG SW (–)	C39	D61	J/B K/WNG (BUZB)
COWL RH J/C5 (11)	#GL	H80	MET RR FOG (IND +)
COWL LH J/C3 (01)	#KA	C06	J/B CLA LP (LH +)
COWL LH J/C3 (03)	#KC	C28	RADIO (ILM +)
J/B HTR ILM (B)	CA1	C19	HTR CON ILM (+)
MET (ILM +)	C21	H78	J/B MET ILM (+)
COWL LH J/C3 (02)	#KB	C12	CLA LP LH (+)
COWL LH J/C2 (E02)	#7B	Z28	CLA LP LH (–)
COWL L BNDR2 (E03)	#9C	Z23	HTR CON ILM (E)
COWL L BNDR1 (E03)	#8C	Z08	MET EARTH (E)
COWL L BNDR2 (E05)	#9E	ZR8	FLOOR ILM (–)
COWL LH J/C3 (05)	#KE	CE0	FLOOR ILM (+)
COWL LH J/C9 (04)	#RD	A61	H-LP LEV ACT (LH +)
COWL LH J/C2 (E05)	#7E	ZM7	H-LP LEV ACT (LH E)
COWL RH J/C5 (02)	#GB	A63	H-LP LEV ACT (LH 0)
COWL LH J/C9 (06)	#RF	#UA	FLOOR BNDR2 (01)
COWL LH J/C9 (05)	#RE	E11	STOP LP SW (–)
STOP LP SW (+)	E10	E28	FUSE STOP (L)
COWL LH J/C5 (05)	#ME	D02	ROOM LP (+)
ROOM LP (DR)	D03	QB6	ITC ECU (CRL)
COWL LH J/C5 (04)	#MD	E44	J/B F/STOP (L2)
COWL L J/C10 (04)	#KU	D72	J/B CTY SW (+2)
COWL L J/C10 (05)	#KV	QB4	ITC ECU (DCSD)
BACK LP SW (+)	G02	G21	J/B BACK LP (SW +)
FLOOR J/C1 (01)	#SA	G03	BACK LP SW (–)
BACK LP SW (+)	G02	G21	J/B BACK LP (SW +)
COWL LH J/C8 (03)	#QC	D39	J/B R/WNG (BUZ +)
COWL LH J/C8 (01)	#QA	G03	BACK LP SW (–)
COWL HL J/C8 (02)	#QB	#SA	FLOOR J/C1 (01)
COWL LH J/C8 (04)	#QD	H28	MET A/T IND (R+)
SID TRN LP L (+)	F11	F44	J/B S/TRN LP (LH +)
FR TRN LP LH (+)	F09	F53	J/B F/TRN LP (LH)
COWL LH J/C2 (E04)	#7D	ZM6	SID TRN LP L (–)
COWL LH J/C2 (E02)	#7B	ZM3	FR TRN LP LH (–)
TRN IND LH (+)	F19	F54	J/B TRN IND (LH)
TRN IND RH (+)	F21	F55	J/B TRN IND (RH)
MET (CHG)	O20	O21	ALT (L)
E/G WP BNDR1 (01)	#BA	M76	J/B FUSE ENG (L1)
COWL LH J/C5 (06)	#MF	D67	LUG ROOM LMP (B)
MET THRM G (+)	H20	H21	THRM SENDER (+)
MET FUEL G (+)	H22	H23	FUEL SENDER (+)
COWL LH J/C6 (01)	#NA	N58	MET (REV)
COWL LH J/C6 (02)	#NB	XQ2	EFI ECU (REV)
COWL LH J/C6 (03)	#NC	VN5	OFFBOARD CON (REV)
COWL LH J/C4 (02)	#LB	H61	MET (IG)
MET OIL PRES (–)	H05	M06	OIL PRES SW (B)

From		To	
Location	Terminal	Terminal	Location
COWL LR J/C4 (01)	#LA	H67	J/B MET (+)
COWL LH J/C3 (06)	#KF	G06	MET BRK WNG (–)
COWL LH J/C3 (08)	#KH	G07	PK BRK SW (+)
COWL LH J/C3 (07)	#KG	G08	BRK O/LEV SW (+)
COWL LH J/C4 (04)	#LD	V72	O/D CUT RLY (B)
O/D CUT SOL (+)	H37	V73	O/D CUT RLY (L)
COWL LH J/C8 (07)	#QG	V74	O/D CUT RLY (COLL)
COWL LH J/C8 (06)	#QF	H35	O/D CUT SW (B)
COWL L BNDR2 (E07)	#9G	ZJ3	O/D CUT SW (E)
COWL LH J/C8 (05)	#QE	H52	O/D OFF IND (DI –)
COWL LH J/C8 (09)	#QJ	M20	A/T IND DIOD (B)
COWL LH J/C8 (08)	#QH	M07	ST RLY (COL –)
MET A/T IND (P)	H29	H66	A/T NSS (P)
MET A/T IND (N)	H27	H65	A/T NSS (N)
MET A/T IND (D)	H26	H64	A/T NSS (D)
MET A/T IND (2)	H25	H63	A/T NSS (2)
MET A/T IND (L)	H24	H62	A/T NSS (L)
COWL L BNDR2 (E09)	#9J	Z53	A/T NSS (E)
MULTI SW (HAZ –)	F48	QB7	ITC ECU (T/H)
J/B TRN SW (–)	F67	QC5	ITC ECU (FL +)
KEYLESS KEY (1)	#E1	D61	J/B K/WNG (BUZB)
KEYLESS KEY (2)	#E2	D14	IG KEY SW (–)
IG KEY SW (+)	D13	D58	J/B KEY SW (+)
FR WIP MTR (HI)	I20	I57	FR WIP SW (2)
FR WIP MTR (LO)	I18	I56	FR WIP SW (1)
FR WIP MTR (S)	I24	I41	INT RLY (INT)
FR WIP MTR (+B)	I22	I65	J/B F/WP-TRN (L1)
FR WSH SW (L)	I60	ZQ9	FR WSH MTR (–)
J/B F/WSH MO (+)	I01	I03	FR WSH MTR (+)
RR WSH SW (B)	I28	I66	J/B F/WP-TRN (L2)
RR WIP MTR (–)	I30	I31	RR WIP SW (B)
COWL L BNDR1 (E04)	#8D	Z18	RR WIP SW (E)
RR WSH MTR (+)	I26	I54	RR WSH SW (L)
COWL LH J/C2 (E03)	#7C	ZN0	RR WSH MTR (E)
DEF SW (B)	K27	K98	J/B FUSE DEF (L)
COWL LH J/C6 (04)	#ND	K28	DEF SW (L)
COWL LH J/C6 (05)	#NE	K29	DEF (+)
COWL L BNDR1 (E05)	#8E	Z42	DEF SW (E)
COWL RH J/C5 (09)	#GJ	R27	E MIRROR LH (C)
E MIRROR SW (HL)	R20	R23	E MIRROR LH (H)
E MIRROR SW (VL)	R18	R22	E MIRROR LH (V)
COWL LH J/C7 (01)	#PA	RC8	FUSE ACC (L3)
COWL LH J/C7 (02)	#PB	R16	E MIRROR SW (B)
FUSE ACC (L2)	RC7	R15	CIG LTR (+)
COWL L BNDR2 (E06)	#9F	Z31	CIG LGT (E)
FUSE ACC (L1)	RC6	R04	RADIO (+B)
COWL LR J/C5 (09)	#MJ	C30	RADIO (B/UP)
COWL LH J/C1 (E03)	#6C	Z30	RADIO (E)
RADIO (SPR +)	R10	R11	SP FR RH (+)
RADIO (SPR –)	R12	R13	SP FR RH (–)
RADIO (SRR –)	R29	R33	RR SP RH (–)
RADIO (SRR +)	R28	R32	RR SP RH (+)

From		To	
Location	Terminal	Terminal	Location
RADIO (SRL –)	R31	R35	RR SP LH (–)
RADIO (SRL +)	R30	R34	RR SP LH (+)
RADIO (SPL +)	R06	R07	SP FR LH (+)
RADIO (SPL –)	R08	R09	SP FR LH (–)
COWL RH J/C4 (12)	#FM	Q28	D/L MTR FR P (LOK +)
COWL RH J/C4 (09)	#FJ	Q27	D/L MTR FR P (U/L +)
COWL RH J/C3 (05)	#EE	P31	P/W SW FR P (B)
P/W MAS SW (PU +)	P27	P29	P/W SW FR P (U +)
P/W MAS SW (PD +)	P28	P30	P/W SW FR P (D +)
HTR BLR MTR (+)	K02	K11	HTR RLY (L)
COWL LH J/C4 (12)	#LM	K13	HTR RLY (COL –)
A/C D/PRS SW (–)	KP7	XS4	EFI ECU (ACSW)
A/C D/PRS SW (+)	KP6	K99	A/C SW (–)
COWL LH J/C4 (07)	#LG	K04	HTR BLR SW (H)
COWL LH J/C4 (08)	#LH	K44	HTR RESSTR (+)
HTR RESSTR (M & M1)	K05	K06	HTR BLR SW (M, M1)
COWL LH J/C4 (10)	#LK	K08	HTR BLR SW (L)
COWL LH J/C4 (11)	#LL	XK3	EFI ECU (BLW)
COWL LH J/C1 (E04)	#6D	Z21	HTR BLR SW (E)
E/G WP BNDR3 (05)	#DE	KK4	A/C THEMSTR (–)
A/C THEMSTR (+)	KP5	XP8	EFI ECU (ACEV)
A/C RLY (COL –)	KG9	XS0	EFI ECU (MGC)
A/C I/UP VSV (–)	K19	XQ6	EFI ECU (VSV3)
MAG CLT (+)	KP1	K23	A/C RLY (L)
J/B F/GGE-BK (L)	H79	K12	HTR RLY (COL +)
COWL LH J/C4 (05)	#LE	KC6	A/C SW (+B)
COWL LH J/C4 (06)	#LF	K30	HTR BLR MTR (–)
COWL LH J/C4 (09)	#LJ	K07	HTR RESSTR (L)
COWL LH J/C4 (13)	#LN	KV2	A/C SW IND (–)
COWL LH J/C4 (03)	#LC	VD1	DIFLOCK SW (B)
COWL LH J/C3 (12)	#KM	H77	DIFLOCK IND (+)
COWL RH J/C3 (01)	#EA	#KL	COWL LH J/C3 (11)
COWL LH J/C3 (10)	#KK	VD2	DIFLOCK SW (L)
COWL LH J/C7 (09)	#PJ	QB2	J/B IMMB ECU (IG)
COWL LH J/C7 (10)	#PK	QA0	IMMOBI ECU (IG)
COWL LH J/C5 (07)	#MG	C90	FUSE BK/UP (L)
IMMOBI ECU (COL +)	QA4	QB0	IMMOBI ANTN (COL +)
IMMOBI ECU (COL –)	QA5	QB1	IMMOBI ANTN (COL –)
COWL L BNDR1 (E06)	#8F	QA6	IMMOBI ECU (E)
COWL LH J/C7 (03)	#PC	QA1	IMMOBI ECU (ACC)
COWL LH J/C5 (10)	#MK	QA2	IMMOBI ECU (+B)
J/B FUSE ENG (L2)	N78	VL2	OFFBOARD CON (IG)
OFFBOARD CON (VF)	VN6	X21	EFI ECU (VF)
COWL LH J/C7 (04)	#PD	XS3	EFI ECU (T)
COWL LH J/C6 (07)	#NG	XT8	EFI ECU (SIO)
IMMOBI ECU (IND)	QA7	VN7	OFFBOARD CON (IMBW)
COWL LH J/C7 (07)	#PG	QA8	IMMOBI ECU (T)
COWL LH J/C6 (10)	#NK	QA3	IMMOBI ECU (SIO)
COWL LH J/C7 (08)	#PH	#TJ	A/B ECU (TC)
COWL LH J/C6 (11)	#NL	#TL	A/B ECU (SIO)
OBD2 (ECUT)	#TK	T28	A/B ECU (T)
OBD2 (SIO)	#TM	T44	A/B ECU (SIO)

From		To	
Location	Terminal	Terminal	Location
COWL LH J/C7 (05)	#PE	VN8	OFFBOARD CON (ECUT)
COWL LH J/C6 (08)	#NH	VL0	OFFBOARD CON (SIO)
COWL L BNDR2 (E02)	#9B	ZS4	OFFBOARD CON (E)
COWL L J/C10 (01)	#KR	Q17	FUSE D/LOCK (L)
COWL L J/C10 (02)	#KS	Q47	ITC ECU (+B)
OFFBOARD CON (ABST)	VN9	WK6	ABS ECU (TS)
COWL LH J/C6 (09)	#NJ	WV0	ABS ECU (SIO)
COWL LH J/C7 (06)	#PF	WV2	ABS ECU (TC)
COWL LH J/C5 (08)	#MH	XR3	EFI ECU (BAT)
COWL LH J/C9 (09)	#RJ	XR4	EFI ECU (+B1)
COWL LH J/C9 (10)	#RK	XV0	EFI ECU (+B2)
E/G WP BNDR2 (01)	#CA	#RL	COWL LH J/C9 (11)
MET (EFI)	X01	X02	EFI ECU (W)
COWL L BNDR2 (E11)	#9L	XR9	EFI ECU (FAN)
EFI ECU (AUX1)	XP0	XT2	RESISTOR1 (+)
COWL LH J/C9 (03)	#RC	XH7	EFI ECU (H/L)
COWL LH J/C6 (06)	#NF	XH6	EFI ECU (DEF)
COWL RH J/C4 (07)	#FG	#RH	COWL LH J/C9 (08)
COWL L J/C10 (11)	#LV	X04	EFI ECU (SPD)
COWL L J/C10 (12)	#LW	X03	MET (SPSR)
COWL L J/C10 (10)	#LU	Q34	ITC ECU (SPD)
COWL LH J/C1 (E02)	#6B	Z83	MET SPD (E)
COWL LH J/C8 (10)	#QK	XQ5	EFI ECU (A/T)
F/P RLY (COL –)	PD7	XU4	EFI ECU (FC1)
A/B ECU (IG2)	#TA	T45	FUSE A/B (L1)
FUSE A/B (L)	#TB	T02	A/B ECU (IG2)
A/B ECU (IG1)	#TH	N31	J/B FUSE ENG (L)
FUSE E/G (L)	#TG	T01	A/B ECU (IG1)
A/B ECU (W)	#TE	T37	MET (A/B)
MET A/B IND (–)	#TF	T26	A/B ECU (W)
COWL L J/C1 (E05)	#TD	T14	A/B ECU (E1)
A/B ECU (E1)	#TC	#6E	COWL LH J/C1 (E05)
A/B ECU (D +)	T11	T24	A/B SQUIB (D +)
A/B ECU (D –)	T12	T25	A/B SQUIB (D –)
A/B ECU (PS +)	T09	T42	A/B SQUIB (P +)
A/B ECU (PS –)	T10	T43	A/B SQUIB (P –)
ABS ACT (MT)	WK1	WS5	ABS ECU (MS)
ABS MTR RLY (COL –)	WS2	WS6	ABS ECU (PCO)
ABS MAI RLY (COL –)	WR7	WS7	ABS ECU (REL)
COWL RH J/C3 (09)	#EJ	WV3	ABS ECU (R +)
ABS ECU (AST)	WV4	WW2	ABS ACT (AST)
ABS ACT (SFRH)	WW3	WX1	ABS ECU (SFRH)
ABS ACT (SFLH)	WW4	WX2	ABS ECU (SFLH)
ABS ACT (SRH)	WW5	WX3	ABS ECU (SRH)
ABS ACT (SFRR)	WW6	WX4	ABS ECU (SFRR)
ABS ACT (SFLR)	WW7	WX5	ABS ECU (SFLR)
ABS ACT (SRR)	WW8	WX6	ABS ECU (SRR)
ABS P SSR FL (+)	WA0	W65	ABS ECU (FL1)
ABS P SSR FL (–)	WA1	W51	ABS ECU (FL0)
COWL LH J/C9 (07)	#RG	WT0	ABS ECU (BLS)
COWL LH J/C7 (11)	#PL	W48	ABS ECU (IGN)
COWL LH J/C8 (11)	#QL	WB0	MET ABS IND (–)

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From		To	
Location	Terminal	Terminal	Location
COWL LH J/C8 (12)	#QM	WU7	CHK TML ABS (STIM)
ABS P SSR FR (–)	WA5	W53	ABS ECU (FR0)
ABS P SSR FR (+)	WA4	W67	ABS ECU (FR1)
COWL LH J/C8 (13)	#QN	WT1	ABS ECU (WLAS)
COWL LH J/C5 (11)	#ML	WS9	ABS ECU (BAT)
COWL LH J/C3 (13)	#KN	WW9	ABS ECU (EXI)
COWL LH J/C1 (E02)	#6B	#8B	COWL L BNDR1 (E02)
COWL LH J/C1 (E01)	#6A	#7A	COWL LH J/C2 (E01)
COWL R BNDR1 (E01)	#4A	#8A	COWL L BNDR1 (E01)
COWL LH J/C1 (E03)	#6C	#9A	COWL L BNDR2 (E01)
A/B ECU (IG2)	#TA	T45	FUSE A/B (L1)
FUSE A/B (L)	#TB	T02	A/B ECU (IG2)
A/B ECU (IG1)	#TH	N31	J/B FUSE ENG (L)
FUSE E/G (L)	#TG	T01	A/B ECU (IG1)
A/B ECU (W)	#TE	T37	MET (A/B)
MET A/B IND (–)	#TF	T26	A/B ECU (W)
COWL L J/C1 (E05)	#TD	T14	A/B ECU (EI)
A/B ECU (E1)	#TC	#6E	COWL LH J/C1 (E05)
A/B ECU (D +)	T11	T24	A/B SQUIB (D +)
A/B ECU (D –)	T12	T25	A/B SQUIB (D –)
COWL LH J/C7 (08)	#PH	#TJ	A/B ECU (TC)
COWL LH J/C6 (11)	#NL	#TL	A/B ECU (SIO)
OBD2 (ECUT)	#TK	T28	A/B ECU (T)
OBD2 (SIO)	#TM	T44	A/B ECU (SIO)
COWL RH J/C4 (08)	#FR	Q51	ITC ECU (ULM)
COWL RH J/C4 (11)	#FL	Q50	ITC ECU (LKM)
COWL L J/C10 (08)	#LS	QB8	ITC ECU (UKS)
COWL L J/C10 (09)	#LT	Q25	D/LOCK SW (U/L +)
COWL LH J/C2 (E04)	#7D	ZS1	D/LOCK SW (E)
COWL LH J/C2 (E03)	#7C	ZT3	ITC ECU (E1)
OFFBOARD CON (ITCT)	VP3	QC1	ITC ECU (T)
ITC ECU (CS –)	QC2	QC9	ALL RNG SSR (–)
ITC ECU (CSI)	QC3	QC8	ALL RNG SSR (+)
COWL RH J/C5 (17)	#GY	QC7	ITC ECU (CHZD)
COWL RH J/C5 (14)	#GV	QB9	ITC ECU (CFL)
J/B HAZ SW (LH)	F50	QC4	ITC ECU (CHL)
J/B HAZ SW (RH)	F49	QB5	ITC ECU (CHR)
J/C4 (ITC)	#E5	QB3	ITC ECU (IG1)

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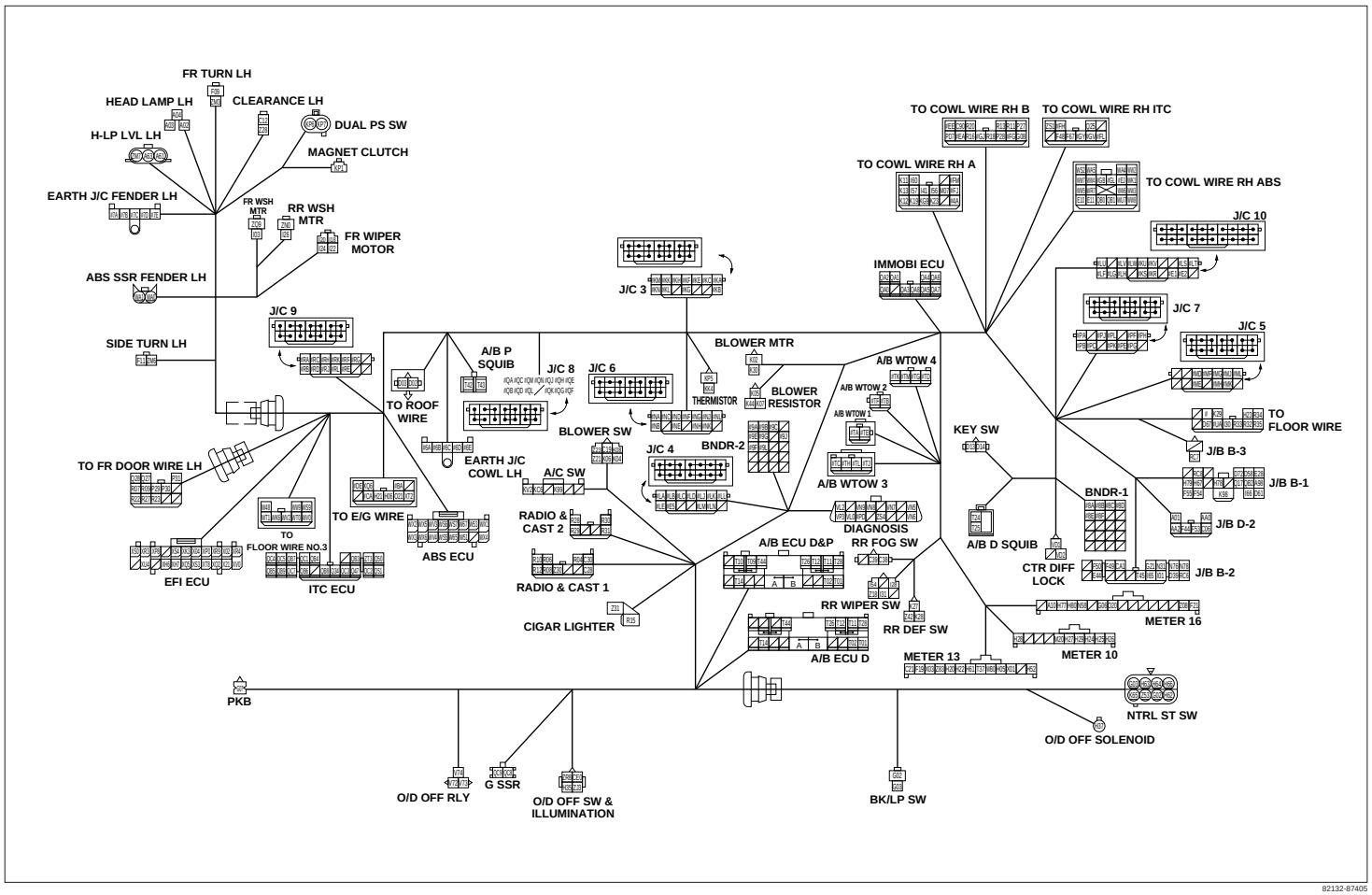
WIRE, COWL, LH (EC/RHD & AUS.)



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WIRE, COWL, LH (General/RHD)

From		To	
Location	Terminal	Terminal	Location
COWL LH J/C9 (02)	#RB	A02	H-LP LH (B)
COWL LH J/C9 (01)	#RA	A01	FUSE H-LP LH (L)
J/B H-LP LOL (–)	AA0	A04	H-LP LH (LO)
J/B H-LP HIL (–)	AA2	A03	H-LP LH (HI)
HI BEAM IND (+)	A10	A98	J/B H BM IND (+)
COWL LH J/C3 (01)	#KA	C06	J/B CLA LP (LH +)
FUSE FOG (L)	CE7	C23	FR FOG LP SW (B)
COWL LH J/C3 (03)	#KC	C28	RADIO (ILM +)
J/B HTR ILM (B)	CA1	C19	HTR CON ILM (+)
MET (ILM +)	C21	H78	J/B MET ILM (+)
COWL LH J/C3 (02)	#KB	C12	CLA LP LR (+)
COWL LH J/C2 (E02)	#7B	Z28	CLA LP LH (–)
COWL L BNDR2 (E03)	#9C	Z23	HTR CON ILM (E)
COWL LH J/C5 (02)	#MB	C26	FR FOG LP LH (+)
COWL LH J/C2 (E05)	#7E	ZD3	FR FOG LP LH (–)
COWL L BNDR1 (E03)	#8C	Z05	MET EARTH (E)
COWL LH J/C5 (03)	#MC	C25	FR FOG LP RH (+)
COWL LH J/C5 (01)	#MA	C24	FR FOG LP SW (L)
COWL L SNDR2 (E05)	#9E	ZR8	FLOOR ILM (–)
COWL LH J/C3 (05)	#KE	CE0	FLOOR ILM (+)
COWL LH J/C9 (06)	#RF	#UA	FLOOR BNDR2 (01)
COWL LH J/C9 (05)	#RE	E11	STOP LP SW (–)
STOP LP SW (+)	E10	E28	FUSE STOP (L)
IG KEY SW (+)	D13	D58	J/B KEY SW (+)
COWL LH J/C5 (05)	#ME	D02	ROOM LP (+)
COWL LH J/C5 (04)	#MD	E44	J/B F/STOP (L2)
BACK LP SW (+)	G02	G21	J/B BACK LP (SW +)
FLOOR J/C1 (01)	#5A	G03	BACK LP SW (–)
BACK LP SW (+)	G02	G21	J/B BACK LP (SW +)
COWL LH J/C8 (03)	#QC	D39	J/B R/WNG (BUZ +)
COWL LH J/C8 (01)	#QA	G03	BACK LP SW (–)
COWL LH J/C8 (02)	#QB	#SA	FLOOR J/C1 (01)
COWL LH J/C8 (04)	#QD	H28	MET A/T IND (R +)
SID TRN LP L (+)	F11	F44	J/S S/TRW LP (LH +)
FR TRN LP LH (+)	F09	F53	J/B F/TRN LP (LH)
COWL LH J/C2 (E04)	#7D	ZM6	SID TRN LP L (–)
COWL LH J/C2 (E02)	#7B	ZM3	FR TRN LP LH (–)
TRN IND LH (+)	F19	F54	J/B TRN IND (LH)
TRN IND RH (+)	F21	F55	J/B TRN IND (RH)
E/G WP BNDR1 (01)	#BA	N76	J/B FUSE ENG (L1)
MET (CHG)	O20	O21	ALT (L)
COWL LH J/C5 (06)	#MF	D67	LUG ROOM LMP (B)
MET THRM G (+)	H20	H21	THRM SENDER (+)
MET FUEL G (+)	H22	H23	FUEL SENDER (+)
COWL LH J/C6 (01)	#NA	N58	MET (REV)
COWL LH J/C6 (02)	#NB	XQ2	EFI ECU (REV)
COWL LH J/C6 (03)	#NC	VN5	OFFBOARD CON (REV)
COWL LH J/C3 (06)	#KF	G05	MET BRK WNG (–)
COWL LH J/C3 (08)	#KH	G07	PK BRK SW (+)
COWL LH J/C3 (07)	#KG	G08	BRK O/LEV SW (+)
MET EXG WRN (–)	Y01	Y02	EXG TEMP SSR (+)
MET SB WRN (–)	H56	H58	SEAT BELT SW (+)

From		To	
Location	Terminal	Terminal	Location
COWL LH J/C4 (02)	#LB	H61	MET (IG)
COWL LH J/C4 (04)	#LD	V72	O/D CUT RLY (B)
O/D CUT SOL (+)	H37	V73	O/D CUT RLY (L)
COWL LH J/C8 (07)	#QG	V74	O/D CUT RLY (COLL)
COWL LH J/C8 (05)	#QE	H52	O/D OFF IND (DI –)
COWL LH J/C8 (06)	#QF	H35	O/D CUT SW (B)
COWL L BNDR2 (E07)	#9G	ZJ3	O/D CUT SW (E)
COWL LH J/C8 (09)	#QJ	M20	A/T IND DIOD (B)
COWL LH J/C8 (08)	#QH	M07	ST RLY (COL –)
MET A/T IND (P)	K29	H60	A/T NSS (P)
MET A/T IND (N)	K27	H65	A/T NSS (N)
MET A/T IND (D)	H26	H64	A/T NSS (D)
MET A/T IND (2)	H25	H63	A/T NSS (2)
MET A/T IND (L)	H24	H62	A/T NSS (L)
COWL L BNDR2 (E09)	#9J	Z53	A/T NSS (E)
FR WIP MTR (HI)	I20	I57	FR WIP SW (2)
FR WIP MTR (LO)	I18	I56	FR WIP SW (1)
FR WIP MTR (S)	I24	I41	INT RLY (INT)
FR WIP MTR (+B)	I22	I65	J/B F/WP-TRN (L1)
FR WSH SW (L)	I60	ZQ9	FR WSN MTR (–)
J/B F/WSH MO (+)	I01	I03	FR WSH MTR (+)
RR WSH SW (B)	I28	I66	J/B F/WP-TRN (L2)
RR WIP MTR (–)	I30	I31	RR WIP SW (B)
COWL L BNDR (E04)	#8D	Z18	RR WIP SW (E)
RR WSH MTR (+)	I26	I54	RR WSH SW (L)
COWL LH J/C2 (E03)	#7Q	ZN0	RR WSH MTR (E)
DEF SW (B)	K27	K98	J/B FUSE DEF (L)
COWL LH J/C6 (04)	#ND	K28	DEF SW (L)
COWL LH J/C6 (05)	#NE	K29	DEF (+)
COWL L BNDR1 (E05)	#8E	Z42	DEF SW (E)
COWL RH J/C5 (09)	#GJ	R27	E MIRROR LH (C)
E MIRROR SW (HL)	R20	R23	E MIRROR LH (H)
E MIRROR SW (VL)	R18	R22	E MIRROR LH (V)
COWL LH J/C7 (01)	#PA	RG8	FUSE ACC (L3)
COWL LH J/C7 (02)	#PB	R16	E MIRROR SW (B)
FUSE ACC (L2)	RC7	R15	CIG LTR (+)
COWL L BNDR2 (E06)	#9F	Z31	CIG LGT (E)
FUSE ACC (L1)	RC5	R04	RADIO (+B)
COWL LH J/C5 (09)	#MJ	C30	RADIO (B/UP)
COWL LH J/C1 (E03)	#6C	Z30	RADIO (E)
RADIO (SPR +)	R10	R11	SP FR RR (+)
RADIO (SPR –)	R12	R13	SP FR RH (–)
RADIO (SRR –)	R29	R33	RR SP RR (–)
RADIO (SRR +)	R28	R32	RR SP RH (+)
RADIO (SRL –)	R31	R35	RR SP LH (–)
RADIO (SRL +)	R30	R34	RR SP LH (+)
RADIO (SPL +)	R06	R07	SP FR LH (+)
RADIO (SPL –)	R08	R09	SP FR LH (–)
COWL RH J/C4 (12)	#FM	Q28	D/L MTR FR P (LOK +)
COWL RR J/C4 (09)	#FJ	Q27	D/L MTR FR P (U/L +)
COWL RH J/C3 (05)	#EE	P31	P/W SW FR P (B)
P/W MAS SW (PD +)	P27	P29	P/W SW FR P (U +)

From		To	
Location	Terminal	Terminal	Location
P/W MAS SW (PD +)	P28	P30	P/W SW FR P (D +)
MTR BLR MTR (+)	K02	K11	MTR RLY (L)
COWL LH J/C4 (12)	#LM	K13	MTR RLY (COL –)
A/C D/PRS SW (–)	KP7	XS4	EFI ECU (ACSW)
A/C D/PRS SW (+)	KP6	K99	A/C SW (–)
COWL LH J/C4 (07)	#LG	K04	HTR BLR SW (H)
COWL LH J/C4 (08)	#LH	K44	HTR BESSTR (+)
NTR RESSTR (M & M1)	K05	K06	HTR BLR SW (M, M1)
COWL LH J/C4 (10)	#LK	K08	HTR BLR SW (L)
COWL LH J/C4 (11)	#LL	XK3	EFI ECU (BLW)
COWL LH J/C1 (E04)	#6D	Z21	HTR BLR SW (E)
E/G WP BNDR3 (05)	#DE	XK4	A/C THEMSTR (–)
A/C THEMSTR (+)	KP5	XP8	EFI ECU (ACEV)
A/C RLY (COL –)	KG9	XS0	EFI ECU (MGC)
A/C I/UP VSV (–)	K19	XQ6	EFI ECU (VSV3)
MAG CLT (+)	KP1	K23	A/C RLY (L)
J/B F/GGE-BK (L)	H79	K12	HTR RLY (COL +)
COWL LH J/C4 (05)	#LE	KC5	A/C SW (+B)
COWL LH J/C4 (01)	#LA	H67	J/B MET (+)
COWL LH J/C4 (06)	#LE	K30	HTR BLR MTR (–)
COWL LH J/C4 (09)	#LJ	K07	HTR RESSTR (L)
COWL LR J/C4 (13)	#LM	KV2	A/C SW IND (–)
COWL LH J/C4 (03)	#LC	VD1	DIFLOCK SW (B)
COWL LH J/C3 (12)	#KM	H77	DIFLOCK IND (+)
COWL RH J/C3 (01)	#EA	#KL	COWL LH J/C3 (11)
COWL LH J/C3 (10)	#KK	VD2	DIFLOCK SW (L)
J/B FUSE ENG (L2)	N78	VL2	OFFBOARD CON (IG)
OFFBOARD CON (VF)	VN6	X21	EFI ECU (VF)
COWL LH J/C7 (04)	#PD	XS3	EFI ECU (T)
COWL LH J/C6 (07)	#NG	XT8	EFI ECU (SIO)
COWL LH J/C7 (08)	#PH	#TJ	A/B ECU (TC)
COWL LH J/C8 (11)	#NL	#TL	A/B ECU (SIO)
OBD2 (ECUT)	#TK	T28	A/B ECU (T)
OBD2 (SIO)	#TM	T44	A/B ECU (SIO)
COWL LH J/C7 (05)	#PE	VN8	OFFBOARD CON (ECUT)
COWL LH J/C6 (08)	#NH	VLO	OFFBOARD CON (SIO)
COWL L BNDR2 (E02)	#9B	ZS4	OFFBOARD CON (E)
OFFBOARD CON (ABST)	VN9	WK5	ABS ECU (TS)
COWL LH J/C6 (09)	#NJ	WV0	ABS ECU (SIO)
COWL LH J/C7 (06)	#PF	WV2	ABS ECU (TC)
COWL LH J/C5 (08)	#MH	XR3	EFI ECU (BAT)
COWL LH J/C5 (07)	#MG	C90	FUSE BK/UP (L)
COWL LH J/C9 (09)	#RJ	XR4	EFI ECU (+B1)
COWL LH J/C9 (10)	#RK	XV0	EFI ECU (+B2)
E/G WP BNDR2 (01)	#CA	#RL	COWL LH J/C9 (11)
FUEL CUT (+)	#F4	PD7	F/P RLY (COL –)
FUEL CUT (–)	#F5	XU4	EFI ECU (FGI)
MET (EFI)	X01	X02	EFI ECU (W)
EFI ECU (AUX1)	XP0	XT2	RESISTOR1 (+)
COWL LH J/C9 (03)	#RC	XH7	EFI ECU (H/L)
COWL LH J/C8 (06)	#NF	XR6	EFI ECU (DEF)
COWL RH J/C4 (07)	#FG	#RH	COWL LH J/C9 (08)

From		To	
Location	Terminal	Terminal	Location
COWL LH J/C1 (E02)	#6B	Z83	MET SPD (E)
COWL L BNDR2 (E11)	#9L	XR9	EFI ECU (FAN)
COWL LH J/C8 (10)	#QK	XQ5	EFI ECU (A/T)
MET OIL PRESS (–)	H05	H06	OIL PRES SW (B)
COWL L J/C10 (11)	#LV	K04	EFI ECU (SPD)
COWL L J/C10 (12)	#LW	X03	MET (SPSR)
COWL L J/C10 (10)	#LU	Q34	ITC ECU (SPD)
COWL L J/C10 (01)	#KR	Q17	FUSE D/LOCK (L)
COWL L J/C10 (02)	#KS	Q47	ITC ECU (+B)
ROOM LP (DR)	D03	QB5	ITC ECU (CRL)
COWL L J/C10 (04)	#KU	D72	J/B CTY SW (+2)
COWL L J/C10 (05)	#KV	QB4	ITC ECU (DCSD)
COWL L J/C10 (13)	#LX	#F3	MLT MET (SPD)
COWL LH J/C4 (14)	#LY	#F2	MLT MET (IG)
ABS ACT (MT)	WK1	WS5	ABS ECU (MS)
ABS MTR RLY (COL –)	WS2	WS6	ABS ECU (PCO)
ABS MAI RLY (COL –)	WR7	WS7	ABS ECU (REL)
COWL RR J/C3 (09)	#EJ	WV3	ABS ECU (R+)
ABS ECU (AST)	WV4	WW2	ABS ACT (AST)
ABS ACT (SFRH)	WW3	WX1	ABS ECU (SFRH)
ABS ACT (SFLH)	WW4	WX2	ABS ECU (SFLH)
ABS ACT (SRH)	WW5	WX3	ABS ECU (SRH)
ABS ACT (SFRR)	WW6	WX4	ABS ECU (SFRR)
ABS ACT (SFLR)	WW7	WX5	ABS ECU (SFLR)
ABS ACT (SRR)	WW8	WX6	ABS ECU (SRR)
ABS P SSR FL (+)	WA0	W65	ABS ECU (FL1)
ABS P SSR FL (–)	WA1	W51	ABS ECU (FL0)
COWL LH J/C9 (07)	#RG	WT0	ABS ECU (BLS)
COWL LH J/C7 (11)	#PL	W48	ABS ECU (IGN)
COWL LH J/C8 (11)	#QL	WB0	MET ABS IND (–)
COWL LH J/C8 (12)	#QM	WU7	CHK TML ABS (STIM)
ABS P SSR FR (–)	WA5	W53	ABS ECU (FR0)
ABS P SSR FR (+)	WA4	W67	ABS ECU (FR1)
COWL LH J/C7 (09)	#PJ	QB2	J/B IMMB ECU (IG)
COWL LH J/C8 (13)	#QN	WT1	ABS ECU (WLAS)
COWL LH J/C5 (11)	#ML	W59	ABS ECU (BAT)
COWL LH J/C3 (13)	#KN	WW9	ABS ECU (EXI)
A/B ECU (IG2)	#TA	T45	FUSE A/B (L1)
FUSE A/B (L)	#TB	T02	A/B ECU (IG2)
A/B ECU (IG1)	#TH	N31	J/B FUSE ENG (L)
FUSE E/G (L)	#TG	T01	A/B ECU (IG1)
A/B ECU (W)	#TE	T37	NET (A/B)
MET A/B IND (–)	#TF	T26	A/B ECU (W)
COWL L J/C1 (E05)	#TD	T14	A/B ECU (E1)
A/B ECU (E1)	#TC	#6E	COWL LH J/C1 (E05)
A/B ECU (D +)	T11	T24	A/B SQUIB (D +)
A/B ECU (D –)	T12	T25	A/B SQUIB (D –)
A/B ECU (PS +)	T09	T42	A/B SQUIB (P +)
A/B ECU (PS –)	T10	T43	A/B SQUIB (P –)
COWL LH J/C1 (E02)	#6B	#8B	COWL L BNDR1 (E02)
COWL LH J/C1 (E01)	#6A	#7A	COWL LH J/C2 (E01)
COWL R BNDR1 (E01)	#4A	#8A	COWL L BNDR1 (E01)

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From		To	
Location	Terminal	Terminal	Location
COWL LH J/C1 (E03)	#6C	#9A	COWL L BNDR2 (E01)
A/B ECU (IG2)	#TA	T45	FUSE A/B (L1)
FUSE A/B (L)	#TB	T02	A/B ECU (IG2)
A/B ECU (IG 1)	#TH	N31	J/B FUSE ENG (L)
FUSE E/G (L)	#TG	T01	A/B ECU (IG1)
A/B ECU (W)	#TE	T37	MET (A/B)
MET A/B IND (–)	#TF	T26	A/B ECU (W)
COWL L J/C1 (E05)	#TD	T14	A/B ECU (EI)
A/B ECU (EI)	#TC	#6E	COWL LH J/C1 (E05)
A/B ECU (D+)	T11	T24	A/B SQUIB (D+)
A/B ECU (D –)	T12	T25	A/B SQUIB (D–)
COWL LH J/C7 (08)	#PN	#TJ	A/B ECU (TC)
COWL LH J/C6 (11)	#NL	#TL	A/B ECU (SIO)
OBD2 (ECUT)	#TK	T28	A/B ECU (T)
OBD2 (SIO)	#TM	T44	A/B ECU (SIO)
COWL L J/C10 (03)	#KT	Q70	K/DEL ENT SR (+B)
COWL L J/C10 (06)	#KW	#JR	KEYLESS ENTY (CS)
KEYLESS ENTY (KLSW)	#JT	Q69	K/DEL ENT SR (SIG)
KEYLESS ENTY (ULS)	#JS	#LR	COWL L J/C10 (07)
COWL LH J/C2 (E05)	#7E	ZD5	K/DEL ENT SR (E)
MULTI SW (HAZ –)	F48	QB7	ITC ECU (T/H)
J/B TRN SW (–)	F67	QC5	ITC ECU (FL +)
KEYLESS KEY (1)	#E1	D61	J/B K/WNG (BUZB)
KEYLESS KEY (2)	#E2	D14	IG KEY SW (–)
KEYLESS KEY (3)	#E3	#E4	KEYLESS KEY (4)
COWL RH J/C4 (08)	#FH	Q51	ITC ECU (ULM)
COWL RH J/C4 (11)	#FL	Q50	ITC ECU (LKM)
COWL L J/C10 (08)	#LS	QB8	ITC ECU (UKS)
COWL L J/C10 (09)	#LT	Q25	D/LOCK SW (U/L +)
COWL LH J/C2 (E04)	#7D	I08	D/LOCK SW (E)
COWL LH J/C2 (E03)	#7C	ZT3	ITC ECU (EI)
OFFBOARD CON (ITCT)	VP3	QC1	ITC ECU (T)
ITC ECU (CS –)	QC2	QC9	ALL RNG SSR (–)
ITC ECU (CS1)	QC3	QC8	ALL RNG SSR (+)
COWL RH J/C5 (17)	#GY	QC7	ITC ECU (CHZP)
COWL RH J/C5 (14)	#GV	Q89	ITC ECU (CFL)
J/B HAZ SW (LH)	F50	QC4	ITC ECU (CHL)
J/B HAZ SW (RH)	F49	QB5	ITC ECU (CHR)
J/C4 (ITC)	#E5	QB3	ITC ECCU (IG1)

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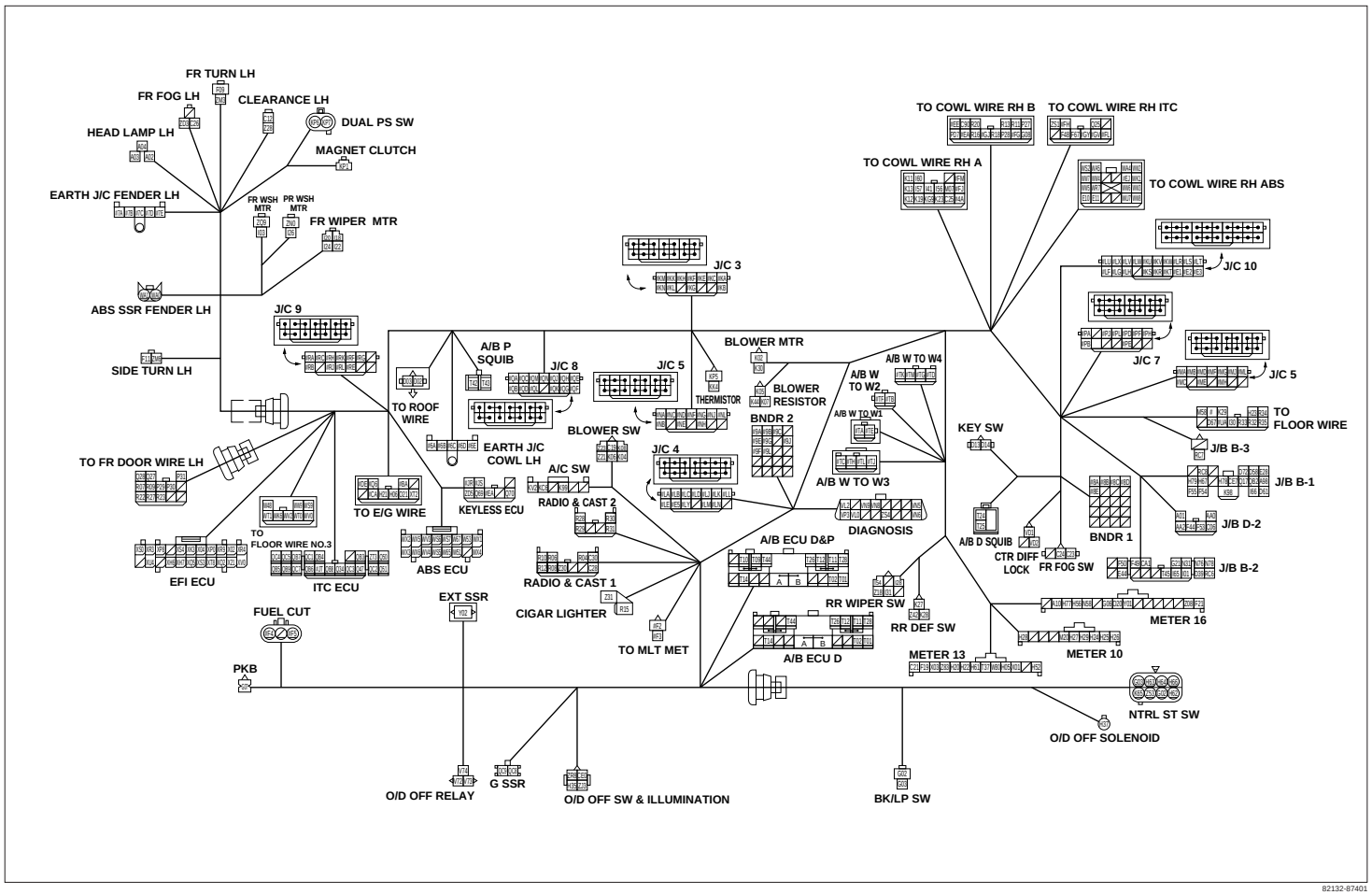
WIRE, COWL, LH (General/RHD)



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WIRE, COWL, LH (EC/LHD)

From		To	
Location	Terminal	Terminal	Location
IG SW (ACC)	R01	R02	FUSE ACC (B)
IG SW (IG1)	N01	N59	J/B IG1
IG SW (IG2)	N30	N60	J/B IG2 (+)
IG SW (AM)	O12	O31	F/L AM (L)
J/B TL SW (+)	CA2	CE1	TAIL LP SW (B)
TAIL LP SW (L)	CE2	CM1	J/B TL SW (–)
J/B H–LP SW (–)	AA5	A23	LGHTNG SW (L)
LGHTNG SW (B)	A22	O69	M/FUSE H/L (L)
J/B H–LP LOL (–)	AA0	A04	H–LP LH (LO)
J/B H–LP HIL (–)	AA2	A03	H–LP LH (HI)
J/B DIM (HI)	AA3	A17	DIM SW (HI)
J/B DIM (LO)	AA4	A18	DIM SW (LO)
COWL LH J/C4 (12)	#LM	C40	RR FOG LP (+)
COWL L BNDR1 (E04)	#8D	Z02	DIM SW (E)
COWL LH J/C4 (11)	#LL	H80	MET RR FOG (IND +)
COWL LH J/C4 (10)	#LK	CJ7	MLT SW R/FOG (–)
COWL LH J/C3 (01)	#KA	A01	FUSE H–LP LH (L)
COWL LH J/C3 (02)	#KB	A02	H–LP LH (B)
MLT SW R/FOG (+)	CJ6	D71	JB R/FOG WNG (BZRB)
COWL LH J/C3 (04)	#KD	A61	H–LP LEV ACT (LH +)
COWL LH J/C3 (03)	#KC	AA6	H–LP LEV SW (+)
COWL LH J/C4 (03)	#LC	A69	H–LP LEV SW (LH 0)
COWL LH J/C4 (01)	#LA	A63	H–LP LEV ACT (LH 0)
COWL L BNDR1 (E10)	#8K	ZM9	H–LP LEV SW (LHE)
COWL LH J/C4 (02)	#LB	A56	H–LP LEV ACT (RH 0)
COWL LH J/C2 (E05)	#7E	ZM7	H–LP LEV ACT (LH E)
J/B CLA LP (LH +)	C06	C12	CLA LP LH (+)
COWL LH J/C2 (E02)	#7B	Z28	CLA LP LH (–)
COWL LH J/C4 (04)	#LD	F32	TRN SW (B)
COWL L BNDR1 (E03)	#8C	Z63	J/B EARTH (1)
TRN SW (LH)	F62	F64	J/B TRN (LH)
TRN SW (RH)	F61	F63	J/B TRN (RH)
SID TRN LP L (+)	F11	F44	J/B S/TRN LP (LH +)
FR TRN LP LH (+)	F09	F53	J/B F/TRN LP (LH)
COWL LH J/C2 (E04)	#7D	ZM6	SID TRN LP L (–)
COWL LH J/C2 (E02)	#7B	ZM3	FR TRN LP LH (–)
COWL LH J/C4 (05)	#LE	F66	J/B TRN SW (IG)
HORN RH (–)	E03	E19	HORN SW (+)
COWL RH J/C3 (06)	#EF	G08	BRK O/LEV SW (+)
COWL LH J/C2 (E03)	#7C	Z11	BRK O/LEV SW (–)
IG SW (ST)	N01	M15	ST RLY (COL +)
COWL LH J/C4 (06)	#LF	I10	FR WIP SW (+)
COWL L BNDR1 (E05)	#8E	Z14	BODY EARTH (CTIR)
FR WIP MTR (HI)	I20	I57	FR WIP SW (2)
FR WIP MTR (LO)	I18	I56	FR WIP SW (1)
FR WSH SW (L)	I60	ZQ9	FR WSH MTR (–)
FR WIP MTR (S)	I24	I41	INT RLY (INT)
COWL RH J/C7 (02)	#YB	R16	E MIRROR SW (B)
COWL LH J/C3 (11)	#KL	R17	E MIRROR SW (C)
COWL LH J/C3 (13)	#KN	R26	E MIRROR RH (C)
E MIRROR SW (VL)	R18	R22	E MIRROR LH (V)
E MIRROR SW (VR)	R19	R24	E MIRROR RH (V)
E MIRROR SW (HL)	R20	R23	E MIRROR LH (H)
E MIRROR SW (HR)	R21	R25	E MIRROR RH (H)
COWL LH J/C3 (12)	#KM	R27	E MIRROR LH (C)
COWL L BNDR1 (E11)	#8L	ZN2	E MIRROR SW (E)
RADIO (SPL –)	R08	R09	SP FR LH (–)
RADIO (SPL +)	R06	R07	SP FR LH (+)
ITC ECU (UKS)	QB8	Q25	D/LOCK SW (U/L +)
COWL LH J/C3 (06)	#KF	Q27	D/L MTR FR P (U/L +)
COWL LH J/C3 (09)	#KJ	Q28	D/L MTR FR P (LOK +)
COWL LH J/C3 (08)	#KH	Q50	ITC ECU (LKM)
COWL LH J/C3 (05)	#KE	Q51	ITC ECU (ULM)
COWL LH J/C3 (07)	#KG	#WF	FLOOR J/C2 (06)
COWL LH J/C3 (10)	#KK	#WK	FLOOR J/C2 (10)
COWL LH J/C4 (08)	#LH	P31	P/W SW FR P (R)
COWL LH J/C4 (09)	#LJ	PD4	FUSE P/W (L)
COWL LH J/C4 (07)	#LG	P22	P/W MAS SW (B)
P/W MAS SW (PU +)	P27	P29	P/W SW FR P (U +)
P/W MAS SW (PD +)	P28	P30	P/W SW FR P (D +)
COWL LH J/C1 (E05)	#6E	Z61	P/W MAS SW (E)
MAG CLT (+)	KP1	K23	A/C RLY (L)
A/C D/PRS SW (–)	KP7	XS4	EFI ECU (ACSW)
A/C D/PRS SW (+)	KP6	K99	A/C SW (–)
IMMOBI ECU (COL –)	QA5	QB1	IMMOBI ANTN (COL –)
IMMOBI ECU (COL +)	QA4	QB0	IMMOBI ANTN (COL +)
ABS P SSR FR (+)	WA0	W65	ABS ECU (EL1)
ABS P SSR FL (–)	WA1	W51	ABS ECU (FL0)
COWL R BNDR1 (E01)	#4A	#8A	COWL L BNDR1 (E01)
COWL LH J/C1 (E02)	#6B	#8B	COWL L BNDR1 (E02)
COWL LH J/C1 (E01)	#6A	#7A	COWL LH J/C2 (E01)
COWL LH J/C1 (E03)	#6C	ZZ7	BODY EARTH (–)
COWL RH J/C3 (01)	#EA	E11	STOP LP SW (–)
STOP LP SW (+)	E10	E28	FUSE STOP (L)
COWL R J/C11 (04)	#NQ	F65	J/B TRN SW (+B)
COWL R J/C11 (06)	#NS	F47	MULTI SW (HAZ +)
COWL R J/C11 (05)	#NR	QC7	ITC ECU (CHZD)
COWL R J/C11 (01)	#NM	F68	J/B TRN SW (RLSW)
COWL R J/C11 (03)	#NP	F60	TRN SW (RL +)
COWL R J/C11 (02)	#NN	QB9	ITC ECU (CFL)
MULTI SW (HAZ –)	F48	QB7	ITC ECU (T/H)
J/B TRN SW (–)	F67	QC5	ITC ECU (FL +)
D/LOCK SW (E)	ZS1	#3E	COWL RH J/C2 (E05)
COWL LH J/C3 (15)	#KP	Q65	D/L MTR FR D (U/L +)
COWL LH J/C3 (15)	#KQ	Q66	D/L MTR FR D (LOK +)

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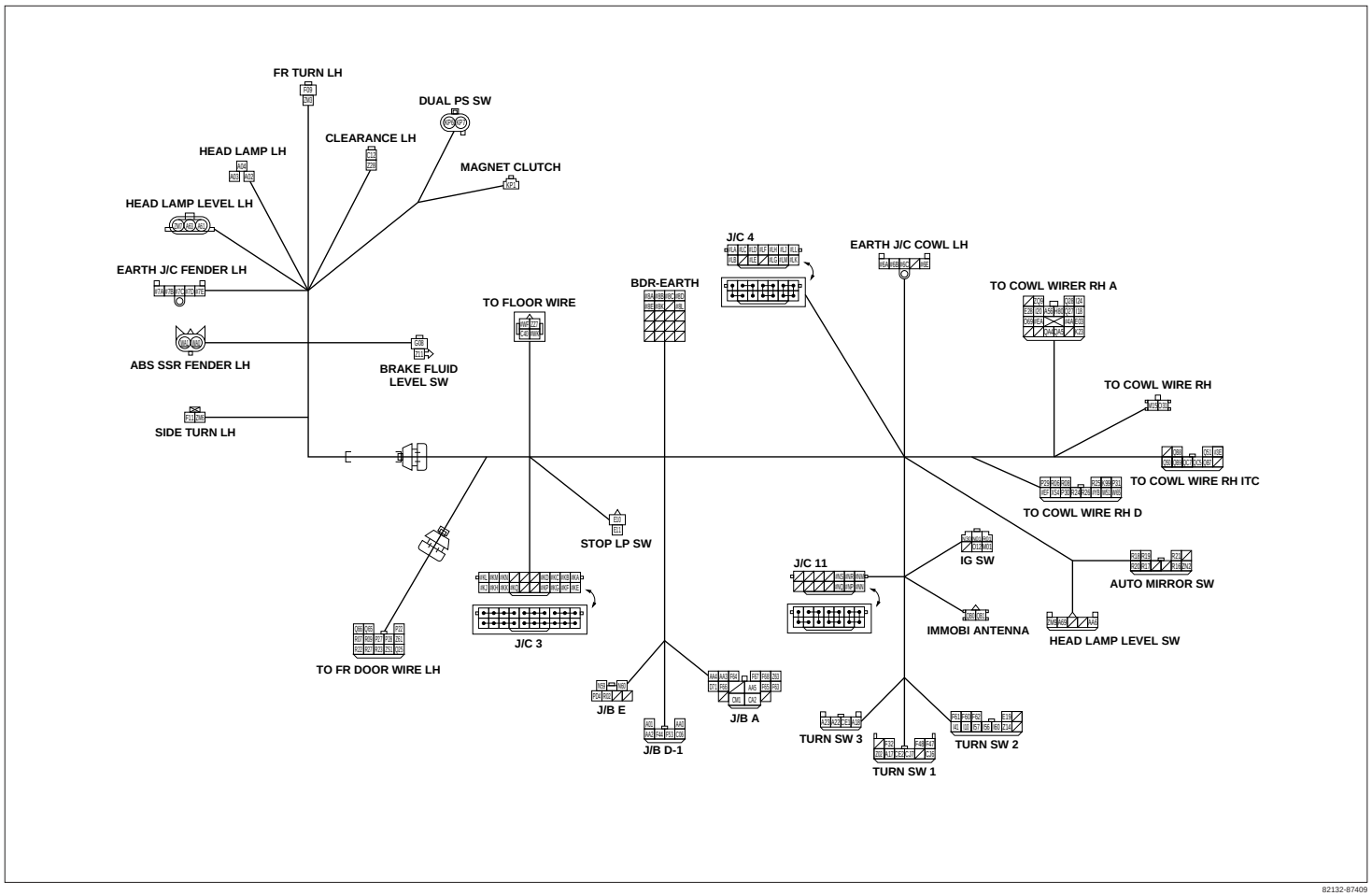
WIRE, COWL, LH (EC/LHD)



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WIRE, COWL, LH (General/LHD)

From		To	
Location	Terminal	Terminal	Location
IG SW (ACC)	R01	R02	FUSE ACC (B)
IG SW (IG1)	N01	N59	J/B IG1 (+)
IG SW (IG2)	N30	N60	J/B IG2 (+)
IG SW (AM)	O12	O31	F/L AM (L)
J/B TL SW (+)	CA2	CE1	TAIL LP SW (B)
TAIL LP SW (L)	CE2	CM1	J/B TL SW (–)
J/B H-LP SW (–)	AA5	A23	LGHTNG SW (L)
LGHTNG SW (B)	A22	O69	M/FUSE H/L (L)
J/B H-LP LOL (–)	AA0	A04	H-LP LH (LO)
J/B H-LP HIL (–)	AA2	A03	H-LP LH (HI)
J/B DIM (HI)	AA3	A17	DIM SW (HI)
J/B DIM (LO)	AA4	A18	DIM SW (LO)
COWL L BNDR1 (E04)	#8D	Z02	DIM SW (E)
COWL LH J/C5 (02)	#MB	C26	FR FOG LP LH (+)
COWL LH J/C2 (E05)	#7E	ZD3	FR FOG LP LH (–)
COWL LH J/C3 (01)	#KA	A01	FUSE H-LP LH (L)
COWL LH J/C3 (02)	#KB	A02	H-LP LH (B)
J/B CLA LP (LH +)	C06	C12	CLA LP LH (+)
COWL LH J/C2 (E02)	#7B	Z28	CLA LP LH (–)
COWL LH J/C4 (04)	#LD	F32	TRN SW (B)
COWL L BNDR1 (E03)	#8C	Z63	J/B EARTH (1)
TRN SW (LH)	F62	F64	J/B TRN (LH)
TRN SW (RH)	F61	F63	J/B TRN (RH)
SID TRN LP L (+)	F11	F44	J/B S/TRN LP (LH +)
FR TRN LP LH (+)	F09	F53	J/B F/TRN LP (LH)
COWL LH J/C2 (E04)	#7D	ZM6	SID TRN LP L (–)
COWL LH J/C2 (E02)	#7B	ZM3	FR TRN LP LH (–)
COWL LH J/C4 (05)	#LE	F66	J/B TRN SW (IG)
HORN RH (–)	E03	E19	HORN SW (+)
COWL RH J/C3 (06)	#EF	G08	BRK O/LEV SW (+)
COWL LH J/C2 (E03)	#7C	Z11	BRK O/LEV SW (–)
IG SW (ST)	M01	M15	ST RLY (COL +)
COWL LH J/C4 (06)	#LF	I10	FR WIP SW (+)
FR WIP MTR (HI)	I20	I57	FR WIP SW (2)
FR WIP MTR (LO)	I18	I56	FR WIP SW (1)
FR WSH SW (L)	I60	ZQ9	FR WSH MTR (–)
FR WIP MTR (S)	I24	I41	INT RLY (INT)
COWL RH J/C7 (02)	#YB	R16	E MIRROR SW (B)
COWL LH J/C3 (11)	#KL	R17	E MIRROR SW (C)
COWL LH J/C3 (13)	#KN	R26	E MIRROR RH (C)
E MIRROR SW (VL)	R18	R22	E MIRROR LH (V)
E MIRROR SW (VR)	R19	R24	E MIRROR RH (V)
E MIRROR SW (HL)	R20	R23	E MIRROR LH (H)
E MIRROR SW (HR)	R21	R25	E MIRROR RH (H)
COWL LH J/C3 (12)	#KM	R27	E MIRROR LH (C)
COWL L BNDR1 (E11)	#8L	ZN2	E MIRROR SW (E)
RADIO (SPL –)	R08	R09	SP FR LH (–)
RADIO (SPL +)	R06	R07	SP FR LH (+)
ITC ECU (UKS)	QB8	Q25	D/LOCK SW (U/L +)
COWL LH J/C3 (06)	#KF	Q27	D/L MTR FR P (U/L +)
COWL LH J/C3 (09)	#KJ	Q27	D/L MTR FR P (LOK +)
COWL LH J/C3 (08)	#KH	Q50	ITC ECU (LKM)
COWL LH J/C3 (05)	#KE	Q51	ITC ECU (ULM)
COWL LH J/C3 (07)	#KG	#WF	FLOOR J/C2 (06)
COWL LH J/C3 (10)	#KK	#WK	FLOOR J/C2 (10)
COWL LH J/C4 (08)	#LH	P31	P/W SW FR P (B)
COWL LH J/C4 (09)	#LJ	PD4	FUSE P/W (L)
COWL LH J/C4 (07)	#LG	P22	P/W MAS SW (B)
P/W MAS SW (PU +)	P27	P29	P/W SW FR P (U +)
P/W MAS SW (PD +)	P28	P30	P/W SW FR P (D +)
COWL LH J/C1 (E05)	#6E	Z61	P/W MAS SW (E)
MAG CLT (+)	KP1	K23	A/C RLY (L)
A/C D/PRS SW (–)	KP7	XS4	EFI ECU (ACSW)
A/C D/PRS SW (+)	KP6	K99	A/C SW (–)
ABS P SSR FL (+)	WA0	W65	ABS ECU (FL1)
ABS P SSR FL (–)	WA1	W51	ABS ECU (FL0)
COWL R BNDR1 (E01)	#4A	#8A	COWL L BNDR1 (E01)
COWL LH J/C1 (E02)	#6B	#8B	COWL L BNDR1 (E02)
COWL LH J/C1 (E01)	#6A	#7A	COWL LH J/C2 (E01)
COWL LH J/C1 (E03)	#6C	Z27	BODY EARTH (–)
COWL RH J/C3 (01)	#EA	E11	STOP LP SW (–)
STOP LP SW (+)	E10	E28	FUSE STOP (L)
COWL R J/C11 (04)	#NQ	F65	J/B TRN SW (+B)
COWL R J/C11 (06)	#NS	F47	MULTI SW (HAZ +)
COWL R J/C11 (05)	#NR	QC7	ITC ECU (CHZD)
COWL R F/C11 (01)	#NM	F68	J/B TRN SW (RLSW)
COWL R J/C11 (03)	#NP	F60	TRN SW (RL +)
COWL R J/C11 (02)	#NN	QB9	ITC ECU (CFL)
MULTI SW (HAZ –)	F48	QB7	ITC ECU (T/H)
J/B TRN SW (–)	F67	QC5	ITC ECU (FL +)
D/LOCK SW (E)	ZS1	#3E	COWL RH J/C2 (E05)
COWL LH J/C3 (15)	#KP	Q65	D/L MTR FR D (U/L +)
COWL LH J/C3 (16)	#KQ	Q66	D/L MTR FR D (LOK +)

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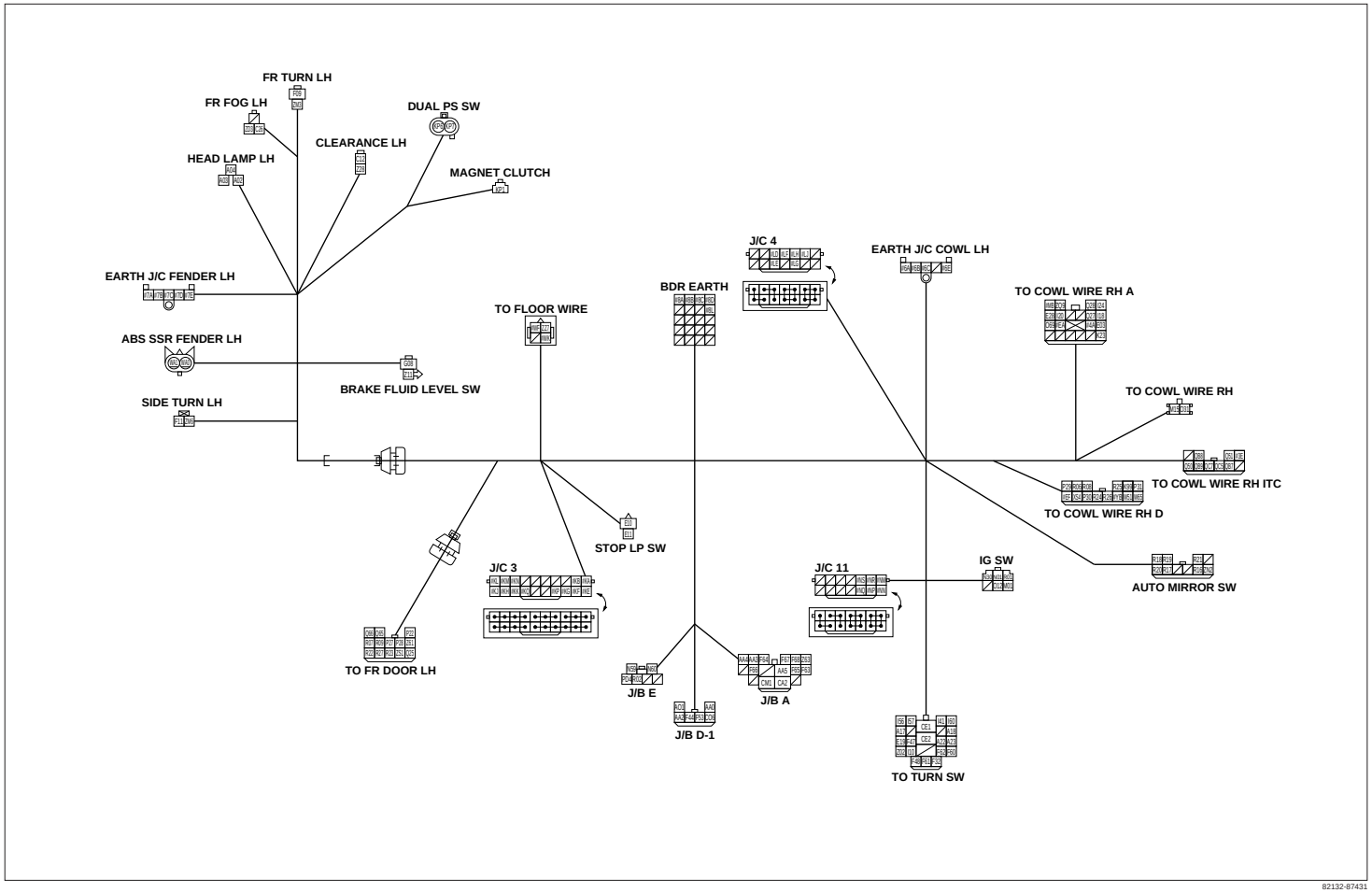
WIRE, COWL, LH (General/LHD)



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