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INFINITI®
QX56
MODEL Z62 SERIES

QUICK REFERENCE INDEX

FOREWORD

This manual contains maintenance and repair procedure for the 2011 INFINITI QX56.

In order to assure your safety and the efficient functioning of the vehicle, this manual should be read thoroughly. It is especially important that the PRECAUTIONS in the GI section be completely understood before starting any repair task.

All information in this manual is based on the latest product information at the time of publication. The right is reserved to make changes in specifications and methods at any time without notice.

IMPORTANT SAFETY NOTICE

The proper performance of service is essential for both the safety of the technician and the efficient functioning of the vehicle.
The service methods in this Service Manual are described in such a manner that the service may be performed safely and accurately.
Service varies with the procedures used, the skills of the technician and the tools and parts available. Accordingly, anyone using service procedures, tools or parts which are not specifically recommended by NISSAN must first be completely satisfied that neither personal safety nor the vehicle's safety will be jeopardized by the service method selected.

INFINITI®

QUICK REFERENCE CHART QX56

PFP:00000

ENGINE TUNE-UP DATA (VK56VD)

ELS0003W

Engine model		VK56VD
Firing order		1-8-7-3-6-5-4-2
Idle speed rpm A/T (In “P or N” position)		600 ± 50
Ignition timing (BTDC at idle speed)		12° ± 2°
CO% at idle		0.7 - 9.9 % and engine runs smoothly
Tensions of drive belt		Auto adjustment by auto tensioner
Radiater cap relief pressure kPa (kg/cm^2 , psi)		
	Standard	108.2 - 127.8 (1.1 - 1.3, 15.7 - 18.5)
	Limit	98 (1.0, 14)
Cooling system leakage testing pressure kPa (kg/cm^2 , psi)		186 (1.9, 27)
Compression pressure kPa (kg/cm^2 , psi)/rpm		
	Standard	1,667 (17, 242)/200
	Minimum	1,226 (12.5, 178)/200
	Differential limit between cylinders	98 (1.0, 14)/200
Spark plug (Iridium-tipped type)	Make	NGK
	Standard type	DILKAR7B11
	Gap (Standard) mm (in)	1.1 (0.043)

FRONT WHEEL ALIGNMENT

ELS0003X

Item			Standard	
Measurement wheel			Left side	Right side
Camber Degree minute (Decimal degree)		Minimum	–0°45′ (–0.75°)	–0°55′ (–0.91°)
		Nominal	0° 00′ (0.00°)	–0°10′ (–0.17°)
		Maximum	0° 45′ (0.75°)	0° 35′ (0.58°)
		Left and right difference	0° 33′ (0.55°) or less	
Caster Degree minute (Decimal degree)		Minimum	2° 20′ (2.34°)	2° 40′ (2.67°)
		Nominal	3° 05′ (3.08°)	3° 25′ (3.42°)
		Maximum	3° 50′ (3.83°)	4° 10′ (4.16°)
		Left and right difference	0° 45′ (0.75°) or less	
Kingpin inclination Degree minute (Decimal degree)		Minimum	—	—
		Nominal	13° 20′ (13.33°)*1	13° 25′ (13.42°)*1
		Maximum	—	—
Toe-in	Total toe-in Distance	Minimum	In 1.4 mm (0.055 in)	
		Nominal	In 2.4 mm (0.094 in)	
		Maximum	In 3.4 mm (0.134 in)	
	Toe angle (left wheel or right wheel) Degree minute (Decimal degree)	Minimum	In 0° 03′ (0.05°)	
		Nominal	In 0° 05′ (0.08°)	
		Maximum	In 0° 07′ (0.11°)	

*1: The minimum value and maximum value is the same as the nominal value.

Measure value under unladen*2 conditions.

*2: Fuel, engine coolant and lubricant are full. Spare tire, jack, hand tools and mats are in designated positions.

REAR WHEEL ALIGNMENT

ELS0003Y

Item			Standard
Camber Degree minute (Decimal degree)		Minimum	–1° 00′ (–1.00°)
		Nominal	–0° 30′ (–0.50°)
		Maximum	0° 00′ (0.00°)
		Left and right difference	0° 45′ (0.75°) or less
Toe-in	Total toe-in Distance	Minimum	0 mm (0 in)
		Nominal	In 3.4 mm (0.134 in)
		Maximum	In 6.8 mm (0.268 in)
	Toe angle (left wheel or right wheel) Degree minute (Decimal degree)	Minimum	0° 00′ (0.00°)
		Nominal	In 0° 07′ (0.12°)
		Maximum	In 0° 14′ (0.23°)

Measure value under unladen* conditions.

*: Fuel, engine coolant and lubricant are full. Spare tire, jack, hand tools and mats are in designated positions.

BRAKE PEDAL

Unit : mm (in)

Item	Standard
Brake pedal height	168.5 (6.63) – 178.5 (7.03)
Depressed brake pedal height [Depressing 490 N (50 kg, 110 lb) while turning the engine ON]	100 (3.94) or more

FRONT DISK BRAKE

Unit : mm (in)

Item		Limit
Brake pad	Wear thickness	1.5 (0.059)
Disc rotor	Wear thickness	28.5 (1.122)
	Thickness variation (measured at 8 positions)	0.015 (0.0006)
	Runout (with it attached to the vehicle)	0.053 (0.0021)

REAR DISK BRAKE

Unit : mm (in)

Item		Limit
Brake pad	Wear thickness	2.0 (0.079)
Disc rotor	Wear thickness	18.0 (0.709)
	Thickness variation (measured at 8 positions)	0.015 (0.0006)
	Runout (with it attached to the vehicle)	0.05 (0.0020)

REFILL CAPACITIES

ELS00040

UNIT		Liter	US measure
Fuel tank		98.4	26 gal
Engine Coolant (With reservoir tank) at MAX level		14.9	15-6/8 qt
Engine oil	Drain and refill		
	With oil filter change	6.5	6-7/8 qt
	Without oil filter change	6.2	6-4/8 qt
	Dry engine (Overhaul)	7.6	8 qt
Transmission		10.0	10-5/8 qt
Transfer		1.5	3-1/8 pt
Final drive	Front	0.75	1-5/8 pt
	Rear	1.75	3-3/4 pt
Power steering system		1.0	7/8 qt
Air conditioning system	Compressor oil	0.21	7.1 fl oz
	Refrigerant	1.05 kg	2.32 lb

SECTION GI
GENERAL INFORMATION

CONTENTS

HOW TO USE THIS MANUAL

HOW TO USE THIS MANUAL

Description

INFOID:0000000006280835

This volume explains “Removal, Disassembly, Installation, Inspection and Adjustment” and “Trouble Diagnoses”.

Terms

INFOID:0000000006280836

- The captions **WARNING** and **CAUTION** warn you of steps that must be followed to prevent personal injury and/or damage to some part of the vehicle.
  WARNING indicates the possibility of personal injury if instructions are not followed.
  CAUTION indicates the possibility of component damage if instructions are not followed.
  BOLD TYPED STATEMENTS except **WARNING** and **CAUTION** give you helpful information.
  Standard value: Tolerance at inspection and adjustment.
  Limit value: The maximum or minimum limit value that should not be exceeded at inspection and adjustment.

Units

INFOID:0000000006280837

- The **UNITS** given in this manual are primarily expressed as the SI UNIT (International System of Unit), and alternatively expressed in the metric system and in the yard/pound system.
  Also with regard to tightening torque of bolts and nuts, there are descriptions both about range and about the standard tightening torque.

  “Example”
  Range

  Outer Socket Lock Nut : 59 - 78 N·m (6.0 - 8.0 kg-m, 43 - 58 ft-lb)

  Standard

  Drive Shaft Installation Bolt : 44.3 N·m (4.5 kg-m, 33 ft-lb)

Contents

INFOID:0000000006280838

- **A QUICK REFERENCE INDEX**, a black tab (e.g. BR) is provided on the first page. You can quickly find the first page of each section by matching it to the section's black tab.
- **THE CONTENTS** are listed on the first page of each section.
- **THE TITLE** is indicated on the upper portion of each page and shows the part or system.
- **THE PAGE NUMBER** of each section consists of two or three letters which designate the particular section and a number (e.g. “BR-5”).
- **THE SMALL ILLUSTRATIONS** show the important steps such as inspection, use of special tools, knacks of work and hidden or tricky steps which are not shown in the previous large illustrations.
  Assembly, inspection and adjustment procedures for the complicated units such as the automatic transaxle or transmission, etc. are presented in a step-by-step format where necessary.

Relation between Illustrations and Descriptions

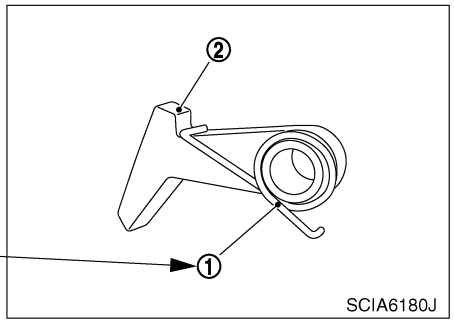
INFOID:0000000006280839

The following sample explains the relationship between the part description in an illustration, the part name in the text and the service procedures.

< Example 1 >

1. Remove return spring (1) from parking pawl (2).

The identifier number of the part name in the text is consistent with the identifier part number in the illustration.

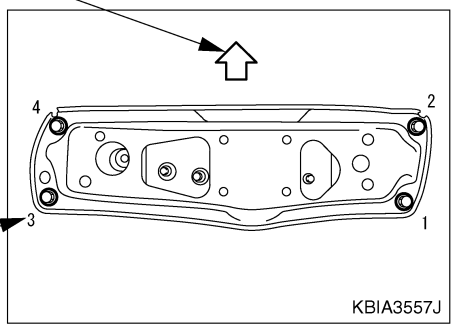


Direction mark

< Example 2 >

- ⇨ : Vehicle front
- Tighten rear member mounting bolts following the numerical order shown in the illustration.
- Note : View upward

The numbers in the illustration are consistent with the service operation instructions.



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Components

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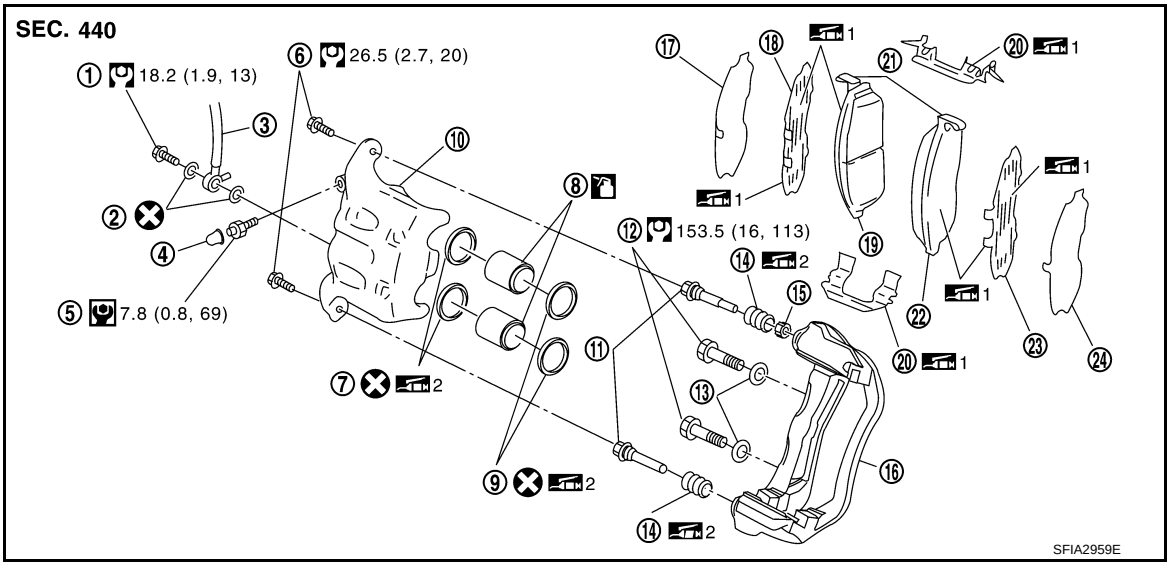
- **THE LARGE ILLUSTRATIONS** are exploded views (see the following) and contain tightening torques, lubrication points, section number of the **PARTS CATALOG** (e.g. SEC. 440) and other information necessary to perform repairs.
  The illustrations should be used in reference to service matters only. When ordering parts, refer to the appropriate **PARTS CATALOG**.
  Components shown in an illustration may be identified by a circled number. When this style of illustration is used, the text description of the components will follow the illustration.



1. Union bolt
2. Copper washer
3. Brake hose
4. Cap
5. Bleed valve
6. Sliding pin bolt
7. Piston seal
8. Piston
9. Piston boot
10. Cylinder body
11. Sliding pin
12. Torque member mounting bolt
13. Washer
14. Sliding pin boot
15. Bushing
16. Torque member
17. Inner shim cover
18. Inner shim
19. Inner pad
20. Pad retainer
21. Pad wear sensor
22. Outer pad
23. Outer shim
24. Outer shim cover

1: PBC (Poly Butyl Cuprysil) grease or silicone-based grease
2: Rubber grease
: Brake fluid

Refer to GI section for additional symbol definitions.

SYMBOLS

SYMBOL	DESCRIPTION		SYMBOL	DESCRIPTION
	Tightening torque The tightening torque specifications of bolts and nuts may be presented as either a range or a standard tightening torque.	: N•m (kg-m, ft-lb)		Always replace after every disassembly.
		: N•m (kg-m, in-lb)	Ⓟ	Apply petroleum jelly.
	Should be lubricated with grease. Unless otherwise indicated, use recommended multi-purpose grease.		Ⓜ	Apply molybdenum added petroleum jelly.
	Should be lubricated with oil.		ATF	Apply ATF.
	Sealing point		★	Select with proper thickness.
Ⓛ	Sealing point with locking sealant.		☆	Adjustment is required.
	Checking point			

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HOW TO FOLLOW TROUBLE DIAGNOSES

Description

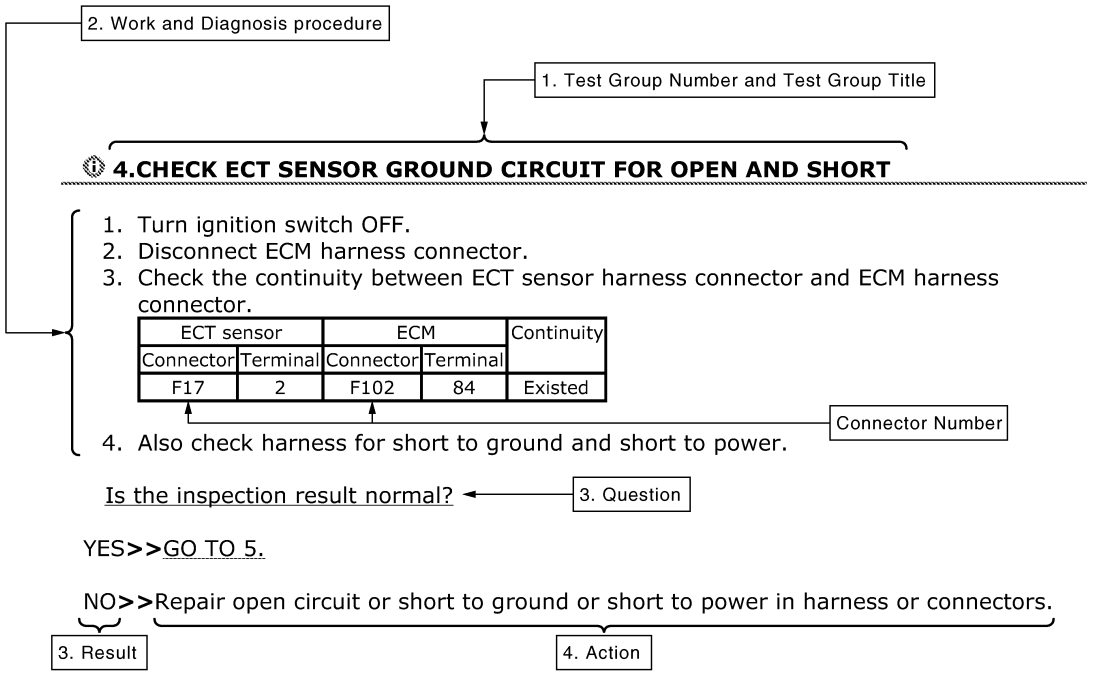
INFOID:0000000006280841

NOTICE:
Trouble diagnoses indicate work procedures required to diagnose problems effectively. Observe the following instructions before diagnosing.

- Before performing trouble diagnoses, read the “Work Flow” in each section.
- After repairs, re-check that the problem has been completely eliminated.
- Refer to Component Parts and Harness Connector Location for the Systems described in each section for identification/location of components and harness connectors.
- When checking circuit continuity, ignition switch should be OFF.
- Refer to the Circuit Diagram for quick pinpoint check.
  If you need to check circuit continuity between harness connectors in more detail, such as when a sub-harness is used, refer to Wiring Diagram in each individual section and Harness Layout in PG section for identification of harness connectors.
- Before checking voltage at connectors, check battery voltage.
- After accomplishing the Diagnosis Procedures and Electrical Components Inspection, check that all harness connectors are reconnected as they were.

How to Follow Test Groups in Trouble Diagnosis

INFOID:0000000006280842



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1. Test group number and test group title
   - Test group number and test group title are shown in the upper portion of each test group.
2. Work and diagnosis procedure
   - Start to diagnose a problem using procedures indicated in enclosed test groups.
3. Questions and results
   - Questions and required results are indicated in test group.
4. Action
   - Next action for each test group is indicated based on result of each question.

Key to Symbols Signifying Measurements or Procedures

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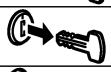
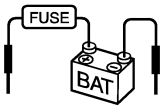
SYMBOL	DESCRIPTION	SYMBOL	DESCRIPTION
	Check after disconnecting the connector to be measured.		Procedure with Generic Scan Tool. (GST, OBD-II scan tool)
	Check after connecting the connector to be measured.		Procedure without CONSULT-II, CONSULT-III or GST
	Insert key into ignition switch.		A/C switch is “OFF”.
	Remove key from ignition switch.		A/C switch is “ON”.
	Insert and remove key repeatedly.		REC switch is “ON”.
	Turn ignition switch to “OFF” position.		REC switch is “OFF”.
	Turn ignition switch to “ACC” position.		Fan switch is “ON”. (At any position except for “OFF” position)
	Turn ignition switch to “ON” position.		Fan switch is “OFF”.
	Turn ignition switch to “START” position.		Apply fuse.
	Turn ignition switch from “OFF” to “ACC” position.		Apply positive voltage from battery with fuse directly to components.
	Turn ignition switch from “ACC” to “ON” position.		
	Turn ignition switch from “ACC” to “OFF” position.		

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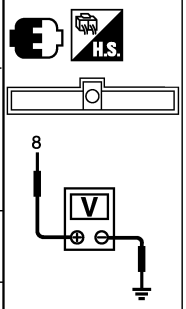
SYMBOL	DESCRIPTION	SYMBOL	DESCRIPTION
	Turn ignition switch from “OFF” to “ON” position.		Drive vehicle.
	Turn ignition switch from “ON” to “OFF” position.		
	Do not start engine, or check with engine stopped.		Disconnect battery negative cable.
	Start engine, or check with engine running.		Depress brake pedal.
	Apply parking brake.		Release brake pedal.
	Release parking brake.		Depress accelerator pedal.
	Check after engine is warmed up sufficiently.		Release accelerator pedal.
	Voltage should be measured with a voltmeter.		Pin terminal check for SMJ type ECM or TCM connectors. **For details regarding the terminal arrangement, refer to the “ELECTRICAL UNITS” electrical reference page at the end of the manual.**
	Circuit resistance should be measured with an ohmmeter.		
	Current should be measured with an ammeter.		
	Pulse signal should be checked with an oscilloscope.		
	Procedure with CONSULT-III		
	Procedure without CONSULT-III		
	Place selector lever in “P” position.		
	Place selector lever in “N” position.		
	Jack up front portion.		
	Jack up rear portion.		
	Inspect under engine room.		
	Inspect under floor.		
	Inspect rear under floor.		

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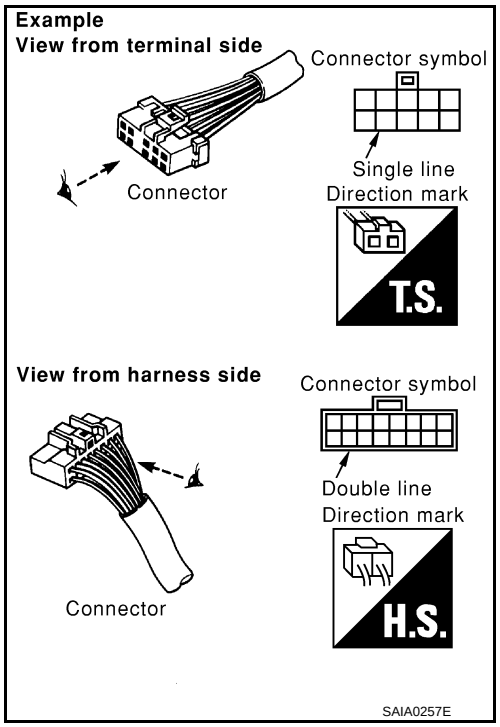
HOW TO READ WIRING DIAGRAMS

Connector Symbols

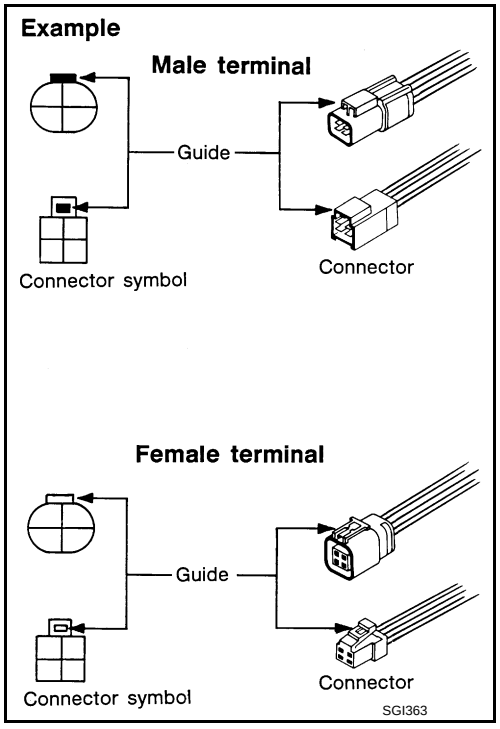
INFOID:0000000006282193

Most of connector symbols in wiring diagrams are shown from the terminal side.

- Connector symbols shown from the terminal side are enclosed by a single line and followed by the direction mark.
- Connector symbols shown from the harness side are enclosed by a double line and followed by the direction mark.
- Certain systems and components, especially those related to OBD, may use a new style slide-locking type harness connector. For description and how to disconnect, refer to PG section, “Description”, “HARNESS CONNECTOR”.



- Male and female terminals
  Connector guides for male terminals are shown in black and female terminals in white in wiring diagrams.



Sample/Wiring Diagram -Example-

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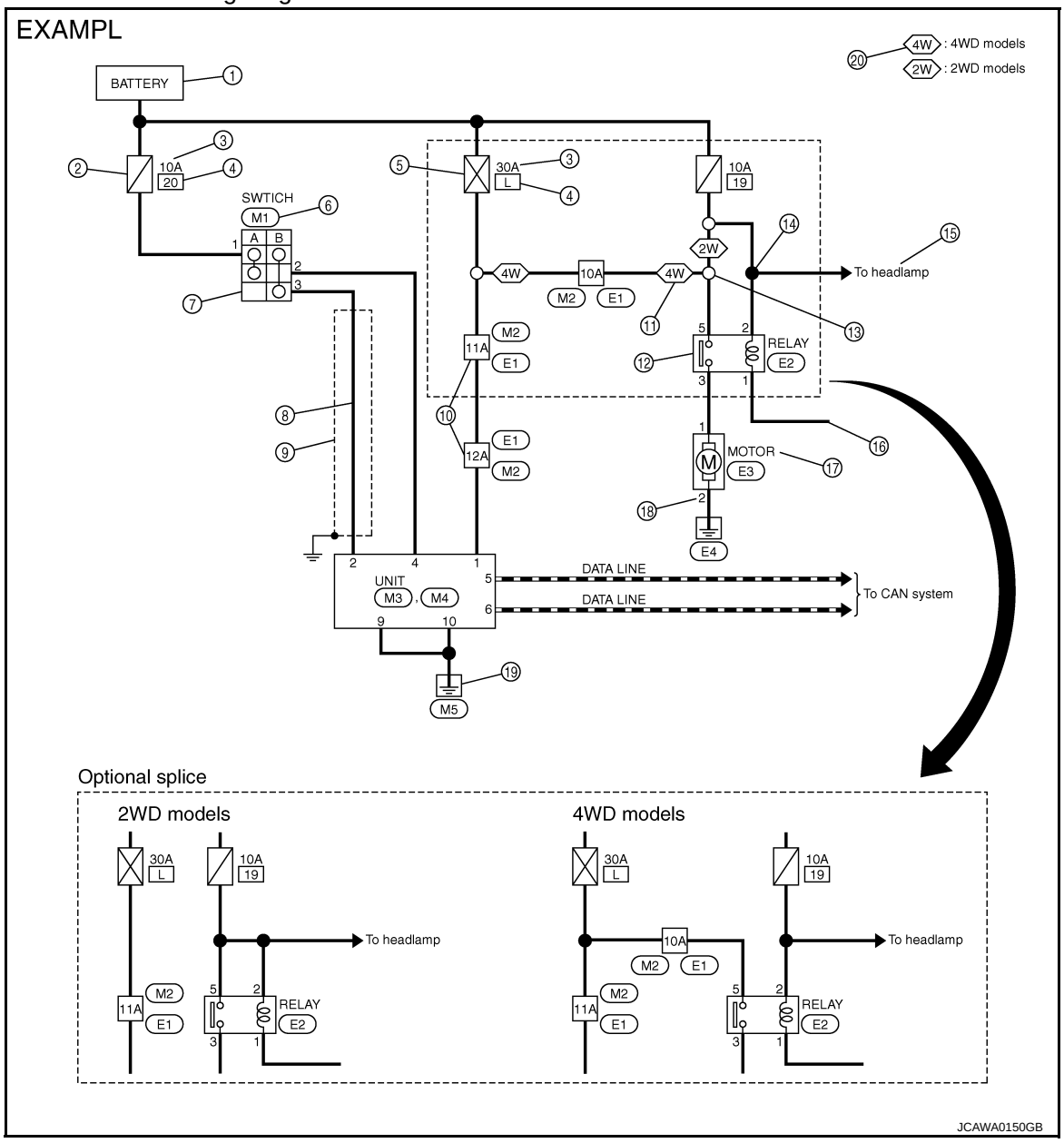
Each section includes wiring diagrams.



Description

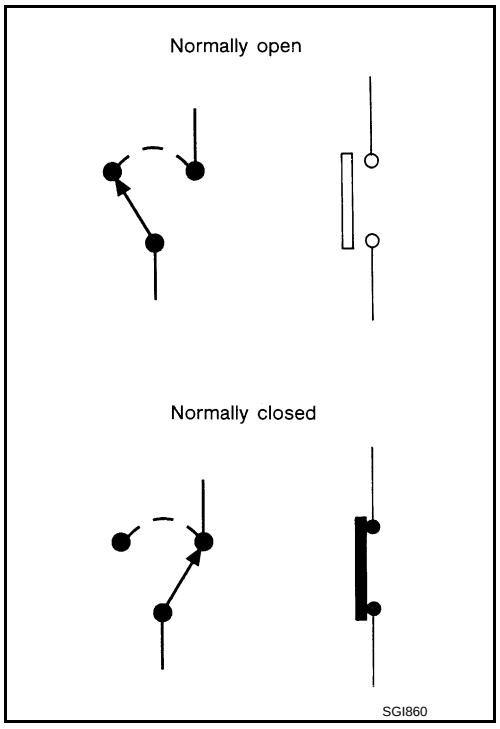
Number	Item	Description
1	Power supply	• This means the power supply of fusible link or fuse.
2	Fuse	• "/" means the fuse.
3	Current rating of fusible link/fuse	• This means the current rating of the fusible link or fuse.
4	Number of fusible link/fuse	• This means the number of fusible link or fuse location.
5	Fusible link	• "X" means the fusible link.
6	Connector number	• Alphabetic characters show to which harness the connector is placed. • Numeric characters show the identification number of connectors.
7	Switch	• This shows that continuity exists between terminals 1 and 2 when the switch is in the A position. Continuity exists between terminals 1 and 3 when the switch is in the B position.
8	Circuit (Wiring)	• This means the wiring.

Number	Item	Description
9	Shielded line	• The line enclosed by broken line circle shows shield wire.
10	Connectors	• This means that a transmission line bypasses two connectors or more.
11	Option abbreviation	• This means the vehicle specifications which layouts the circuit between "○".
12	Relay	• This shows an internal representation of the relay.
13	Optional splice	• The open circle shows that the splice is optional depending on vehicle application.
14	Splice	• The shaded circle "●" means the splice.
15	System branch	• This shows that the circuit is branched to other systems.
16	Page crossing	• This circuit continues to an adjacent page.
17	Component name	• This shows the name of a component.
18	Terminal number	• This means the terminal number of a connector.
19	Ground (GND)	• This shows the ground connection.
20	Explation of option description	• This shows a explanation of the option abbreviation used on the same page.

SWITCH POSITIONS

Switches are shown in wiring diagrams as if the vehicle is in the "normal" condition.
A vehicle is in the "normal" condition when:

- ignition switch is "OFF",
- doors, hood and trunk lid/back door are closed,
- pedals are not depressed, and
- parking brake is released.



MULTIPLE SWITCH

The continuity of multiple switch is described in two ways as shown below.

- The switch chart is used in schematic diagrams.

- The switch diagram is used in wiring diagrams.

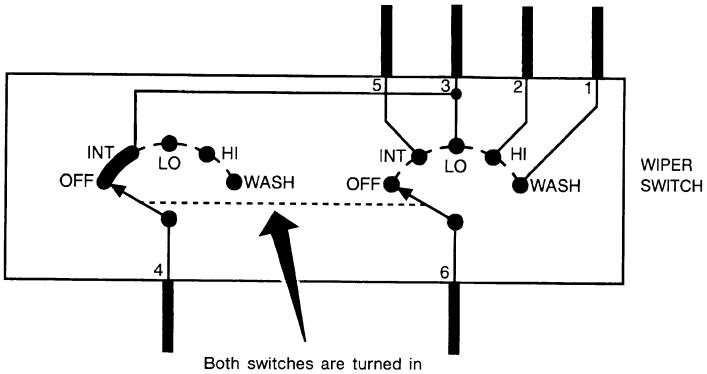
Example

(SWITCH CHART)

WIPER SWITCH

	OFF	INT	LO	HI	WASH
1					○
2				○	
3	○	○	○		
4	○	○			
5		○			
6		○	○	○	○

(SWITCH DIAGRAM)



Continuity circuit of wiper switch

SWITCH POSITION	CONTINUITY CIRCUIT
OFF	3 - 4
INT	3 - 4, 5 - 6
LO	3 - 6
HI	2 - 6
WASH	1 - 6

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Connector Information

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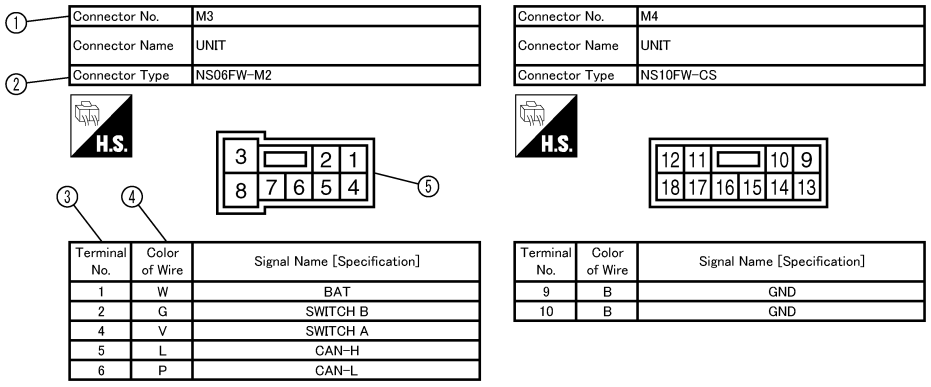

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Description

Number	Item	Description
1	Connector number	• Alphabetic characters show to which harness the connector is placed. • Numeric characters show the identification number of connectors.
2	Connector type	• This means the connector number. Refer to PG-144, "How To Read Harness Layout".
3	Terminal number	• This means the terminal number of a connector.

Number	Item	Description
4	Wire color	• This shows a code for the color of the wire. B = Black W = White R = Red G = Green L = Blue Y = Yellow LG = Light Green BG = Beige BR = Brown OR or O = Orange P = Pink PU or V (Violet) = Purple GY or GR = Gray SB = Sky Blue CH = Dark Brown DG = Dark Green • When the wire color is striped, the base color is given first, followed by the stripe color as shown below: Example: L/W = Blue with White Stripe
5	Connector	• This means the connector information. • This unit-side is described by the connector symbols.

ABBREVIATIONS

Abbreviation List

INFOID:0000000006280882

The following **ABBREVIATIONS** are used:

A

ABBREVIATION	DESCRIPTION
A/C	Air conditioner
A/C	Air conditioning
A/F sensor	Air fuel ratio sensor
A/T	Automatic transaxle/transmission
ABS	Anti-lock braking system
ACCS	Advance climate control system
ACL	Air cleaner
AP	Accelerator pedal
APP	Accelerator pedal position
ATF	Automatic transmission fluid
AV	Audio visual
AWD	All wheel drive

B

ABBREVIATION	DESCRIPTION
BARO	Barometric pressure
BCM	Body control module
BLSD	Brake limited slip differential
BPP	Brake pedal position
BSI	Blind spot intervention
BSW	Blind spot warning

C

ABBREVIATION	DESCRIPTION
CKP	Crankshaft position
CL	Closed loop
CMP	Camshaft position
CPP	Clutch pedal position
CTP	Closed throttle position
CVT	Continuously Variable transaxle/transmission

D

ABBREVIATION	DESCRIPTION
D_1	Drive range first gear
D_2	Drive range second gear
D_3	Drive range third gear
D_4	Drive range fourth gear
DCA	Distance control assist
DFI	Direct fuel injection system
DLC	Data link connector
DTC	Diagnostic trouble code

E

ABBREVIATION	DESCRIPTION
E/T	Exhaust temperature
EBD	Electric brake force distribution
EC	Engine control
ECL	Engine coolant level
ECM	Engine control module
ECT	Engine coolant temperature
ECV	Electrical control valve
EEPROM	Electrically erasable programmable read only memory
EFT	Engine fuel temperature
EGR	Exhaust gas recirculation
EGRT	Exhaust gas recirculation temperature
EGT	Exhaust gas temperature
EOP	Engine oil pressure
EP	Exhaust pressure
EPR	Exhaust pressure regulator
EPS	Electronically controlled power steering
ESP	Electronic stability program system
EVAP canister	Evaporative emission canister
EXC	Exhaust control

F

ABBREVIATION	DESCRIPTION
FC	Fan control
FCW	Forward collision warning
FIC	Fuel injector control
FP	Fuel pump
FR	Front
FRP	Fuel rail pressure
FRT	Fuel rail temperature
FTP	Fuel tank pressure
FTT	Fuel tank temperature

G

ABBREVIATION	DESCRIPTION
GND	Ground
GPS	Global positioning system
GST	Generic scan tool

H

ABBREVIATION	DESCRIPTION
HBMC	Hydraulic body-motion control system
HDD	Hard disk drive
HO2S	Heated oxygen sensor
HOC	Heated oxidation catalyst

I

ABBREVIATION	DESCRIPTION
I/M	Inspection and maintenance
IA	Intake air
IAC	Idle air control
IAT	Intake air temperature
IBA	Intelligent brake assist
IC	Ignition control
ICC	Intelligent cruise control
ICM	Ignition control module
IPDM E/R	Intelligent power distribution module engine room
ISC	Idle speed control
ISS	Input shaft speed

K

ABBREVIATION	DESCRIPTION
KS	Knock sensor

L

ABBREVIATION	DESCRIPTION
LCD	Liquid crystal display
LCU	Local control unit
LDP	Lane departure prevention
LDW	Lane departure warning
LED	Light emitting diode
LH	Left-hand
LIN	Local interconnect network

M

ABBREVIATION	DESCRIPTION
M/T	Manual transaxle/transmission
MAF	Mass airflow
MAP	Manifold absolute pressure
MI	Malfunction indicator
MIL	Malfunction indicator lamp

N

ABBREVIATION	DESCRIPTION
NOX	Nitrogen oxides

O

ABBREVIATION	DESCRIPTION
O2	Oxygen
O2S	Oxygen sensor
OBD	On board diagnostic
OC	Oxidation catalytic converter
OD	Overdrive
OL	Open loop
OSS	Output shaft speed

P

ABBREVIATION	DESCRIPTION
P/S	Power steering
PBR	Potentio balance resistor
PCV	Positive crankcase ventilation
PNP	Park/Neutral position
PSP	Power steering pressure
PTC	Positive temperature coefficient
PTO	Power takeoff
PWM	Pulse width modulation

R

ABBREVIATION	DESCRIPTION
RAM	Random access memory
RAS	Rear active steer
RH	Right-hand
ROM	Read only memory
RPM	Engine speed
RR	Rear

S

ABBREVIATION	DESCRIPTION
SAE	Society of Automotive Engineers, Inc.
SCK	Serial clock
SDS	Service Data and Specifications
SRT	System readiness test
SST	Special Service Tools

T

ABBREVIATION	DESCRIPTION
TC	Turbocharger
TCM	Transmission control module
TCS	Traction control system
TP	Throttle position
TPMS	Tire pressure monitoring system
TSS	Turbine shaft speed
TWC	Three way catalytic converter

V

ABBREVIATION	DESCRIPTION
VDC	Vehicle dynamics control system
VIN	Vehicle identification number
VSS	Vehicle speed sensor

W

ABBREVIATION	DESCRIPTION
WOT	Wide open throttle

1

ABBREVIATION	DESCRIPTION
1_1	1st range first gear

ABBREVIATION	DESCRIPTION
12	1st range second gear
1GR	First gear

2

ABBREVIATION	DESCRIPTION
21	2nd range first gear
22	2nd range second gear
2GR	Second gear
2WD	2-Wheel Drive

3

ABBREVIATION	DESCRIPTION
3GR	Third gear

4

ABBREVIATION	DESCRIPTION
4GR	Fourth gear
4WAS	Four wheel active steer
4WD	Four wheel drive

5

ABBREVIATION	DESCRIPTION
5GR	Fifth gear

6

ABBREVIATION	DESCRIPTION
6GR	Sixth gear

7

ABBREVIATION	DESCRIPTION
7GR	Seventh gear

TIGHTENING TORQUE OF STANDARD BOLTS

Description

INFOID:0000000006280848

This vehicle has both new standard based on ISO* and previous standard bolts/nuts. There are some differences between these two types of bolts/ nuts; shape of the head, grade of strength, hexagonal width across flats and the standard tightening torque.

- For guidance in discriminating, refer to GI-19, "Tightening Torque Table (New Standard Included)".
- The new standard machine screws and tapping screws have a head of ISO standard torx recess.
- If the tightening torque is not described in the description or figure, refer to GI-19, "Tightening Torque Table (New Standard Included)".

*ISO: International Organization for Standardization

Tightening Torque Table (New Standard Included)

INFOID:0000000006280849

CAUTION:

- **The special parts are excluded.**
- **The bolts/nuts in these tables have a strength (discrimination) number/symbol assigned to the head or the like. As to the relation between the strength grade in these tables and the strength (discrimination) number/symbol, refer to “DISCRIMINATION OF BOLTS AND NUTS”.**

PREVIOUS STANDARD

Grade (Strength grade)	Bolt size	Bolt diameter mm	Hexagonal width across flats mm	Pitch mm	Tightening torque (Without lubricant)							
					Hexagon head bolt				Hexagon flange bolt			
					N·m	kg-m	ft-lb	in-lb	N·m	kg-m	ft-lb	in-lb
4T	M6	6.0	10	1.0	5.5	0.56	4	49	7	0.71	5	62
	M8	8.0	12	1.25	13.5	1.4	10	—	17	1.7	13	—
				1.0	13.5	1.4	10	—	17	1.7	13	—
	M10	10.0	14	1.5	28	2.9	21	—	35	3.6	26	—
				1.25	28	2.9	21	—	35	3.6	26	—
	M12	12.0	17	1.75	45	4.6	33	—	55	5.6	41	—
				1.25	45	4.6	33	—	65	6.6	48	—
	M14	14.0	19	1.5	80	8.2	59	—	100	10	74	—
7T	M6	6.0	10	1.0	9	0.92	7	80	11	1.1	8	97
	M8	8.0	12	1.25	22	2.2	16	—	28	2.9	21	—
				1.0	22	2.2	16	—	28	2.9	21	—
	M10	10.0	14	1.5	45	4.6	33	—	55	5.6	41	—
				1.25	45	4.6	33	—	55	5.6	41	—
	M12	12.0	17	1.75	80	8.2	59	—	100	10	74	—
				1.25	80	8.2	59	—	100	10	74	—
	M14	14.0	19	1.5	130	13	96	—	170	17	125	—
9T	M6	6.0	10	1.0	11	1.1	8	—	13.5	1.4	10	—
	M8	8.0	12	1.25	28	2.9	21	—	35	3.6	26	—
				1.0	28	2.9	21	—	35	3.6	26	—
	M10	10.0	14	1.5	55	5.6	41	—	80	8.2	59	—
				1.25	55	5.6	41	—	80	8.2	59	—
	M12	12.0	17	1.75	100	10	74	—	130	13	96	—
				1.25	100	10	74	—	130	13	96	—
	M14	14.0	19	1.5	170	17	125	—	210	21	155	—

CAUTION:

TIGHTENING TORQUE OF STANDARD BOLTS

The parts with aluminum or the cast iron washer surface/thread surface are excluded.

NEW STANDARD BASED ON ISO

Grade (Strength grade)	Bolt size	Bolt diameter mm	Hexagonal width across flats mm	Pitch mm	Tightening torque							
					Hexagon head bolt				Hexagon flange bolt			
					N·m	kg-m	ft-lb	in-lb	N·m	kg-m	ft-lb	in-lb
4.8 (Without lubricant)	M6	6.0	10	1.0	5.5	0.56	4	49	7	0.71	5	62
	M8	8.0	13	1.25	13.5	1.4	10	—	17	1.7	13	—
				1.0	13.5	1.4	10	—	17	1.7	13	—
	M10	10.0	16	1.5	28	2.9	21	—	35	3.6	26	—
				1.25	28	2.9	21	—	35	3.6	26	—
	M12	12.0	18	1.75	45	4.6	33	—	55	5.6	41	—
				1.25	45	4.6	33	—	65	6.6	48	—
	M14	14.0	21	1.5	80	8.2	59	—	100	10	74	—
4.8 (With lubricant)	M6	6.0	10	1.0	4	0.41	3	35	5.5	0.56	4	49
	M8	8.0	13	1.25	11	1.1	8	—	13.5	1.4	10	—
				1.0	11	1.1	8	—	13.5	1.4	10	—
	M10	10.0	16	1.5	22	2.2	16	—	28	2.9	21	—
				1.25	22	2.2	16	—	28	2.9	21	—
	M12	12.0	18	1.75	35	3.6	26	—	45	4.6	33	—
				1.25	35	3.6	26	—	45	4.6	33	—
	M14	14.0	21	1.5	65	6.6	48	—	80	8.2	59	—
8.8 (With lubricant)	M6	6.0	10	1.0	8	0.82	6	71	10	1.0	7	89
	M8	8.0	13	1.25	21	2.1	15	—	25	2.6	18	—
				1.0	21	2.1	15	—	25	2.6	18	—
	M10	10.0	16	1.5	40	4.1	30	—	50	5.1	37	—
				1.25	40	4.1	30	—	50	5.1	37	—
	M12	12.0	18	1.75	70	7.1	52	—	85	8.7	63	—
				1.25	70	7.1	52	—	85	8.7	63	—
	M14	14.0	21	1.5	120	12	89	—	140	14	103	—
10.9 (With lubricant)	M6	6.0	10	1.0	10	1.0	7	89	12	1.2	9	106
	M8	8.0	13	1.25	27	2.8	20	—	32	3.3	24	—
				1.0	27	2.8	20	—	32	3.3	24	—
	M10	10.0	16	1.5	55	5.6	41	—	65	6.6	48	—
				1.25	55	5.6	41	—	65	6.6	48	—
	M12	12.0	18	1.75	95	9.7	70	—	110	11	81	—
				1.25	95	9.7	70	—	110	11	81	—
	M14	14.0	21	1.5	160	16	118	—	180	18	133	—

CAUTION:

1. **Use tightening torque with lubricant for the new standard bolts/nuts in principle. Friction coefficient stabilizer is applied to the new standard bolts/nuts.**
2. **However, use tightening torque without lubricant for the following cases. Friction coefficient stabilizer is not applied to the following bolts/nuts.**

- **Grade 4.8, M6 size bolt, Conical spring washer installed**
- **Paint removing nut (Size M6 and M8) for fixing with weld bolt**

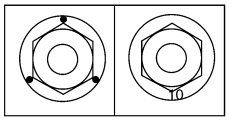
BOLTS

	Grade (Strength)	Discrimination	
Previous standard	4T ($392N/mm^2$)	4	(No number/ symbol)
	7T ($686N/mm^2$)	7	
	9T ($883N/mm^2$)	9	
New Standard	4.8 ($420N/mm^2$)	4.8	(No number/ symbol)
	8.8 ($800N/mm^2$)	8.8	
	10.9 ($1040N/mm^2$)	10.9	

NUTS

	Grade (Proof load stress)	Discrimination		
Previous standard	7N ($686N/mm^2$)	(No number/ symbol)		
	9N ($883N/mm^2$)	9		
New Standard	8 ($800N/mm^2$)	8		(No number/ symbol)
	10 ($1040N/mm^2$)	10		

NOTICE:
- A number is assigned on the side of the nuts in some cases.
- A number or symbol is assigned on the upper surface of the flange for the nut with flange.



MACHINE SCREWS AND TAPPING SCREWS

Shape of the head :
Cross recess for the previous standard
Torx recess for the new standard

Screw size	Screw diameter	Torx size
M4	4.0	T20
M5	5.0	T20
M6	6.0	T30

NOTICE:
Use torx size T20 (united with M4 screw) for M5 screw although ISO standard specifies T25.

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RECOMMENDED CHEMICAL PRODUCTS AND SEALANTS

Recommended Chemical Products and Sealants

INFOID:0000000006280850

Refer to the following chart for help in selecting the appropriate chemical product or sealant.

	Product Description	Purpose	Nissan North America Part No. (USA)	Nissan Canada Part No. (Canada)	Aftermarket Cross-reference Part Nos.
1	Rear View Mirror Adhesive	Used to permanently remount rear view mirrors to windows.	999MP-AM000P	99998-50505	Permatex 81844
2	Anaerobic Liquid Gasket	For metal-to-metal flange sealing. Can fill a 0.38 mm (0.015 inch) gap and provide instant sealing for most powertrain applications.	999MP-AM001P	99998-50503	Permatex 51813 and 51817
3	High Performance Thread Sealant	Provides instant sealing on any threaded straight or parallel threaded fitting. (Thread sealant only, no locking ability.) • Do not use on plastic.	999MP-AM002P	999MP-AM002P	Permatex 56521
4	Silicone RTV	Gasket Maker	999MP-AM003P (Ultra Grey)	99998-50506 (Ultra Grey)	Permatex Ultra Grey 82194; Three Bond 1207,1215, 1216, 1217F, 1217G and 1217H Nissan RTV Part No. 999MP-A7007
		Gasket Maker for Maxima/ Quest 5-speed automatic transmission (RE5F22A)	–	–	Three Bond 1281B or exact equivalent in its quality
5	High Temperature, High Strength Thread Locking Sealant (Red)	Threadlocker	999MP-AM004P	999MP-AM004P	Permatex 27200; Three Bond 1360, 1360N, 1305 N&P, 1307N, 1335, 1335B, 1363B, 1377C, 1386B, D&E and 1388 Loctite 648
6	Medium Strength Thread Locking Sealant (Blue)	Threadlocker (service tool removable)	999MP-AM005P	999MP-AM005P	Permatex 24200, 24206, 24240, 24283 and 09178; Three Bond 1322, 1322N, 1324 D&N, 1333D, 1361C, 1364D, 1370C and 1374

VEHICLE INFORMATION

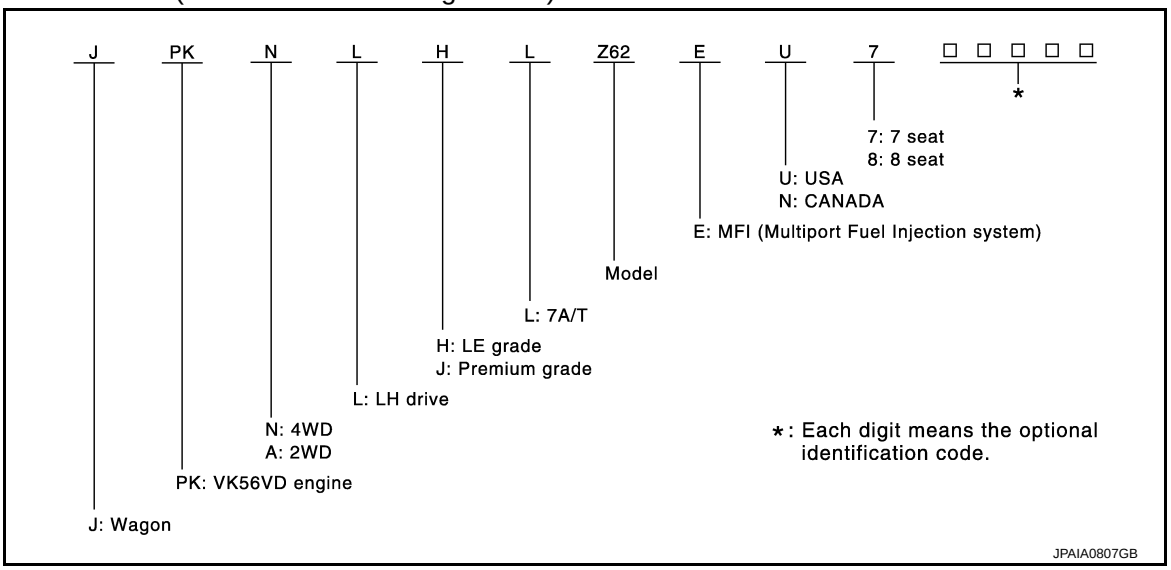
IDENTIFICATION INFORMATION

Model Variation

INFOID:0000000006280861

Destination	Body	Transmission	Engine	Axle	Grade	Model
USA	Wagon	7A/T	VK56VD	4WD	LE	JPKNLHL-EU7
						JPKNLHL-EU8
					Premium	JPKNLJL-EU7
						JPKNLJL-EU8
				2WD	LE	JPKALHL-EU7
						JPKALHL-EU8
					Premium	JPKALJL-EU7
						JPKALJL-EU8
CANADA				4WD	LE	JPKNLHL-EN7
						JPKNLHL-EN8

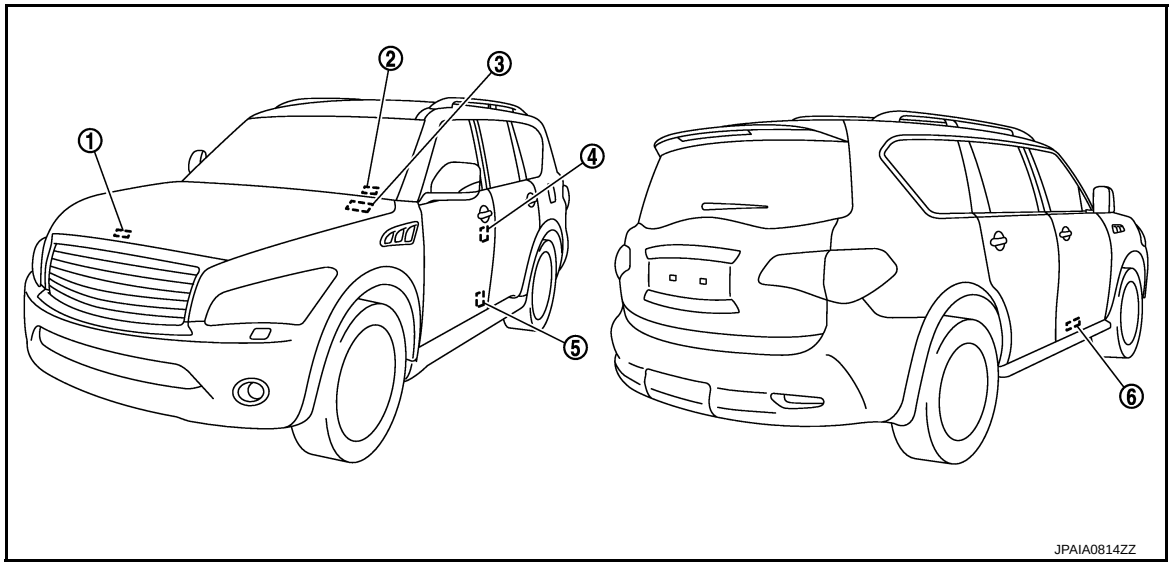
Model variation code (Prefix and suffix designations)



Information About Identification or Model Code

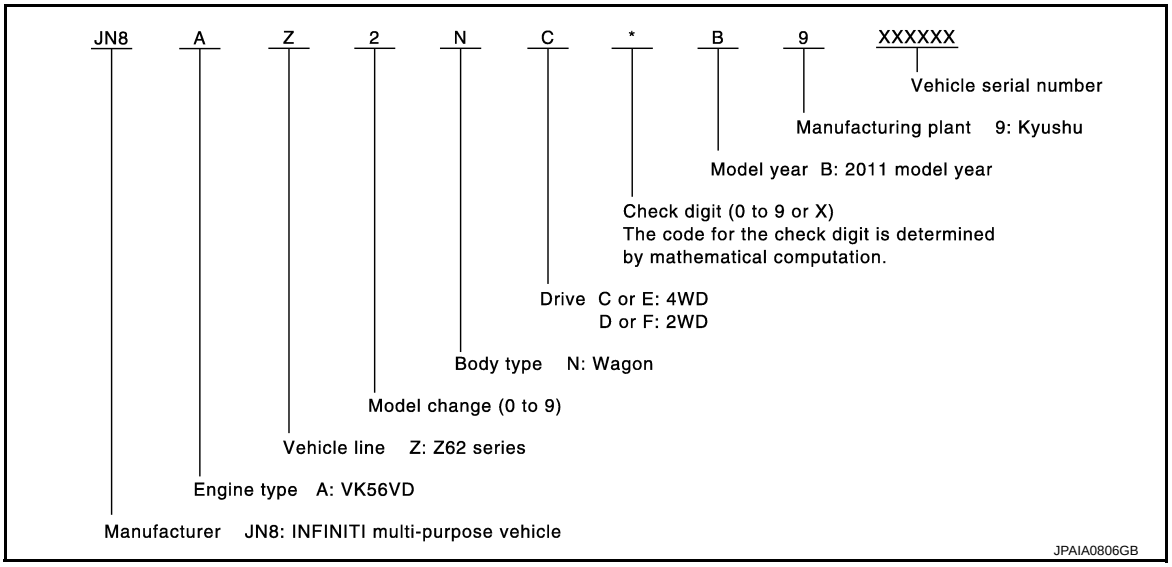
INFOID:0000000006280862

IDENTIFICATION NUMBER



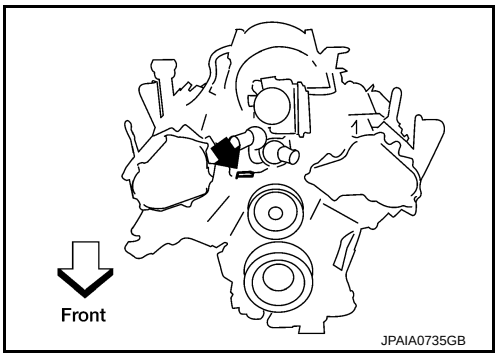
1. Air conditioner specification label
2. Vehicle identification number plate
3. Emission control information label
4. Tire and loading information label
5. FMVSS certification label
6. Vehicle identification number (Chassis number)

VEHICLE IDENTIFICATION NUMBER ARRANGEMENT



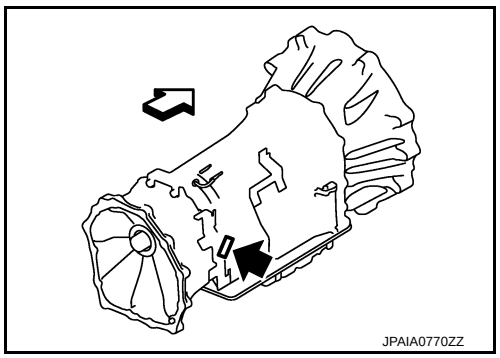
ENGINE SERIAL NUMBER

⇦ : Vehicle front



AUTOMATIC TRANSMISSION NUMBER

⇦ : Vehicle front



Dimensions

INFOID:0000000006280863

Unit: mm (in)

Overall length	5,290 (208.3)
Overall width	2,030 (79.9)
Overall height	1,925 (75.8)
Front tread	1,715 (67.5)
Rear tread	1,725 (67.9)
Wheelbase	3,075 (121.1)

Wheels & Tires

INFOID:0000000006280864

Conventional	Tire		20 inch	P275/60R20 114H
			22 inch	P275/50R22 111H
	Road wheel	20 inch (Aluminum)	Size	20 × 8J
			Offset	30 mm (1.18 in)
		22 inch (Aluminum)	Size	22 × 8J
			Offset	30 mm (1.18 in)
Spare	Tire		20 inch	P275/60R20 114H
			22 inch	P275/50R22 111H
	Road wheel	20 inch (Aluminum)	Size	20 × 8J
			Offset	30 mm (1.18 in)
		22 inch (Aluminum)	Size	22 × 8J
			Offset	30 mm (1.18 in)

PRECAUTION

PRECAUTIONS

Description

INFOID:0000000006280865

Observe the following precautions to ensure safe and proper servicing. These precautions are not described in each individual section.

Precaution for Supplemental Restraint System (SRS) "AIR BAG" and "SEAT BELT PRE-TENSIONER"

INFOID:0000000006280866

The Supplemental Restraint System such as “AIR BAG” and “SEAT BELT PRE-TENSIONER”, used along with a front seat belt, helps to reduce the risk or severity of injury to the driver and front passenger for certain types of collision. This system includes seat belt switch inputs and dual stage front air bag modules. The SRS system uses the seat belt switches to determine the front air bag deployment, and may only deploy one front air bag, depending on the severity of a collision and whether the front occupants are belted or unbelted. Information necessary to service the system safely is included in the “SRS AIR BAG” and “SEAT BELT” of this Service Manual.

WARNING:

- **To avoid rendering the SRS inoperative, which could increase the risk of personal injury or death in the event of a collision that would result in air bag inflation, all maintenance must be performed by an authorized NISSAN/INFINITI dealer.**
- **Improper maintenance, including incorrect removal and installation of the SRS, can lead to personal injury caused by unintentional activation of the system. For removal of Spiral Cable and Air Bag Module, see the “SRS AIR BAG”.**
- **Do not use electrical test equipment on any circuit related to the SRS unless instructed to in this Service Manual. SRS wiring harnesses can be identified by yellow and/or orange harnesses or harness connectors.**

PRECAUTIONS WHEN USING POWER TOOLS (AIR OR ELECTRIC) AND HAMMERS

WARNING:

- **When working near the Air Bag Diagnosis Sensor Unit or other Air Bag System sensors with the ignition ON or engine running, DO NOT use air or electric power tools or strike near the sensor(s) with a hammer. Heavy vibration could activate the sensor(s) and deploy the air bag(s), possibly causing serious injury.**
- **When using air or electric power tools or hammers, always switch the ignition OFF, disconnect the battery, and wait at least 3 minutes before performing any service.**

Precautions For Xenon Headlamp Service

INFOID:0000000006280867

WARNING:

Comply with the following warnings to prevent any serious accident.

- **Disconnect the battery cable (negative terminal) or the power supply fuse before installing, removing, or touching the xenon headlamp (bulb included). The xenon headlamp contains high-voltage generated parts.**
- **Never work with wet hands.**
- **Check the xenon headlamp ON-OFF status after assembling it to the vehicle. Never turn the xenon headlamp ON in other conditions. Connect the power supply to the vehicle-side connector. (Turning it ON outside the lamp case may cause fire or visual impairments.)**
- **Never touch the bulb glass immediately after turning it OFF. It is extremely hot.**

CAUTION:

Comply with the following cautions to prevent any error and malfunction.

- **Install the xenon bulb securely. (Insufficient bulb socket installation may melt the bulb, the connector, the housing, etc. by high-voltage leakage or corona discharge.)**
- **Never perform HID circuit inspection with a tester.**
- **Never touch the xenon bulb glass with hands. Never put oil and grease on it.**
- **Dispose of the used xenon bulb after packing it in thick vinyl without breaking it.**
- **Never wipe out dirt and contamination with organic solvent (thinner, gasoline, etc.).**

Precaution Necessary for Steering Wheel Rotation after Battery Disconnect

INFOID:0000000006280868

NOTE:

- Before removing and installing any control units, first turn the push-button ignition switch to the LOCK position, then disconnect both battery cables.
- After finishing work, confirm that all control unit connectors are connected properly, then re-connect both battery cables.
- Always use CONSULT-III to perform self-diagnosis as a part of each function inspection after finishing work. If a DTC is detected, perform trouble diagnosis according to self-diagnosis results.

For vehicle with steering lock unit, if the battery is disconnected or discharged, the steering wheel will lock and cannot be turned.

If turning the steering wheel is required with the battery disconnected or discharged, follow the operation procedure below before starting the repair operation.

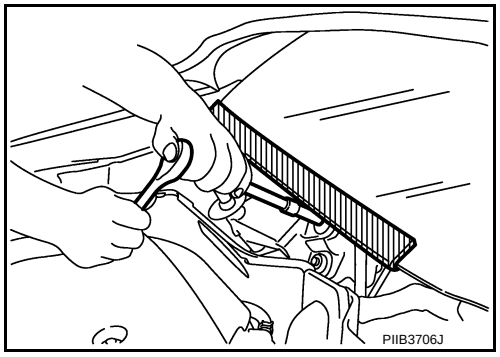
OPERATION PROCEDURE

1. Connect both battery cables.
   NOTE:
   Supply power using jumper cables if battery is discharged.
2. Turn the push-button ignition switch to ACC position.
   (At this time, the steering lock will be released.)
3. Disconnect both battery cables. The steering lock will remain released with both battery cables disconnected and the steering wheel can be turned.
4. Perform the necessary repair operation.
5. When the repair work is completed, re-connect both battery cables. With the brake pedal released, turn the push-button ignition switch from ACC position to ON position, then to LOCK position. (The steering wheel will lock when the push-button ignition switch is turned to LOCK position.)
6. Perform self-diagnosis check of all control units using CONSULT-III.

Precaution for Procedure without Cowl Top Cover

INFOID:0000000006280869

When performing the procedure after removing cowl top cover, cover the lower end of windshield with urethane, etc.



General Precautions

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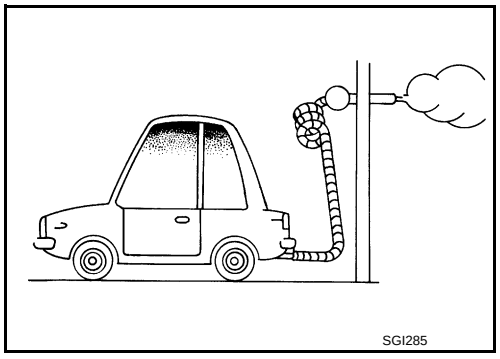
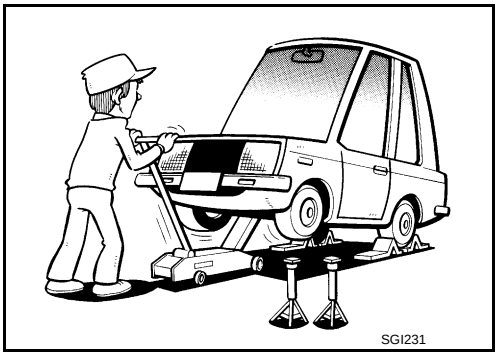
- Do not operate the engine for an extended period of time without proper exhaust ventilation.
  Keep the work area well ventilated and free of any inflammable materials. Special care should be taken when handling any inflammable or poisonous materials, such as gasoline, refrigerant gas, etc. When working in a pit or other enclosed area, be sure to properly ventilate the area before working with hazardous materials.
  Do not smoke while working on the vehicle.



- Before jacking up the vehicle, apply wheel chocks or other tire blocks to the wheels to prevent the vehicle from moving. After jacking up the vehicle, support the vehicle weight with safety stands at the points designated for proper lifting before working on the vehicle.
  These operations should be done on a level surface.
- When removing a heavy component such as the engine or transaxle/transmission, be careful not to lose your balance and drop them. Also, do not allow them to strike adjacent parts, especially the brake tubes and master cylinder.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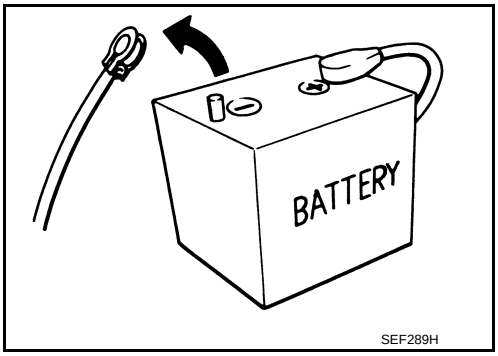
- Before starting repairs which do not require battery power:
  Turn off ignition switch.
  Disconnect the negative battery terminal.
- If the battery terminals are disconnected, recorded memory of radio and each control unit is erased.



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- To prevent serious burns:
  Avoid contact with hot metal parts.
  Do not remove the radiator cap when the engine is hot.
- Dispose of drained oil or the solvent used for cleaning parts in an appropriate manner.
- Do not attempt to top off the fuel tank after the fuel pump nozzle shuts off automatically.
  Continued refueling may cause fuel overflow, resulting in fuel spray and possibly a fire.
- Clean all disassembled parts in the designated liquid or solvent prior to inspection or assembly.
- Replace oil seals, gaskets, packings, O-rings, locking washers, cotter pins, self-locking nuts, etc. with new ones.


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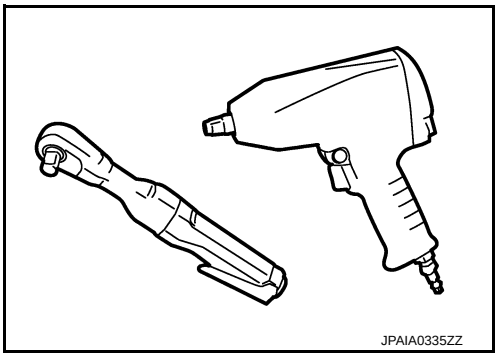
- Replace inner and outer races of tapered roller bearings and needle bearings as a set.
- Arrange the disassembled parts in accordance with their assembled locations and sequence.
- Do not touch the terminals of electrical components which use microcomputers (such as ECM).
  Static electricity may damage internal electronic components.
- After disconnecting vacuum or air hoses, attach a tag to indicate the proper connection.
- Use only the fluids and lubricants specified in this manual.
- Use approved bonding agent, sealants or their equivalents when required.
- Use hand tools, power tools (disassembly only) and recommended special tools where specified for safe and efficient service repairs.
- When repairing the fuel, oil, water, vacuum or exhaust systems, check all affected lines for leakage.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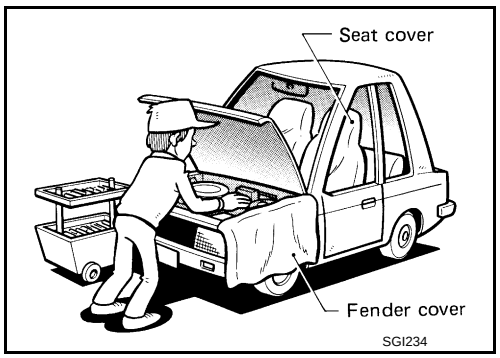
- Before servicing the vehicle:
  Protect fenders, upholstery and carpeting with appropriate covers.
  Take caution that keys, buckles or buttons do not scratch paint.



WARNING:
To prevent ECM from storing the diagnostic trouble codes, never carelessly disconnect the harness connectors which are related to the engine control system and TCM (transmission control module) system. The connectors should be disconnected only when working according to the WORK FLOW of TROUBLE DIAGNOSES in EC and TM sections.

Three Way Catalyst

INFOID:0000000006280871

If a large amount of unburned fuel flows into the catalyst, the catalyst temperature will be excessively high. To prevent this, follow the instructions.
- Use unleaded gasoline only. Leaded gasoline will seriously damage the three way catalyst.
- When checking for ignition spark or measuring engine compression, make tests quickly and only when necessary.
- Do not run engine when the fuel tank level is low, otherwise the engine may misfire, causing damage to the catalyst.

Do not place the vehicle on flammable material. Keep flammable material off the exhaust pipe and the three way catalyst.

Multiport Fuel Injection System or Engine Control System

INFOID:0000000006280872

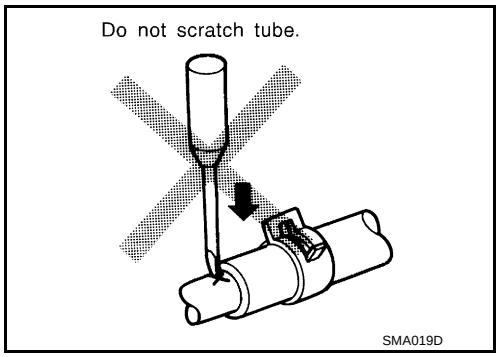
- Before connecting or disconnecting any harness connector for the multiport fuel injection system or ECM:
  Turn ignition switch to “OFF” position.
  Disconnect negative battery terminal.
  Otherwise, there may be damage to ECM.
- Before disconnecting pressurized fuel line from fuel pump to injectors, be sure to release fuel pressure.
- Be careful not to jar components such as ECM and mass air flow sensor.

Hoses

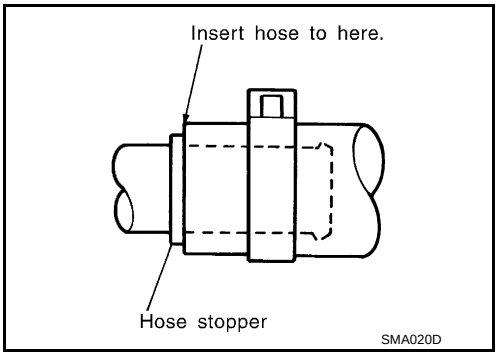
INFOID:0000000006280873

HOSE REMOVAL AND INSTALLATION

- To prevent damage to rubber hose, do not pry off rubber hose with tapered tool or screwdriver.

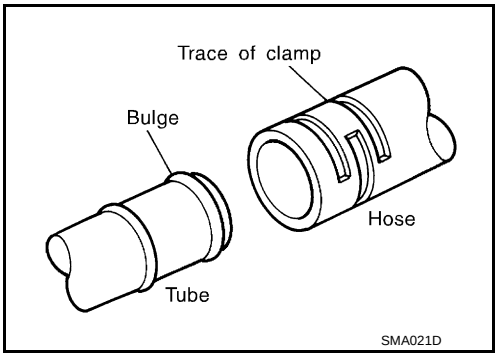


- To reinstall the rubber hose securely, check that hose insertion length and orientation is correct. (If tube is equipped with hose stopper, insert rubber hose into tube until it butts up against hose stopper.)

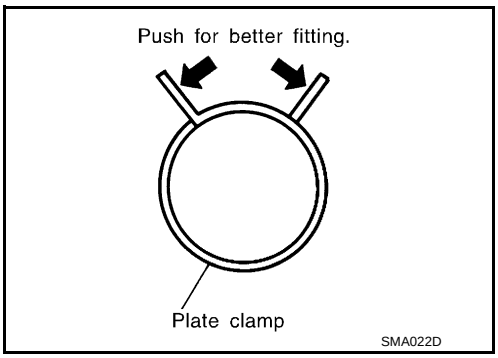


HOSE CLAMPING

- If old rubber hose is re-used, install hose clamp in its original position (at the indentation where the old clamp was). If there is a trace of tube bulging left on the old rubber hose, align rubber hose at that position.
- Discard old clamps; replace with new ones.



- After installing plate clamps, apply force to them in the direction of the arrow, tightening rubber hose equally all around.



Engine Oils

INFOID:0000000006280874

Prolonged and repeated contact with used engine oil may cause skin cancer. Try to avoid direct skin contact with used oil.
If skin contact is made, wash thoroughly with soap or hand cleaner as soon as possible.

HEALTH PROTECTION PRECAUTIONS

- Avoid prolonged and repeated contact with oils, particularly used engine oils.
- Wear protective clothing, including impervious gloves where practicable.
- Do not put oily rags in pockets.
- Avoid contaminating clothes, particularly underpants, with oil.
- Heavily soiled clothing and oil-impregnated footwear should not be worn. Overalls must be cleaned regularly.
- First aid treatment should be obtained immediately for open cuts and wounds.
- Use barrier creams, applying them before each work period, to help the removal of oil from the skin.
- Wash with soap and water to ensure all oil is removed (skin cleansers and nail brushes will help). Preparations containing lanolin replace the natural skin oils which have been removed.
- Do not use gasoline, kerosene, diesel fuel, gas oil, thinners or solvents for cleaning skin.
- If skin disorders develop, obtain medical advice without delay.
- Where practical, degrease components prior to handling.
- Where there is a risk of eye contact, eye protection should be worn, for example, chemical goggles or face shields; in addition an eye wash facility should be provided.

ENVIRONMENTAL PROTECTION PRECAUTIONS

Dispose of used oil and used oil filters through authorized waste disposal contractors to licensed waste disposal sites, or to the waste oil reclamation trade. If in doubt, contact the local authority for advice on disposal facilities.
It is illegal to pour used oil on to the ground, down sewers or drains, or into water sources.
The regulations concerning pollution vary between regions.

Air Conditioning

INFOID:0000000006280875

Use an approved refrigerant recovery unit any time the air conditioning system must be discharged. Refer to HA section “REFRIGERANT” for specific instructions.

Fuel

INFOID:0000000006280876

INFINITI recommends the use of unleaded premium gasoline with an octane rating of at least 91 AKI (Anti-Knock Index) number (Research octane number 96).

If unleaded premium gasoline is not available, unleaded regular gasoline with an octane rating of at least 87 AKI number (Research octane number 91), can be used. In such case, engine performance may be decrease.

CAUTION:
- **Using a fuel other than that specified could adversely affect the emission control system, and may also affect warranty coverage.**
- **Under no circumstances should a leaded gasoline be used, because this will damage the three-way catalyst.**
- **Do not use E-85 fuel in the vehicle. The vehicle is not designed to run on E-85 fuel. Using E-85 fuel can damage the fuel system components and is not covered by the INFINITI vehicle limited warranty.**

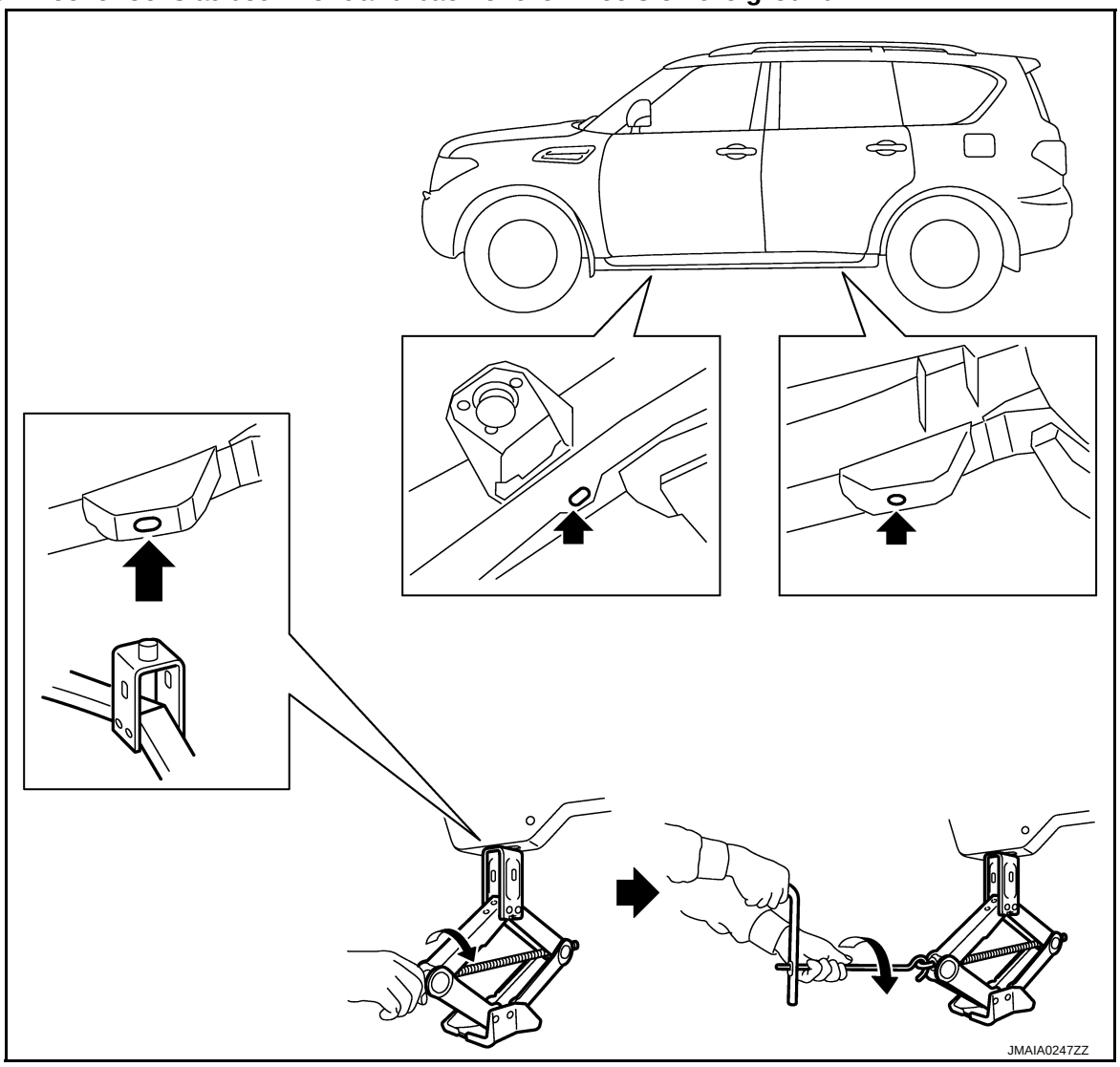
LIFTING POINT

Pantograph Jack

INFOID:0000000006280877

WARNING:

- **Never get under the vehicle while it is supported only by the jack. Always use safety stands to support the frame when you have to get under the vehicle.**
- **Place wheel chocks at both front and back of the wheels on the ground.**

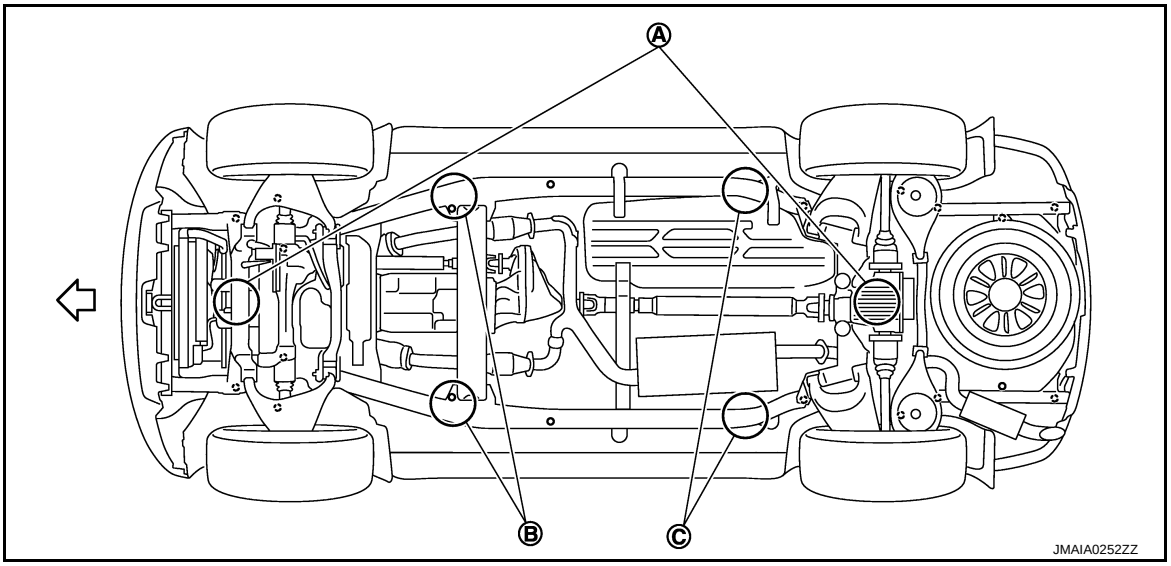


Garage Jack and Safety Stand

INFOID:0000000006280878

CAUTION:

- **Place a wooden or rubber block between safety stand and vehicle body when the supporting body is flat.**
- **Remove engine under cover before jacking up the front side of the vehicle with garage jack. Refer to BRM-39, "Rear Fender".**



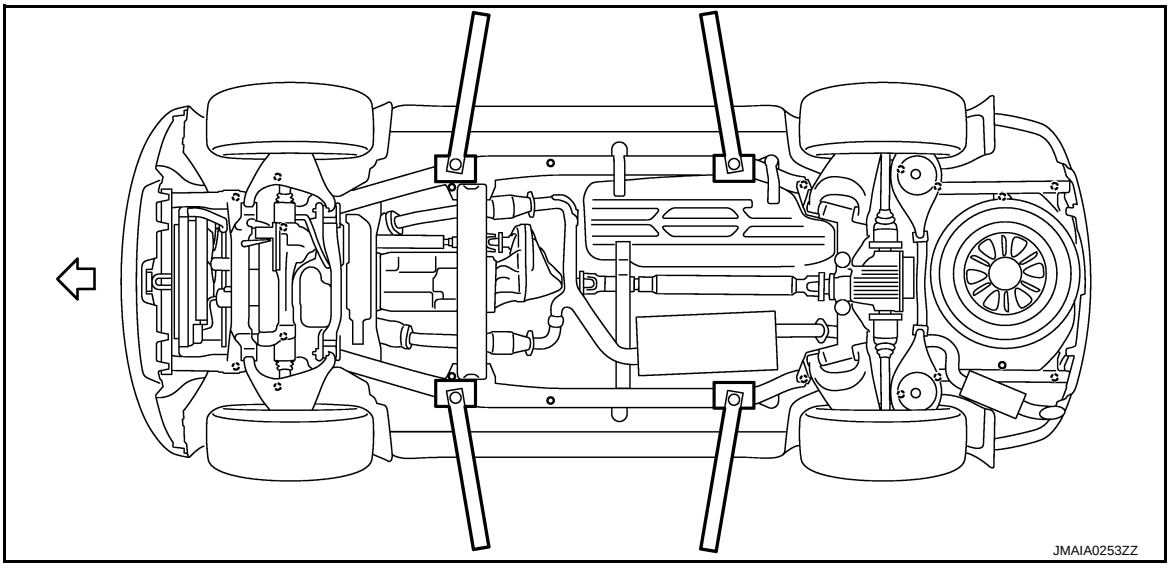
A : Garage jack point
B : Safety stand point
⇦ : Vehicle front

2-Pole Lift

INFOID:0000000006280879

WARNING:

- **When lifting the vehicle, open the lift arms as wide as possible and ensure that the front and rear of the vehicle are well balanced.**
- **When setting the lift arm, never allow the arm to contact the brake tubes, brake cable, or fuel lines.**



⇦ : Vehicle front

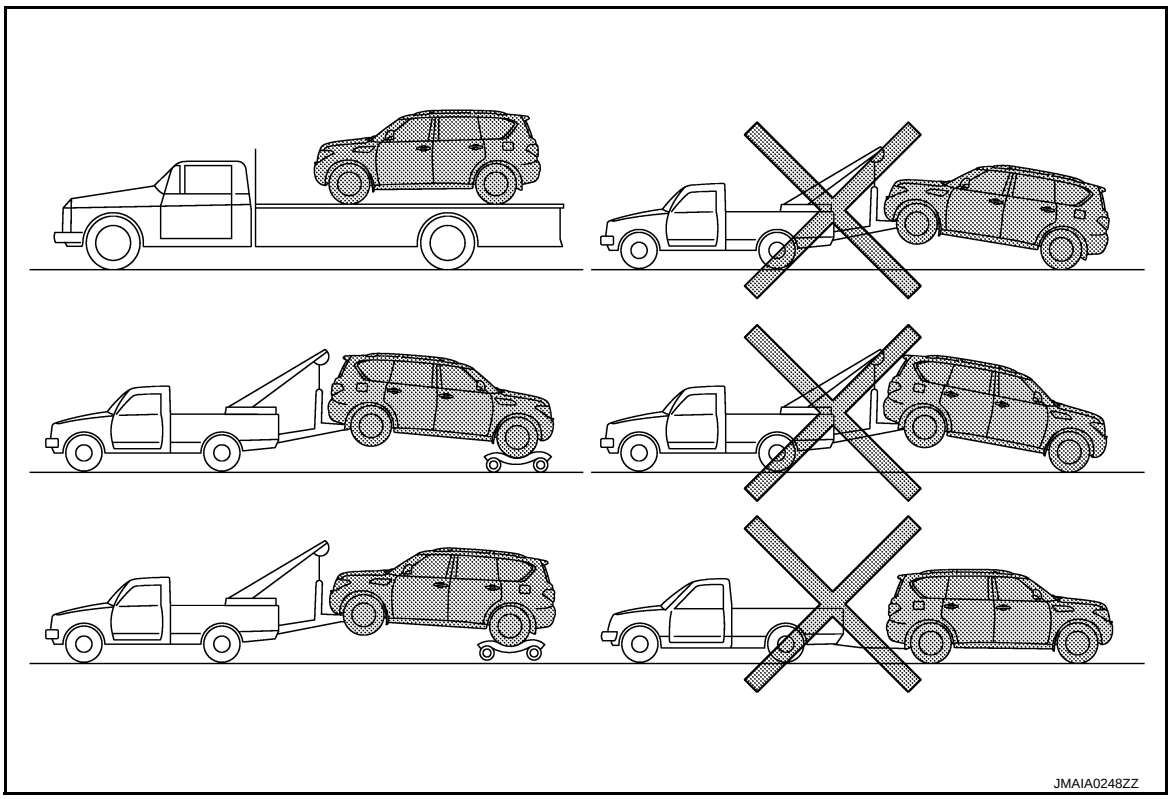
TOW TRUCK TOWING

Tow Truck Towing

INFOID:0000000006280880

CAUTION:
- **All applicable local laws regarding the towing operation must be obeyed.**
- **It is necessary to use proper towing equipment to avoid possible damage to the vehicle during towing operation. Towing is in accordance with Towing Procedure Manual at dealer.**
- **Always attach safety chains before towing.**
- **When towing, check that the transmission, steering system and powertrain are in good order. If any unit is damaged, dollies must be used.**
- **Never tow automatic transmission model from the rear (that is backward) with four wheels on the ground. This may cause serious and expensive damage to the transmission.**

4WD MODELS



NISSAN recommends that a dolly be used as illustrated when towing 4WD models.

CAUTION:
Never tow 4WD models with any of the wheels on the ground as this may cause serious and expensive damage to the powertrain.

Vehicle Recovery (Freeing a Stuck Vehicle)

INFOID:0000000006280881

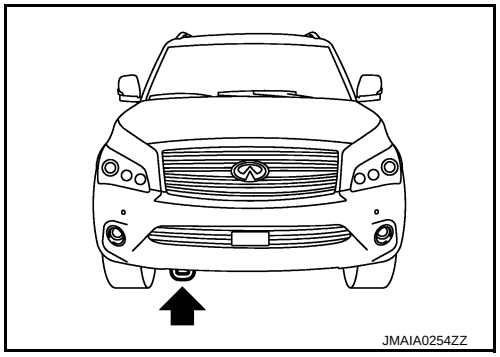
FREEING TRAPPED VEHICLE

WARNING:
- **Stand clear of a stuck vehicle.**
- **Never allow anyone to stand near the towing line during the pulling operation.**
- **Never spin your tires at high speed. This could cause them to explode and result in serious injury. Parts of your vehicle could also overheat and be damaged.**

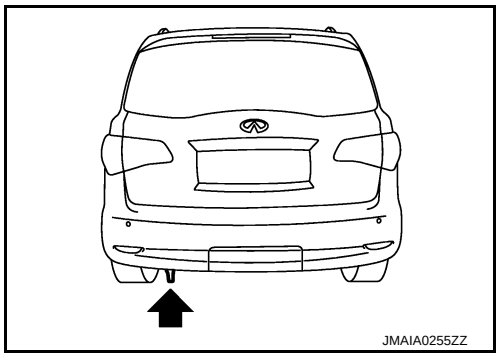
CAUTION:
- **Tow chains or cables must be attached only to the vehicle recovery hooks or main structural members of the vehicle. Otherwise, the vehicle body will be damaged.**
- **Never use the vehicle tie downs to free a vehicle stuck in sand, snow, mud, etc. Never tow the vehicle using the vehicle tie downs or recovery hooks.**
- **Always pull the cable straight out from the front of the vehicle. Never pull on the hook at an angle.**

- **Pulling devices should be routed so they do not touch any part of the suspension, steering, brake or cooling systems.**
- **Pulling devices such as ropes or canvas straps are not recommended for use in vehicle towing or recovery.**
- **In order to not break the towing line, tension it slowly.**

FRONT



REAR



AUTOMATIC TRANSMISSION

To tow a vehicle equipped with an automatic transmission, an appropriate vehicle dolly **MUST** be placed under the towed vehicle's drive wheels. **Always** follow the dolly manufacture's recommendations when using their product.

If the vehicle is stuck in sand, snow, mud, etc., use the following procedure:

1. Turn off the Vehicle Dynamic Control System. (if equipped)
2. Check the area in front and behind the vehicle is clear of obstructions.
3. Turn the steering wheel right and left to clear an area around the front tires.
4. Slowly rock the vehicle forward and backward.
   Shift back and forth between R (reverse) and D (drive).
   Apply the accelerator as little as possible to maintain the rocking motion.
   Release the accelerator pedal before shifting between R and D.
   Do not spin the tires above 35 mph. (55 km/h).
5. If the vehicle can not be freed after a few tries, contact a professional towing service to remove the vehicle.

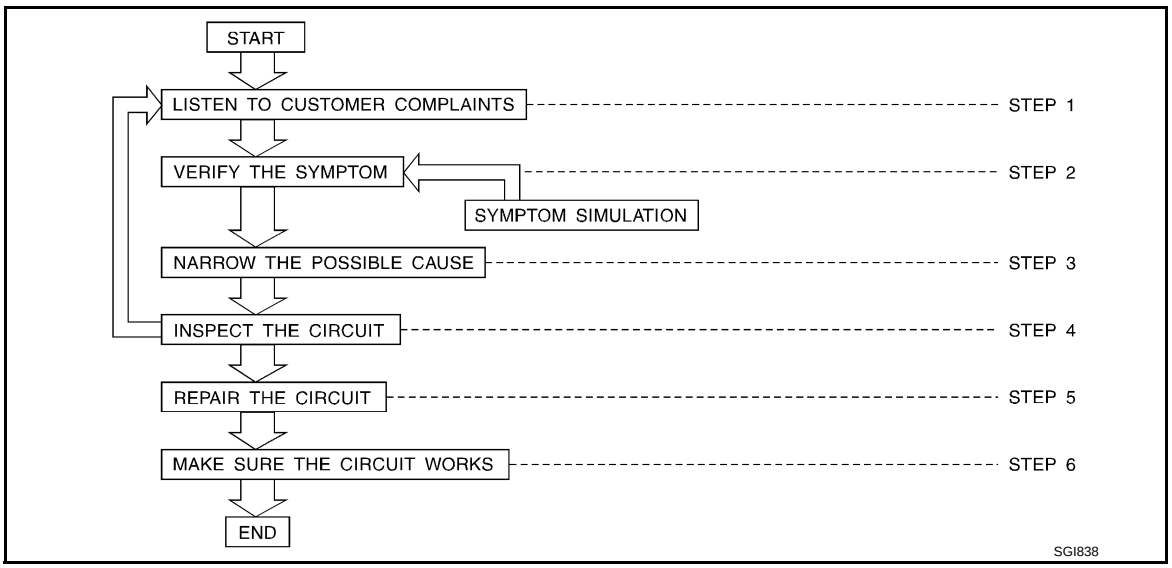
BASIC INSPECTION

SERVICE INFORMATION FOR ELECTRICAL INCIDENT

Work Flow

INFOID:0000000006280851

WORK FLOW



STEP	DESCRIPTION	
STEP 1	Get detailed information about the conditions and the environment when the incident occurred. The following are key pieces of information required to make a good analysis:	
	WHAT	Vehicle Model, Engine, Transmission/Transaxle and the System (i.e. Radio).
	WHEN	Date, Time of Day, Weather Conditions, Frequency.
	WHERE	Road Conditions, Altitude and Traffic Situation.
	HOW	System Symptoms, Operating Conditions (Other Components Interaction). Service History and if any After Market Accessories have been installed.
STEP 2	Operate the system, road test if necessary. Verify the parameter of the incident. If the problem cannot be duplicated, refer to “Incident Simulation Tests”.	
STEP 3	Get the proper diagnosis materials together including: • Power Supply Routing • System Operation Descriptions • Applicable Service Manual Sections • Check for any Service Bulletins Identify where to begin diagnosis based upon your knowledge of the system operation and the customer comments.	
STEP 4	Inspect the system for mechanical binding, loose connectors or wiring damage. Determine which circuits and components are involved and diagnose using the Power Supply Routing and Harness Lay-outs.	
STEP 5	Repair or replace the incident circuit or component.	
STEP 6	Operate the system in all modes. Verify the system works properly under all conditions. check you have not inadvertently created a new incident during your diagnosis or repair steps.	

Control Units and Electrical Parts

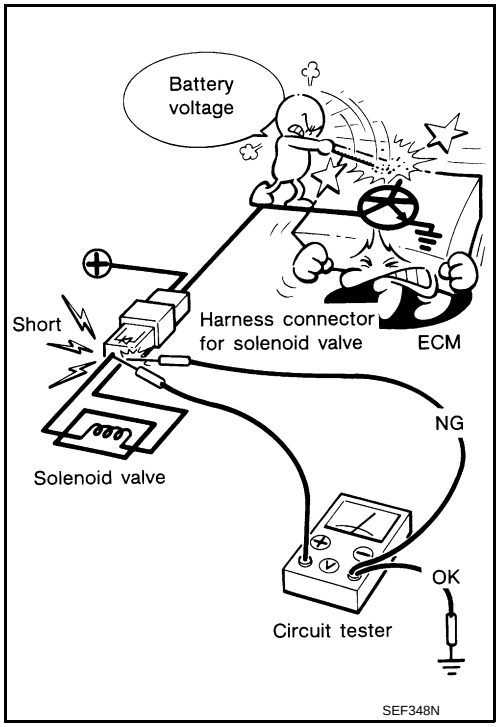
INFOID:0000000006280852

PRECAUTIONS

- Never reverse polarity of battery terminals.
- Install only parts specified for a vehicle.
- Before replacing the control unit, check the input and output and functions of the component parts.
- Do not apply excessive force when disconnecting a connector.

- Do not apply excessive shock to the control unit by dropping or hitting it.
- Be careful to prevent condensation in the control unit due to rapid temperature changes and do not let water or rain get on it. If water is found in the control unit, dry it fully and then install it in the vehicle.
- Be careful not to let oil to get on the control unit connector.
- Avoid cleaning the control unit with volatile oil.
- Do not disassemble the control unit, and do not remove the upper and lower covers.

- When using a DMM, be careful not to let test probes get close to each other to prevent the power transistor in the control unit from damaging battery voltage because of short circuiting.
- When checking input and output signals of the control unit, use the specified check adapter.

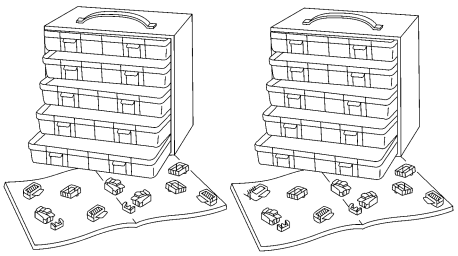
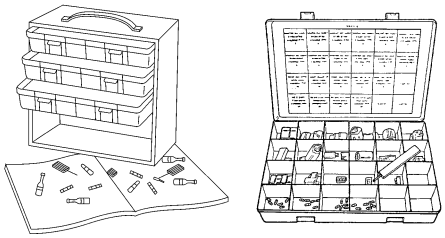


How to Check Terminal

INFOID:0000000006280853

CONNECTOR AND TERMINAL PIN KIT

- Use the connector and terminal pin kits listed below when replacing connectors or terminals.
- The connector and terminal pin kits contain some of the most commonly used NISSAN/INFINITI connectors and terminals. For detailed connector and terminal pin replacement procedures, refer to the latest NISSAN/INFINITI CONNECTOR AND TERMINAL PIN SERVICE MANUAL.

Tool number (Kent-Moore No.) Tool name	Description
- (J38751-95NI) Connector and terminal pin kit (NISSAN) - (J38751-95INF) Connector and terminal pin kit (INFINITI) - (J42992-98KIT) OBD and terminal repair kit - (J42992-2000UPD) OBD-II Connector Kit Update	J38751-95NI J38751-95INF  WAIA0004E J42992-98KIT J42992-2000UPD  WAIA0005E

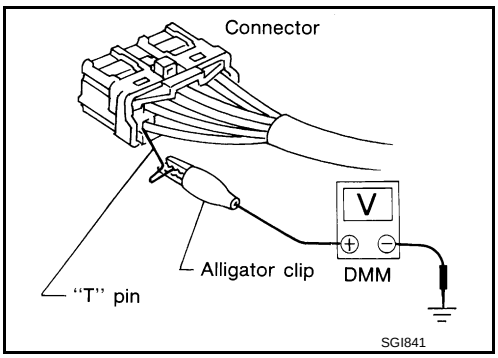
HOW TO PROBE CONNECTORS

- Connector damage and an intermittent connection can result from improperly probing of the connector during circuit checks.
- The probe of a digital multimeter (DMM) may not correctly fit the connector cavity. To correctly probe the connector, follow the procedures below using a “T” pin. For the best contact grasp the “T” pin using an alligator clip.

Probing from Harness Side

Standard type (not waterproof type) connector should be probed from harness side with “T” pin.

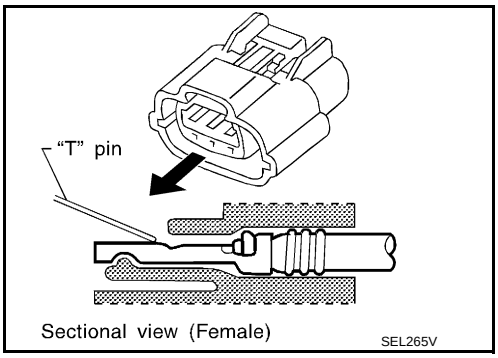
- If the connector has a rear cover such as a ECM connector, remove the rear cover before probing the terminal.
- Do not probe waterproof connector from harness side. Damage to the seal between wire and connector may result.



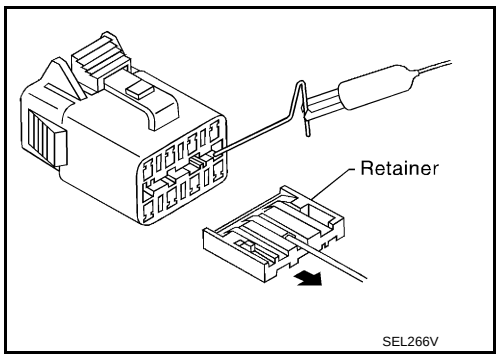
Probing from Terminal Side

FEMALE TERMINAL

- There is a small notch above each female terminal. Probe each terminal with the “T” pin through the notch.
  Do not insert any object other than the same type male terminal into female terminal.



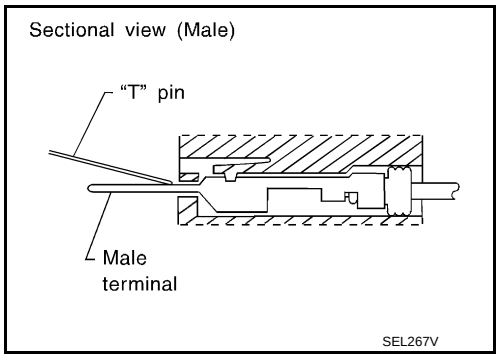
- Some connectors do not have a notch above each terminal. To probe each terminal, remove the connector retainer to make contact space for probing.



MALE TERMINAL

- Carefully probe the contact surface of each terminal using a “T” pin.

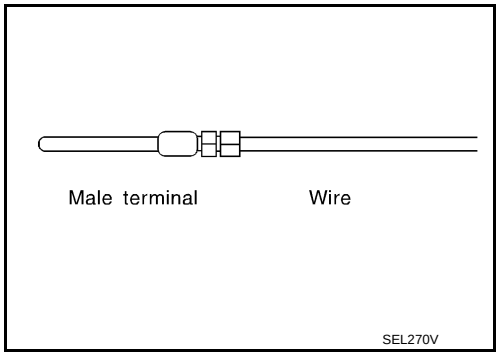
CAUTION:
Never bend terminal.



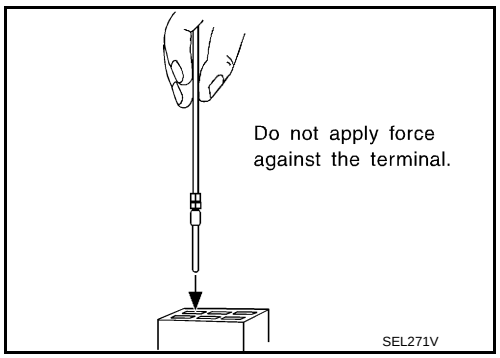
How to Check Enlarged Contact Spring of Terminal

- An enlarged contact spring of a terminal may create intermittent signals in the circuit.
- If the intermittent open circuit occurs, follow the procedure below to inspect for open wires and enlarged contact spring of female terminal.

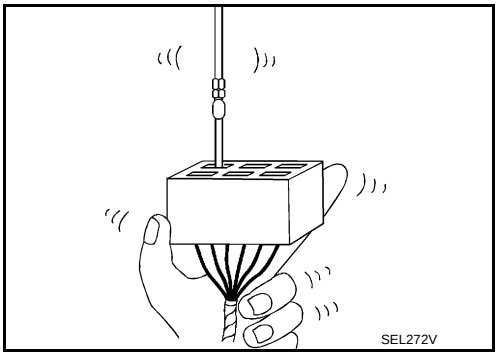
1. Assemble a male terminal and approx. 10 cm (3.9 in) of wire.
   NOTE:
   Use a male terminal which matches the female terminal.
2. Disconnect the suspected faulty connector and hold it terminal side up.



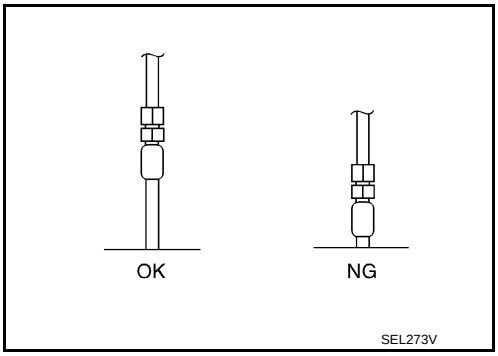
3. While holding the wire of the male terminal, try to insert the male terminal into the female terminal.
   CAUTION:
   Never force the male terminal into the female terminal with your hands.



4. While moving the connector, check whether the male terminal can be easily inserted or not.



- If the male terminal can be easily inserted into the female terminal, replace the female terminal.



Waterproof Connector Inspection

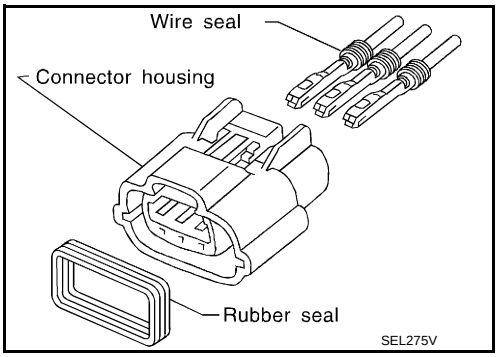
If water enters the connector, it can short interior circuits. This may lead to intermittent problems. Check the following items to maintain the original waterproof characteristics.

RUBBER SEAL INSPECTION

- Most waterproof connectors are provided with a rubber seal between the male and female connectors. If the seal is missing, the waterproof performance may not meet specifications.
- The rubber seal may come off when connectors are disconnected. Whenever connectors are reconnected, check the rubber seal is properly installed on either side of male or female connector.

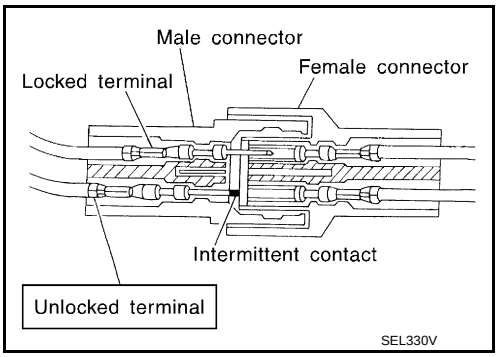
WIRE SEAL INSPECTION

- The wire seal must be installed on the wire insertion area of a waterproof connector. Be sure that the seal is installed properly.



Terminal Lock Inspection

Check for unlocked terminals by pulling wire at the end of connector. An unlocked terminal may create intermittent signals in the circuit.



Intermittent Incident

INFOID:0000000006280854

DESCRIPTION

Sometimes the symptom is not present when the vehicle is brought in for service. If possible, re-create the conditions present at the time of the incident. Doing so may help avoid a No Trouble Found Diagnosis. The fol-

lowing section illustrates ways to simulate the conditions/environment under which the owner experiences an electrical incident.

The section is broken into the six following topics:
- Vehicle vibration
- Heat sensitive
- Freezing
- Water intrusion
- Electrical load
- Cold or hot start up

Get a thorough description of the incident from the customer. It is important for simulating the conditions of the problem.

VEHICLE VIBRATION

The problem may occur or become worse while driving on a rough road or when engine is vibrating (idle with A/C on). In such a case, you will want to check for a vibration related condition. Refer to the following illustration.

Connector & Harness

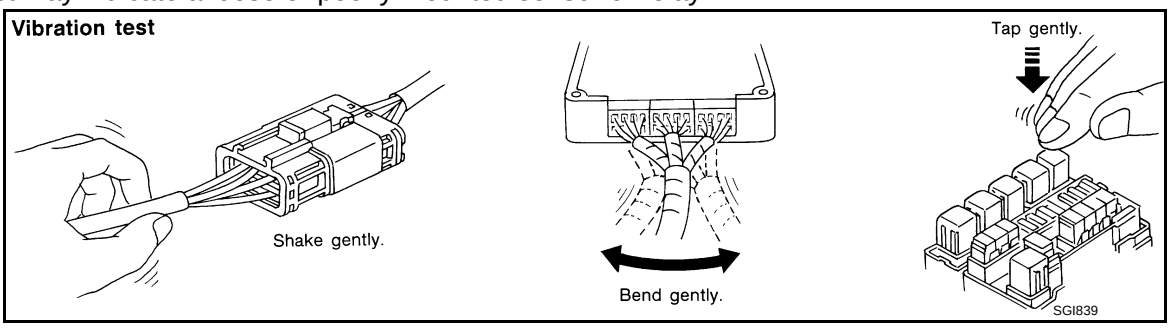
Determine which connectors and wiring harness would affect the electrical system you are inspecting. Gently shake each connector and harness while monitoring the system for the incident you are trying to duplicate. This test may indicate a loose or poor electrical connection.

Hint

Connectors can be exposed to moisture. It is possible to get a thin film of corrosion on the connector terminals. A visual inspection may not reveal this without disconnecting the connector. If the problem occurs intermittently, perhaps the problem is caused by corrosion. It is a good idea to disconnect, inspect and clean the terminals on related connectors in the system.

Sensor & Relay

Gently apply a slight vibration to sensors and relays in the system you are inspecting.
This test may indicate a loose or poorly mounted sensor or relay.



Engine Compartment

There are several reasons a vehicle or engine vibration could cause an electrical complaint. Some of the things to check for are:
- Connectors not fully seated.
- Wiring harness not long enough and is being stressed due to engine vibrations or rocking.
- Wires laying across brackets or moving components.
- Loose, dirty or corroded ground wires.
- Wires routed too close to hot components.

To inspect components under the hood, start by verifying the integrity of ground connections. (Refer to Ground Inspection described later.) First check that the system is properly grounded. Then check for loose connection by gently shaking the wiring or components as previously explained. Using the wiring diagrams inspect the wiring for continuity.

Behind the Instrument Panel

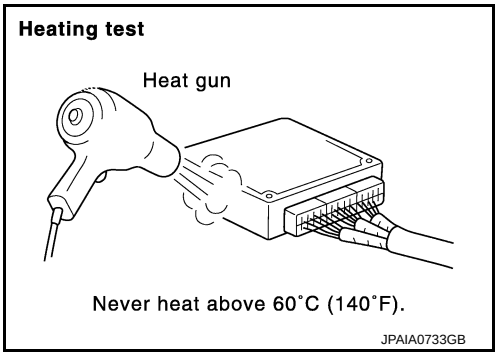
An improperly routed or improperly clamped harness can become pinched during accessory installation. Vehicle vibration can aggravate a harness which is routed along a bracket or near a screw.

Under Seating Areas

An unclamped or loose harness can cause wiring to be pinched by seat components (such as slide guides) during vehicle vibration. If the wiring runs under seating areas, inspect wire routing for possible damage or pinching.

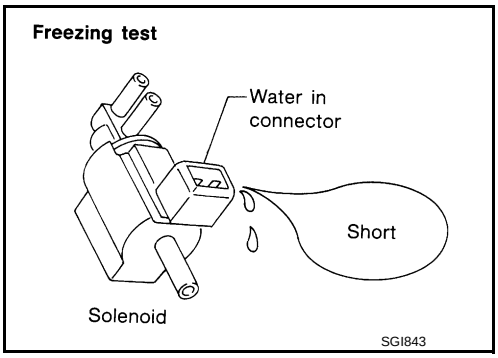
HEAT SENSITIVE

- The customer's concern may occur during hot weather or after car has sat for a short time. In such cases you will want to check for a heat sensitive condition.
- To determine if an electrical component is heat sensitive, heat the component with a heat gun or equivalent.
  CAUTION:
  Never heat components above 60°C (140°F).
- If incident occurs while heating the unit, either replace or properly insulate the component.



FREEZING

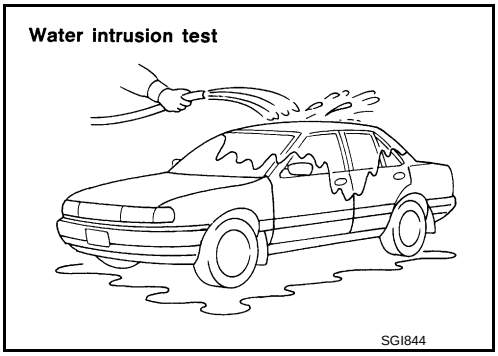
- The customer may indicate the incident goes away after the car warms up (winter time). The cause could be related to water freezing somewhere in the wiring/electrical system.
- There are two methods to check for this. The first is to arrange for the owner to leave his car overnight. Check it will get cold enough to demonstrate his complaint. Leave the car parked outside overnight. In the morning, do a quick and thorough diagnosis of those electrical components which could be affected.
- The second method is to put the suspect component into a freezer long enough for any water to freeze. Reinstall the part into the car and check for the reoccurrence of the incident. If it occurs, repair or replace the component.



WATER INTRUSION

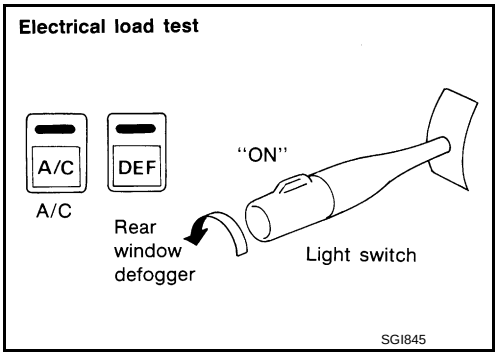
The incident may occur only during high humidity or in rainy/snowy weather. In such cases the incident could be caused by water intrusion on an electrical part. This can be simulated by soaking the car or running it through a car wash.

CAUTION:
Never spray water directly on any electrical components.



ELECTRICAL LOAD

The incident may be electrical load sensitive. Perform diagnosis with all accessories (including A/C, rear window defogger, radio, fog lamps) turned on.



COLD OR HOT START UP

On some occasions an electrical incident may occur only when the car is started cold, or it may occur when the car is restarted hot shortly after being turned off. In these cases you may have to keep the car overnight to make a proper diagnosis.

Circuit Inspection

INFOID:0000000006280855

GI

DESCRIPTION

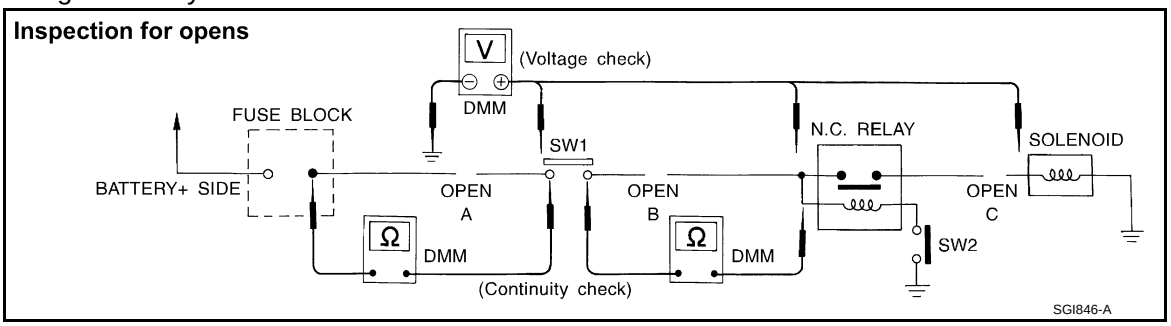
- In general, testing electrical circuits is an easy task if it is approached in a logical and organized method. Before beginning it is important to have all available information on the system to be tested. Also, get a thorough understanding of system operation. Then you will be able to use the appropriate equipment and follow the correct test procedure.
- You may have to simulate vehicle vibrations while testing electrical components. Gently shake the wiring harness or electrical component to do this.

OPEN	A circuit is open when there is no continuity through a section of the circuit.	
SHORT	There are two types of shorts.	
	• SHORT CIRCUIT	When a circuit contacts another circuit and causes the normal resistance to change.
	• SHORT TO GROUND	When a circuit contacts a ground source and grounds the circuit.

NOTE:
Refer to GI-37, "How to Check Terminal" to probe or check terminal.

TESTING FOR “OPENS” IN THE CIRCUIT

Before you begin to diagnose and test the system, you should rough sketch a schematic of the system. This will help you to logically walk through the diagnosis process. Drawing the sketch will also reinforce your working knowledge of the system.



Continuity Check Method

The continuity check is used to find an open in the circuit. The digital multimeter (DMM) set on the resistance function will indicate an open circuit as over limit (no beep tone or no ohms symbol). Check to always start with the DMM at the highest resistance level.

To help in understanding the diagnosis of open circuits, please refer to the previous schematic.

- Disconnect the battery negative cable.
- Start at one end of the circuit and work your way to the other end. (At the fuse block in this example)
- Connect one probe of the DMM to the fuse block terminal on the load side.
- Connect the other probe to the fuse block (power) side of SW1. Little or no resistance will indicate that portion of the circuit has good continuity. If there were an open in the circuit, the DMM would indicate an over limit or infinite resistance condition. (point A)
- Connect the probes between SW1 and the relay. Little or no resistance will indicate that portion of the circuit has good continuity. If there were an open in the circuit, the DMM would indicate an over limit or infinite resistance condition. (point B)
- Connect the probes between the relay and the solenoid. Little or no resistance will indicate that portion of the circuit has good continuity. If there were an open in the circuit, the DMM would indicate an over limit or infinite resistance condition. (point C)

Any circuit can be diagnosed using the approach in the previous example.

Voltage Check Method

To help in understanding the diagnosis of open circuits please refer to the previous schematic.

In any powered circuit, an open can be found by methodically checking the system for the presence of voltage. This is done by switching the DMM to the voltage function.

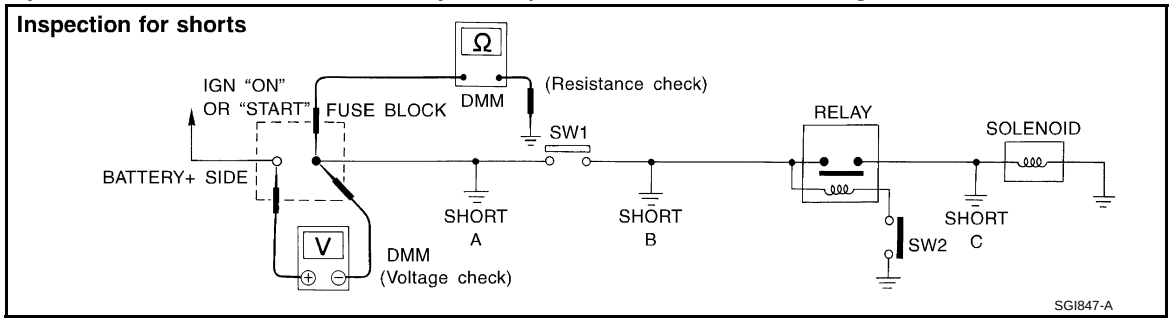
- Connect one probe of the DMM to a known good ground.
- Begin probing at one end of the circuit and work your way to the other end.
- With SW1 open, probe at SW1 to check for voltage.
  voltage: open is further down the circuit than SW1.

no voltage: open is between fuse block and SW1 (point A).
- Close SW1 and probe at relay.
  voltage: open is further down the circuit than the relay.
  no voltage: open is between SW1 and relay (point B).
- Close the relay and probe at the solenoid.
  voltage: open is further down the circuit than the solenoid.
  no voltage: open is between relay and solenoid (point C).

Any powered circuit can be diagnosed using the approach in the previous example.

TESTING FOR “SHORTS” IN THE CIRCUIT

To simplify the discussion of shorts in the system, please refer to the following schematic.



Resistance Check Method

- Disconnect the battery negative cable and remove the blown fuse.
- Disconnect all loads (SW1 open, relay disconnected and solenoid disconnected) powered through the fuse.
- Connect one probe of the DMM to the load side of the fuse terminal. Connect the other probe to a known good ground.
- With SW1 open, check for continuity.
  continuity: short is between fuse terminal and SW1 (point A).
  no continuit: short is further down the circuit than SW1.
- Close SW1 and disconnect the relay. Put probes at the load side of fuse terminal and a known good ground. Then, check for continuity.
  continuity: short is between SW1 and the relay (point B).
  no continuity: short is further down the circuit than the relay.
- Close SW1 and jump the relay contacts with jumper wire. Put probes at the load side of fuse terminal and a known good ground. Then, check for continuity.
  continuity: short is between relay and solenoid (point C).
  no continuity: check solenoid, retrace steps.

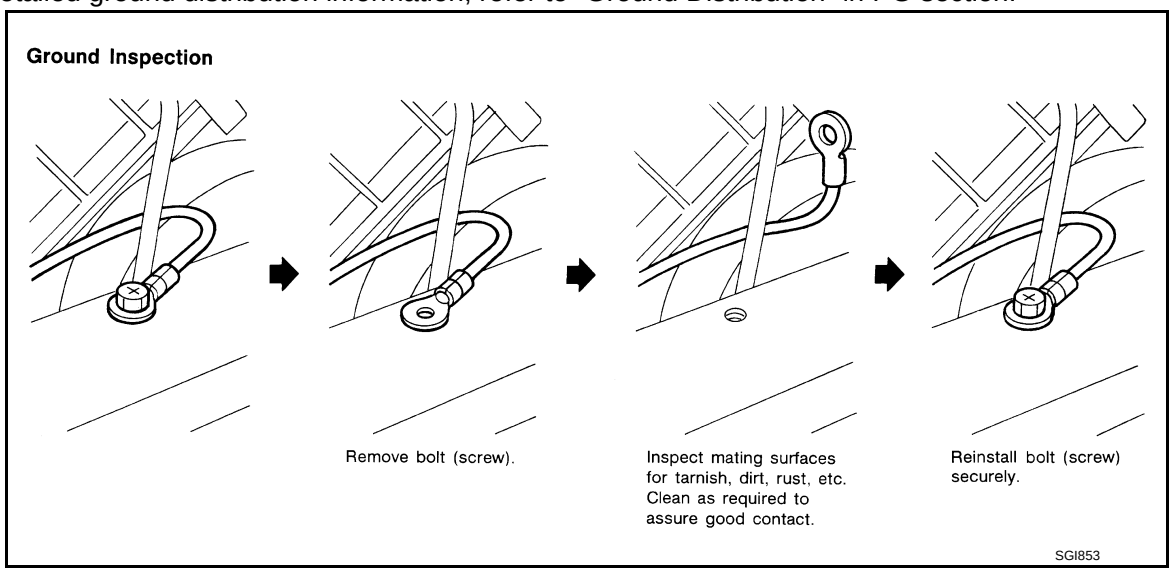
Voltage Check Method

- Remove the blown fuse and disconnect all loads (i.e. SW1 open, relay disconnected and solenoid disconnected) powered through the fuse.
- Turn the ignition switch to the ON or START position. Verify battery voltage at the battery + side of the fuse terminal (one lead on the battery + terminal side of the fuse block and one lead on a known good ground).
- With SW1 open and the DMM leads across both fuse terminals, check for voltage.
  voltage: short is between fuse block and SW1 (point A).
  no voltage: short is further down the circuit than SW1.
- With SW1 closed, relay and solenoid disconnected and the DMM leads across both fuse terminals, check for voltage.
  voltage: short is between SW1 and the relay (point B).
  no voltage: short is further down the circuit than the relay.
- With SW1 closed, relay contacts jumped with fused jumper wire check for voltage.
  voltage: short is down the circuit of the relay or between the relay and the disconnected solenoid (point C).
  no voltage: retrace steps and check power to fuse block.

GROUND INSPECTION

- Ground connections are very important to the proper operation of electrical and electronic circuits. Ground connections are often exposed to moisture, dirt and other corrosive elements. The corrosion (rust) can become an unwanted resistance. This unwanted resistance can change the way a circuit works.
- Electronically controlled circuits are very sensitive to proper grounding. A loose or corroded ground can drastically affect an electronically controlled circuit. A poor or corroded ground can easily affect the circuit. Even when the ground connection looks clean, there can be a thin film of rust on the surface.

- When inspecting a ground connection follow these rules:
- Remove the ground bolt or screw.
- Inspect all mating surfaces for tarnish, dirt, rust, etc.
- Clean as required to assure good contact.
- Reinstall bolt or screw securely.
- Inspect for “add-on” accessories which may be interfering with the ground circuit.
- If several wires are crimped into one ground eyelet terminal, check for proper crimps. Check all of the wires are clean, securely fastened and providing a good ground path. If multiple wires are cased in one eyelet check no ground wires have excess wire insulation.
- For detailed ground distribution information, refer to “Ground Distribution” in PG section.



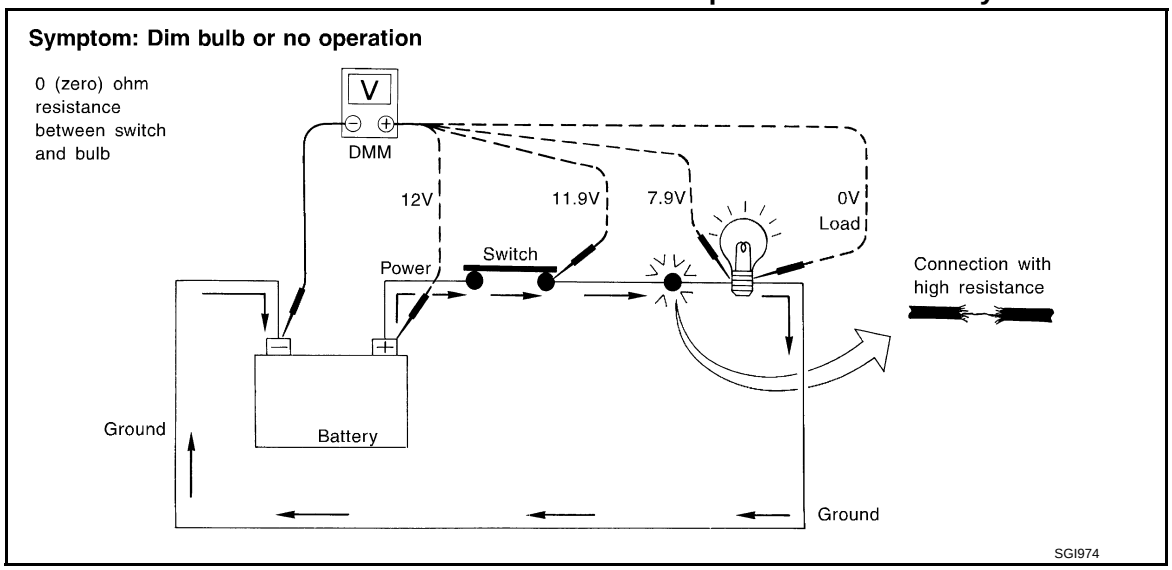
VOLTAGE DROP TESTS

- Voltage drop tests are often used to find components or circuits which have excessive resistance. A voltage drop in a circuit is caused by a resistance when the circuit is in operation.
- Check the wire in the illustration. When measuring resistance with DMM, contact by a single strand of wire will give reading of 0 ohms. This would indicate a good circuit. When the circuit operates, this single strand of wire is not able to carry the current. The single strand will have a high resistance to the current. This will be picked up as a slight voltage drop.
- Unwanted resistance can be caused by many situations as follows:
- Undersized wiring (single strand example)
- Corrosion on switch contacts
- Loose wire connections or splices.
- If repairs are needed always use wire that is of the same or larger gauge.

Measuring Voltage Drop — Accumulated Method

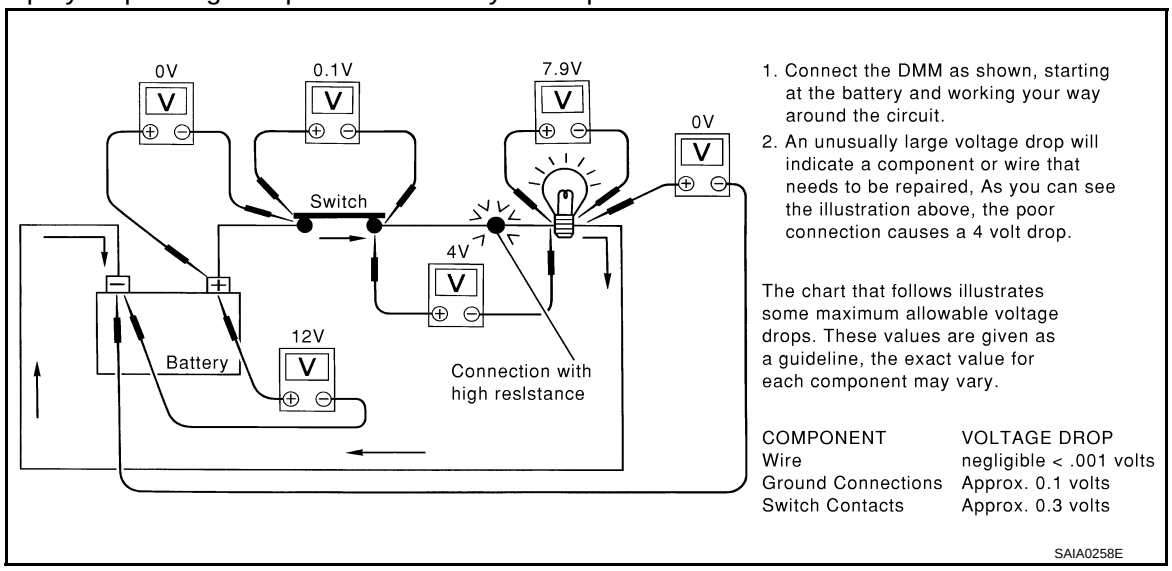
- Connect the DMM across the connector or part of the circuit you want to check. The positive lead of the DMM should be closer to power and the negative lead closer to ground.
- Operate the circuit.
- The DMM will indicate how many volts are being used to “push” current through that part of the circuit.

Note in the illustration that there is an excessive 4.1 volt drop between the battery and the bulb.



Measuring Voltage Drop — Step-by-Step

- The step-by-step method is most useful for isolating excessive drops in low voltage systems (such as those in “Computer Controlled Systems”).
- Circuits in the “Computer Controlled System” operate on very low amperage.
- The (Computer Controlled) system operations can be adversely affected by any variation in resistance in the system. Such resistance variation may be caused by poor connection, improper installation, improper wire gauge or corrosion.
- The step by step voltage drop test can identify a component or wire with too much resistance.

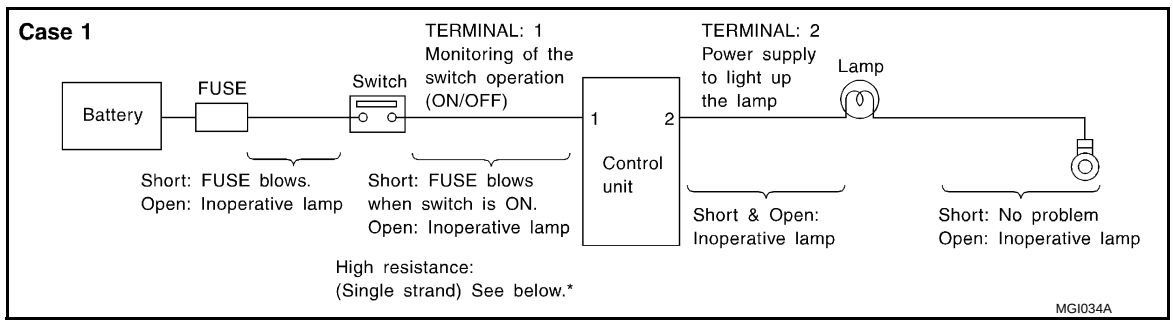


CONTROL UNIT CIRCUIT TEST

System Description

- When the switch is ON, the control unit lights up the lamp.

CASE 1

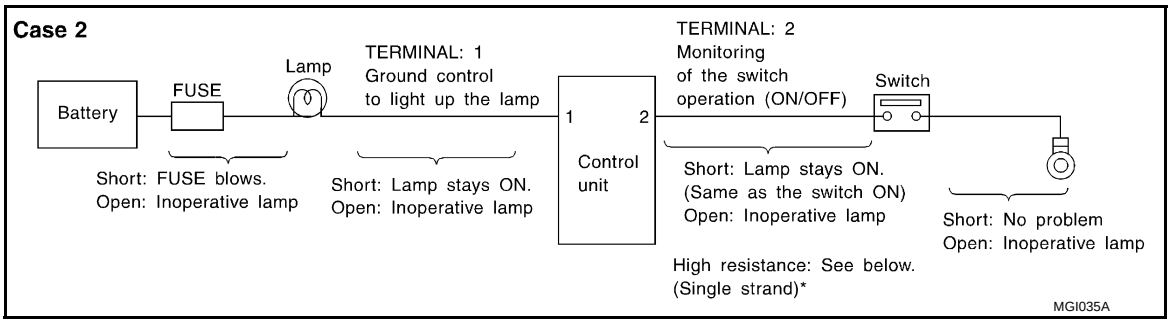


INPUT-OUTPUT VOLTAGE CHART

Terminal No.		Description		Condition	Value (Approx.)	In case of high resistance such as single strand (V) *
+	–	Signal name	Input/ Output			
1	Body ground	Switch	Input	Switch ON	Battery voltage	Lower than battery voltage Approx. 8 (Example)
				Switch OFF	0 V	Approx. 0
2	Body ground	Lamp	Output	Switch ON	Battery voltage	Approx. 0 (Inoperative lamp)
				Switch OFF	0 V	Approx. 0

- The voltage value is based on the body ground.
- *: If high resistance exists in the switch side circuit (caused by a single strand), terminal 1 does not detect battery voltage. Control unit does not detect the switch is ON even if the switch does not turn ON. Therefore, the control unit does not supply power to light up the lamp.

CASE 2



INPUT-OUTPUT VOLTAGE CHART

Terminal No.		Description		Condition	Value (Approx.)	In case of high resistance such as single strand (V) *
+	–	Signal name	Input/ Output			
1	Body ground	Lamp	Output	Switch ON	0 V	Battery voltage (Inoperative lamp)
				Switch OFF	Battery voltage	Battery voltage
2	Body ground	Switch	Input	Switch ON	0 V	Higher than 0 Approx. 4 (Example)
				Switch OFF	5 V	Approx. 5

- The voltage value is based on the body ground.
- *: If high resistance exists in the switch side circuit (caused by a single strand), terminal 2 does not detect approx. 0 V. Control unit does not detect the switch is ON even if the switch does not turn ON. Therefore, the control unit does not control ground to light up the lamp.

CONSULT-III/GST CHECKING SYSTEM

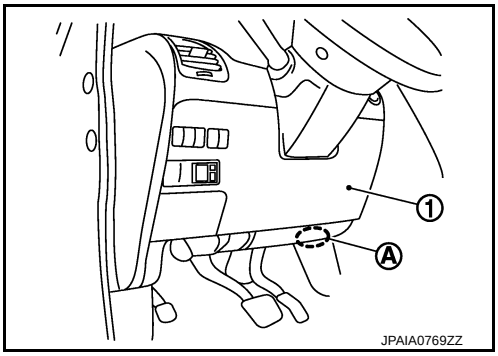
Description

INFOID:0000000006280856

- When CONSULT-III/GST is connected with a data link connector (A) equipped on the vehicle side, it will communicate with the control unit equipped in the vehicle and then enable various kinds of diagnostic tests.

  1 : Instrument lower panel LH

- Refer to “CONSULT-III Software Operation Manual” for more information.



CONSULT-III Function and System Application*1

INFOID:0000000006280857

Diagnostic test mode	Function	ENGINE	TRANSMISSION	AIR BAG	METER/M&A	AUTO BACK DOOR	BCM	AUTO DRIVE POS.	ABS	IPDM E/R	ALL MODE AWD/4WD	MULTI AV	ICC/ADAS	SONAR	AIR PRESSURE MONITOR	AFS (ADAPTIVE LIGHT)	PRECRASH SEAT BELT	HVAC	LASER	LANE CAMERA	ACCELE PEDAL ACT	E–SUS	SIDE RADAR LEFT	SIDE RADAR RIGHT	CAN GATEWAY
Work Support	This mode enables a technician to adjust some devices faster and more accurately.	x	x	-	-	-	x	x	x	-	x	x	x	x	x	x	-	x	x	x	-	x	x	x	-
Self Diagnostic Results	Retrieve DTC from ECU and display diagnostic items.	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x
Data Monitor	Monitor the input/output signal of the control unit in real time.	x	x	-	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	-
CAN Diagnosis	This mode displays a network diagnosis result about CAN by a diagram.	x	x	x	x	x	x	x	x	x	x	x	x	-	x	x	x	x	x	x	x	x	x	x	x
CAN Diagnosis Support Monitor	It monitors the status of CAN communication.	x	x	-	x	x	x	x	x	x	x	x	x	-	x	x	x	x	x	x	x	x	x	x	x

Diagnostic test mode	Function	ENGINE	TRANSMISSION	AIR BAG	METER/M&A	AUTO BACK DOOR	BCM	AUTO DRIVE POS.	ABS	IPDM E/R	ALL MODE AWD/4WD	MULTI AV	ICC/ADAS	SONAR	AIR PRESSURE MONITOR	AFS (ADAPTIVE LIGHT)	PRECRASH SEAT BELT	HVAC	LASER	LANE CAMERA	ACCELE PEDAL ACT	E–SUS	SIDE RADAR LEFT	SIDE RADAR RIGHT	CAN GATEWAY
Active Test	Send the drive signal from CONSULT-III to the actuator. The operation check can be performed.	x	-	-	-	-	x	x	x	x	-	-	x	x	x	x	-	x	-	-	x	x	x	x	-
DTC & SRT confirmation	The status of system monitoring tests and the self-diagnosis status/result can be confirmed.	x	x	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
ECU Identification	Display the ECU identification number (part number etc.) of the selected system.	x	x	x	-	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x
Function Test	This mode can show results of self-diagnosis of ECU with either “OK” or “NG”. For engine, more practical tests regarding sensors/switches and/or actuators are available.	x	x	x	-	-	-	-	x	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Configuration	Function to READ/WRITE vehicle configuration.	-	-	-	-	-	x	-	-	-	-	x	-	-	-	-	-	-	-	-	-	-	-	-	x
Special Function	Other results or histories, etc. that are recorded in ECU are displayed.	-	x	x	x	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-

x: Applicable

*1: If GST application is equipped, functions in accordance with SAE J1979 and ISO 15031-5 can be used.

CONSULT-III/GST Data Link Connector (DLC) Circuit

INFOID:0000000006280858

INSPECTION PROCEDURE

If the CONSULT-III/GST cannot diagnose the system properly, check the following items.

Symptom	Check item
CONSULT-III/GST cannot access any system.	• CONSULT-III/GST DLC power supply circuit (Terminal 8 and 16) and ground circuit (Terminal 4 and 5)
CONSULT-III cannot access individual system. (Other systems can be accessed.)	• Power supply and ground circuit for the control unit of the system (For detailed circuit, refer to wiring diagram for each system.) • Open or short circuit between the system and CONSULT-III DLC (For detailed circuit, refer to wiring diagram for each system.) • Open or short circuit CAN communication line. Refer to LAN-18, "Trouble Diagnosis Flow Chart".

NOTE:

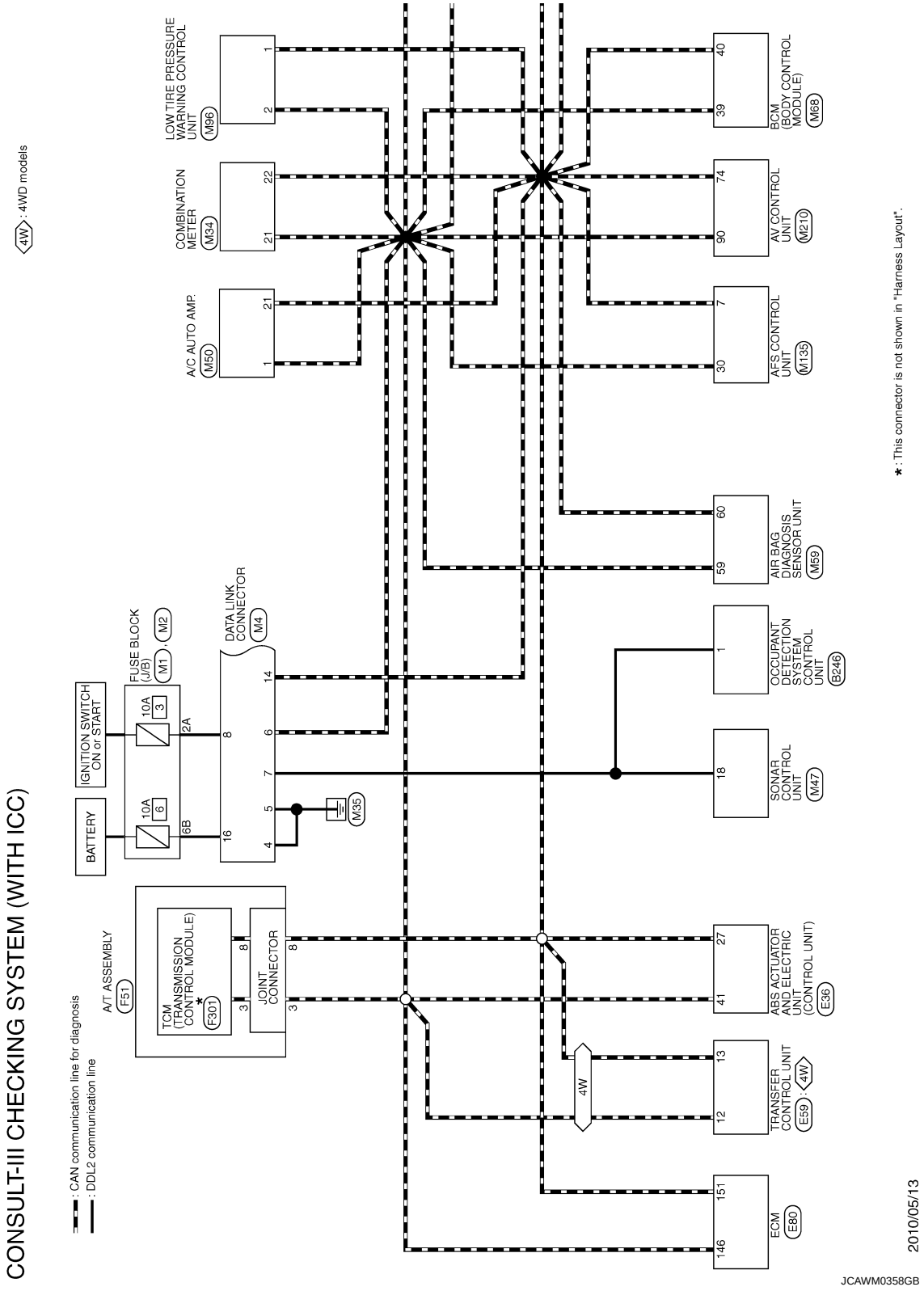
The DDL1 and DDL2 circuits from DLC pins 12, 13, 14 and 15 may be connected to more than one system. A short in a DDL circuit connected to a control unit in one system may affect CONSULT-III access to other systems.

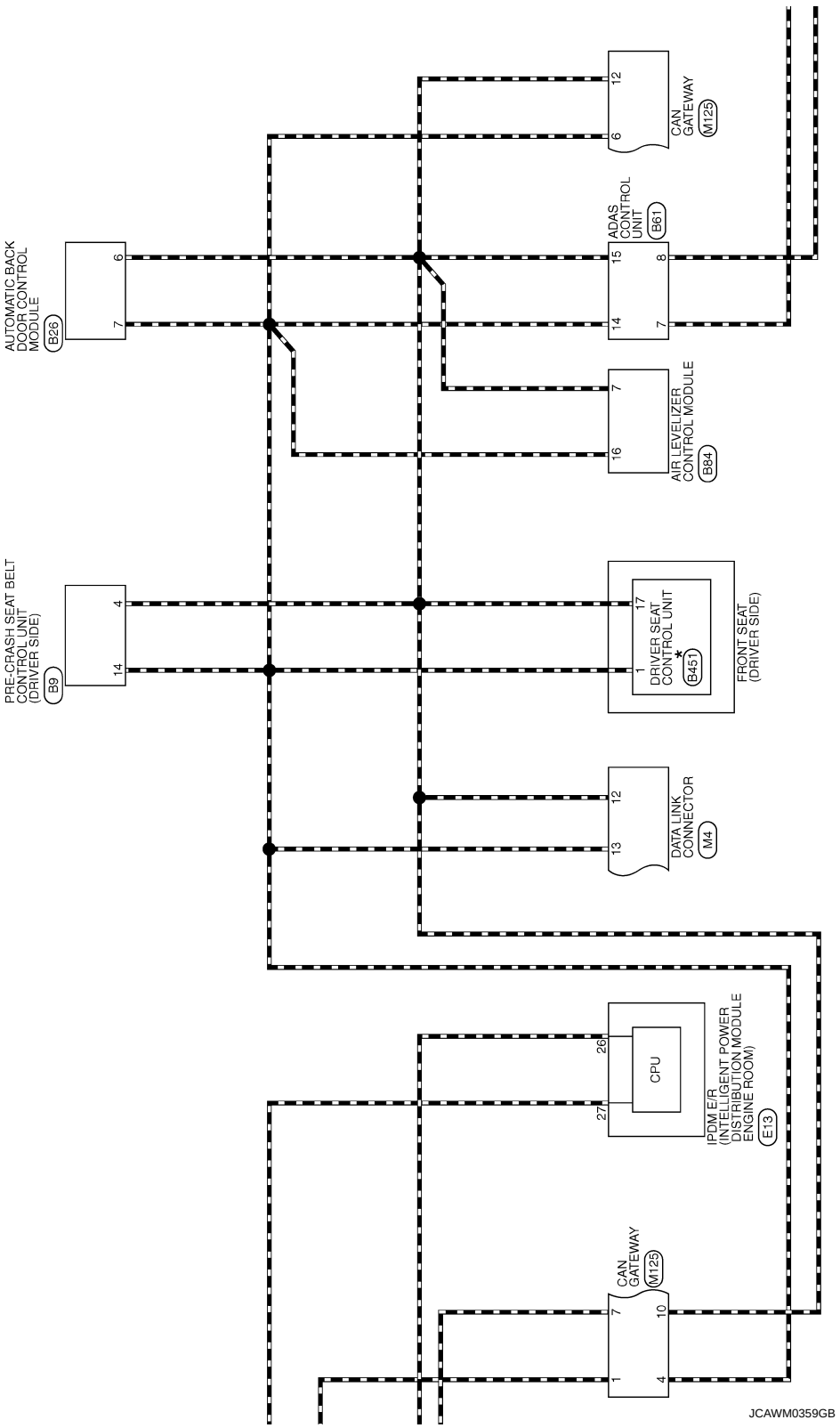
If the GST cannot operate properly, check the circuit based on the information of SAE J1962 and ISO 15031-3.

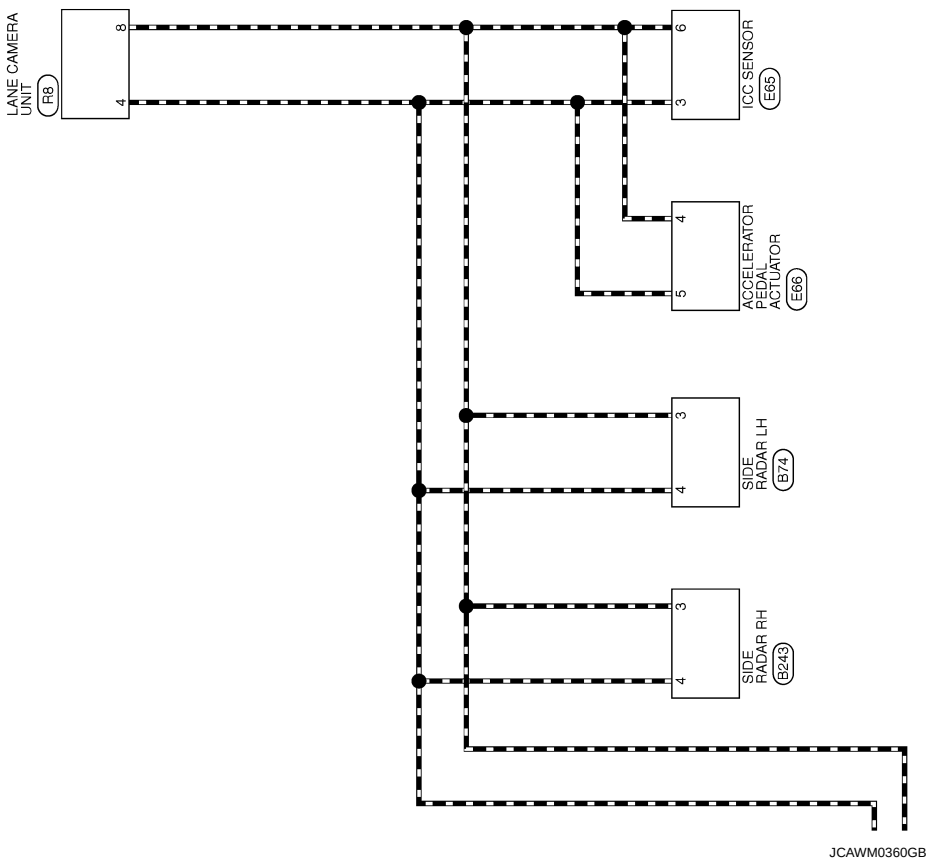
Wiring Diagram - CONSULT-III/GST CHECKING SYSTEM -

INFOID:0000000006280859

WITH ICC




CAN GATEWAY
M125
12
6
ADAS CONTROL UNIT
B61
15
8
14
7
AUTOMATIC BACK DOOR CONTROL MODULE
B26
6
7
AIR LEVELIZER CONTROL MODULE
B84
7
16
PRE-CRASH SEAT BELT CONTROL UNIT (DRIVER SIDE)
B9
4
14
FRONT SEAT (DRIVER SIDE)
DRIVER SEAT CONTROL UNIT
B451
17
1
DATA LINK CONNECTOR
M4
12
13
IPDM E/R (INTELLIGENT POWER DISTRIBUTION MODULE ENGINE ROOM)
E13
CPU
26
27
CAN GATEWAY
M123
7
10
1
4
JCAWM0359GB


LANE CAMERA UNIT
R8
8
4
ICC SENSOR
E65
6
3
ACCELERATOR PEDAL ACTUATOR
E66
4
5
SIDE RADAR LH
B74
3
4
SIDE RADAR RH
B243
3
4
JCAWM0360GB

CONSULT-III CHECKING SYSTEM (WITH ICC)

Connector No.	B9
Connector Name	PRE-CRASH SEAT BELT CONTROL UNIT (DRIVER SIDE)
Connector Type	TH18FW-CS2

Terminal No.	Color of Wire	Signal Name [Specification]
1	Y	SIG BAT
2	G	OUT 1
4	P	CAN-L
6	LG/R	BUCKLE SW LH NO
8	G	LOCAL COMM 2
9	SHIELD	SHIELD GND
10	R	SENS POWER 1
12	B	OUT 2
14	L	CAN-H
16	W	LOCAL COMM 1
17	W	SENS GND 1
18	B	SIG GND
19	W	MOTOR BAT
20	B	MOTOR GND

Connector No.	B26
Connector Name	AUTOMATIC BACK DOOR CONTROL MODULE
Connector Type	TH20FW-TB6

Terminal No.	Color of Wire	Signal Name [Specification]
1	L	BUZZER
2	Y/B	ABD SW
4	GR	ABD CLOSE SW
6	P	CAN-L
7	L	CAN-H
8	L/W	HALF LATCH SW
9	GR/L	IGN
10	Y	BAT

11	R	CLOSURE MTR (CLOSE)
12	V	CLOSURE MTR (OPEN)
14	G/W	TOUCH SENS LH
15	L/R	TOUCH SENS GND
16	LG	TOUCH SENS RH
17	O	MAIN SW
19	L/Y	CLOSE SW
20	G/Y	OPEN SW
22	B	GND
23	B	GND
28	R/W	BAT
34	B	GND

Connector No.	B61
Connector Name	ADAS CONTROL UNIT
Connector Type	TH16FW-NH

Terminal No.	Color of Wire	Signal Name [Specification]
1	V/W	WARNING SYSTEMS SW
3	R/Y	IBA OFF SW
4	LG/B	WARNING SYSTEMS ON IND
5	R	BRAKE HOLD RLY DRIVE SIGNAL
6	B	GND
7	L	ITS COMM-H
8	Y	ITS COMM-L
12	G/R	WARNING BUZZER
14	L	CAN-H
15	P	CAN-L
16	W/G	IGNITION

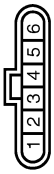
Connector No.	B74
Connector Name	SIDE RADAR LH
Connector Type	AAC06FB-WP-5P

Terminal No.	Color of Wire	Signal Name [Specification]
2	B	GND
3	Y	ITS COMM-L
4	L	ITS COMM-H
5	W/G	IGNITION
6	BR	BSW INDICATOR

Connector No.	B84
Connector Name	AIR LEVELIZER CONTROL MODULE
Connector Type	TH16FW-NH

Terminal No.	Color of Wire	Signal Name [Specification]
2	B	GND
3	V	AIR COMPRESSOR RELAY
4	L/W	VEHICLE HEIGHT SENSOR GND
5	W	VEHICLE HEIGHT SENSOR SIGNAL
7	P	CAN-L
9	P/L	IGN
11	V/W	EXHAUST SOLENOID
13	R	VEHICLE HEIGHT SENSOR POWER SUPPLY
16	L	CAN-H

Connector No.	B243
Connector Name	SIDE RADAR RH
Connector Type	AAC06FB-WP



Terminal No.	Color of Wire	Signal Name [Specification]
1	B/Y	RIGHT/LEFT SWITCHING SIGNAL
2	B	GND
3	Y	ITS COMM-L
4	L	ITS COMM-H
5	W/G	IGNITION
6	L/R	BSW INDICATOR

Connector No.	B246
Connector Name	OCCUPANT DETECTION SYSTEM CONTROL UNIT
Connector Type	TH04FW-NH

Terminal No.	Color of Wire	Signal Name [Specification]
1	W	–
2	B	–
3	L/R	–
4	R/L	–

JCAWM0361GB

CONSULT-III CHECKING SYSTEM (WITH ICC)

Connector No.	B451
Connector Name	DRIVER SEAT CONTROL UNIT
Connector Type	TH32FW-NH

Terminal No.	Color of Wire	Signal Name [Specification]
1	R/Y	CAN-H
2	R	UART (TX/RX)
4	R/L	PULSE (RECLINER)
5	R/B	TELESCOPIC SENSOR
6	R/W	ADDRESS 2
7	R/G	IND-2
8	SB	SLIDE SW (BACKWARD)
9	L	RECLINER SW (BACKWARD)
10	L/B	FRONT LIFTER SW (DOWNWARD)
11	L/W	REAR LIFTER SW (DOWNWARD)
12	L/R	SENSOR POWER SUPPLY
17	V	CAN-L
18	B/W	PULSE (SLIDE)
19	B/R	PULSE (FRONT LIFTER)
20	B/L	PULSE (REAR LIFTER)
21	W/B	TILT SENSOR
22	W/L	ADDRESS 1
23	W/R	IND-1
24	V/W	SLIDE SW (FORWARD)
25	V/B	RECLINER SW (FORWARD)
26	V/R	FRONT LIFTER SW (UPWARD)
27	Y/L	REAR LIFTER SW (UPWARD)
28	G	SET SW

Connector No.	E13
Connector Name	IPDM E/R (INTELLIGENT POWER DISTRIBUTION MODULE ENGINE ROOM)
Connector Type	TH12FW-NH

Terminal No.	Color of Wire	Signal Name [Specification]
23	GR/R	–
24	W/G	–
25	L/Y	–
26	P	–
27	L	–
30	R/W	–
31	B	–
32	LG	–
33	R	–
34	P/B	–

Connector No.	E36
Connector Name	ABS ACTUATOR AND ELECTRIC UNIT (CONTROL UNIT)
Connector Type	SAZ42FB-SJ24

Terminal No.	Color of Wire	Signal Name [Specification]
1	G	BAT
2	B	GND
3	B	GND
4	W	MOTOR SUPPLY
9	R/B	YAW RATE / SIDE / DECEL G SENSOR COMMUNICATION-H
10	P/B	YAW RATE / SIDE / DECEL G SENSOR COMMUNICATION-L
13	GR	BRAKE FLUID LEVEL SW
17	L/R	STP2
18	W/B	IGN
19	O	DS FR
20	SB	DP FL
21	R/Y	DS RR
22	V	DP RL
27	P	CAN-L
33	LG	DP FR
34	G	DS FL
35	BR	DP RR
36	P	DS RL
37	R	STP
39	L/W	VDC OFF SW
41	L	CAN-H
46	W	STOP LAMP SW ON

Connector No.	E59
Connector Name	TRANSFER CONTROL UNIT
Connector Type	TH40FW-NH

Terminal No.	Color of Wire	Signal Name [Specification]
6	BR	HI-LO POSITION SEN 1
7	Y	TRANSFER FLUID TEMP SEN SUPPLY
9	G	INTERNAL SPEED SEN GND
10	Y/G	INTERNAL SPEED SEN IMP
11	V	4LO SW
12	L	CAN-H
13	P	CAN-L
14	W/R	AUTO SW
15	P/B	ROTALY POSITION SEN PWM
16	LG	ROTALY POSITION SEN GND
17	W/L	LOCK POSITION SEN SUPPLY
18	BR/Y	ROTAY POSITION SEN SUPPLY
20	GR	TRANSFER C/U SUPPLY
25	P/L	HI-LO POSITION SEN 3
28	W	MOTOR TEMP SEN SUPPLY
29	LG/R	HI-LO POSITION SEN 2
30	R/B	LOCK POSITION SEN GND
31	L/O	INT SPEED SEN DIR
32	BR/R	IGN
35	R	LOCK SW
36	L/R	TRANSFER FLUID TEMP SEN GND
38	G/O	LOCK POSITION SEN SIGNAL
39	R/W	INTERNAL SPEED SEN SUPPLY

Connector No.	E65
Connector Name	ICC SENSOR
Connector Type	RS06FB-PR

Terminal No.	Color of Wire	Signal Name [Specification]
1	W/G	IGNITION
3	L	ITS COMM-H
4	B	GND
6	Y	ITS COMM-L

Connector No.	E66
Connector Name	ACCELERATOR PEDAL ACTUATOR
Connector Type	RH06FLGY

Terminal No.	Color of Wire	Signal Name [Specification]
1	B/O	BATTERY
2	B	GND
3	W/G	IGNITION
4	Y	ITS COMM-L
5	L	ITS COMM-H

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CONSULT-III CHECKING SYSTEM (WITH ICC)

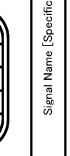
Connector No.	E80
Connector Name	ECM
Connector Type	MAB55FB-MEB10-LH

Terminal No.	Color of Wire	Signal Name [Specification]
111	R	FUEL INJECTOR DRIVER POWER SUPPLY
112	SB	FUEL INJECTOR DRIVER POWER SUPPLY
113	G	FUEL RETURN VALVE
114	B	ECM GROUND
115	B	ECM GROUND
120	Y	EVAP CANISTER VENT CONTROL VALVE
122	BR/W	VVEL ACTUATOR MOTOR RELAY ABORT SIGNAL (VVEL CONTROL MODULE)
123	V/R	THROTTLE CONTROL MOTOR RELAY
125	GR	FUEL PUMP CONTROL MODULE (FPCM)
126	O	ACCELERATOR PEDAL POSITION SENSOR 2
128	Y	ICC STEERING SWITCH
129	P/L	SENSOR GROUND (APP SENSOR 2)
130	R	SENSOR GROUND
131	L/W	SENSOR POWER SUPPLY
133	SB	SENSOR POWER SUPPLY
134	V/W	TF
136	W/R	ACCELERATOR PEDAL POSITION SENSOR 1
137	W/G	SENSOR POWER SUPPLY (APP SENSOR 1)
138	V	BATTERY CURRENT SENSOR
139	G	BATTERY TEMPERATURE SENSOR
140	R/Y	SENSOR GROUND
141	SB	IGNITION SWITCH
142	R/W	FUEL PUMP CONTROL MODULE (FPCM) CHECK
143	L/Y	EVAP CONTROL SYSTEM PRESSURE SENSOR
144	O/B	REFRIGERANT PRESSURE SENSOR
146	L	CAN COMMUNICATION LINE
147	G/Y	ICC BRAKE SWITCH
150	R	SENSOR GROUND
151	P	CAN COMMUNICATION LINE
156	L	POWER SUPPLY FOR ECM (BACK-UP)
158	W/B	STOP LAMP SWITCH
161	R/W	ECM COMMUNICATION LINE
163	L/G	ECM RELAY (SELF SHUT-OFF)
165	GR/R	–
166	W	ECM COMMUNICATION LINE
169	G/B	ENGINE SPEED SIGNAL OUTPUT
171	W	POWER SUPPLY FOR ECM
172	W	POWER SUPPLY FOR ECM
173	O	THROTTLE CONTROL MOTOR POWER SUPPLY
174	B	ECM GROUND
175	B	ECM GROUND

Connector No.	F51
Connector Name	A/T ASSEMBLY
Connector Type	RK10FG

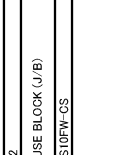
Terminal No.	Color of Wire	Signal Name [Specification]
1	V	–
2	P	–
3	L	–
4	SB	–
5	B	–
6	V	–
7	R	–
8	P	–
9	BR	–
10	B	–

Connector No.	F301
Connector Name	TCM (TRANSMISSION CONTROL MODULE)
Connector Type	SP10FG



Terminal No.	Color of Wire	Signal Name [Specification]
1	–	VIGN
2	–	BATT
3	–	CAN-H
4	–	K LINE
5	–	GND
6	–	VIGN
7	–	REV LAMP RLY
8	–	CAN-L
9	–	START RLY
10	–	GND

Connector No.	M1
Connector Name	FUSE BLOCK (J/B)
Connector Type	NS06FW-M2



Terminal No.	Color of Wire	Signal Name [Specification]
1A	Y	–
2A	GR	–
3A	W	–
4A	Y/G	–
5A	V	–
6A	L/W	–
7A	LG	–
8A	W	–

Connector No.	M2
Connector Name	FUSE BLOCK (J/B)
Connector Type	NS10FW-CS

Terminal No.	Color of Wire	Signal Name [Specification]
1B	R	–
3B	R	–
4B	B	–
5B	BR	–
6B	Y	–
7B	G	–
8B	L/O	–
10B	W/B	–

Connector No.	M4
Connector Name	DATA LINK CONNECTOR
Connector Type	BD16FW

Terminal No.	Color of Wire	Signal Name [Specification]
3	LG	–
4	B	–
5	B	–
6	L	–
7	SB	–
8	GR	–
11	SB	–
12	R	–
13	L	–
14	P	–
16	Y	–

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CONSULT-III CHECKING SYSTEM (WITH ICC)

Connector No.	M34
Connector Name	COMBINATION METER
Connector Type	TH40FW-NH

H.S.

1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20
21	22	23	24	25	26	27	28	29	30	31	32	33	34	35	36	37	38	39	40

Terminal No.	Color of Wire	Signal Name [Specification]
1	Y	BATTERY POWER SUPPLY
2	GR	IGNITION SIGNAL
3	B	GROUND
4	B	GROUND
5	B	ILL GND
7	R	TOW MODE SIGNAL
8	P/L	TRIP RESET SWITCH SIGNAL
11	G	ENTER SWITCH SIGNAL
12	O	SELECT SWITCH SIGNAL
13	W/R	ILLUMINATION CONTROL SWITCH SIGNAL (+)
14	R	ILLUMINATION CONTROL SWITCH SIGNAL (-)
15	R/W	AIR BAG SIGNAL
18	W/R	AMBIENT SENSOR SIGNAL
19	V/W	A/C AUTO AMP. CONNECTION RECOGNITION SIGNAL
20	B	AMBIENT SENSOR GROUND
21	L	CAN-H
22	P	CAN-L
23	B	GROUND
24	V	FUEL LEVEL SENSOR GROUND
25	O/L	ALTERNATOR SIGNAL
26	W	PARKING BRAKE SWITCH SIGNAL
28	GR/R	SECURITY SIGNAL
29	BR	WASHER LEVEL SWITCH SIGNAL
30	SB	VEHICLE SPEED SIGNAL (2-PULSE)
31	BR/W	VEHICLE SPEED SIGNAL (8-PULSE)
33	W	SNOW MODE SIGNAL
34	BR/Y	FUEL LEVEL SENSOR SIGNAL
35	O/B	SEAT BELT BUCKLE SWITCH SIGNAL (DRIVER SIDE)
36	G/Y	PASSENGER SEAT BELT WARNING SIGNAL
37	R/Y	NON-MANUAL MODE SIGNAL
38	L/W	MANUAL MODE SHIFT DOWN SIGNAL
39	Y/B	MANUAL MODE SHIFT UP SIGNAL
40	G/W	MANUAL MODE SIGNAL

Connector No.	M47
Connector Name	SONAR CONTROL UNIT
Connector Type	TH24FW-NH

H.S.

1	2	3	4	5	6	7	8	9	10	11	12
13		15	16	17	18	19	20			23	24

Terminal No.	Color of Wire	Signal Name [Specification]
3	G/R	CORNER SENSOR FRONT LH
4	G/Y	CORNER SENSOR FRONT RH
5	G/R	CORNER SENSOR REAR LH
6	G/Y	CORNER SENSOR REAR RH
12	G/O	SENSOR GND
13	V	ACC
18	SB	K LINE
19	SB	AV COMM (H)
20	LG	AV COMM (L)
24	B	GND

Connector No.	M50
Connector Name	A/C AUTO AMP.
Connector Type	SAB40FW

H.S.

1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20
21	22	23	24	25	26	27	28	29	30	31	32	33	34	35	36	37	38	39	40

Terminal No.	Color of Wire	Signal Name [Specification]
1	L	CAN-H
2	B	GROUND
3	Y/G	BATTERY POWER SUPPLY
4	V	ACC POWER SUPPLY
5	W	IONIZER CONTROL SIGNAL
6	V/W	A/C AUTO AMP. CONNECTION RECOGNITION SIGNAL
7	W/R	AMBIENT SENSOR SIGNAL
8	GR/L	RR IN-VEHICLE SENSOR SIGNAL
9	BR	SUNLOAD SENSOR (DR) SIGNAL
10	V/W	EXH GAS / OUTSIDE DOOR DETECTING SENSOR SIGNAL
11	W	COMM (A/C AUTO AMP.->RR A/C CONT)
14	O/L	FR BLOWER MOTOR CONTROL SIGNAL
16	R/G	EACH DOOR MOTOR LIN SIGNAL
17	L/Y	EACH DOOR MOTOR POWER SUPPLY
21	P	CAN-L
22	B	GROUND
23	GR/L	IGNITION POWER SUPPLY
25	R	–
26	B	SENSOR GROUND
27	GR	FR IN-VEHICLE SENSOR SIGNAL
28	R	INTAKE SENSOR SIGNAL
29	O	SUNLOAD SENSOR (PASS) SIGNAL
31	O/L	COMM (RR A/C CONT->A/C AUTO AMP.)
34	L/O	RR BLOWER MOTOR CONTROL SIGNAL
37	B	GROUND
38	G/W	RR A/C RELAY CONTROL SIGNAL

Connector No.	M59
Connector Name	AIR BAG DIAGNOSIS SENSOR UNIT
Connector Type	NH28FY-EX

H.S.

1														
8	9	7	6						2	5	4	3		
19					23					24	22			
18					60	59	25	57	58	1				

Terminal No.	Color of Wire	Signal Name [Specification]
1	R/L	IGN
2	B	GND
3	Y	DR1 (+)
4	Y/R	DR1 (–) DR2 (–)
5	Y/G	DR 2 (+)
6	Y/L	AS1 (+)
7	Y/B	AS1 (–)
8	B/Y	AS 2 (+)
9	Y	AS 2 (–)
18	O	EC2S (+)
19	W	EC2S (–)
22	SHIELD	GND
23	R/W	AIRBAG W/L
24	G/Y	SEATBELT W/L
25	R	CUTOFF TELLTALE
59	L	CAN-H
60	P	CAN-L

Connector No.	M68
Connector Name	BCM (BODY CONTROL MODULE)
Connector Type	TH40FB-NH

H.S.

1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20
21	22	23	24	25	26	27	28	29	30	31	32	33	34	35	36	37	38	39	40

Terminal No.	Color of Wire	Signal Name [Specification]
2	BR/Y	COMBI SW INPUT 5
3	GR	COMBI SW INPUT 4
4	L	COMBI SW INPUT 3
5	G	COMBI SW INPUT 2
6	V	COMBI SW INPUT 1
8	V	POWER WINDOW SW COMM
9	R	STOP LAMP SW 1
11	R	L&R SENSOR SERIAL LINK
14	P/B	OPTICAL SENSOR
16	L/O	DIMMER SIGNAL
17	Y/G	SENSOR PWR SPLY
18	B/Y	RECEIVER/SENSOR GND
19	BR	RECEIVER PWR SPLY
20	G/R	KYLS ENT RECEIVER COMM
21	P	NATS ANT AMP.
22	W/B	KYLS ENT RECEIVER RSSI
23	GR/R	SECURITY IND CONT
24	SB	DONGLE LINK
25	LG/R	NATS ANT AMP.
29	W	HAZARD SW
30	W/L	BK DOOR OPNR SW
31	W/G	DR DOOR UNLOCK SENSOR
32	LG	COMBI SW OUTPUT 5
33	Y	COMBI SW OUTPUT 4
34	W	COMBI SW OUTPUT 3
35	R/W	COMBI SW OUTPUT 2
36	SB	COMBI SW OUTPUT 1
37	G/Y	SHIFT P
39	L	CAN-H
40	P	CAN-L

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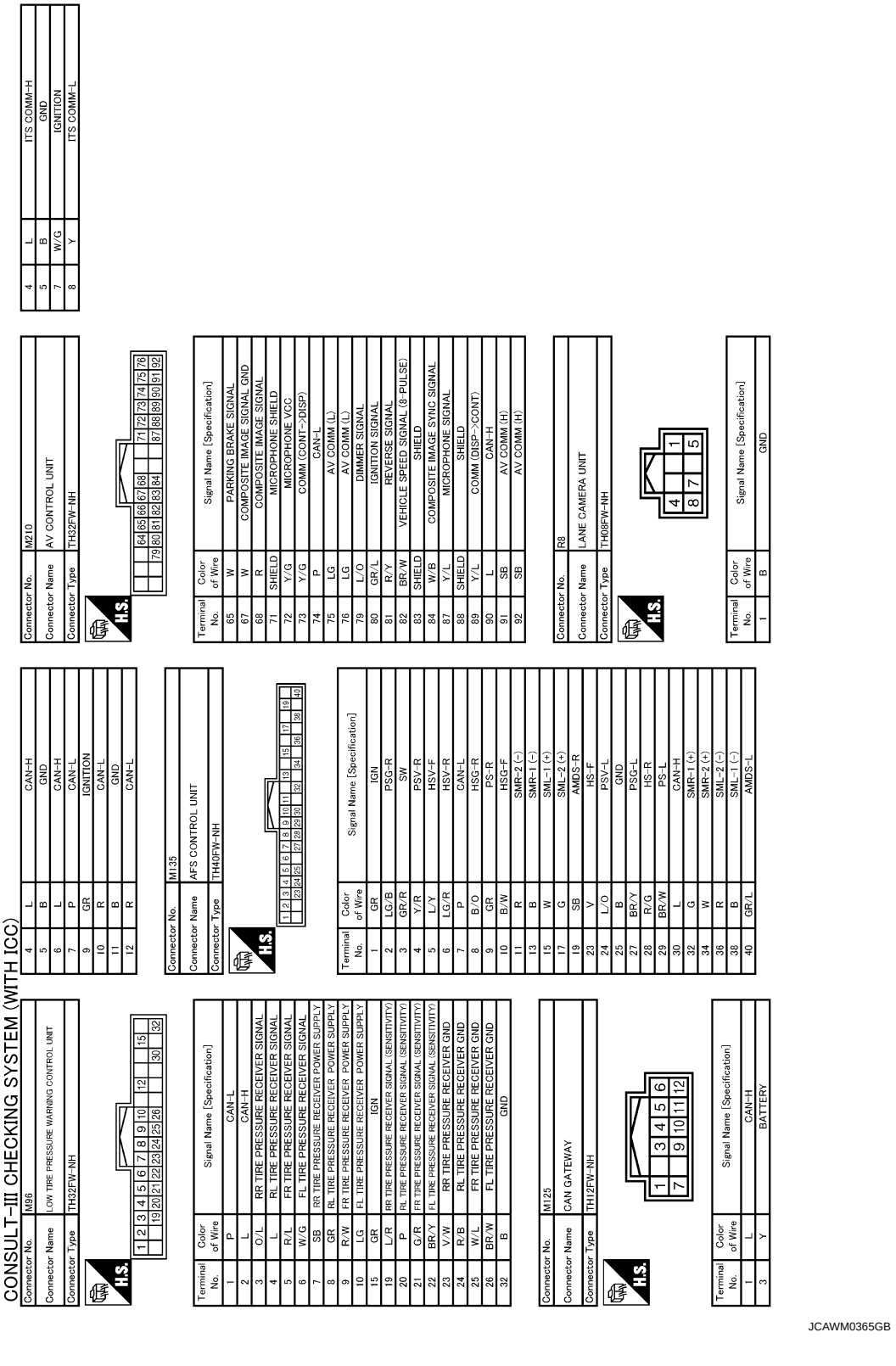
CONSULT-III CHECKING SYSTEM (WITH ICC)



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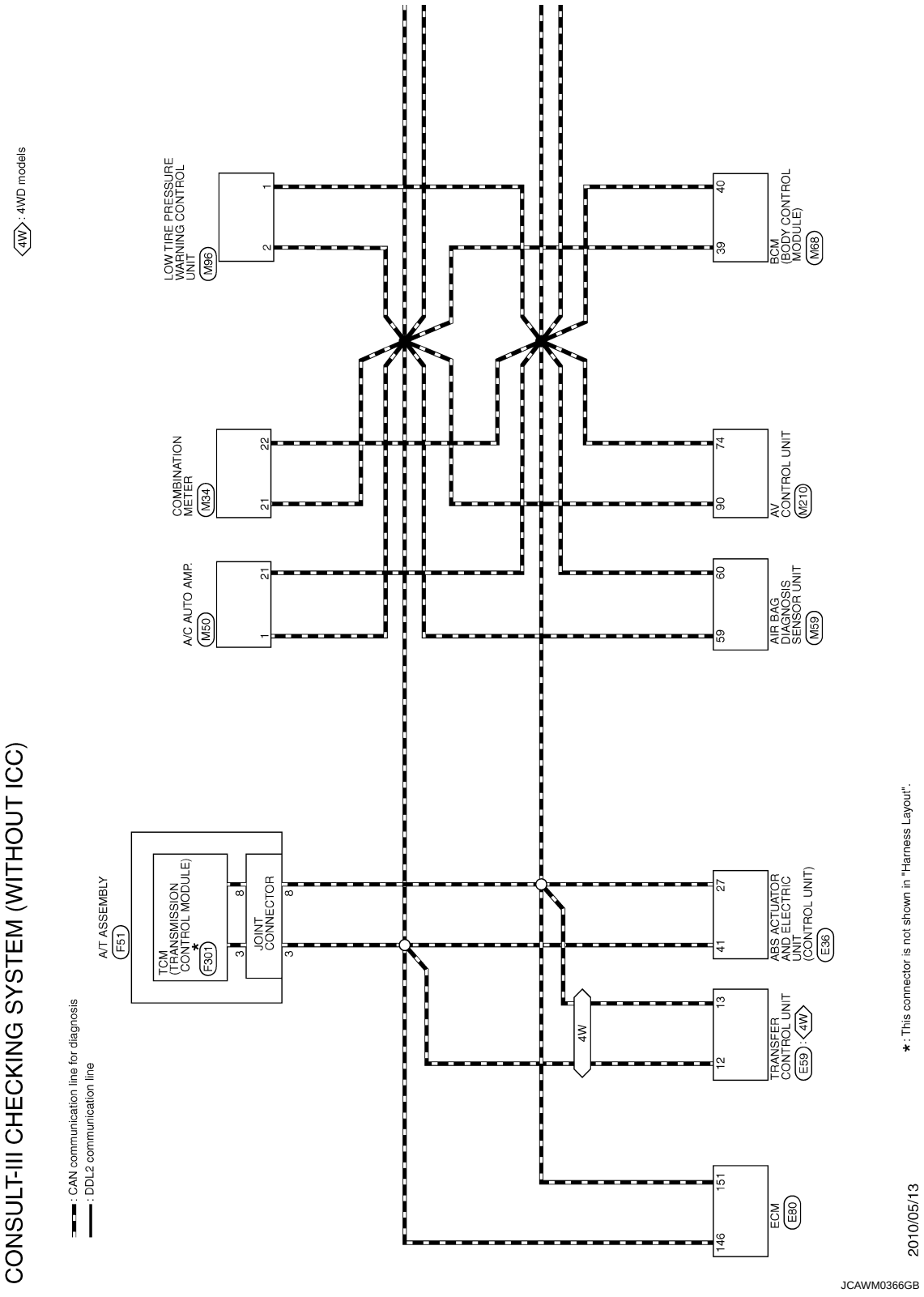
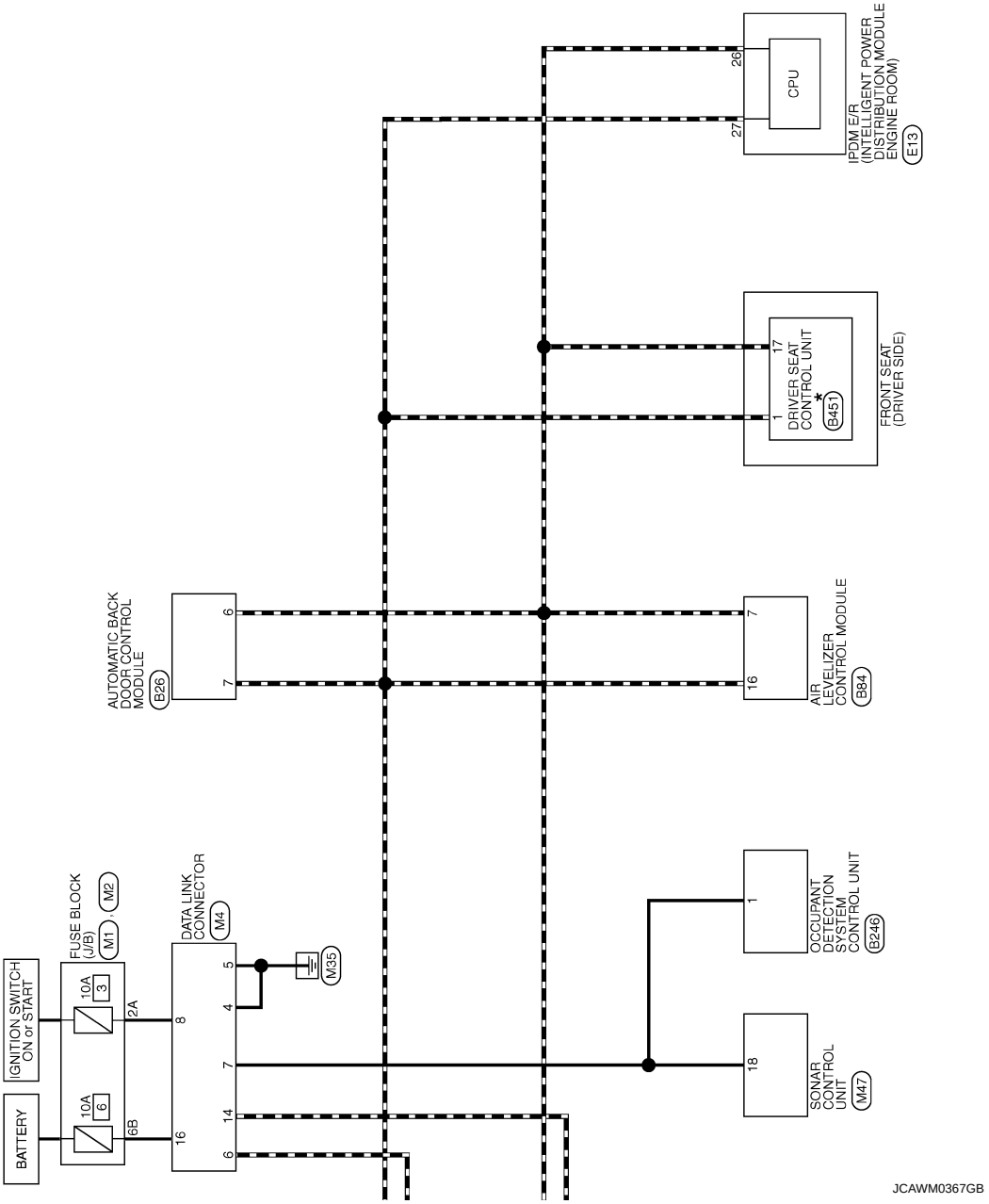
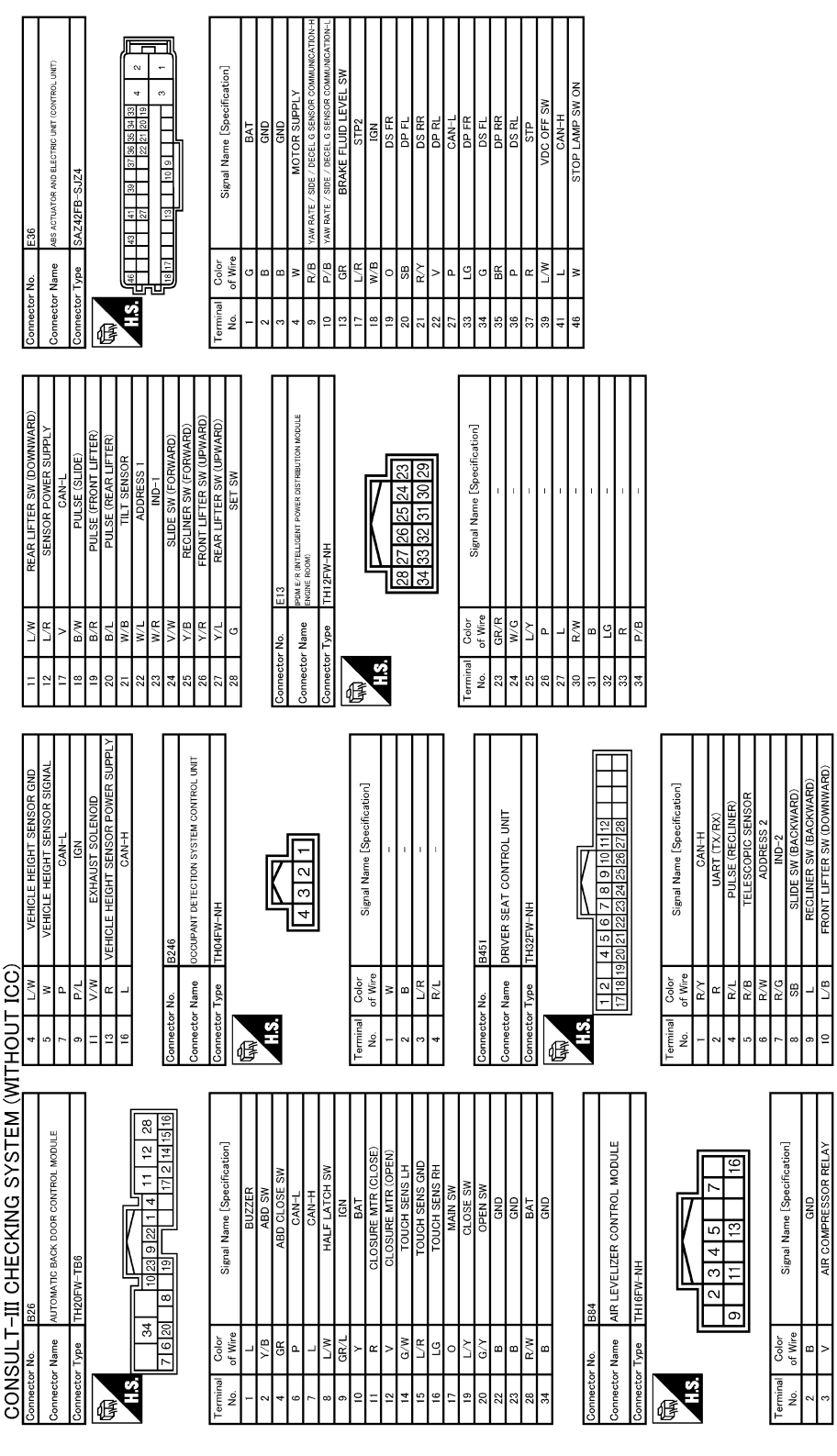
CONSULT-III CHECKING SYSTEM (WITHOUT ICC)




IPDM E/R
(INTELLIGENT POWER
DISTRIBUTION MODULE
ENGINE ROOM)
E13
CPU
26
27
FRONT SEAT
(DRIVER SIDE)
DRIVER SEAT
CONTROL UNIT
B451
17
1
AUTOMATIC BACK
DOOR CONTROL
MODULE
B26
6
7
AIR
LEVELIZER
CONTROL MODULE
B84
7
16
OCCUPANT
DETECTION
SYSTEM
CONTROL UNIT
B246
1
SONAR
CONTROL
UNIT
M47
18
DATA LINK
CONNECTOR
M4
5
4
7
14
6
8
16
M35
FUSE BLOCK
(J/B)
M1
M2
10A
3
10A
6
2A
6B
IGNITION SWITCH
ON or START
BATTERY
JCAWM0367GB

CONSULT-III CHECKING SYSTEM (WITHOUT ICC)



JCAWM0368GB

CONSULT-III CHECKING SYSTEM (WITHOUT ICC)

Connector No.	E59
Connector Name	TRANSFER CONTROL UNIT
Connector Type	TH40FW-NH

Terminal No.	Color of Wire	Signal Name [Specification]
6	BR	HI-LO POSITION SEN 1
7	Y	TRANSFER FLUID TEMP SEN SUPPLY
9	G	INTERNAL SPEED SEN GND
10	Y/G	INTERNAL SPEED SEN IMP
11	V	4LO SW
12	L	CAN-H
13	P	CAN-L
14	W/R	AUTO SW
15	P/B	ROTALY POSITION SEN PWM
16	LG	ROTALY POSITION SEN GND
17	W/L	LOCK POSITION SEN SUPPLY
18	BR/Y	ROTAY POSITION SEN SUPPLY
20	GR	TRANSFER C/U SUPPLY
25	P/L	HI-LO POSITION SEN 3
28	W	MOTOR TEMP SEN SUPPLY
29	LG/R	HI-LO POSITION SEN 2
30	R/B	LOCK POSITION SEN GND
31	L/O	INT SPEED SEN DIR
32	BR/R	IGN
35	R	LOCK SW
36	L/R	TRANSFER FLUID TEMP SEN GND
38	G/O	LOCK POSITION SEN SIGNAL
39	R/W	INTERNAL SPEED SEN SUPPLY

Connector No.	E80
Connector Name	ECM
Connector Type	MAB55FB-MEB10-LH

Terminal No.	Color of Wire	Signal Name [Specification]
111	R	FUEL INJECTOR DRIVER POWER SUPPLY
112	SB	FUEL INJECTOR DRIVER POWER SUPPLY
113	G	FUEL RETURN VALVE
114	B	ECM GROUND
115	B	ECM GROUND
120	Y	EVAP CANISTER VENT CONTROL VALVE
122	BR/W	CVSL ACTUATOR MOTOR RELAY ABORT SIGNAL (CVSL CONTROL MODULE)
123	V/R	THROTTLE CONTROL MOTOR RELAY
125	GR	FUEL PUMP CONTROL MODULE (FPCM)
126	O	ACCELERATOR PEDAL POSITION SENSOR 2
128	Y	ICC STEERING SWITCH
129	P/L	SENSOR GROUND (APP SENSOR 2)
130	R	SENSOR GROUND
131	L/W	SENSOR POWER SUPPLY
133	SB	SENSOR POWER SUPPLY
134	V/W	TF
136	W/R	ACCELERATOR PEDAL POSITION SENSOR 1
137	W/G	SENSOR POWER SUPPLY (APP SENSOR 1)
138	V	BATTERY CURRENT SENSOR
139	G	BATTERY TEMPERATURE SENSOR
140	R/Y	SENSOR GROUND
141	SB	IGNITION SWITCH
142	R/W	FUEL PUMP CONTROL MODULE (FPCM) CHECK
143	L/Y	EVAP CONTROL SYSTEM PRESSURE SENSOR
144	O/B	REFRIGERANT PRESSURE SENSOR
146	L	CAN COMMUNICATION LINE
147	G/Y	ICC BRAKE SWITCH
150	R	SENSOR GROUND
151	P	CAN COMMUNICATION LINE
156	L	POWER SUPPLY FOR ECM (BACK-UP)
158	W/B	STOP LAMP SWITCH
161	R/W	ECM COMMUNICATION LINE
163	L/G	ECM RELAY (SELF SHUT-OFF)
165	GR/R	-
166	W	ECM COMMUNICATION LINE
169	G/B	ENGINE SPEED SIGNAL OUTPUT
171	W	POWER SUPPLY FOR ECM
172	W	POWER SUPPLY FOR ECM
173	O	THROTTLE CONTROL MOTOR POWER SUPPLY
174	B	ECM GROUND
175	B	ECM GROUND

Connector No.	F51
Connector Name	A/T ASSEMBLY
Connector Type	RK10FG

Terminal No.	Color of Wire	Signal Name [Specification]
1	V	-
2	P	-
3	L	-
4	SB	-
5	B	-
6	V	-
7	R	-
8	P	-
9	BR	-
10	B	-

Connector No.	F301
Connector Name	TCM (TRANSMISSION CONTROL MODULE)
Connector Type	SP10FG

Terminal No.	Color of Wire	Signal Name [Specification]
1	-	VIGN
2	-	BATT
3	-	CAN-H
4	-	K LINE
5	-	GND
6	-	VIGN
7	-	REV LAMP RLY
8	-	CAN-L
9	-	START RLY
10	-	GND

Connector No.	M1
Connector Name	FUSE BLOCK (J/B)
Connector Type	NS08FW-M2

Terminal No.	Color of Wire	Signal Name [Specification]
1A	Y	-
2A	GR	-
3A	W	-
4A	Y/G	-
5A	V	-
6A	L/W	-
7A	LG	-
8A	W	-

Connector No.	M2
Connector Name	FUSE BLOCK (J/B)
Connector Type	NS10FW-CS

Terminal No.	Color of Wire	Signal Name [Specification]
1B	R	-
3B	R	-
4B	B	-
5B	BR	-
6B	Y	-
7B	G	-
8B	L/O	-
10B	W/B	-

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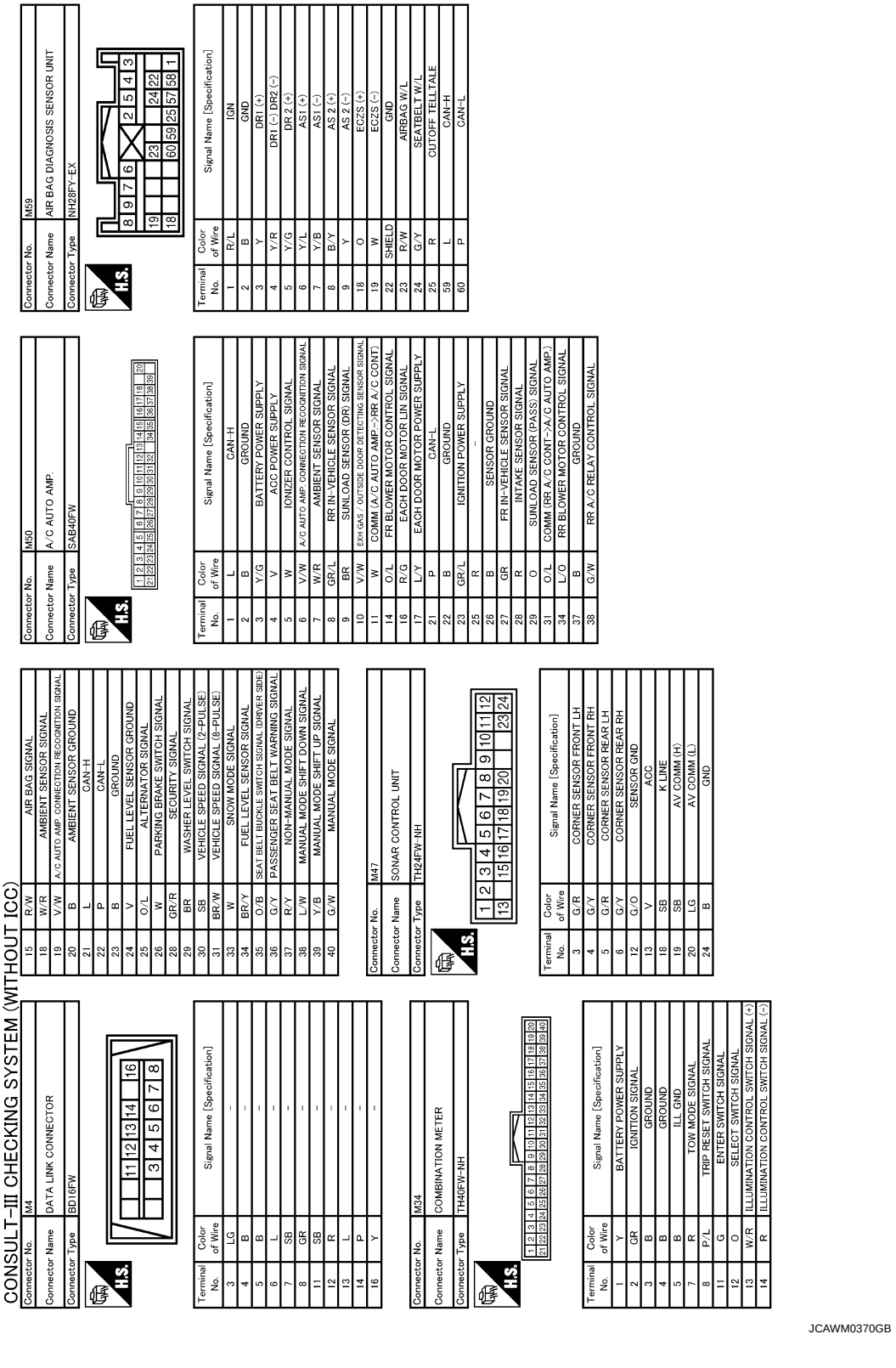

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CONSULT-III CHECKING SYSTEM (WITHOUT ICC)

Connector No.	M68
Connector Name	BCM (BODY CONTROL MODULE)
Connector Type	TH40FB-NH

H.S.

1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20
21	22	23	24	25	26	27	28	29	30	31	32	33	34	35	36	37	38	39	40

Terminal No.	Color of Wire	Signal Name [Specification]
2	BR/Y	COMBI SW INPUT 5
3	GR	COMBI SW INPUT 4
4	L	COMBI SW INPUT 3
5	G	COMBI SW INPUT 2
6	V	COMBI SW INPUT 1
8	V	POWER WINDOW SW COMM
9	R	STOP LAMP SW 1
11	R	L&R SENSOR SERIAL LINK
14	P/B	OPTICAL SENSOR
16	L/O	DIMMER SIGNAL
17	Y/G	SENSOR PWR SPLY
18	B/Y	RECEIVER/SENSOR GND
19	BR	RECEIVER PWR SPLY
20	G/R	KYLS ENT RECEIVER COMM
21	P	NATS ANT AMP
22	W/B	KYLS ENT RECEIVER RSSI
23	GR/R	SECURITY IND CONT
24	SB	DONGLE LINK
25	LG/R	NATS ANT AMP
29	W	HAZARD SW
30	W/L	BK DOOR OPNR SW
31	W/G	DR DOOR UNLOCK SENSOR
32	LG	COMBI SW OUTPUT 5
33	Y	COMBI SW OUTPUT 4
34	W	COMBI SW OUTPUT 3
35	R/W	COMBI SW OUTPUT 2
36	SB	COMBI SW OUTPUT 1
37	G/Y	SHIFT P
39	L	CAN-H
40	P	CAN-L

Connector No.	M96
Connector Name	LOW TIRE PRESSURE WARNING CONTROL UNIT
Connector Type	TH32FW-NH

H.S.

1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16
17	18	19	20	21	22	23	24	25	26	27	28	29	30	31	32

Terminal No.	Color of Wire	Signal Name [Specification]
1	P	CAN-L
2	L	CAN-H
3	O/L	RR TIRE PRESSURE RECEIVER SIGNAL
4	L	RL TIRE PRESSURE RECEIVER SIGNAL
5	R/L	FR TIRE PRESSURE RECEIVER SIGNAL
6	W/G	FL TIRE PRESSURE RECEIVER SIGNAL
7	SB	RR TIRE PRESSURE RECEIVER POWER SUPPLY
8	GR	RL TIRE PRESSURE RECEIVER POWER SUPPLY
9	R/W	FR TIRE PRESSURE RECEIVER POWER SUPPLY
10	LG	FL TIRE PRESSURE RECEIVER POWER SUPPLY
15	GR	IGN
19	L/R	RR TIRE PRESSURE RECEIVER SIGNAL (SENSITIVITY)
20	P	RL TIRE PRESSURE RECEIVER SIGNAL (SENSITIVITY)
21	G/R	FR TIRE PRESSURE RECEIVER SIGNAL (SENSITIVITY)
22	BR/Y	FL TIRE PRESSURE RECEIVER SIGNAL (SENSITIVITY)
23	V/W	RR TIRE PRESSURE RECEIVER GND
24	R/B	RL TIRE PRESSURE RECEIVER GND
25	W/L	FR TIRE PRESSURE RECEIVER GND
26	BR/W	FL TIRE PRESSURE RECEIVER GND
32	B	GND

Connector No.	M210
Connector Name	AV CONTROL UNIT
Connector Type	TH32FW-NH

H.S.

64	65	66	67	68		71	72	73	74	75	76
79	80	81	82	83	84		87	88	89	90	91	92

Terminal No.	Color of Wire	Signal Name [Specification]
65	W	PARKING BRAKE SIGNAL
67	W	COMPOSITE IMAGE SIGNAL GND
68	R	COMPOSITE IMAGE SIGNAL
71	SHIELD	MICROPHONE SHIELD
72	Y/G	MICROPHONE VCC
73	Y/G	COMM (CONT->DISP)
74	P	CAN-L
75	LG	AV COMM (L)
76	LG	AV COMM (L)
79	L/O	DIMMER SIGNAL
80	GR/L	IGNITION SIGNAL
81	R/Y	REVERSE SIGNAL
82	BR/W	VEHICLE SPEED SIGNAL (8-PULSE)
83	SHIELD	SHIELD
84	W/B	COMPOSITE IMAGE SYNC SIGNAL
87	Y/L	MICROPHONE SIGNAL
88	SHIELD	SHIELD
89	Y/L	COMM (DISP->CONT)
90	L	CAN-H
91	SB	AV COMM (H)
92	SB	AV COMM (H)

JCAWM0371GB

INSPECTION AND ADJUSTMENT
ADDITIONAL SERVICE WHEN REMOVING BATTERY NEGATIVE TERMINAL

ADDITIONAL SERVICE WHEN REMOVING BATTERY NEGATIVE TERMINAL : Required Procedure After Battery Disconnection

INFOID:0000000006344676

SYSTEM	ITEM	REFERENCE
Front automatic air conditioning system	Temperature setting trimmer (Front)	HAC-68, "FRONT AUTOMATIC AIR CONDITIONING SYSTEM : Temperature Setting Trimmer (Front)"
	Foot position setting trimmer	HAC-68, "FRONT AUTOMATIC AIR CONDITIONING SYSTEM : Foot Position Setting Trimmer"
	Inlet port memory function*	—
	Inlet port memory function (FRE)	HAC-69, "FRONT AUTOMATIC AIR CONDITIONING SYSTEM : Inlet Port Memory Function (FRE)"
	Inlet port memory function (REC)	HAC-69, "FRONT AUTOMATIC AIR CONDITIONING SYSTEM : Inlet Port Memory Function (REC)"
ACCS (Advanced Climate Control System)	Exhaust gas / outside odor detecting sensor sensitivity adjustment function	HAC-70, "ACCS (ADVANCED CLIMATE CONTROL SYSTEM) : Exhaust Gas / Outside Odor Detecting Sensor Sensitivity Adjustment Function"
	Auto intake switch interlocking movement change function	HAC-70, "ACCS (ADVANCED CLIMATE CONTROL SYSTEM) : Auto Intake Switch Interlocking Movement Change Function"
	Clean switch interlocking movement change function*	—
Rear automatic air conditioning system	Temperature setting trimmer (Rear)	HAC-69, "REAR AUTOMATIC AIR CONDITIONING SYSTEM : Temperature Setting Trimmer (Rear)"
Automatic drive positioner	Automatic drive positioner system	ADP-51, "ADDITIONAL SERVICE WHEN REMOVING BATTERY NEGATIVE TERMINAL : Description"
Power window control	Power window control system	PWC-31, "Description"
Sunroof system*	Sunroof system	—
Sunshade system*	Sunshade system	—
Rear view monitor*	Rear view monitor predictive course line center position adjustment	—
Around view monitor	Predictive course line center position adjustment	AV-111, "Description"
Automatic back door system	Automatic back door system	DLK-80, "ADDITIONAL SERVICE WHEN REMOVING BATTERY NEGATIVE TERMINAL : Description"
Engine oil level read*	Engine oil level read	—

*: Not equipped.

SECTION EM
ENGINE MECHANICAL

CONTENTS

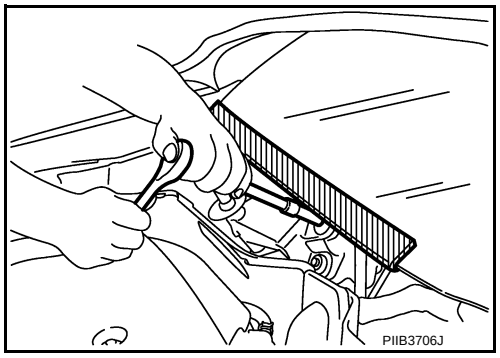
PRECAUTION

PRECAUTIONS

Precaution for Procedure without Cowl Top Cover

INFOID:0000000006289506

When performing the procedure after removing cowl top cover, cover the lower end of windshield with urethane, etc.



Precaution for Supplemental Restraint System (SRS) "AIR BAG" and "SEAT BELT PRE-TENSIONER"

INFOID:0000000006417202

The Supplemental Restraint System such as “AIR BAG” and “SEAT BELT PRE-TENSIONER”, used along with a front seat belt, helps to reduce the risk or severity of injury to the driver and front passenger for certain types of collision. This system includes seat belt switch inputs and dual stage front air bag modules. The SRS system uses the seat belt switches to determine the front air bag deployment, and may only deploy one front air bag, depending on the severity of a collision and whether the front occupants are belted or unbelted. Information necessary to service the system safely is included in the “SRS AIR BAG” and “SEAT BELT” of this Service Manual.

WARNING:

- **To avoid rendering the SRS inoperative, which could increase the risk of personal injury or death in the event of a collision that would result in air bag inflation, all maintenance must be performed by an authorized NISSAN/INFINITI dealer.**
- **Improper maintenance, including incorrect removal and installation of the SRS, can lead to personal injury caused by unintentional activation of the system. For removal of Spiral Cable and Air Bag Module, see the “SRS AIR BAG”.**
- **Do not use electrical test equipment on any circuit related to the SRS unless instructed to in this Service Manual. SRS wiring harnesses can be identified by yellow and/or orange harnesses or harness connectors.**

PRECAUTIONS WHEN USING POWER TOOLS (AIR OR ELECTRIC) AND HAMMERS

WARNING:

- **When working near the Air Bag Diagnosis Sensor Unit or other Air Bag System sensors with the ignition ON or engine running, DO NOT use air or electric power tools or strike near the sensor(s) with a hammer. Heavy vibration could activate the sensor(s) and deploy the air bag(s), possibly causing serious injury.**
- **When using air or electric power tools or hammers, always switch the ignition OFF, disconnect the battery, and wait at least 3 minutes before performing any service.**

Precaution Necessary for Steering Wheel Rotation after Battery Disconnect

INFOID:0000000006289508

NOTE:

- Before removing and installing any control units, first turn the push-button ignition switch to the LOCK position, then disconnect both battery cables.
- After finishing work, confirm that all control unit connectors are connected properly, then re-connect both battery cables.
- Always use CONSULT-III to perform self-diagnosis as a part of each function inspection after finishing work. If a DTC is detected, perform trouble diagnosis according to self-diagnosis results.

For vehicle with steering lock unit, if the battery is disconnected or discharged, the steering wheel will lock and cannot be turned.

If turning the steering wheel is required with the battery disconnected or discharged, follow the operation procedure below before starting the repair operation.

OPERATION PROCEDURE

1. Connect both battery cables.
   NOTE:
   Supply power using jumper cables if battery is discharged.
2. Turn the push-button ignition switch to ACC position.
   (At this time, the steering lock will be released.)
3. Disconnect both battery cables. The steering lock will remain released with both battery cables disconnected and the steering wheel can be turned.
4. Perform the necessary repair operation.
5. When the repair work is completed, re-connect both battery cables. With the brake pedal released, turn the push-button ignition switch from ACC position to ON position, then to LOCK position. (The steering wheel will lock when the push-button ignition switch is turned to LOCK position.)
6. Perform self-diagnosis check of all control units using CONSULT-III.

Precaution for Drain Engine Coolant and Engine Oil

INFOID:0000000006289509

Drain engine coolant and engine oil when engine is cooled.

Precaution for Disconnecting Fuel Piping

INFOID:0000000006289510

- Before starting work, check no fire or spark producing items are in the work area.
- Release fuel pressure before disconnecting and disassembly.
- After disconnecting pipes, plug openings to stop fuel leakage.

Precaution for Handling High Pressure Fuel System

INFOID:0000000006289511

- High pressure fuel system components are between high pressure fuel pump and fuel injector.
- Always release fuel pressure and never start the engine when performing removal and installation.
- When removing or installing parts without releasing fuel pressure, fuel may be splashed and, if fuel contacts skin or eyes, it may cause inflammation.

Precaution for Removal and Disassembly

INFOID:0000000006289512

- When instructed to use SST, use specified tools. Always be careful to work safely, avoid forceful or uninstructed operations.
- Exercise maximum care to avoid damage to mating or sliding surfaces.
- Cover openings of engine system with tape or the equivalent, if necessary, to seal out foreign materials.
- Mark and arrange disassembly parts in an organized way for easy troubleshooting and assembly.
- When loosening nuts and bolts, as a basic rule, start with the one furthest outside, then the one diagonally opposite, and so on. If the order of loosening is specified, do exactly as specified. Power tools may be used where noted in the step.

Precaution for Inspection, Repair and Replacement

INFOID:0000000006289513

Before repairing or replacing, thoroughly inspect parts. Inspect new replacement parts in the same way, and replace if necessary.

Precaution for Assembly and Installation

INFOID:0000000006289514

- Use torque wrench to tighten bolts or nuts to specification.
- When tightening nuts and bolts, as a basic rule, equally tighten in several different steps starting with the ones in center, then ones on inside and outside diagonally in this order. If the order of tightening is specified, do exactly as specified.
- Replace with new gasket, packing, oil seal or O-ring.
- Thoroughly wash, clean, and air-blow each part. Carefully check engine oil or engine coolant passages for any restriction and blockage.
- Dowel pins are used for several parts alignment. When replacing and reassembling parts with dowel pins, check that dowel pins are installed in the original position.

- Avoid damaging sliding or mating surfaces. Completely remove foreign materials such as cloth lint or dust. Before assembly, oil sliding surfaces well.
- Release air within route when refilling after draining engine coolant.
- After repairing, start engine and increase engine speed to check engine coolant, fuel, engine oil, and exhaust gases for leakage.

Parts Requiring Angle Tightening

INFOID:0000000006289515

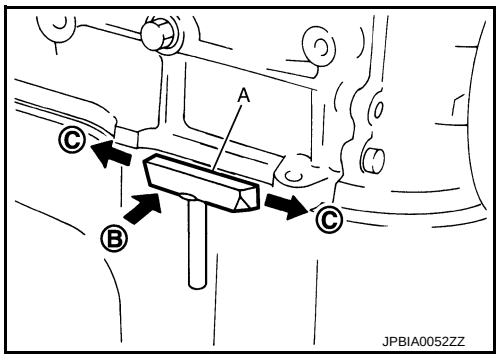
- Use angle wrench [SST: KV10112100 (BT8653-A)] for the final tightening of the following engine parts:
- Cylinder head bolts
- Main bearing cap bolts
- Main bearing cap sub bolts
- Connecting rod cap bolts
- Crankshaft pulley bolt (No angle wrench is required as the bolt flange is provided with notches for angle tightening)
- Ensure thread and seat surfaces are clean and coated with engine oil.

Precaution for Liquid Gasket

INFOID:0000000006289516

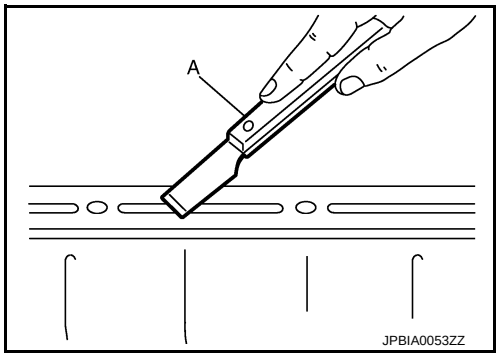
REMOVAL OF LIQUID GASKET SEALING

- After removing mounting nuts and bolts, separate the mating surface using the seal cutter [SST:KV10111100 (J-37228)] (A) and remove old liquid gasket sealing.
  CAUTION:
  Be careful not to damage the mating surfaces.
- Tap the seal cutter to insert it (B), and then slide it (C) by tapping on the side as shown in the figure.
- In areas where the seal cutter is difficult to use, lightly tap the parts using a plastic hammer to remove it.
  CAUTION:
  If for some unavoidable reason a tool such as a screwdriver is used, be careful not to damage the mating surfaces.

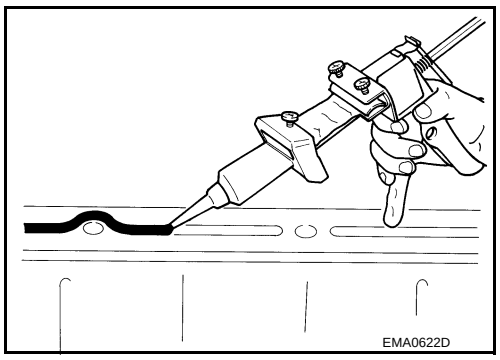


LIQUID GASKET APPLICATION PROCEDURE

1. Using a scraper (A), remove old liquid gasket adhering to the liquid gasket application surface and the mating surface.
   - Remove liquid gasket completely from the groove of the liquid gasket application surface, mounting bolts and bolt holes.
2. Wipe the liquid gasket application surface and the mating surface with white gasoline (lighting and heating use) to remove adhering moisture, grease and foreign materials.



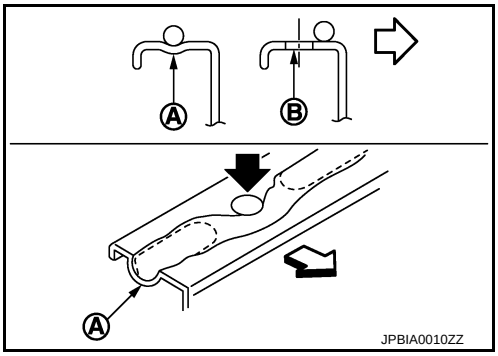
3. Attach liquid gasket tube to the tube presser (commercial service tool).
   Use Genuine RTV Silicone Sealant or equivalent. Refer to GI-22, "Recommended Chemical Products and Sealants".
4. Apply liquid gasket without gaps to the specified location according to the specified dimensions.
   - If there is a groove for liquid gasket application, apply liquid gasket to the groove.



- As for bolt holes (B), normally apply liquid gasket inside the holes. Occasionally, it should be applied outside the holes. Check to read the text of this manual.

  A : Groove

  ⇦ : Inside



- Within 5 minutes of liquid gasket application, install the mating component.
- If liquid gasket protrudes, wipe it off immediately.
- Do not retighten mounting bolts or nuts after the installation.
- After 30 minutes or more have passed from the installation, fill engine oil and engine coolant.

CAUTION:

If there are specific instructions in this manual, observe them.

Definitions of Bank Names

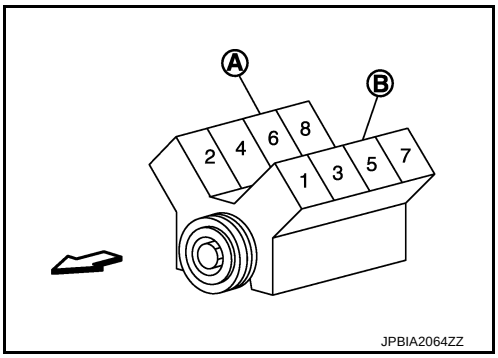
INFOID:0000000006289517

- In this manual, each bank name is defined as per the following:

  A : Bank 2 (The conventional right bank)

  B : Bank 1 (The conventional left bank)

  ⇦ : Engine front



- For cylinder numbers and bank layout, refer to the figure.

  Bank 1 : The bank side including cylinder No. 1 (odd-numbered cylinder side)

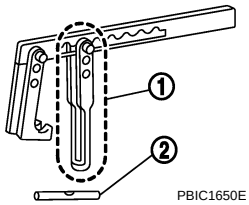
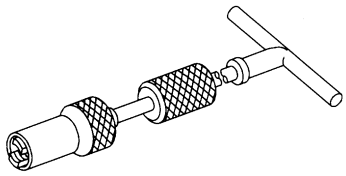
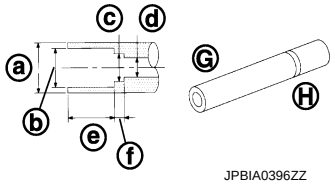
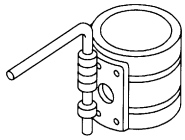
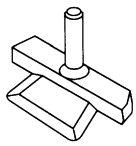
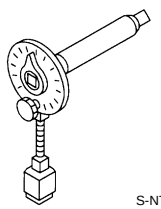
  Bank 2 : The other bank side of the above (even-numbered cylinder side)

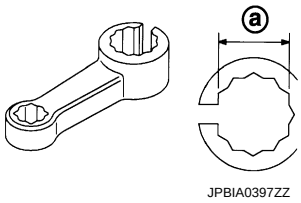
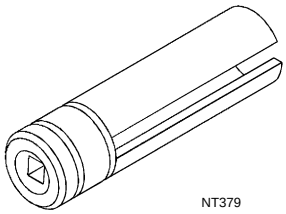
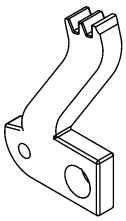
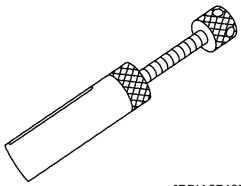
PREPARATION

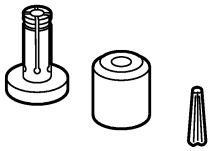
PREPARATION

Special Service Tool

INFOID:0000000006289518

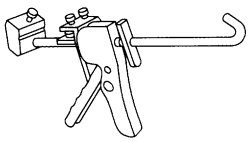
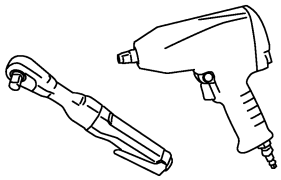
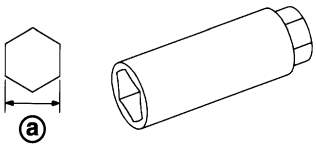
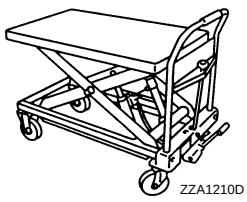
Tool number (Kent-Moore No.) Tool name	Description
KV10116200 (J-26336-A) Valve spring compressor 1. KV10115900 (J-26336-20) Attachment 2. KV10109220 (—) Adapter	 PBIC1650E Disassembling valve mechanism Part (1) is a component of KV10116200 (J26336-A), but part (2) is not so.
KV10107902 (J-38959) Valve oil seal puller	 S-NT011 Removing valve oil seal
KV10115600 (J-38958) Valve oil seal drift	 JPBIA0396ZZ Installing valve oil seal **Use side A (G)** **a: 20 (0.79) dia.** **d: 8 (0.31) dia.** **b: 13 (0.51) dia.** **e: 10.7 (0.421)** **c: 10.3 (0.406) dia.** **f: 5 (0.20)** **H: Side B** Unit: mm (in)
EM03470000 (J-8037) Piston ring compressor	 S-NT044 Installing piston assembly into cylinder bore
KV10111100 (J-37228) Seal cutter	 S-NT046 Removing steel oil pan and front cover
KV10112100 (BT8653-A) Angle wrench	 S-NT014 Tightening bolts for bearing cap, cylinder head, etc.

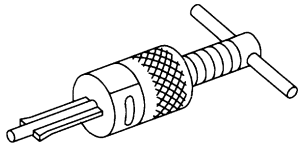
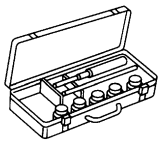
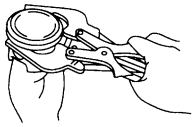
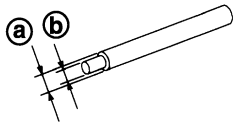
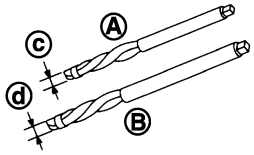
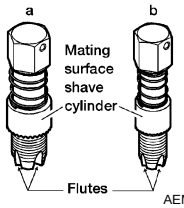
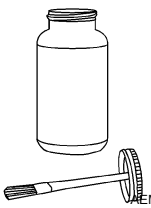
Tool number (Kent-Moore No.) Tool name	Description
KV10114400 (J-38365) Heated oxygen sensor wrench  JPBIA0397ZZ	Loosening or tightening heated oxygen sensor 2 **a: 22 mm (0.87 in)**
KV10117100 (J-44626) Heated oxygen sensor wrench  NT379	Loosening or tightening air fuel ratio sensor 1 **a: 22 mm (0.87 in)**
KV10120100 (J-47245) Ring gear stopper  LBIA0451E	Removing and installing crankshaft pulley
— (J-45488) Quick connector release  PBIC0198E	Removing fuel tube quick connectors in engine room (Available in SEC. 164 of PARTS CATALOG:Part No. 16441 6N210)
KV10119300 (—) Adapter and torque wrench assembly  JPBIA2623ZZ	Tightening rocker cover mounting bolts. (specified torque)
KV10119600 (—) Injector remover  JPBIA3746ZZ	Removing fuel injector

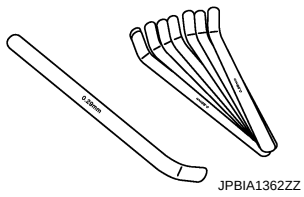
Tool number (Kent-Moore No.) Tool name	Description
KV101197S0 (—) Injector seal drift set  JPBIA3281ZZ	Installing fuel injector seal ring
EG15050500 (J-45402) Compression gauge adapter  ZZA1225D	Checking compresion pressure

Commercial Service Tool

INFOID:0000000006289519

(Kent-Moore No.) Tool name	Description
(—) Tube presser  S-NT052	Pressing the tube of liquid gasket
(—) Power tool  PBIC0190E	Loosening nuts and bolts
(—) Spark plug wrench  JPBIA0399ZZ	Removing and installing spark plug **a: 14 mm (0.55 in)**
(—) Manual lift table caddy  ZZA1210D	Removing and installing engine

(Kent-Moore No.) Tool name	Description
(—) Pilot bushing puller  NT045	Removing pilot converter
(—) Valve seat cutter set  S-NT048	Finishing valve seat (EXH) dimensions
(—) Piston ring expander  S-NT030	Removing and installing piston ring
(—) Valve guide drift  JPBIA0400ZZ	Removing and installing valve guide (EXH) **a: 9.5 mm (0.374 in) dia.** **b: 5.5 mm (0.217 in) dia.**
(—) Valve guide reamer  JPBIA0401ZZ	(A): Reaming valve guide (EXH) inner hole (B): Reaming hole for oversize valve guide (EXH) **c: 6.0 mm (0.236 in) dia.** **d: 10.2 mm (0.402 in) dia.**
(J-43897-18) (J-43897-12) Oxygen sensor thread cleaner  AEM488	Reconditioning the exhaust system threads before installing a new heated oxygen sensor (Use with anti-seize lubricant shown below.) **a: J-43897-18 (18 mm dia.) for zirconia heated oxygen sensor and air fuel ratio sensor** **b: J-43897-12 (12 mm dia.) for titania heated oxygen sensor and air fuel ratio sensor**
(—) Anti-seize lubricant (Permatex 133AR or equivalent meeting MIL specification MIL-A-907)  AEM489	Lubricating oxygen sensor thread cleaning tool when reconditioning exhaust system threads

(Kent-Moore No.) Tool name	Description
(—) Feeler gauge  JPBIA1362ZZ	Inspection valve clearance (use a curved-tip gauge)
(—) Compression gauge with flexible type adapter	Checking compression pressure

BASIC INSPECTION

CAMSHAFT VALVE CLEARANCE

Inspection

INFOID:0000000006289520

INSPECTION

Check valve clearance if applicable to the following cases:

Intake side:
- At the removal and installation of VVEL ladder assembly or valve-related parts, or at the occurrence of malfunction (poor starting, idle malfunction, unusual noise) due to aged deterioration in valve clearance.

CAUTION:
Valve clearance check on the intake side is not required after replacing the VVEL ladder assembly & cylinder head assembly with a new one. (Install new VVEL ladder assembly & cylinder head assembly in factory-shipped condition because it is factory-adjusted and inspected.)
NOTE:
VVEL ladder assembly cannot be replaced as a single part, because it is machined together with cylinder head assembly.

Exhaust side:
- At the removal, installation, and replacement of exhaust camshaft or valve-related parts, or at the occurrence of malfunction (poor starting, idle malfunction, unusual noise) due to aged deterioration in valve clearance.

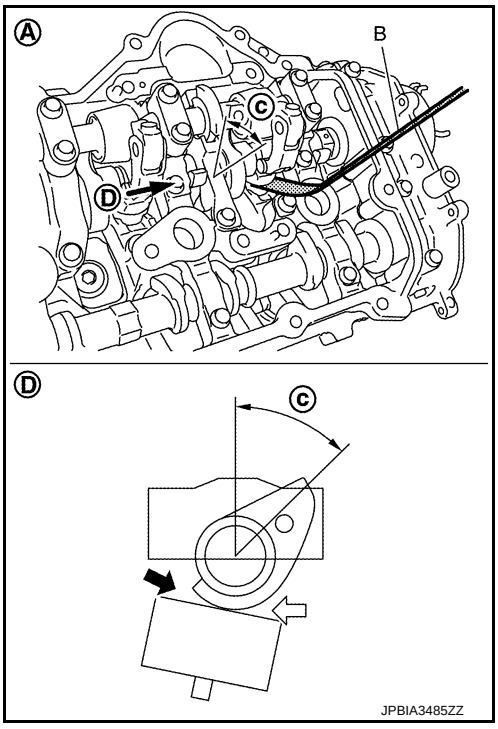
1. Remove VVEL actuator motor assembly. Refer to EM-36, "Removal and Installation".
2. Remove rocker covers (bank 1 and bank 2). Refer to EM-33, "Removal and Installation".
3. Remove VVEL actuator housing assembly. Refer to EM-36, "Removal and Installation".
4. Measure the valve clearance as per the following:
   - Use the feeler gauge (commercial service tool) of curved-tip. This allows the feeler gauge to access the clearance between camshaft (drive shaft) nose and valve lifter with ease.

Valve clearance : Refer to EM-133, "Camshaft".

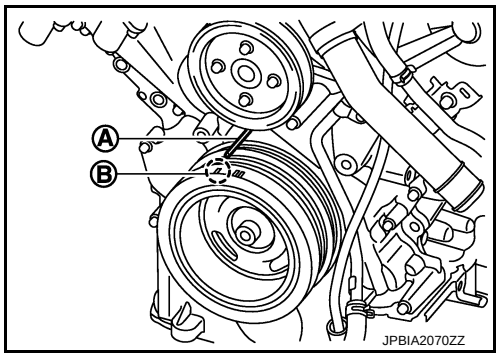
NOTE:
Be sure to note the following points when measuring valve clearance on the intake side.
- Before measuring, check that the position of drive shaft nose is within the angle shown in the figure.

A : Bank 2
B : Feeler gauge (commercial service tool)
c : 45 degrees (drive shaft nose angle)
D : View D
⇦ : Insertion direction of feeler gauge on the bank 2
⬅ : Insertion direction of feeler gauge on the bank 1

- Refer to the figure for the insertion direction of the feeler gauge since the direction depends on the bank.



a. Set No. 1 cylinder at TDC of its compression stroke.
- Rotate crankshaft pulley clockwise to align timing mark (grooved line without color) (B) with timing indicator (A).

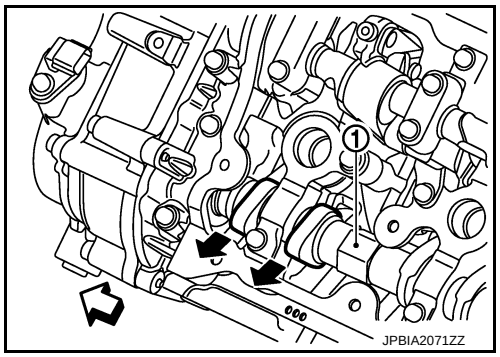


- Check that exhaust cam nose on No. 1 cylinder (engine front side of bank 1) is located as shown in the figure.

  1 : Exhaust camshaft (bank 1)

  ⇦ : Engine front

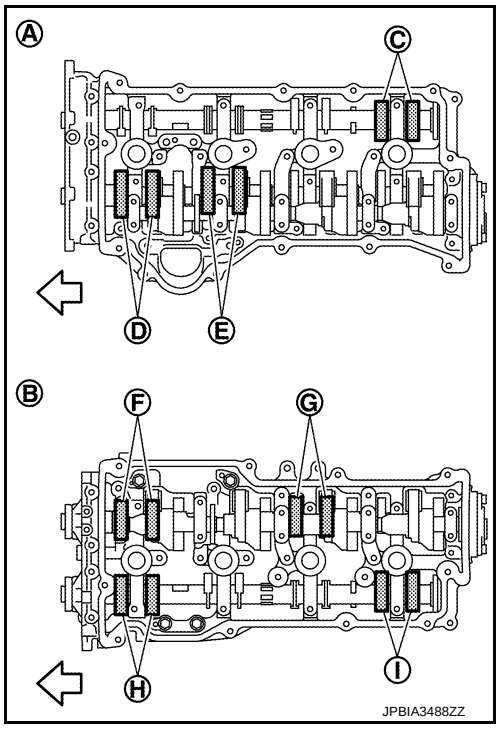
- If not, turn crankshaft one revolution (360 degrees) and align as shown in the figure.



- By referring to the figure, measure the valve clearances at locations marked "×" as shown in the table below (locations indicated in the figure).

  ⇦ : Engine front

- No. 1 cylinder at compression TDC

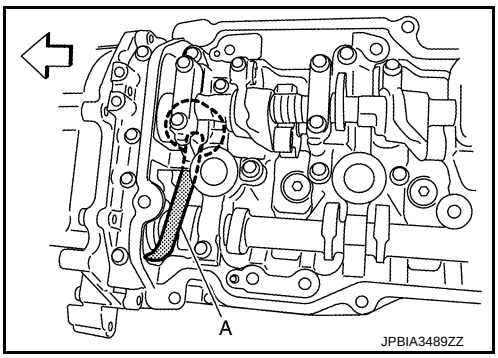


Measuring position [bank 2 (A)]		No. 2 CYL.	No. 4 CYL.	No. 6 CYL.	No. 8 CYL.
No. 1 cylinder at compression TDC	EXH				× (C)
	INT	× (D)	× (E)		
Measuring position [bank 1 (B)]		No. 1 CYL.	No. 3 CYL.	No. 5 CYL.	No. 7 CYL.
No. 1 cylinder at compression TDC	INT	× (F)		× (G)	
	EXH	× (H)			× (I)

NOTE:

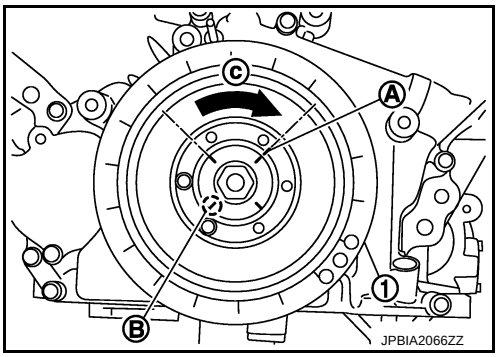
To measure valve clearance of No. 1 cylinder INT valve (front side), insert feeler gauge (A) (commercial service tool) as shown in the figure.

⇦ : Engine front



b. Rotate crankshaft 270 degrees clockwise (when viewed from engine front) to align No. 3 cylinder at TDC its compression stroke.
NOTE:
Crankshaft pulley mounting bolt flange has an angle mark (B) every 90 degrees (c). They can be used as a guide to rotation angle.

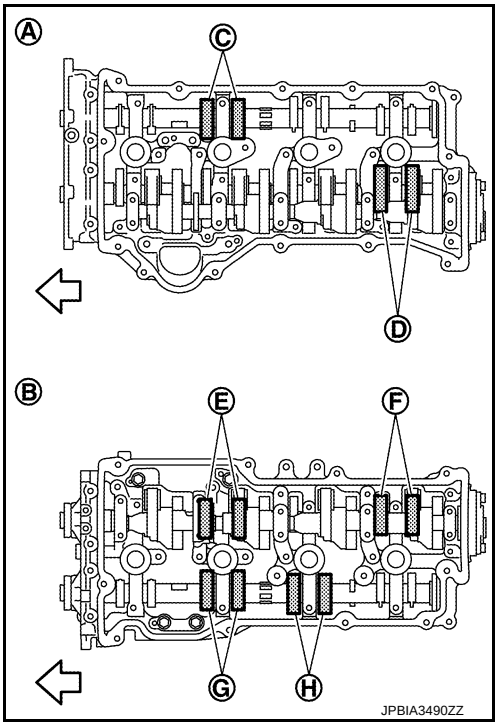
A : Paint mark



- By referring to the figure, measure the valve clearances at locations marked "×" as shown in the table below (locations indicated in the figure).

⇦ : Engine front

- No. 3 cylinder at compression TDC

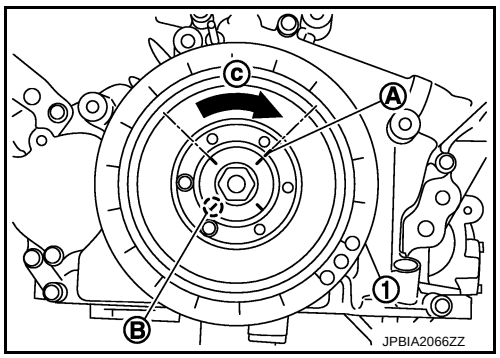


Measuring position [bank 2 (A)]		No. 2 CYL.	No. 4 CYL.	No. 6 CYL.	No. 8 CYL.
No. 3 cylinder at compression TDC	EXH		× (C)		
	INT				× (D)
Measuring position [bank 1 (B)]		No. 1 CYL.	No. 3 CYL.	No. 5 CYL.	No. 7 CYL.
No. 3 cylinder at compression TDC	INT		× (E)		× (F)
	EXH		× (G)	× (H)	

c. Rotate crankshaft 90 degrees clockwise (when viewed from engine front) to align No. 6 cylinder at TDC of compression stroke.
NOTE:

Crankshaft pulley mounting bolt flange has an angle mark (B) every 90 degrees (c). They can be used as a guide to rotation angle.

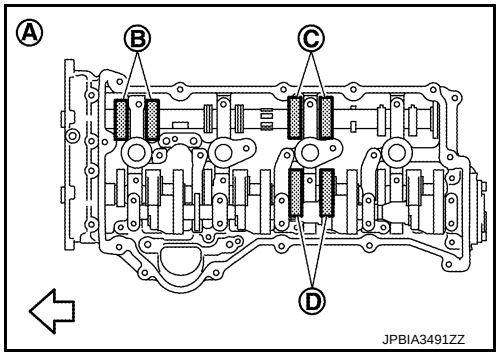
A : Paint mark



- By referring to the figure, measure the valve clearances at locations marked "×" as shown in the table below (locations indicated in the figure).

⇦ : Engine front

- No. 6 cylinder at compression TDC



Measuring position [bank 2 (A)]		No. 2 CYL.	No. 4 CYL.	No. 6 CYL.	No. 8 CYL.
No. 6 cylinder at compression TDC	EXH	× (B)		× (C)	
	INT			× (D)	

5. Perform adjustment or replacement if the measured value is out of the standard.
   - If a valve clearance on the exhaust side is out of specification, adjust the valve clearance. Refer to EM-77, "Inspection".
   - If a valve clearance on the intake side is out of specification, replace VVEL ladder assembly & cylinder head assembly. Refer to EM-86, "Exploded View".

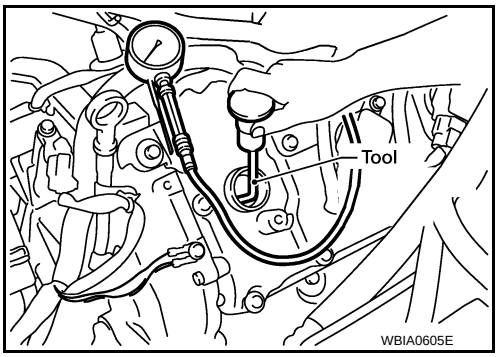
   CAUTION:
   Never adjust valve clearance on the intake side.
   NOTE:
   Since the valve lifter (INT) cannot be replaced by the piece, VVEL ladder assembly & cylinder head assembly replacement are required.

COMPRESSION PRESSURE

Inspection

INFOID:0000000006289521

1. Warm up engine thoroughly. Then, stop it.
2. Release fuel pressure. Refer to EC-153, "Work Procedure".
   CAUTION:
   If CONSULT-III is not used to release fuel pressure leave the fuel pump fuse disconnected until step 7.
3. Remove fuel pump fuse in IPDM E/R.
   NOTE:
   - For the fuse number, refer to EC-114, "Wiring Diagram".
   - For the fuse arrangement, refer to PG-143, "Fuse, Connector and Terminal Arrangement".
4. Remove engine cover. Refer to EM-25, "Exploded View".
5. Remove ignition coil and spark plug from each cylinder. Refer to EM-29, "Exploded View".
6. Connect engine tachometer (not required in use of CONSULT-III).
7. Install the compression tester with Tool [SST: EG15050500 (J-45402)] into the spark plug hole.



8. Measure compression pressure using compression gauge connected with flexible type adapter (commercial service tool).
9. With accelerator pedal fully depressed, turn ignition switch to “START” for cranking. When the gauge pointer stabilizes, read the compression pressure and the engine rpm. Perform these steps to check each cylinder.

Compression pressure : Refer to EM-132, "General Specification".

CAUTION:
- **Measure a six-cylinder under the same conditions since a measurement depends on measurement conditions (engine water temperature, etc.).**
- **Always use a fully changed battery to obtain the specified engine speed.**
- If the engine speed is out of the specified range, check battery liquid for proper gravity. Check the engine speed again with normal battery gravity. Refer to PG-159, "How to Handle Battery".
- If compression pressure is below the minimum value, check valve clearances and parts associated with combustion chamber (valve, valve seat, piston, piston ring, cylinder bore, cylinder head, cylinder head gasket). After checking, measure compression pressure again.
- If a cylinder has low compression pressure, pour a small amount of engine oil into the spark plug hole of the cylinder to re-check it for compression.
  - If the added engine oil improves the compression, piston rings may be worn out or damaged. Check piston rings and replace if necessary. Refer to EM-107, "Disassembly and Assembly".
  - If the compression pressure remains at low level despite the addition of engine oil, valves may be malfunctioning. Check valves for damage. Replace valve or valve seat accordingly. Refer to EM-107, "Disassembly and Assembly".
- If two adjacent cylinders have respectively low compression pressure and their compression remains low even after the addition of engine oil, cylinder head gaskets are leaking. In such a case, replace cylinder head gaskets. Refer to EM-87, "Removal and Installation".

10. After inspection is completed, install removed parts.
11. Start the engine, and check that the engine runs smoothly.

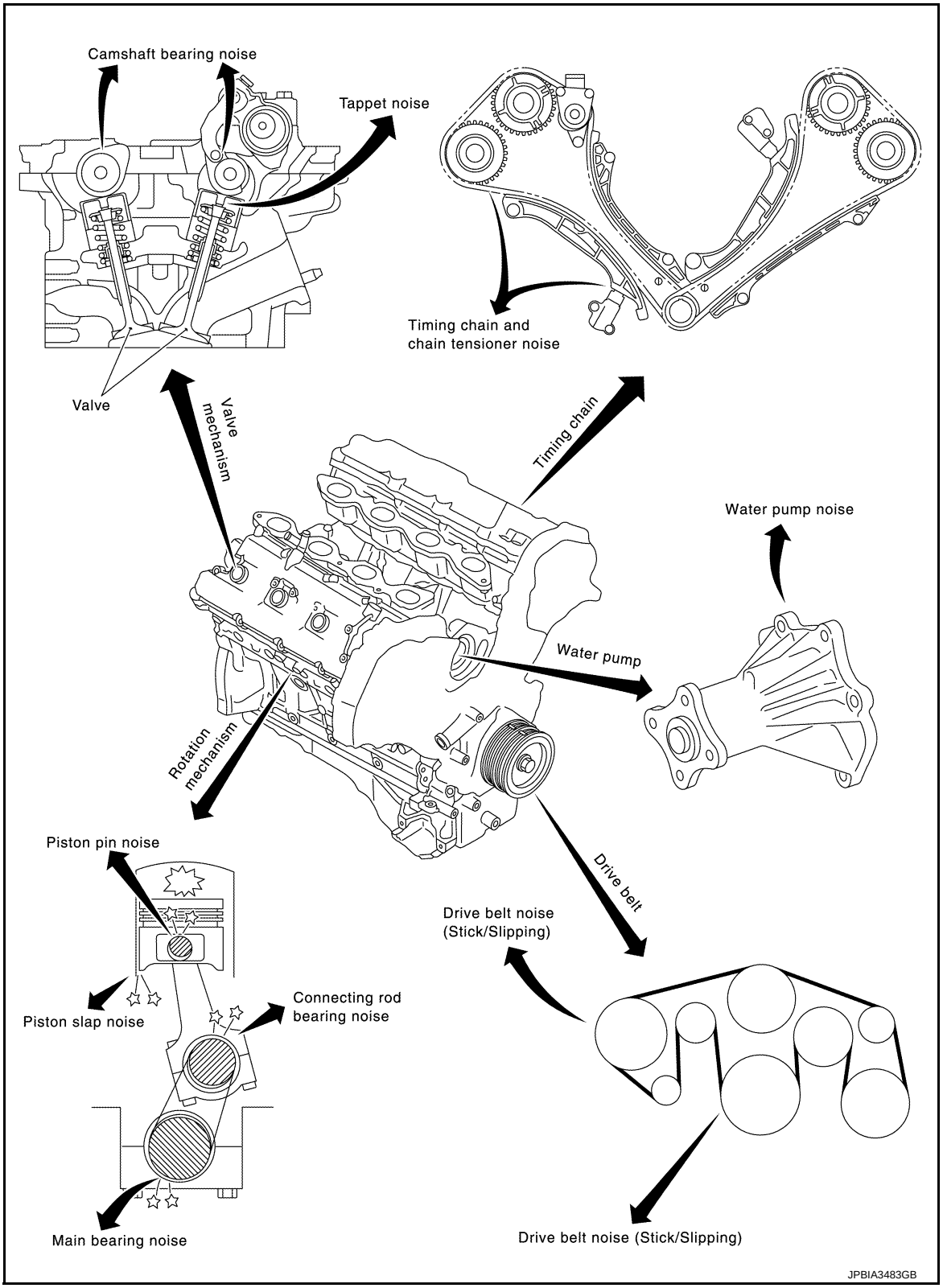
12. Perform trouble diagnosis. If DTC appears, erase it. Refer to EC-161, "Description".

SYMPTOM DIAGNOSIS

NOISE, VIBRATION AND HARSHNESS (NVH) TROUBLESHOOTING

NVH Troubleshooting - Engine Noise

INFOID:0000000006289522



Use the Chart Below to Help You Find the Cause of the Symptom

INFOID:0000000006289523

1. Locate the area where noise occurs.
2. Confirm the type of noise.
3. Specify the operating condition of the engine.
4. Check specified noise source.

If necessary, repair or replace these parts.

Location of noise	Type of noise	Operating condition of engine						Source of noise	Check item	Reference page
		Before warm-up	After warm-up	When starting	When idling	When racing	While driving			
Top of engine Rocker cover Cylinder head	Ticking or clicking	C	A	—	A	B	—	Tappet noise	Valve clearance	EM-12
	Rattle	C	A	—	A	B	C	Camshaft bearing noise	Camshaft runout Camshaft journal oil clearance	EM-77
Crankshaft pulley Cylinder block (Side of engine) Oil pan	Slap or knock	—	A	—	B	B	—	Piston pin noise	Piston to piston pin oil clearance Connecting rod bushing oil clearance	EM-115
	Slap or rap	A	—	—	B	B	A	Piston slap noise	Piston to cylinder bore clearance Piston ring side clearance Piston ring end gap Connecting rod bend and torsion	EM-115
	Knock	A	B	C	B	B	B	Connecting rod bearing noise	Connecting rod bushing oil clearance Connecting rod bearing oil clearance	EM-115
	Knock	A	B	—	A	B	C	Main bearing noise	Main bearing oil clearance Crankshaft runout	EM-115
Front of engine Timing chain case	Tapping or ticking	A	A	—	B	B	B	Timing chain and timing chain tensioner noise	Timing chain cracks and wears Timing chain tensioner operation	EM-72
Front of engine	Squeaking or fizzing	A	B	—	B	—	C	Drive belts (Sticking or slipping)	Drive belts deflection	EM-20
	Creaking	A	B	A	B	A	B	Drive belts (Slipping)	Idler pulley bearing operation	
	Squall Creak	A	B	—	B	A	B	Water pump noise	Water pump operation	CO-19

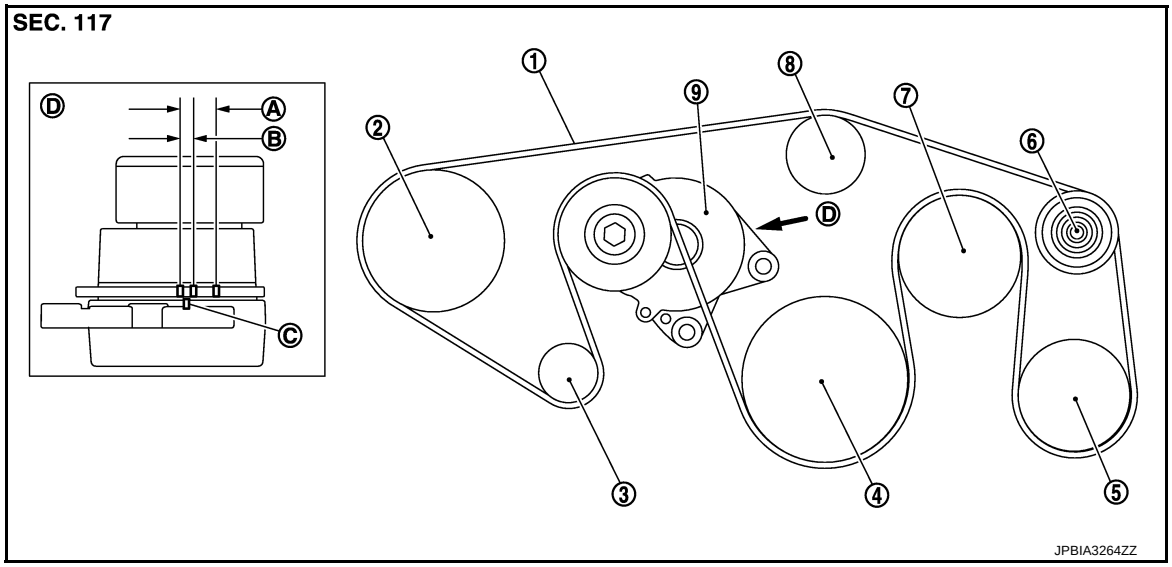
A: Closely related B: Related C: Sometimes related —: Not related

PERIODIC MAINTENANCE

DRIVE BELTS

Exploded View

INFOID:0000000006289524



1. Drive belt
2. Power steering oil pump pulley
3. Alternator pulley
4. Crankshaft pulley
5. A/C compressor
6. Idler pulley
7. Cooling fan pulley
8. Water pump pulley
9. Drive belt auto-tensioner
- A. Possible use range
- B. Range when new drive belt is installed
- C. Indicator
- D. View D

Checking

INFOID:0000000006289525

WARNING:

Be sure to perform the these steps when engine is stopped.

- Check that the indicator (C) (notch on fixed side) of each auto-tensioner is within the possible use range (A).
  NOTE:
  - Check the each auto-tensioners indication when the engine is cold.
  - When new drive belts is installed, the indicator (notch on fixed side) should be within the range (B) in the figure.
- Visually check all drive belts for wear, damage or cracks.
- If the indicator (notch on fixed side) is out of the possible use range or drive belts are damaged, replace drive belts.

Tension Adjustment

INFOID:0000000006289526

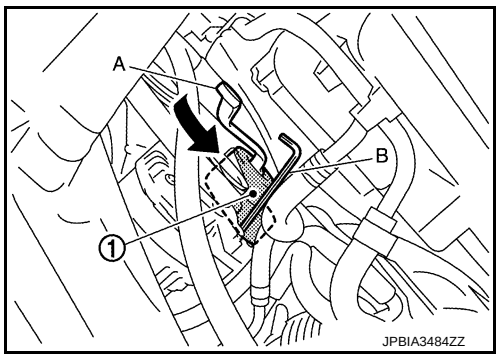
Refer to EM-132, "Drive Belts".

Removal and Installation

INFOID:0000000006289527

REMOVAL

1. Move reservoir tank to the position without the hindrance for work. Refer to CO-13, "Exploded View".

2. Install wrench (A) on drive belt auto tensioner pulley bolt, move in the direction of arrow (loosening direction of tensioner) as shown.


CAUTION:
- **Never place hand in a location where pinching may occur if the holding tool accidentally comes off.**
- **Never loosen the hexagonal part in center of auto tensioner pulley (1) (Never turn it clockwise). If turned clockwise, the complete auto tensioner must be replaced as a unit, including the pulley.**

3. Under the above condition, insert a metallic bar (B) of approximately 6 mm (0.24 in) in diameter (hexagonal bar wrench shown as example in the figure) through the holding boss to lock auto tensioner pulley arm.
4. Remove drive belt.

INSTALLATION

Note the following item, and install in the reverse order of removal.

CAUTION:
- **Check drive belts are securely installed around all pulleys.**
- **Check drive belts are correctly engaged with the pulley groove.**
- **Check for engine oil and engine coolant are not adhered drive belts and pulley groove.**

Inspection

INFOID:0000000006289528

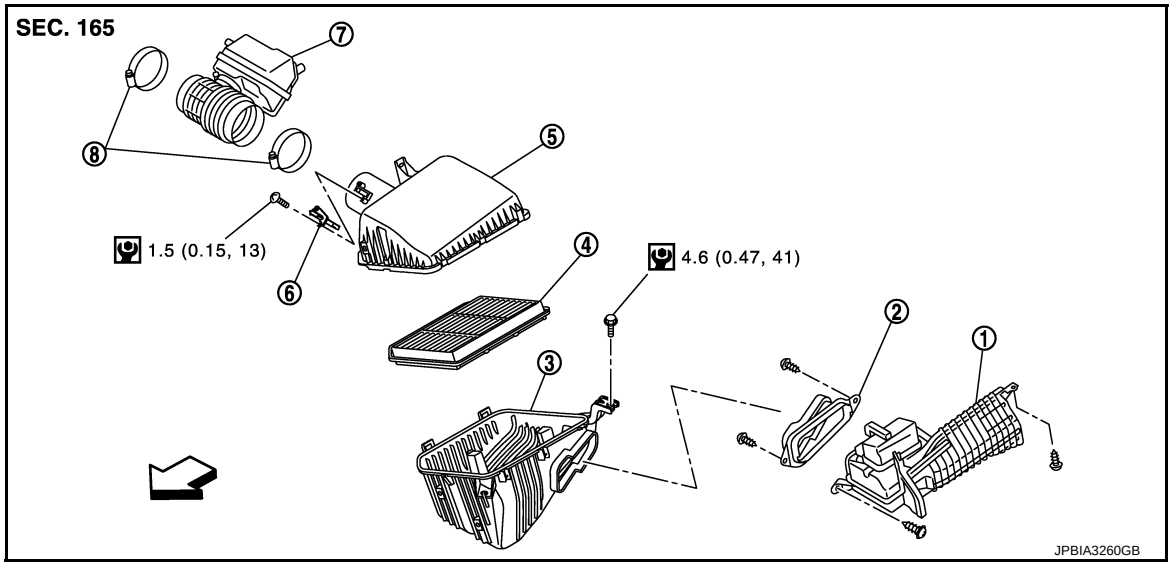
INSPECTION AFTER INSTALLATION

- Turn crankshaft pulley clockwise several times to equalize tension between each pulley, and then confirm tension of drive belts at indicator (notch on fixed side) is within the possible use range. Refer to EM-20, "Exploded View".

AIR CLEANER FILTER

Exploded View

INFOID:0000000006289529



1. Resonator
2. Adapter
3. Air cleaner case (lower)
4. Air cleaner filter
5. Air cleaner case (upper)
6. Mass air flow sensor
7. Air duct
8. Clamp

⇦ Vehicle front

Refer to GI-4, "Components" for symbols in the figure.

Removal and Installation

INFOID:0000000006289530

REMOVAL

NOTE:

- The viscous paper type filter does not need cleaning between replacement intervals.
- Replace the air filter as necessary for periodic maintenance. Refer to MA-6, "Introduction of Periodic Maintenance".

1. Unhook clips, and lift air cleaner case (upper).
2. Remove air cleaner filter from air cleaner case.

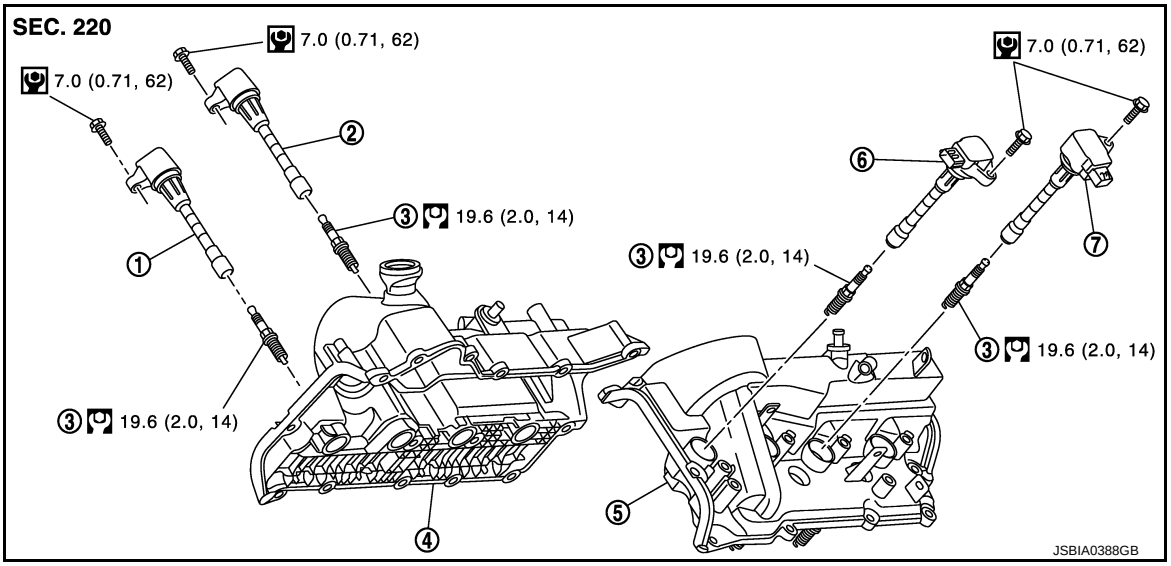
INSTALLATION

Install is the reverse order of removal.

SPARK PLUG

Exploded View

INFOID:0000000006289531



1. Ignition coil (No. 2, 4)
2. Ignition coil (No. 6, 8)
3. Spark plug
4. Rocker cover (bank 2)
5. Rocker cover (bank 1)
6. Ignition coil (No. 1, 3)
7. Ignition coil (No. 5, 7)

Refer to GI-4, "Components" for symbols in the figure.

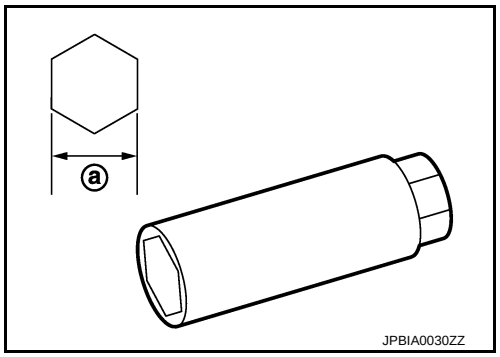
Removal and Installation

INFOID:0000000006289532

REMOVAL

1. Remove engine cover. Refer to EM-25, "Exploded View".
2. Remove ignition coil. Refer to EM-29, "Exploded View".
3. Remove spark plug with a spark plug wrench (commercial service tool).

a : 14 mm (0.55 in)



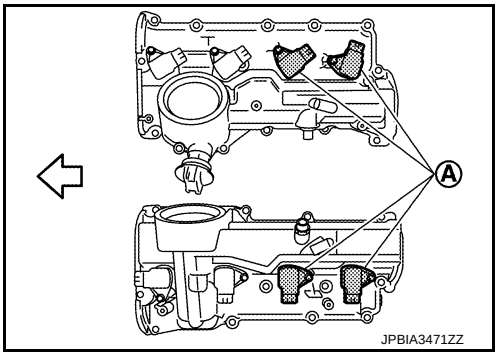
INSTALLATION

Note the following item, installa is the reverse order of removal.

CAUTION:

Install ignition coil marked with an identification mark (A) on cylinder No. 5, 6, 7 and 8.

⇦ : Engine front



Inspection

INFOID:0000000006289533

INSPECTION AFTER REMOVAL

Use the standard type spark plug for normal condition.

Spark plug (Standard type) : Refer to EM-132, "Spark Plug".

CAUTION:

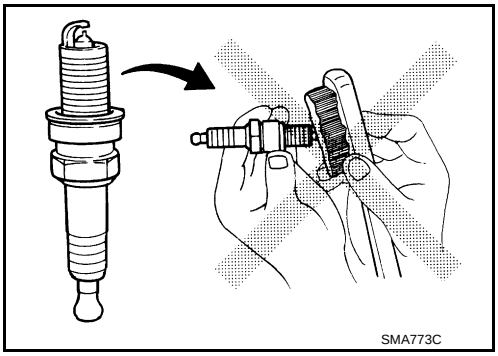
- **Never drop or impact spark plug.**
- **Never use a wire brush for cleaning.**
- **If plug tip is covered with carbon, use spark plug cleaner to clean.**

Cleaner air pressure

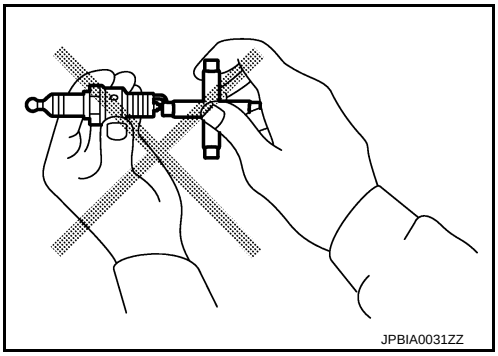
: Less than 588 kPa (5.9 bar, 6 kg/cm^2, 85 psi)

Cleaning time

: Less than 20 seconds



- **Measure spark plug gap. When it exceeds the limit, replace spark plug even if it is within the specified replacement mileage. Refer to EM-132, "Spark Plug".**
- **Spark plug gap adjustment is not required between replacement intervals.**

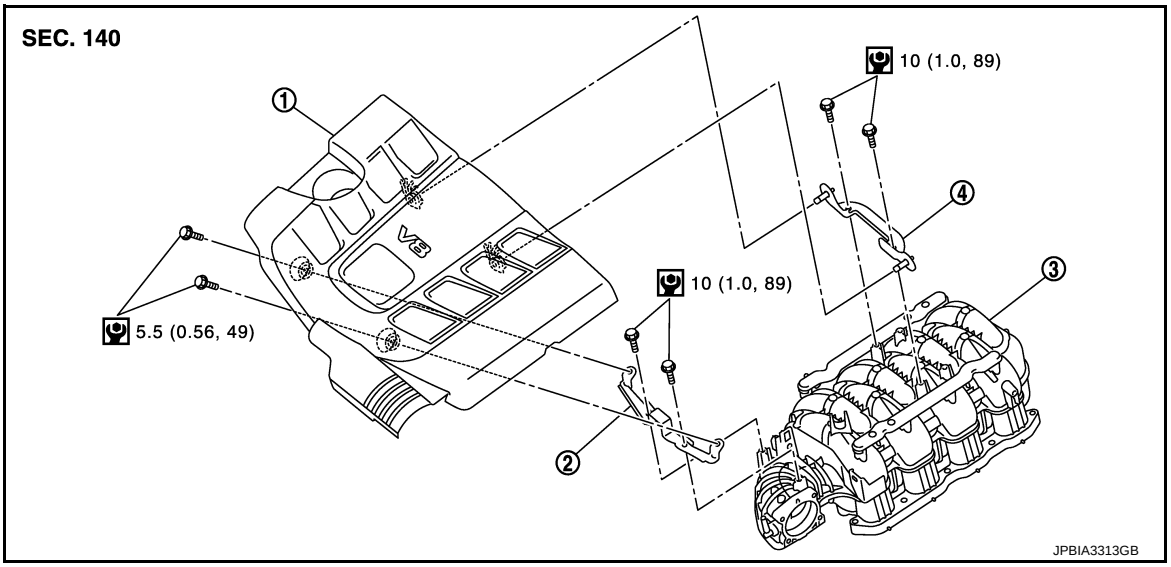


REMOVAL AND INSTALLATION

ENGINE COVER

Exploded View

INFOID:0000000006289534



1. Engine cover
2. Bracket (front)
3. Intake manifold
4. Bracket (rear)

Refer to GI-4, "Components" for symbols in the figure.

Removal and Installation

INFOID:0000000006289535

REMOVAL

CAUTION:

Never damage or scratch engine cover when installing or removing.

1. Remove mounting bolts.
2. Pull forward and remove engine cover.
3. Remove bracket (front) and bracket (rear).

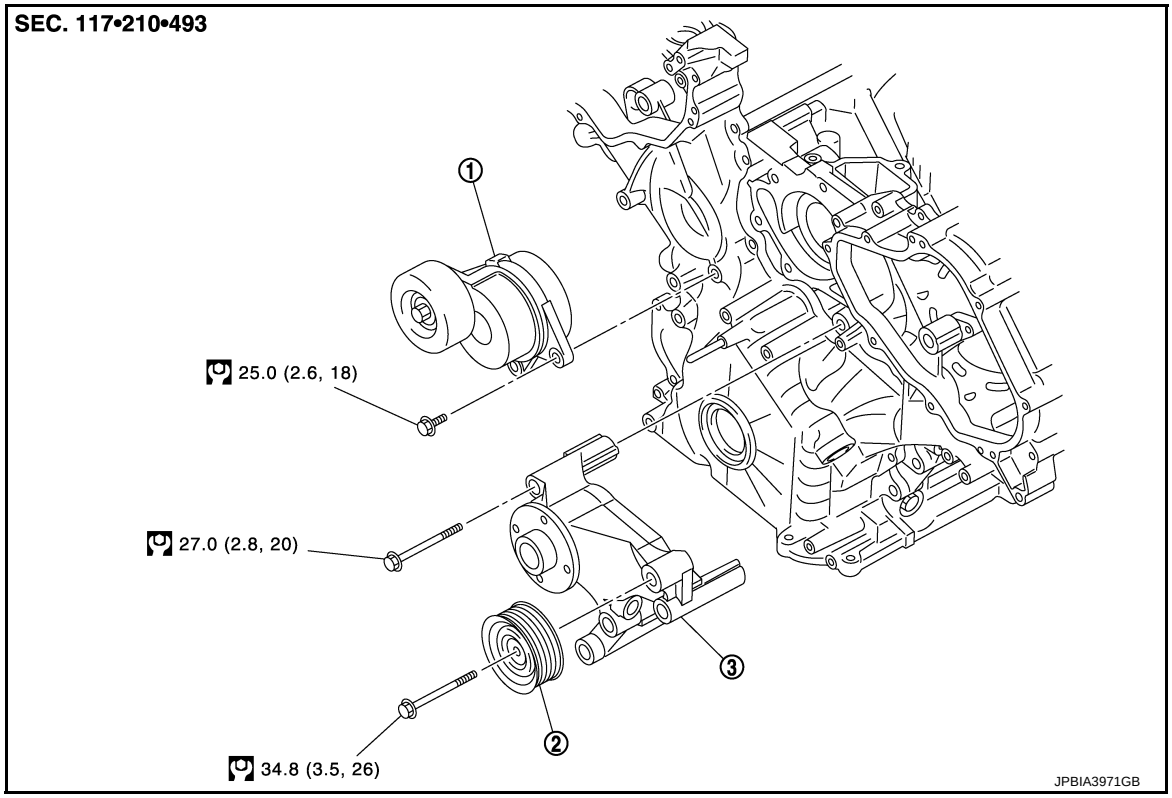
INSTALLATION

Installation is the reverse order of removal.

DRIVE BELT AUTO TENSIONER AND IDLER PULLEY

Exploded View

INFOID:0000000006289536



1. Drive belt auto-tensioner
2. Idler pulley
3. Fan bracket

Refer to GI-4, "Components" for symbols in the figure.

Removal and Installation

INFOID:0000000006289537

Removal

CAUTION:

The complete drive belt auto-tensioner must be replaced as a unit, including the pulley.

1. Remove drive belts. Refer to EM-20, "Exploded View".
   - Keep auto-tensioner pulley arm locked after drive belt is removed.
2. Remove drive belt auto-tensioner.
   - Keep auto-tensioner pulley arm locked to install or remove auto-tensioner.

   CAUTION:

   Never loosen the hexagonal part in center of drive belt auto tensioner pulley (Never turn it clockwise). If turned clockwise, the complete drive belt auto tensioner must be replaced as a unit, including the pulley.
3. Remove idler pulley.

Installation

Installation is the reverse order of removal.

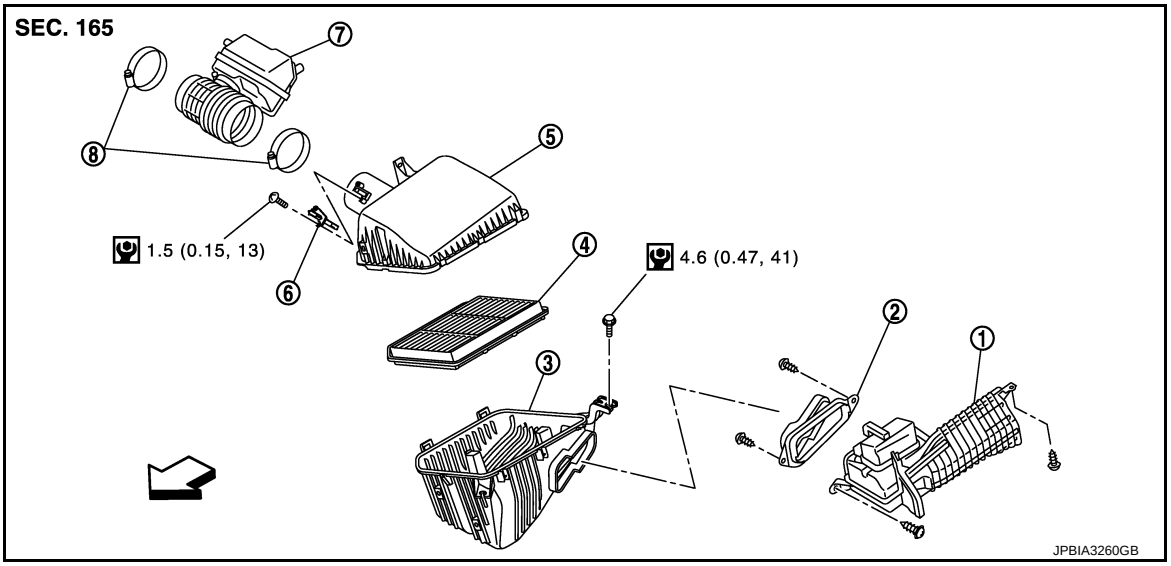
CAUTION:

Never swap the pulley between new and old drive belt auto tensioner.

AIR CLEANER AND AIR DUCT

Exploded View

INFOID:0000000006289538



1. Resonator
2. Adapter
3. Air cleaner case (lower)
4. Air cleaner filter
5. Air cleaner case (upper)
6. Mass air flow sensor
7. Air duct
8. Clamp

⇦ Vehicle front

Refer to GI-4, "Components" for symbols in the figure.

Removal and Installation

INFOID:0000000006289539

REMOVAL

NOTE:
Mass air flow sensor is removable under the car-mounted condition.

1. Remove engine cover. Refer to EM-25, "Exploded View".
2. Disconnect mass air flow sensor harness connector.
3. Remove air cleaner case and mass air flow sensor assembly and air duct by disconnecting their joints.
   - Add matching marks, if necessary for easier installation.
4. Remove mass air flow sensor from air cleaner case, if necessary.
   CAUTION:
   Handle mass air flow sensor according to the following instructions.
   - **Never impact it.**
   - **Never disassemble it.**
   - **Never touch its sensor.**
5. Disconnect PCV hose from air duct.
6. Remove air duct.
7. Remove air cleaner filter.
8. Remove air cleaner case (lower).
9. Remove adapter.
10. If remove resonator (location in wheel house), refer to following.

a. Remove LH front wheel and tire.
b. Remove fender protector. Refer to EXT-23, "FENDER PROTECTOR : Exploded View".
c. Remove resonator.

INSTALLATION

Note the following item, and install in the reverse order of removal.
- Align marks. Attach each joint. Screw clamps firmly.

Clamp tightening torque : 4.5 N·m (0.46 kg-m, 40 in-lb)

Inspection

INFOID:0000000006289540

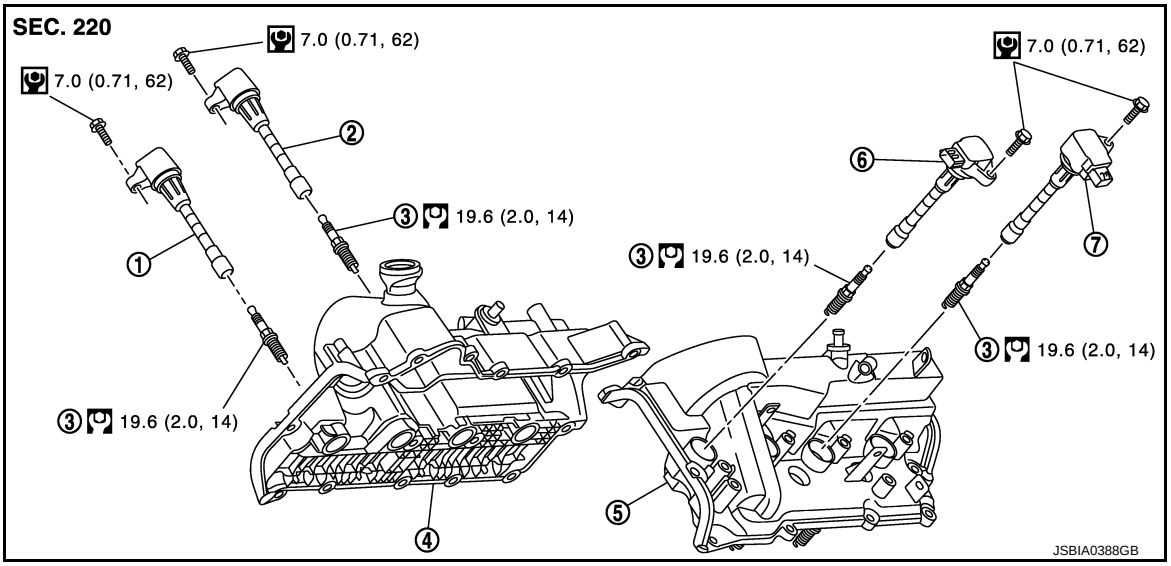
INSPECTION AFTER REMOVAL

Inspect air duct assembly for crack or tear.
- If damage is found, replace air duct assembly

IGNITION COIL

Exploded View

INFOID:0000000006289541



1. Ignition coil (No. 2, 4)
2. Ignition coil (No. 6, 8)
3. Spark plug
4. Rocker cover (bank 2)
5. Rocker cover (bank 1)
6. Ignition coil (No. 1, 3)
7. Ignition coil (No. 5, 7)

Refer to GI-4, "Components" for symbols in the figure.

Removal and Installation

INFOID:0000000006289542

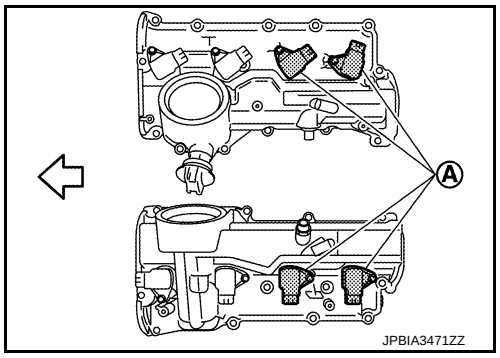
REMOVAL

1. Remove engine cover. Refer to EM-25, "Exploded View".
2. Remove ignition coil.
   CAUTION:
   Never impact it.
   NOTE:
   Installation position of ignition coil depends on cylinder position.

INSTALLATION

1. Install ignition coil.
   CAUTION:
   - **Install Ignition coil marked with an identification mark (A) on cylinder No. 5, 6, 7 and 8.**

   ⇦ : Engine front

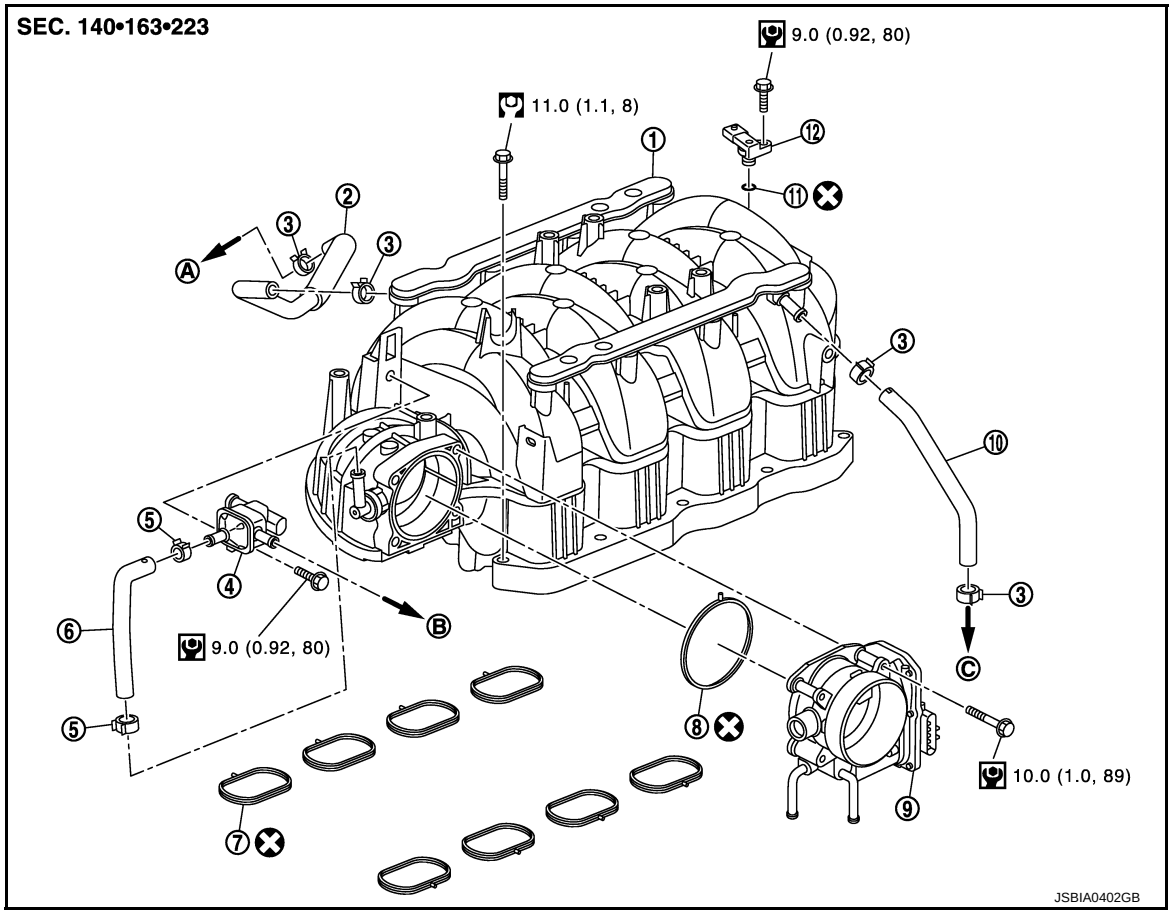


2. Install engine cover.

INTAKE MANIFOLD

Exploded View

INFOID:0000000006289543



1.	Intake manifold	2.	PCV hose	3.	Clamp
4.	EVAP canister purge control solenoid valve	5.	Clamp	6.	EVAP hose
7.	Gasket	8.	Gasket	9.	Electric throttle control actuator
10.	PCV hose	11.	O-ring	12.	Manifold absolute pressure (MAP) sensor
A.	To rocker cover (bank 2)	B.	To centralized under-floor piping	C.	To rocker cover (bank 1)

Refer to GI-4, "Components" for symbols in the figure.

Removal and Installation

INFOID:0000000006289544

REMOVAL

WARNING:

To avoid the danger of being scalded, never drain the engine coolant when the engine is hot.

1. Remove engine cover and bracket. Refer to EM-25, "Exploded View".
2. Remove air cleaner case (upper) and air duct. Refer to EM-27, "Exploded View".
3. Disconnect manifold absolute pressure (MAP) sensor harness connector.
4. Remove EVAP canister purge control solenoid valve.
5. Disconnect PCV hoses from intake manifold.
   - Add matching marks as necessary for easier installation.
6. Drain engine coolant from radiator. Refer to CO-8, "Draining".

   CAUTION:
   - **Perform this step when the engine is cold.**

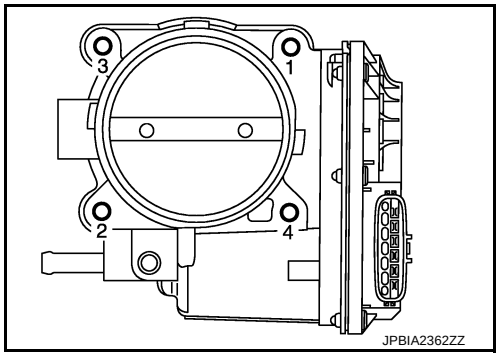
- **Never spill engine coolant on drive belts.**

NOTE:
When removing only intake manifold, move electric throttle control actuator without disconnecting the water hoses.

7. Remove electric throttle control actuator.
   - Loosen mounting bolts in reverse order as shown in the figure.

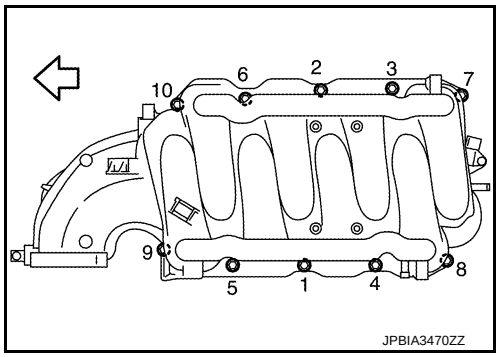
NOTE:
The figure shows the electric throttle control actuator viewed from the air duct side.

CAUTION:
- **Handle carefully to avoid any impact to electric throttle control actuator.**
- **Never disassemble.**



8. Remove intake manifold, using a power tool.
   - Loosen mounting bolts in reverse order as shown in the figure.

⇦ : Engine front



9. Remove intake manifold gaskets.

CAUTION:
Cover engine openings to avoid entry of foreign materials.

10. Remove manifold absolute pressure (MAP) sensor, if necessary.

CAUTION:
Handle carefully to avoid any impact to manifold absolute pressure (MAP) sensor.

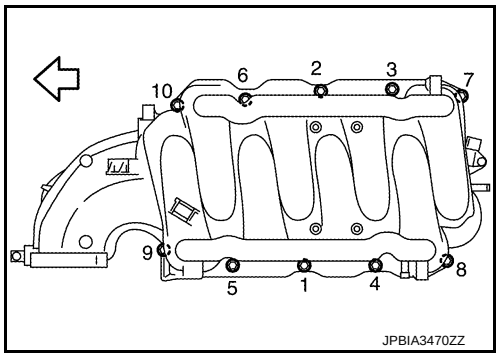
INSTALLATION

Note the following item, and install in the reverse order of removal.

Intake Manifold

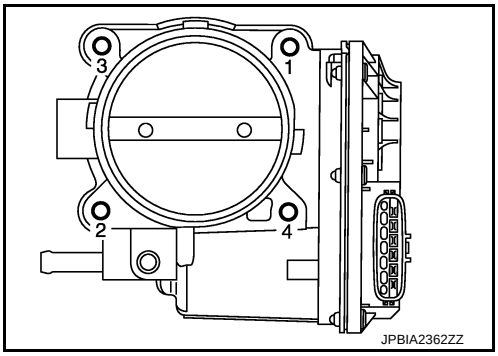
Tighten in numerical order as shown in the figure.

⇦ : Engine front



Electric Throttle Control Actuator

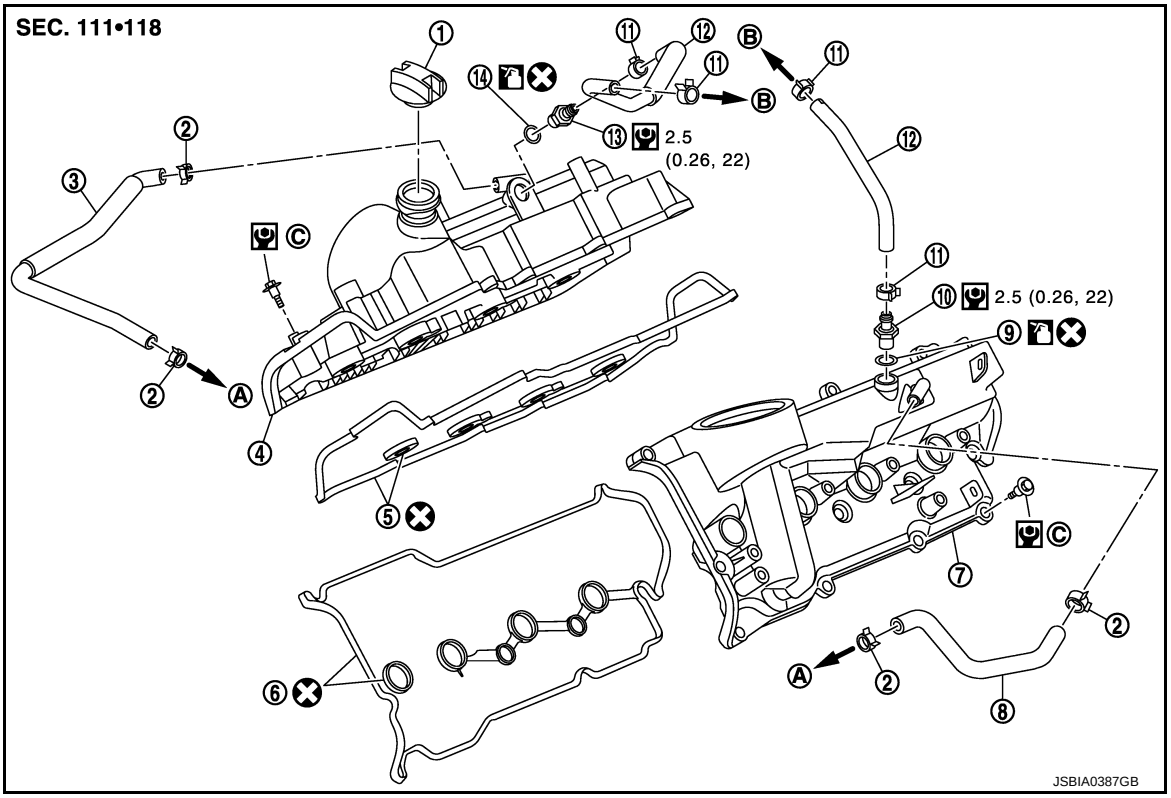
- Tighten in numerical order as shown in the figure.
  NOTE:
  The figure shows the electric throttle control actuator viewed from the air duct side.
- Perform the “Throttle Valve Closed Position Learning” when harness connector of electric throttle control actuator is disconnected. Refer to EC-147, "Description".
- Perform the “Idle Air Volume Learning” and “Throttle Valve Closed Position Learning” when electric throttle control actuator is replaced. Refer to EC-148, "Description" and EC-147, "Description".



ROCKER COVER

Exploded View

INFOID:0000000006289545



1.	Oil filler cap	2.	Clamp	3.	PCV hose
4.	Rocker cover (bank 2)	5.	Rocker cover gasket (bank 2)	6.	Rocker cover gasket (bank 1)
7.	Rocker cover (bank 1)	8.	PCV hose	9.	O-ring
10.	PCV valve	11.	Clamp	12.	PCV hose
13.	PCV valve	14.	O-ring		
A.	To air duct	B.	To intake manifold	C.	Comply with the installation procedure when tightening. Refer to EM-33, "Removal and Installation".

Refer to GI-4, "Components" for symbols in the figure.

Removal and Installation

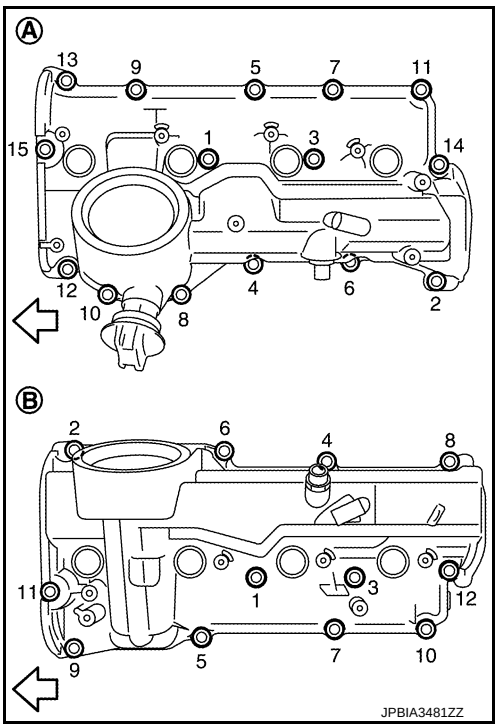
INFOID:0000000006289546

REMOVAL

1. Remove engine cover and bracket (rear). Refer to EM-25, "Exploded View".
2. Disconnect PCV hose from rocker cover.
3. Remove air cleaner case (upper) and air duct. Refer to EM-27, "Exploded View".
4. Move the following parts to the position without the hindrance for work.
   - Oil level gauge guide. Refer to EM-57, "Exploded View".
   - Power steering fluid reservoir tank bracket. Refer to ST-54, "Exploded View".
   - EVAP canister purge control solenoid valve. EM-30, "Exploded View".
   - Fuel feed hose. Refer to EM-43, "Exploded View".
5. Remove VVEL actuator motor assembly. Refer to EM-36, "Exploded View".
6. Remove ignition coil. Refer to EM-29, "Exploded View".
   CAUTION:
   Never impact it.
7. Remove rocker cover.

- Loosen bolts in reverse order shown in the figure.

A : Bank 2
B : Bank 1
⇦ : Engine front



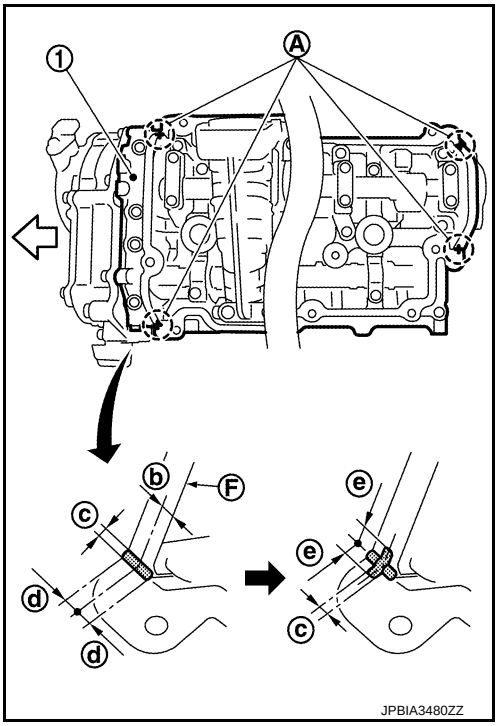
8. Remove rocker cover gasket from rocker cover.
9. Use scraper to remove all traces of liquid gasket from cylinder head & VVEL ladder assembly.
   CAUTION:
   Never scratch or damage the mating surface when cleaning off old liquid gasket.
10. Remove PCV valve from rocker cover, if necessary.
11. Remove oil filler cap from rocker cover, if necessary.

INSTALLATION

1. Apply liquid gasket with the tube presser (commercial service tool) to VVEL ladder assembly (1).

A : Liquid gasket application point
F : End surface of VVEL ladder assembly
b : 4.0 mm (0.16 in)
c : 2.5 - 3.5 mm (0.098 - 0.138 in)
d : 5.0 mm (0.20 in)
e : 10.0 mm (0.39 in)
⇦ : Engine front

Use Genuine RTV silicone sealant or equivalent. Refer to GI-22, "Recommended Chemical Products and Sealants".
NOTE:
The figure shows an example of bank 1 side.
- Apply liquid gasket on the front and rear side of engine first. [5 mm (0.20 in) + 5 mm (0.20 in) side as shown in the figure]

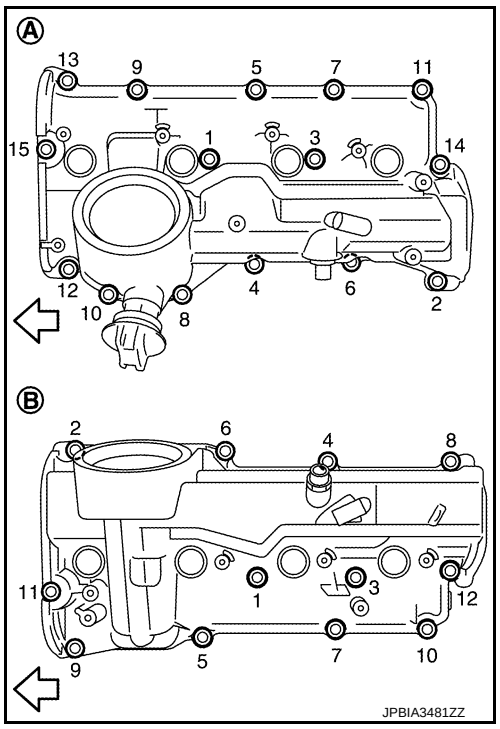


2. Install rocker cover gasket to rocker cover.
3. Install rocker cover.
   - Check that rocker cover gasket does not drop from the installation groove of rocker cover.

4. Tighten bolts in two steps separately in numerical order as shown in the figure.

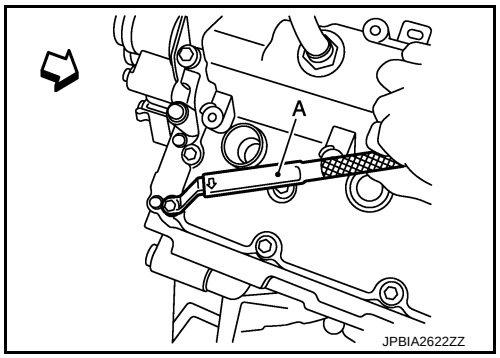
A : Bank 2
B : Bank 1
⇦ : Engine front

1st step : 2.0 N·m (0.2 kg-m, 18 in-lb)
2nd step : 8.3 N·m (0.85 kg-m, 73 in-lb)



- Because of the limited working space, use adapter and torque wrench assembly [SST: KV10119300 (—)] (A) to tighten bolts (on the No.7 and No. 8 cylinders) to the specified torque.

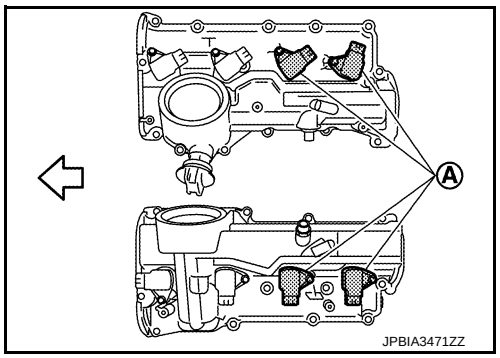
⇦ : Engine front



5. Install ignition coil. Refer to EM-29, "Exploded View".

CAUTION:
- **Install Ignition coil marked with an identification mark (A) on cylinder No. 5, 6, 7 and 8.**

⇦ : Engine front

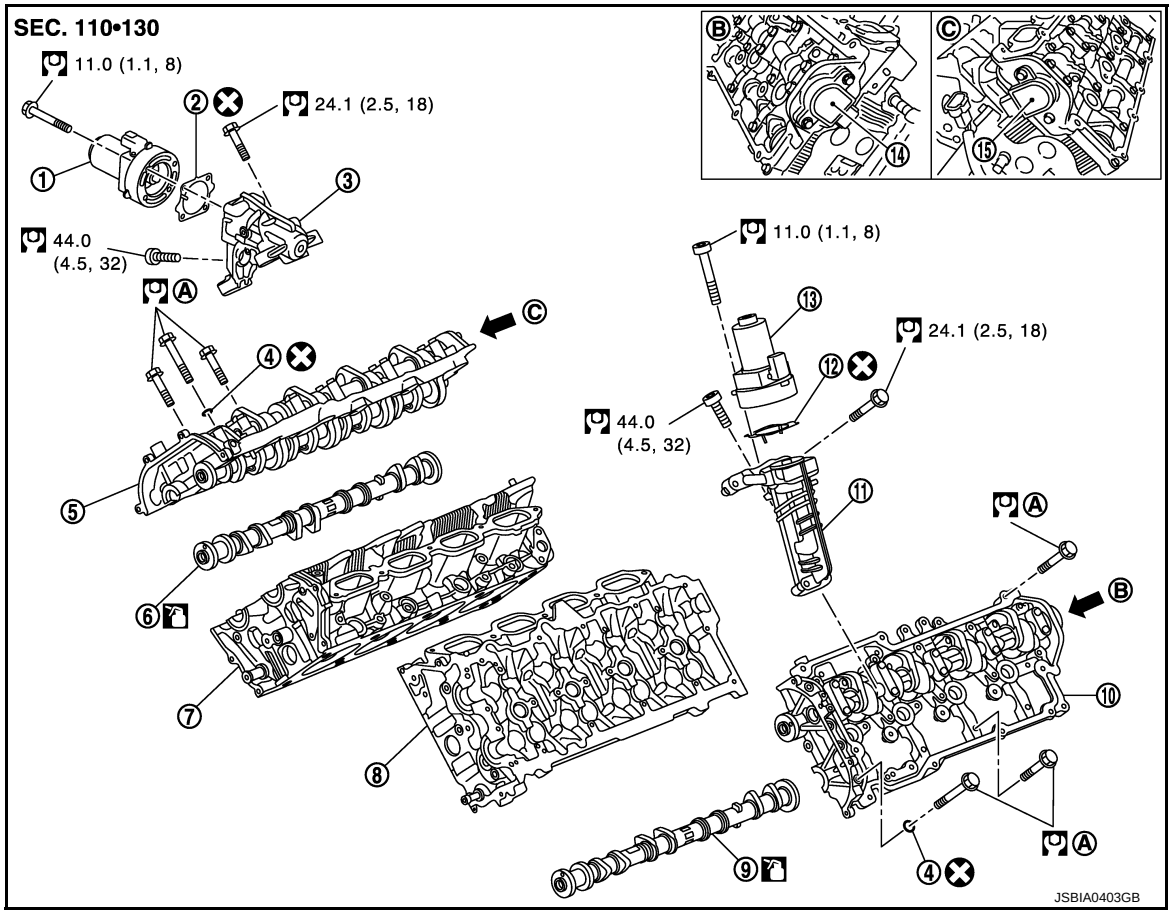


6. Install VVEL actuator motor assembly. Refer to EM-36, "Exploded View".
7. Install in the reverse order of removal.

VVEL ACTUATOR ASSEMBLY

Exploded View

INFOID:0000000006289547



1.	VVEL actuator motor assembly (bank 2)	2.	Gasket	3.	VVEL actuator housing assembly (bank 2)
4.	Washer	5.	VVEL ladder assembly (bank 2)	6.	Exhaust camshaft (bank 2)
7.	Cylinder head (bank 2)	8.	Cylinder head (bank 1)	9.	Exhaust camshaft (bank 1)
10.	VVEL ladder assembly (bank 1)	11.	VVEL actuator housing assembly (bank 1)	12.	Gasket
13.	VVEL actuator motor assembly (bank 1)	14.	VVEL control shaft position sensor (bank 1)	15.	VVEL control shaft position sensor (bank 2)
A.	Comply with the installation procedure when tightening. Refer to EM-75, "Removal and Installation".	B.	View B	C.	View C

Refer to GI-4, "Components" for symbols in the figure.

Removal and Installation

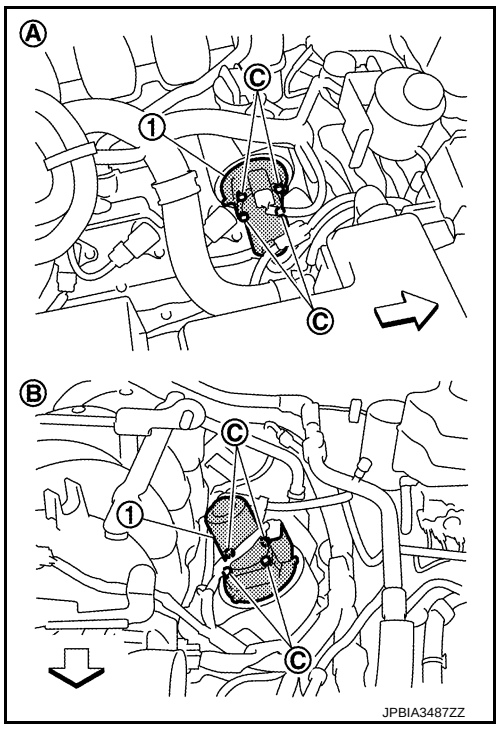
INFOID:0000000006289548

REMOVAL

1. Remove engine cover. Refer to EM-25, "Exploded View".

2. Loosen mounting bolts (C), and then remove VVEL actuator motor assembly (1).

A : Bank 2
B : Bank 1
⇦ : Engine front



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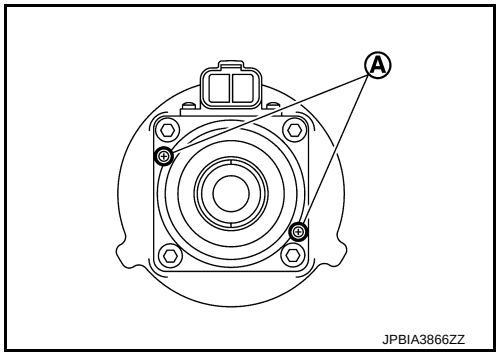
CAUTION:
Never loosen screws (A) of VVEL actuator motor assembly.



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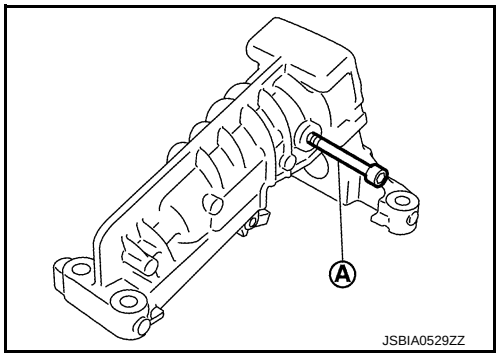
3. Remove rocker cover. Refer to EM-33, "Exploded View".
4. Insert mounting bolt (A) removed at step 2 into VVEL actuator housing assembly.



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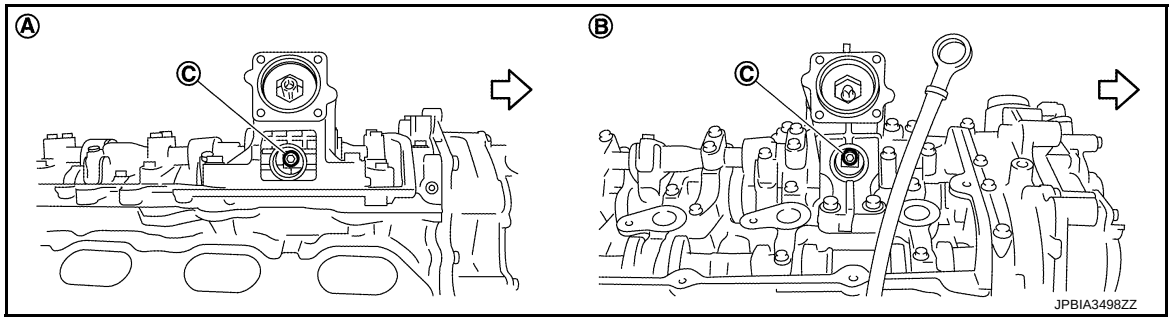
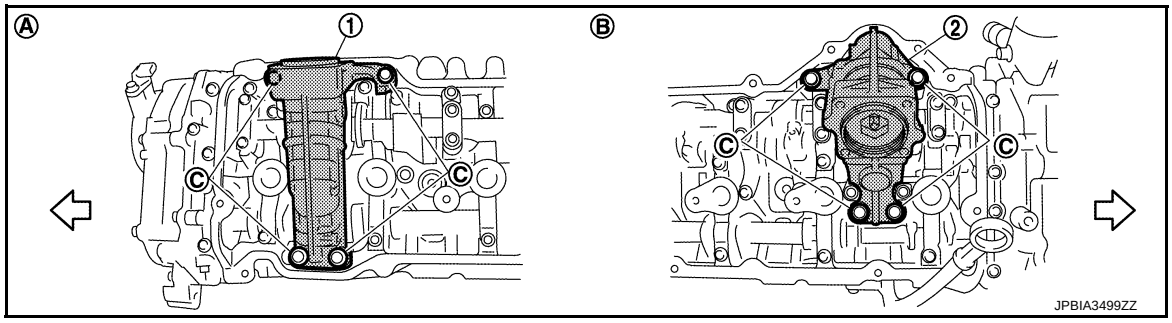
5. Loosen mounting bolt (C) to disengage the control shaft and the actuator arm.



A. Bank 1 B. Bank 2

⇦ : Engine front

6. Loosen mounting bolts (C), and then remove VVEL actuator housing assembly.



1. VVEL actuator housing assembly (bank 1) 2. VVEL actuator housing assembly (bank 2)

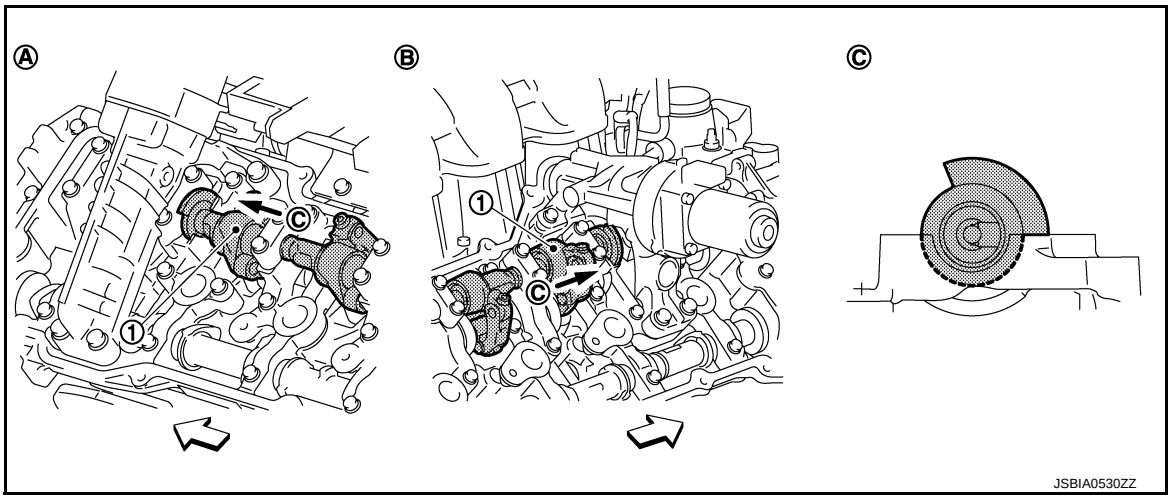
A. Bank 1 B. Bank 2

⇦ : Engine front

INSTALLATION

Note the following, and install in the reverse order of removal.

- When disengaging the control shaft (1) and the actuator arm, hold the stopper of the control shaft in the position shown in the figure.



A. Bank 1 B. Bank 2 C. View C

⇦ : Engine front

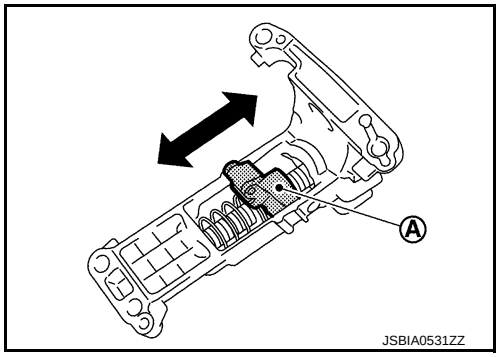
Inspection

INFOID:0000000006289549

INSPECTION AFTER REMOVAL

VVEL actuator housing assembly

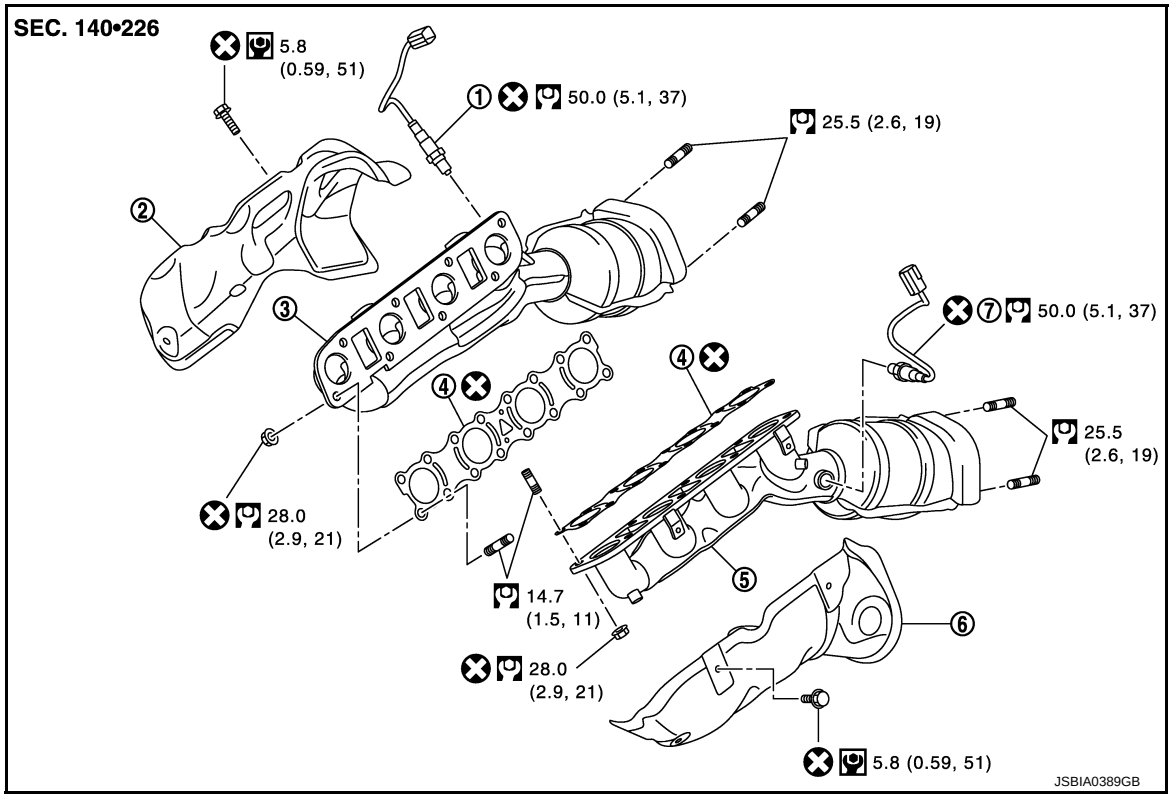
- Move the ball nut (A) in the axial direction to check the smooth rotation.



EXHAUST MANIFOLD AND THREE WAY CATALYST

Exploded View

INFOID:0000000006289550



1. Air fuel ratio sensor 1 (bank 2)
2. Exhaust manifold cover (bank 2)
3. Exhaust manifold and three way catalyst (bank 2)
4. Gasket
5. Exhaust manifold and three way catalyst (bank 1)
6. Exhaust manifold cover (bank 1)
7. Air fuel ratio sensor 1 (bank 1)

Refer to GI-4, "Components" for symbols in the figure.

Removal and Installation

INFOID:0000000006289551

REMOVAL

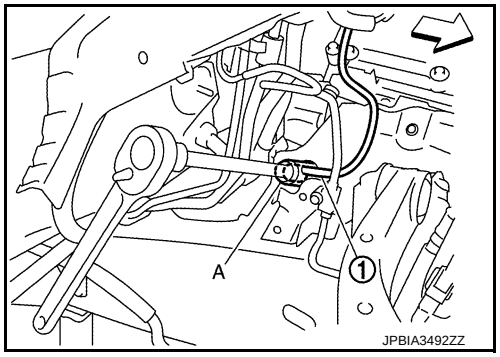
WARNING:

Perform the work when the exhaust and cooling system have cooled sufficiently.

1. Drain engine coolant from radiator. Refer to CO-8, "Draining".
   CAUTION:
   - **Perform this step when the engine is cold.**
   - **Never spill engine coolant on drive belt.**
2. Remove reservoir tank. Refer to CO-13, "Exploded View".
3. Remove drive belt. Refer to EM-20, "Removal and Installation".
4. Remove power steering oil pump. Refer to ST-48, "Exploded View".
5. Remove radiator. Refer to CO-13, "Exploded View".
6. Remove front under cover. Refer to EXT-25, "Exploded View".
7. Remove front wheels and tires. Refer to WT-64, "Exploded View".
8. Remove A/C compressor. Refer to HA-30, "Exploded View".
9. Remove alternator and alternator bracket. Refer to CHG-25, "Exploded View".
10. Remove exhaust front tube (bank 1 and bank 2). Refer to EX-5, "Exploded View".

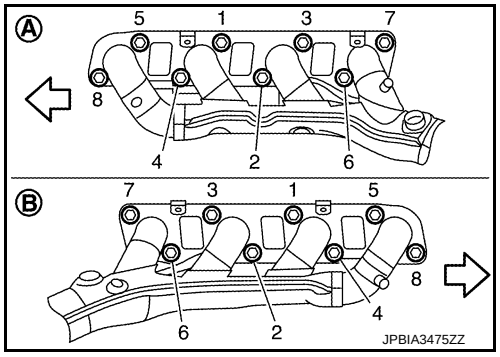
11. Remove front propeller shaft. Refer to DLN-128, "Exploded View".
12. Disconnect steering lower joint. Refer to ST-37, "Exploded View".
13. Remove air fuel ratio sensor 1 as per the following:
    CAUTION:
    Air fuel ratio sensor 1 is not reusable. Never remove air fuel ratio sensor 1 unless this is required.
    - Using the heated oxygen sensor wrench [SST: KV10117100 (J-44626)] (A), remove air fuel ratio sensor 1 (1).

    ⇦ : Vehicle front



14. Remove exhaust manifold cover.
15. Remove oil level gauge guide. Refer to EM-57, "Exploded View".
16. Remove exhaust manifold.
    - Loosen nuts in the reverse order of figure to remove exhaust manifold with a power tool.

    A : Bank 1
    B : Bank 2
    ⇦ : Engine front



17. Remove exhaust manifold gaskets.
    CAUTION:
    Cover engine openings to avoid entry of foreign materials.

INSTALLATION

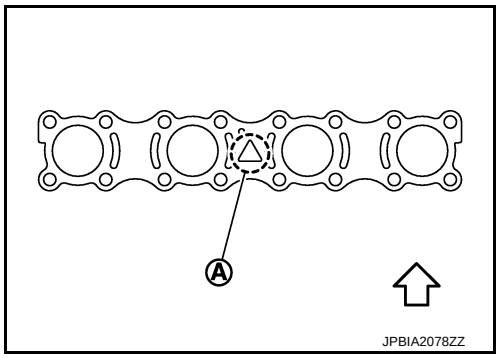
Note the following item, and install in the reverse order of removal.

Exhaust Manifold Gasket

- Install exhaust manifold gasket in directional shown in the figure.

    A : Triangle press
    ⇦ : Above

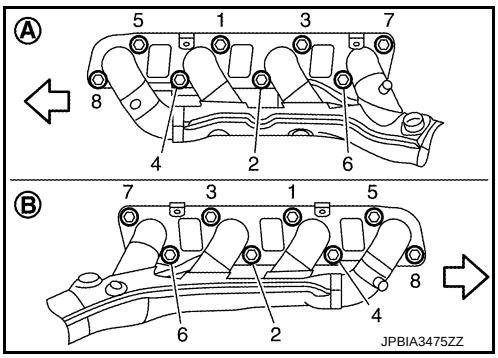
NOTE:
When install exhaust manifold gasket, coating surface (black) shall be located on the exhaust manifold side.



Exhaust Manifold

- Tighten mounting nuts in numerical order as shown in the figure.

A : Bank 1
B : Bank 2
⇦ : Engine front

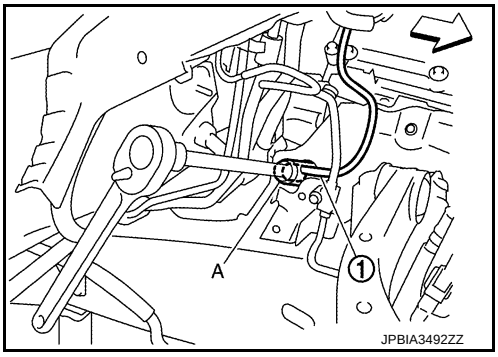


CAUTION:
All exhaust manifold nuts are tightened at twice.

Air Fuel Ratio Sensor 1, Heated Oxygen Sensor 2

CAUTION:

- **Before installing new sensors, clean exhaust system threads using oxygen sensor thread cleaner (commercial service tool: J-43897-18 or J-43897-12), and apply anti-seize lubricant (commercial service tool).**
- **Sensors are not reusable. Replace them with a new one after removal. When replacing them, handle with care not to impact on them.**
- **When installing the new air fuel ratio sensors 1 (1), set the heated oxygen sensor wrench [SST: KV10117100(J-44626)] (A) in the hexagonal part to tighten the them.**



- **Never over torque sensors. Doing so may cause damage to the sensors, resulting in “MIL” coming on.**

Inspection

INFOID:0000000006289552

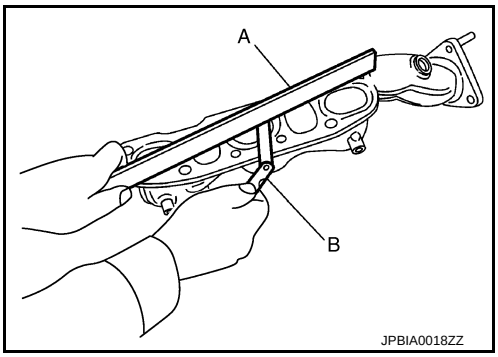
INSPECTION AFTER DISASSEMBLY

Surface Distortion

- Check the surface distortion of the exhaust manifold mating surface with a straightedge (A) and a feeler gauge (B).

Limit : Refer to EM-133, "Exhaust Manifold".

- If it exceeds the limit, replace exhaust manifold.

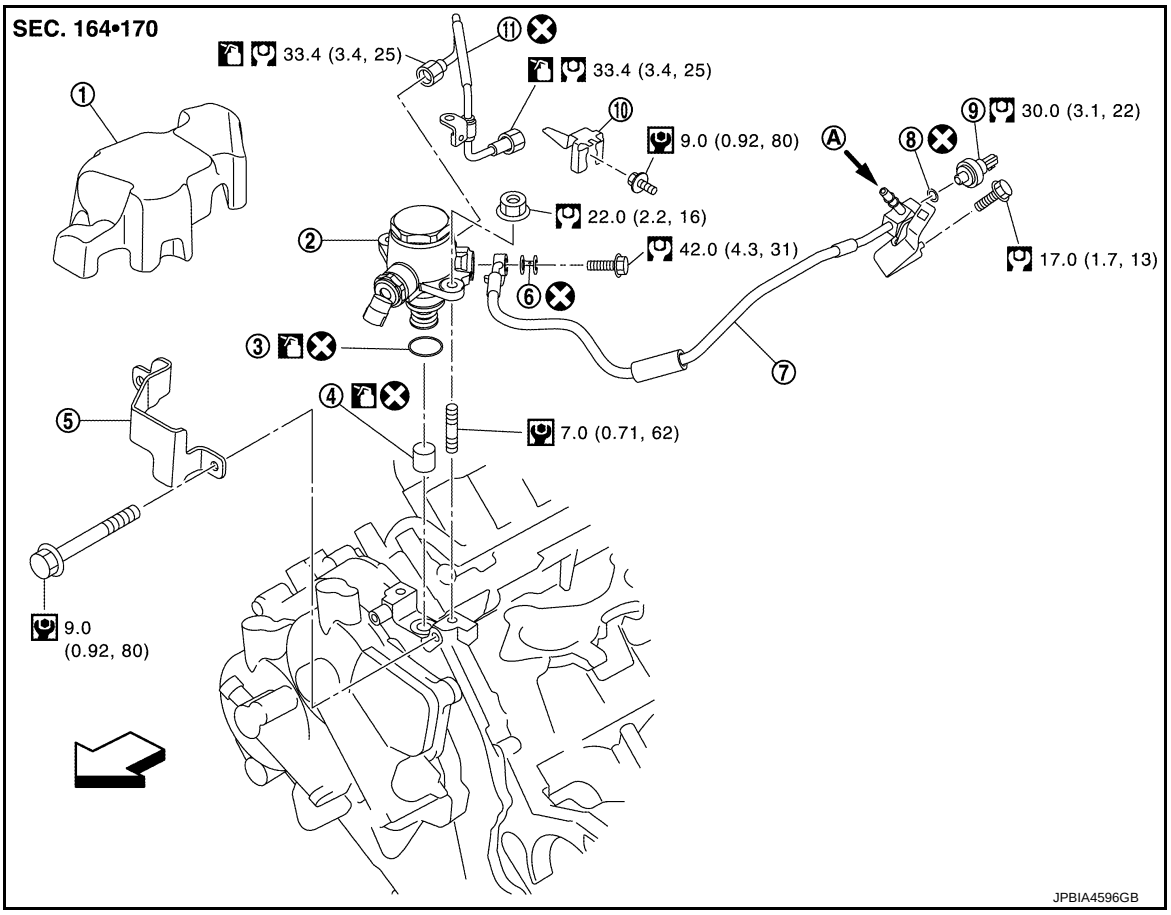


HIGH PRESSURE FUEL PUMP AND FUEL HOSE

Exploded View

INFOID:0000000006289553

CAUTION:
Never remove or disassemble parts unless instructed as shown in the figure.



1. High pressure fuel pump insulator
2. High pressure fuel pump
3. O-ring
4. Lifter
5. Fuel pump connector protector
6. Copper washer
7. Fuel feed hose
8. Copper washer
9. Low fuel pressure sensor
10. Bracket
11. Fuel feed tube (pump side)

A. From fuel tank

⇦ : Engine front

Refer to GI-4, "Components" for symbols in the figure.

Removal and Installation

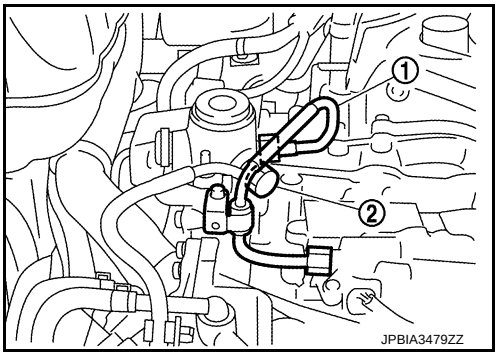
INFOID:0000000006289554

REMOVAL

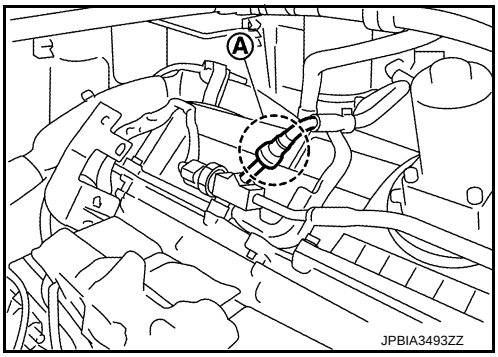
WARNING:
- **Be sure to read EM-4, "Precaution for Handling High Pressure Fuel System" when working on the high pressure fuel system.**
- **Put a “CAUTION: FLAMMABLE” sign in the workshop.**
- **Be sure to work in a well ventilated area and furnish workshop with a CO_2 fire extinguisher.**
- **Never smoke while servicing fuel system. Keep open flames and sparks away from the work area.**
- **To avoid the danger of being scalded, never drain engine coolant when engine is hot.**

1. Release fuel pressure. Refer to EC-153, "Work Procedure".
2. Remove intake manifold. Refer to EM-30, "Removal and Installation".
3. Disconnect harness connector from high pressure fuel pump.

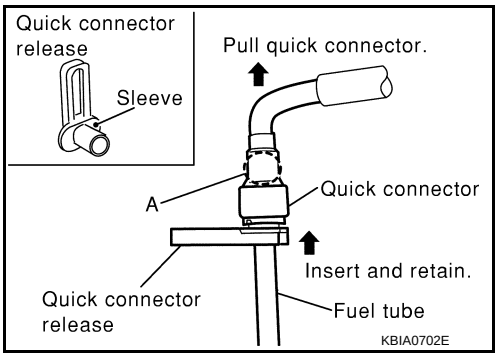
4. Remove fuel feed tube (pump side) (1).
5. Disconnect fuel hose (2) from high pressure fuel pump.



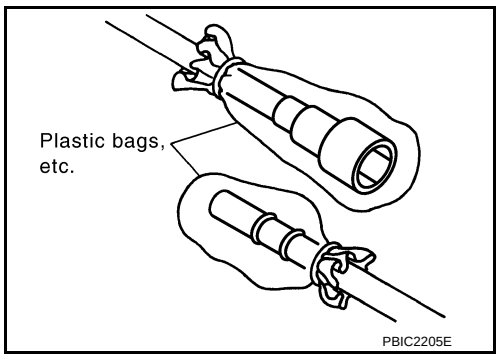
6. Remove high pressure fuel pump and lifter.
   CAUTION:
   After removing lifter, replace lifter with a new one.
7. Disconnect quick connector (A) with the following procedure.



a. Remove quick connector cap from quick connector connection.
b. With the sleeve side of quick connector release facing quick connector, install quick connector release onto fuel tube.
c. Insert quick connector release into quick connector until sleeve contacts and goes no further. Hold quick connector release on that position.
   CAUTION:
   Inserting quick connector release hard will not disconnect quick connector. Hold quick connector release where it contacts and goes no further.
d. Draw and pull out quick connector straight from fuel tube.
   CAUTION:
   - **Pull quick connector holding (A) position as shown in the figure.**
   - **Never pull with lateral force applied. O-ring inside quick connector may be damaged.**
   - **Prepare container and cloth beforehand because fuel will leak out.**
   - **Avoid fire and sparks.**
   - **Keep parts away from heat source. Especially, be careful when welding is performed around them.**
   - **Never expose parts to battery electrolyte or other acids.**
   - **Never bend or twist connection between quick connector and fuel feed hose (with damper) during installation/removal.**



- **To keep clean the connecting portion and to avoid damage and foreign materials, cover them completely with plastic bags, etc. or a similar item.**



8. Disconnect harness connector from low fuel pressure sensor.
9. Remove fuel hose assembly.
10. Remove fuel pressure sensor.

CAUTION:
- **Never allow water and foreign materials enter into the connector.**
- **Never reuse the dropped sensor.**
- **Carefully handle sensor avoiding shocks.**
- **Use hex head support installation for removal and installation of sensor.**
- **The contact surface of gasket must not have any stain or scoring by dust etc.**

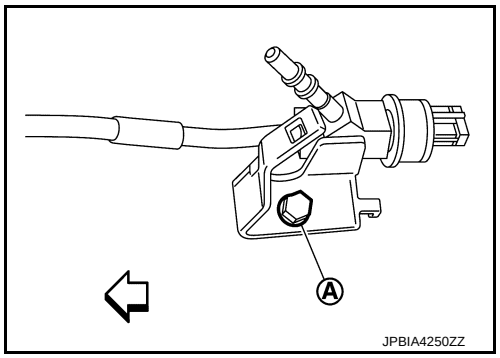
INSTALLATION

1. Install O-ring to high pressure fuel pump. When handing new O-ring, paying attention to the following caution items:

CAUTION:
- **Handle O-ring with bare hands. Never wear gloves.**
- **Lubricate O-ring with new engine oil.**
- **Never clean O-ring with solvent.**
- **Check that O-ring and its mating part are free of foreign material.**
- **When installing O-ring, be careful not to scratch it with tool or fingernails. Also be careful not to twist or stretch O-ring. If O-ring was stretched while it was being attached, never insert it quickly into fuel tube.**
- **Insert new O-ring straight into fuel rail. Never decenter or twist it.**

2. Install fuel pressure sensor.
3. Install fuel hose assembly.
   - Temporarily tighten mounting bolt (A) as shown in the figure.

⇦ : Engine front



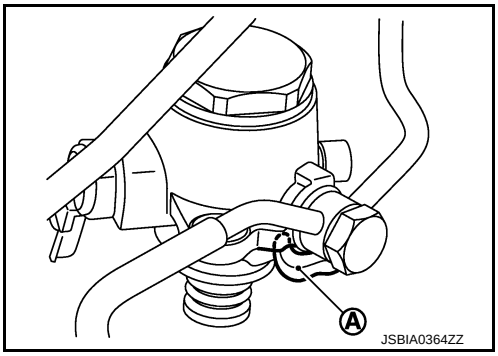
4. Install high pressure fuel pump to front cover.

CAUTION:
After removing lifter, replace lifter with a new one.

5. Connect fuel feed hose to high pressure fuel pump.

NOTE:
- Never allow the machined edge of the high pressure fuel pump to contact with gasket.
- The gasket contact area must be free of dust and scratches.

- Check that rotation stopper (A) of fuel feed hose contact high pressure fuel pump.

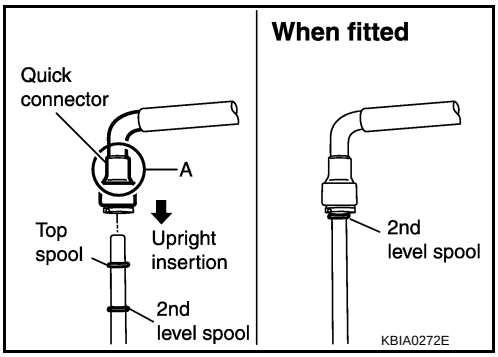


6. Tighten mounting bolts that are temporarily tightened in step 3.
7. Connect harness connector to high pressure fuel pump.
8. Install fuel pump connector protector.
9. Connect harness connector to low fuel pressure sensor.
10. Note the following, and connect quick connector to install fuel feed hose.

a. Check the connection for foreign material and damage.

b. Align center to insert quick connector straightly into fuel tube.
NOTE:
The figure shows engine side as an example.
- Insert fuel tube into quick connector until the top spool on fuel tube is inserted completely and the second level spool is positioned slightly below quick connector bottom end.

CAUTION:
- **Hold "A" position in the figure when inserting fuel tube into quick connector.**
- **Carefully align center to avoid inclined insertion to prevent damage to O-ring inside quick connector.**
- **Insert until you hear a "click" sound and actually feel the engagement.**
- **To avoid misidentification of engagement with a similar sound, be sure to perform the next step.**

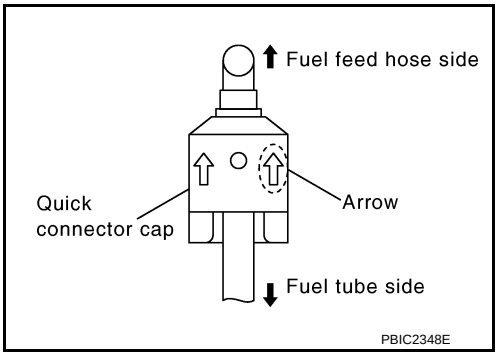


c. Before clamping fuel feed hose with hose clamps, pull quick connector hard by hand holding "A" position. Check it is completely engaged (connected) so that it does not come out from fuel feed tube.

d. Install quick connector cap to quick connector connection.
- Install so that the arrow mark on the side faces up.

CAUTION:
- **Check that quick connector and fuel tube are securely fit into quick connector cap installation groove.**
- **If quick connector cap cannot be installed smoothly, quick connector may have not been installed correctly. Check connection again.**

11. Install in the reverse order of removal.



Inspection

INFOID:0000000006289555

INSPECTION AFTER INSTALLATION

Check for Fuel Leakage

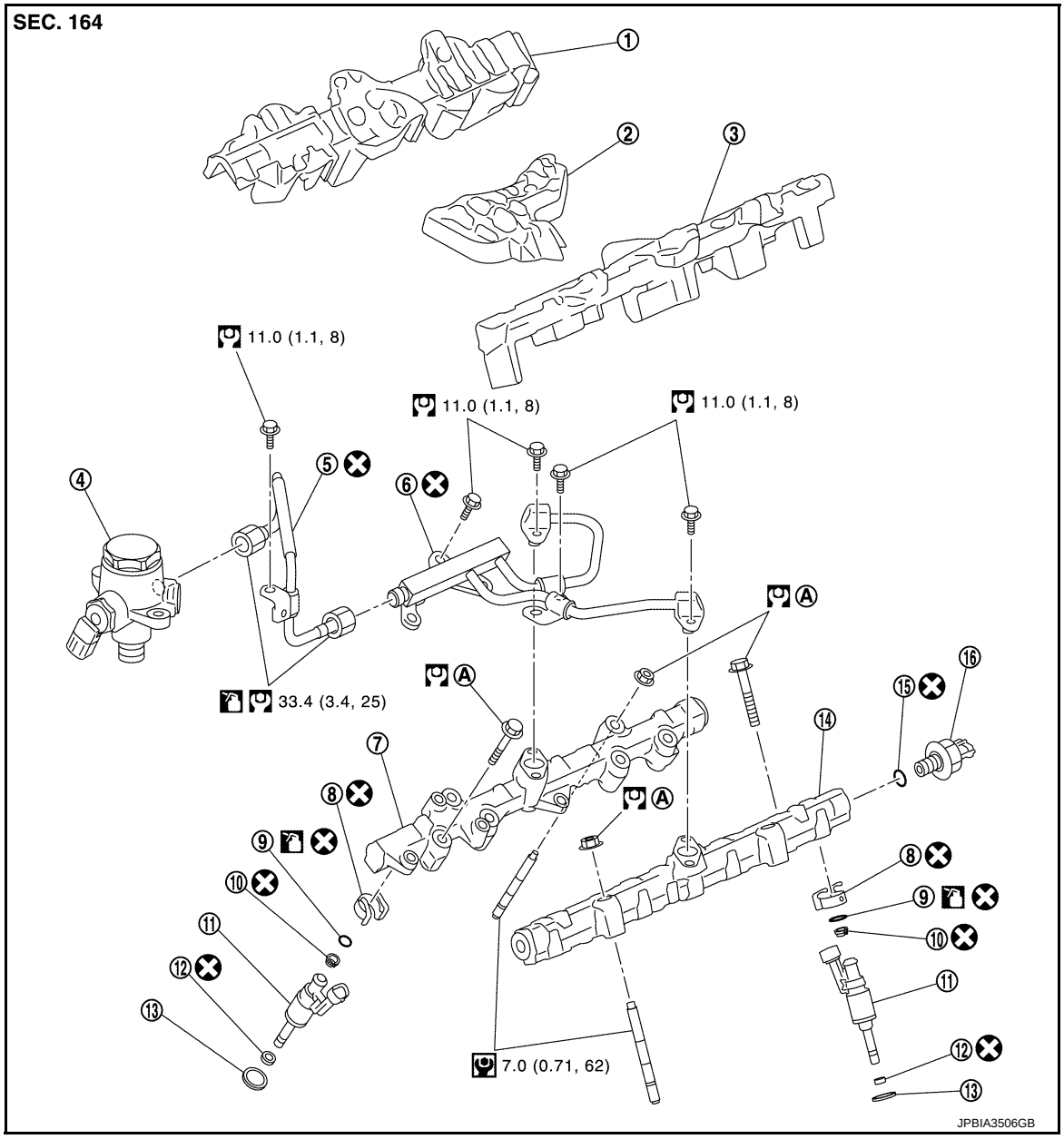
1. Turn ignition switch "ON" (with the engine stopped). With fuel pressure applied to fuel piping, check that there is no fuel leakage at connection points.
NOTE:
Use mirrors for checking at points out of clear sight.
2. Start the engine. With engine speed increased, check again that there is no fuel leakage at connection points.

CAUTION:
Never touch the engine immediately after it is stopped because the engine is extremely hot.

FUEL INJECTOR AND FUEL TUBE

Exploded View

INFOID:0000000006289556



1. Fuel tube insulator (bank 2)
2. Fuel tube insulator (center)
3. Fuel tube insulator (bank 1)
4. High pressure fuel pump
5. Fuel feed tube (pump side)
6. Fuel feed tube (bank side)
7. Fuel rail (bank 2)
8. Injector holder
9. O-ring (blue)
10. Backup ring
11. Fuel injector
12. Seal ring
13. Insulator
14. Fuel rail (bank 1)
15. Gasket
16. Fuel rail pressure sensor

A. Comply with the installation procedure when tightening. Refer to EM-49, "Removal and Installation".

Refer to GI-4, "Components" for symbols in the figure.

CAUTION:

- **Never remove or disassemble parts unless instructed as shown in the figure.**
- **Be sure to follow the tightening instruction to avoid fuel leakage.**

Removal and Installation

INFOID:0000000006289557

REMOVAL

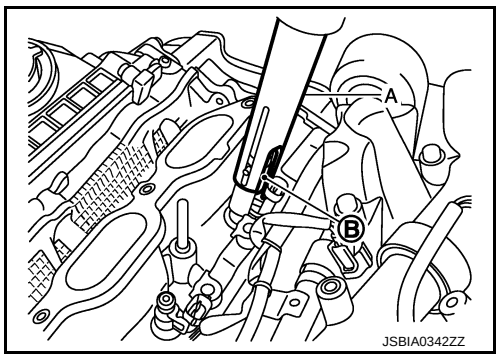
WARNING:

- **Be sure to read EM-4, "Precaution for Handling High Pressure Fuel System" when working on the high pressure fuel system.**
- **Put a "CAUTION: FLAMMABLE" sign in the workshop.**
- **Be sure to work in a well ventilated area and furnish workshop with a CO_2 fire extinguisher.**
- **Never smoke while servicing fuel system. Keep open flames and sparks away from the work area.**
- **To avoid the danger of being scalded, never drain engine coolant when engine is hot.**

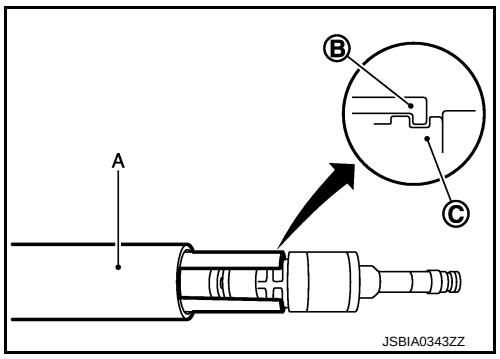
1. Release fuel pressure. Refer to EC-153, "Work Procedure".
2. Remove intake manifold. Refer to EM-30, "Removal and Installation".
3. Remove fuel feed tube (pump side) and fuel feed tube (bank side).
   CAUTION:
   Never reuse fuel feed tube.
4. Remove fuel rail (bank 1) and fuel rail (bank 2).
5. Disconnect harness connector from fuel injectors.
6. Remove fuel injector from cylinder head as per the following:
   CAUTION:
   - **Be careful with remaining fuel that may go out from fuel tube.**
   - **Be careful not to damage injector nozzles during removal.**
   - **Never bump or drop fuel injector.**
   - **Never disassemble fuel injector.**

a. Remove injector holder.

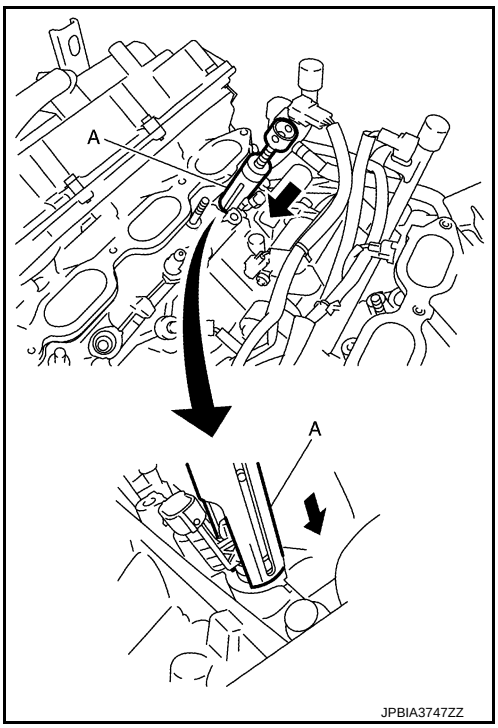
b. Install an injector remover [SST: KV10119600 (—)] (A) to the injector connector side so that cutout (B) of injector remover faces the injector connector side.



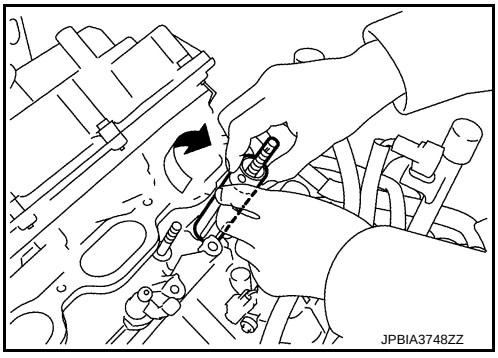
- Hook pawl portion (B) of injector remover [SST: KV10119600 (—)] (A) to groove portion (C) of injector.



c. Press down body portion (A) of injector remover [SST: KV10119600 (—)] until it contacts cylinder head.

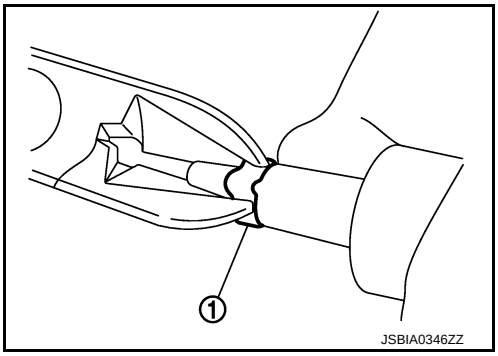


d. Tighten injector remover [SST: KV10119600 (—)] clockwise and remove injector from cylinder head.



e. Cut Teflon seal (1) while pinching it. Be careful not to damage injector.

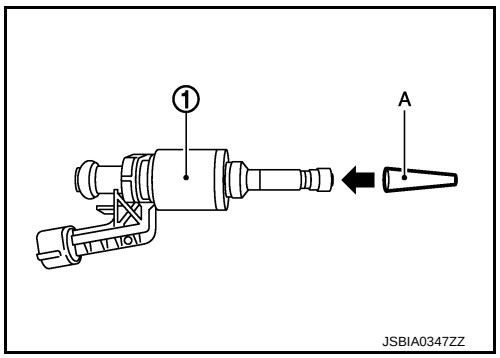
f. Remove insulator from mounting hole of fuel injector of cylinder head.



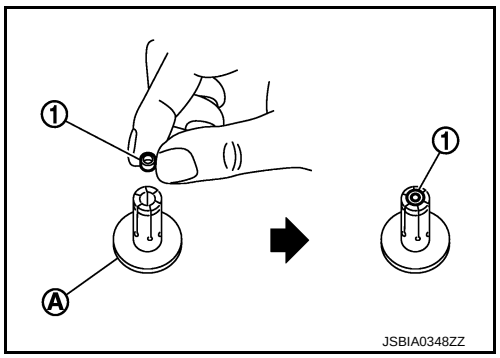
INSTALLATION

1. Install seal ring to fuel injector as per the following:
   CAUTION:
   - **Handle seal ring with bare hands. Never wear gloves.**
   - **Never apply engine oil to seal ring.**
   - **Never clean seal ring with solvent.**

a. Install an injector seal drift set [SST: KV101197S0 (—)] (A) to fuel injector (1).



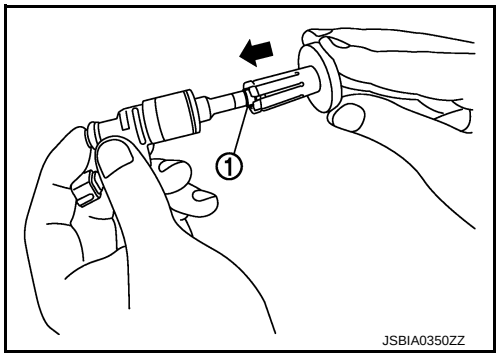
b. Set seal ring (1) to injector seal drift set [SST: KV101197S0 (—)] (A).



c. Straightly insert seal ring (1), which is set in step 2, to fuel injector as shown in the figure and install.

CAUTION:

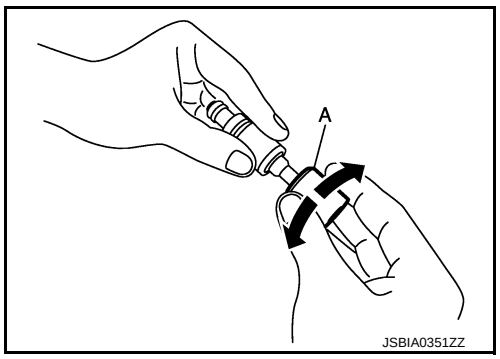
Be careful that seal ring does not exceed the groove portion of fuel injector.



d. Insert injector seal drift set [SST: KV101197S0 (—)] (A) to injector and rotate clockwise and counterclockwise by 90° while pressing seal ring to fit it.

NOTE:

Compress seal ring, because this operation is for rectifying stretch of seal ring caused by installation and for preventing sticking when inserting injector into cylinder head.

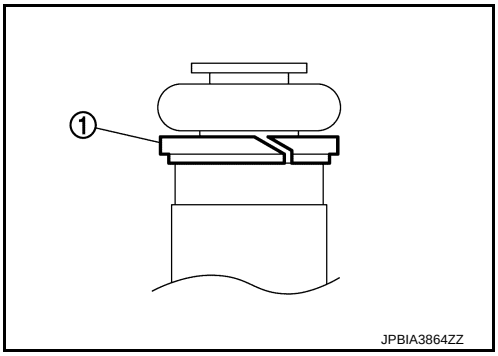


2. Install O-ring and backup ring to fuel injector. When handing new O-ring and backup ring, paying attention to the following caution items:

CAUTION:

- **Handle O-ring with bare hands. Never wear gloves.**
- **Lubricate O-ring with new engine oil.**
- **Never clean O-ring with solvent.**
- **Check that O-ring and its mating part are free of foreign material.**
- **When installing O-ring, be careful not to scratch it with tool or fingernails. Also be careful not to twist or stretch O-ring. If O-ring was stretched while it was being attached, never insert it quickly into fuel tube.**
- **Insert new O-ring straight into fuel rail. Never decenter or twist it.**

- **Always install the back up ring (1) in the right direction as instructed.**



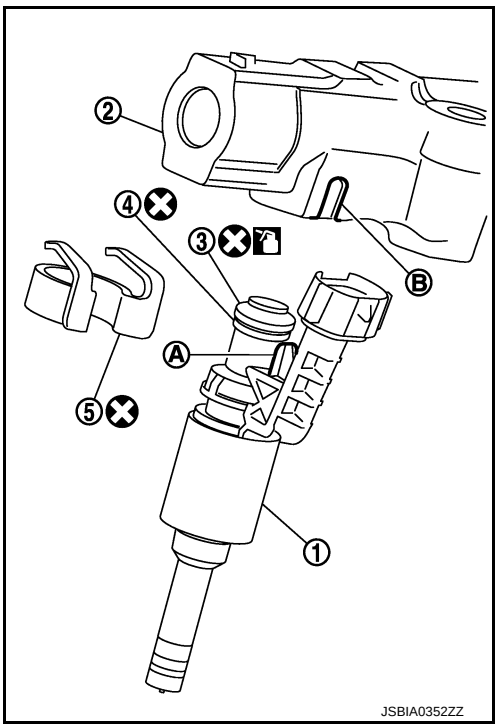
3. Install fuel injector (1) to fuel rail (2) as per the following:

   3 : O-ring (blue)
   4 : Backup ring

a. Install fuel injector holder (5) to fuel injector.
CAUTION:
- **Never reuse injector holder. Replace it with a new one.**
- **Be careful to keep fuel injector holder from interfering with O-ring. If interference occurs, replace O-ring.**

b. Insert fuel injector into fuel rail with fuel injector holder attached.
- Insert it while matching it to the axial center.
- Insert so that protrusion (A) of fuel injector is aligned to cutout (B).

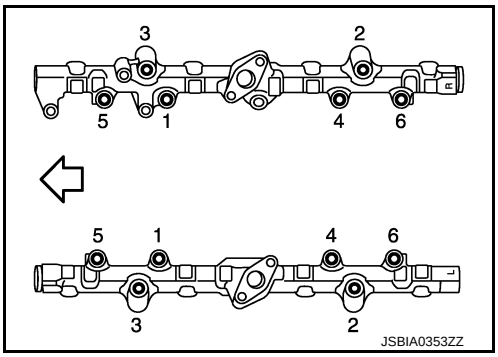
c. Check that installation is complete by checking that fuel injector does not rotate or come off.
- Check that protrusions of fuel injectors and fuel rail are aligned with cutouts of clips after installation.



4. Insert insulator into mounting hole of fuel injector of cylinder head.
5. Install fuel rail and fuel injector assembly to cylinder head.
- Tighten mounting bolts and nuts in two steps in numerical order as shown in the figure.

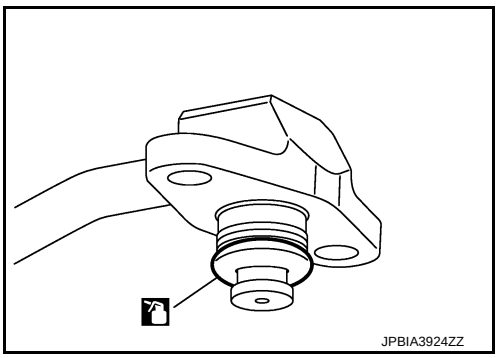
   ⇦ : Engine front

1st step : 10.0 N·m (1.0 kg-m, 89 in-lb)
2nd step : 20.5 N·m (2.1 kg-m, 15 ft-lb)



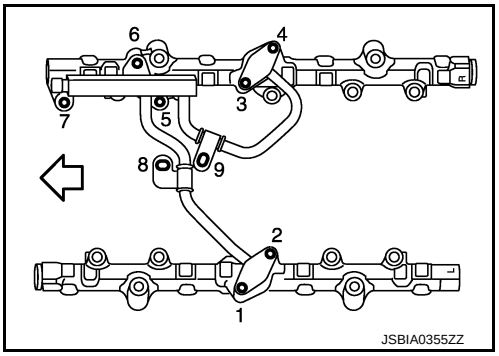
6. Connect injector harness connector.
7. Install fuel feed tube (bank side) to fuel rail.
CAUTION:
- **When inserting fuel feed tube (bank side) to fuel rail, press the flange part to install the tube.**
- **Never use O-ring with any scoring.**
- **Never reuse fuel feed tube (bank side), O-ring and back up ring.**

- Apply engine oil to O-ring.


JPBIA3924ZZ

- Tighten mounting bolts in numerical order as shown in the figure.

⇦ : Engine front



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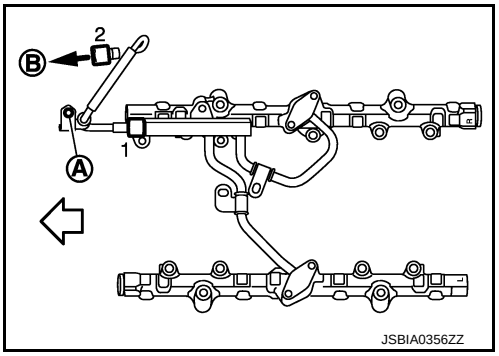
8. Install fuel feed tube (pump side) to fuel feed tube (bank side) as per the following:
CAUTION:
Never reuse fuel feed tube (pump side).

a. Apply engine oil to flare screw parts of high pressure pump side and fuel feed tube (bank side) side.
b. Manually tighten 2 flare nuts without using a tool until they are seated to screw thread.
c. Tighten mounting bolt (A).

B :To high pressure fuel pump
⇦ : Engine front

d. Tighten flare nuts in numerical order as shown in the figure.



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9. Install in the reverse order of removal.

Inspection

INFOID:0000000006289558

INSPECTION AFTER INSTALLATION

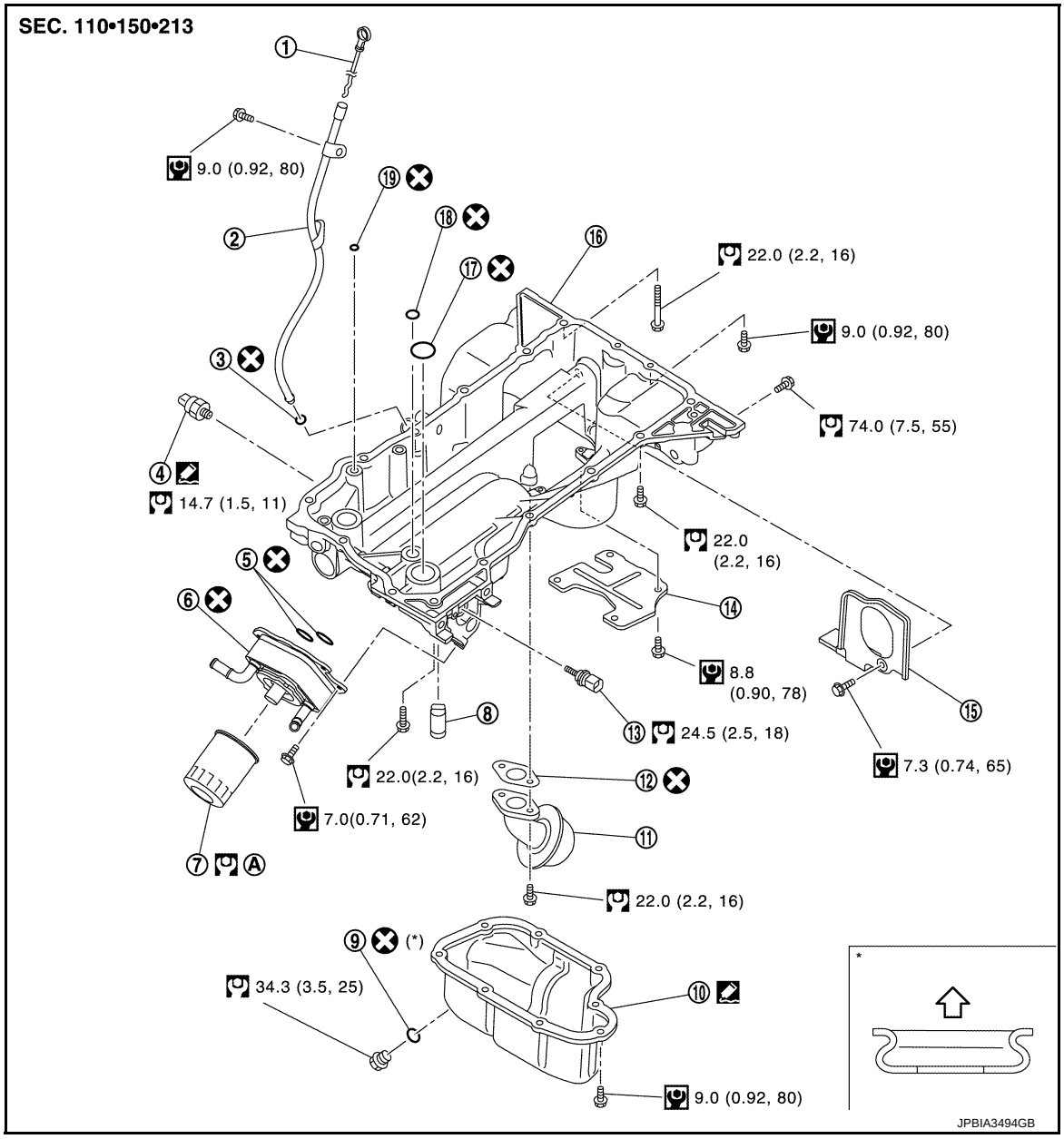
Check for Fuel Leakage

1. Turn ignition switch “ON” (with the engine stopped). With fuel pressure applied to fuel piping, check that there is no fuel leakage at connection points.
NOTE:
Use mirrors for checking at points out of clear sight.
2. Start the engine. With engine speed increased, check again that there is no fuel leakage at connection points.
CAUTION:
Never touch the engine immediately after it is stopped because the engine is extremely hot.

OIL PAN (LOWER) AND OIL STRAINER

Exploded View

INFOID:0000000006289559



1. Oil level gauge
2. Oil level gauge guide
3. O-ring
4. Oil pressure switch
5. O-ring
6. Oil cooler
7. Oil filter
8. Relief valve
9. Drain plug washer
10. Oil pan (lower)
11. Oil strainer
12. Gasket
13. Oil temperature sensor
14. Baffle plate
15. Rear plate cover
16. Oil pan (upper)
17. O-ring
18. O-ring
19. O-ring

A. Comply with the installation procedure when tightening. Refer to LU-9, "Removal and Installation".

⇦ : Oil pan side

Refer to GI-4, "Components" for symbols in the figure.

Thank you very much for your reading.

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