FOREWORD

This manual contains maintenance and repair procedures for the 1985 Tercel.

Applicable models: AL 21 series
AL 25 series

The manual is divided into 21 sections and 5 appendixes with a thumb index for each section at the edge of the pages.

All information in this manual is based on the latest product information at the time of publication. However specifications and procedures are subject to change without notice.

. v . *yf.* .
TOYOTA MOTOR CORPORATION

NOTE: Click on "Bookmarks" on the left side of this pdf for easy navigation.

This manual is for a 1985 Tercel only.
It should be compatible with other model years.
Use at your own risk. •¿

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1985 TOYOTA TERCEL REPAIR MANUAL

INTRODUCTION

HOW TO USE THIS MANUAL

To assist in finding your way through the manual, the Section Title and major heading are given at the top of every page.

An **INDEX** is provided on the first page of each section to guide you to the item to be repaired.

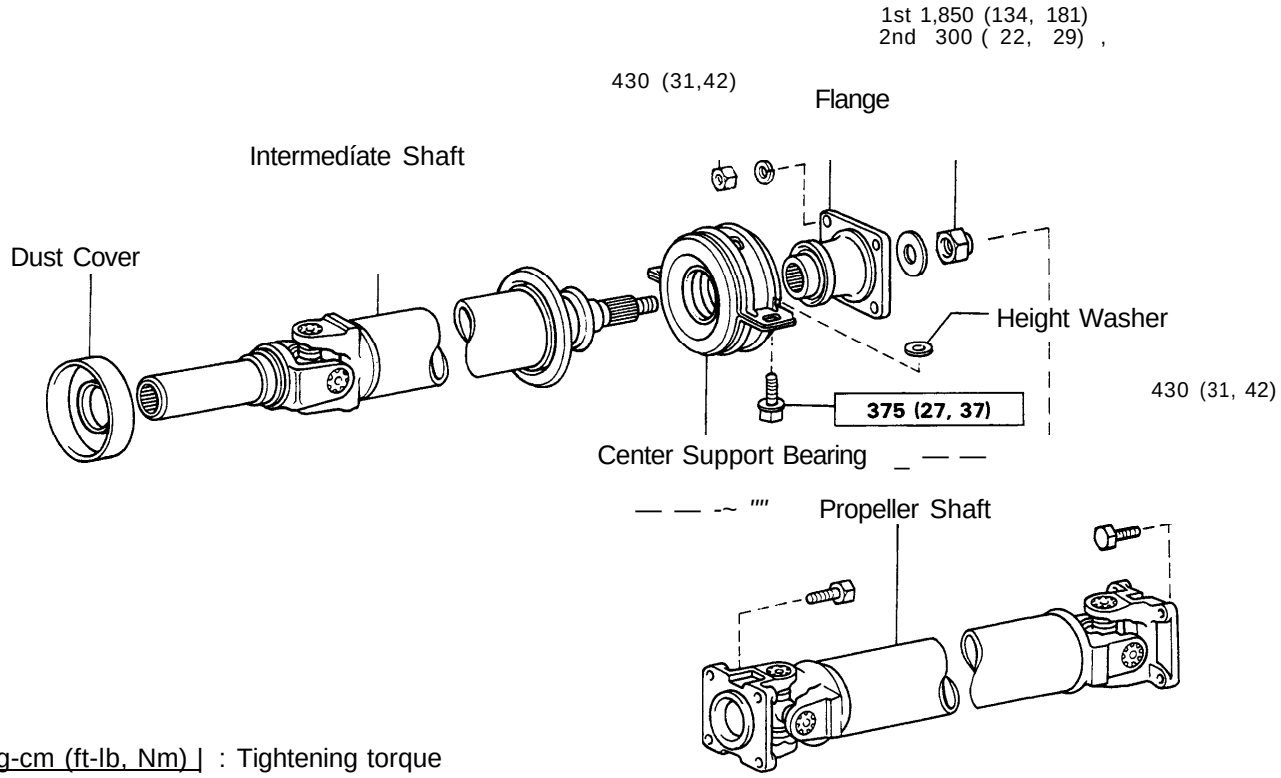
At the beginning of each section, **PRECAUTIONS** are given that pertain to *all* repair operations contained in that section. *Read these precautions befo re starting any repair task.*

TROUBLESHQOTING tables are included for each system to help you diagnose the system problem and find the cause. The repair for each possible cause is referenced in the remedy column to quickly lead you to the solution.

REPAIR PROCEDURES

Most repair operations begin with an overview illustration. It identifies the components and shows how the parts fit together.

Example:



kg-cm (ft-lb, Nm) | : Tightening torque
• : Non-reusable part

The procedures are presented in a step-by-step format:

- The photo or illustration shows *what to* do and *whereto* do it.
- The task heading tells *what* to do.
- The detailed text tells *how* to perform the task and gives other information such as speciÍFications and warnings.

Example:

/Task heading: what to do

CONNECT PROPELLER SHAFT FLANGE TO COMPANION FLANGE ON DIFFEREIMTIAL

(a) Align the marks on the flanges and connect the them with the four bolts and nuts. *n t i H t*

(b) Torque the nuts. *how to do it*

Torque: 430 kg-cm {31 ft-lb, 42 Nm)

Specification

Photograph or illustration: what to do and where

This format enables the experienced technician to have a FAST TRACK. He can read the task headings and only refer to the detailed text when he needs it. Important specifications and warnings always stand out in bold type.

REFERENCES

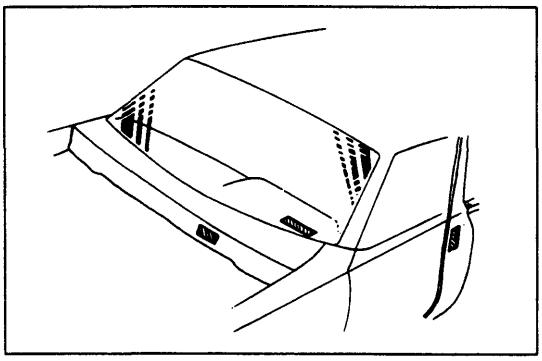
References have been kept to a mínimum. However, when they are required you are given the *page* to go to.

SPECIFICATIONS

Specifications are presented in bold type throughout the text in the applicable step. You never have to leave the procedure to look up your specs.

WARNINGS, CAUTIONS, NOTES:

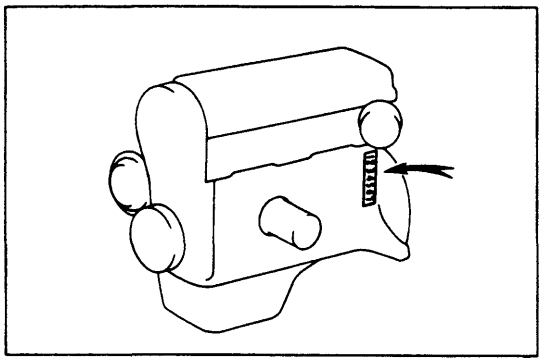
- WARNINGS are presented in bold type, and indícate there is a possibility of injury to you or other people.
- CAUTIONS are also presented in bold type, and indícate the possibility of damage to the components being repaired.
- NOTES are separated from the text but do not appear in bold. They provide additional information to help you efficiently perform the repair.



IDENTIFICATION INFORMATION

VEHICLE IDENTIFICATION NUMBER

The vehicle identification number is stamped on the front cowl of the engine compartment This number is also stamped on top of the instrument panel and the driver's door post.

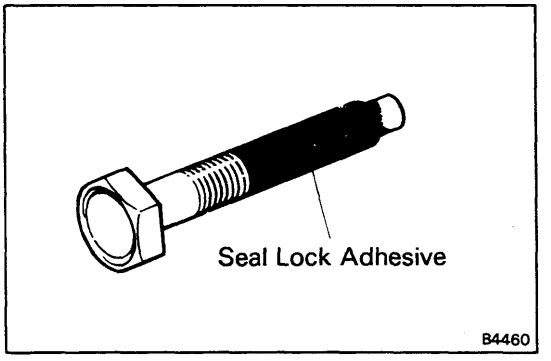


ENGINE SERIAL NUMBER

The engine serial number is stamped on the left side of the cylinder block.

GENERAL REPAIR INSTRUCTIONS

1. Use fender, seat and floor covers to keep the vehicle clean and prevent damage.
2. During disassembly, keep parts in order to facilítate reassembly.
3. Observe the following:
   (a) Before performing electrical work, disconnect the cable from the battery terminal.
   (b) If it is necessary to disconnect the battery for inspection or repair, always disconnect the cable from the negative (-) terminal which is grounded to the vehicle body.
   (c) To prevent damage to the battery terminal post, loosen the terminal nut and raise the cable straight up without twisting it or prying it.
   (d) Clean the battery terminal posts and cable terminal with a shop rag. Do not scrape them with a file or such.
   (e) Install the cable terminal to the battery post with the nut loóse, and tighten the nut after installation. Do not use a hammer or such to tap the terminal onto the post.
   (f) Be sure the cover for the positive (+) terminal is properly in place.
4. Check hose and wiring connectors to make sure that they are secure and correct.
5. Non-reusable Parts
   (a) Always replace cotter pins, gaskets, O-rings and oil seáis etc. With new ones.
   (b) Non-reusable parts are indicated in the component ¡llustrations by the symbol "•".



Precoated Parts

Precoated parts are the bolts, nuts, etc. Which are coated with a seal lock adheasive at the factory.

(a) If a precoated part is tightened, loosened or caused to move in any way, it must be recoated with the specified adhesive.

(b) Recoating of Precoated Parts

(I Clean off the oíd adhesive from the bolts, nut or installation part threads.

(2) Dry with compressed air.

(3) Apply the specified seal lock adhesive to the bolt or nut threads.

(c) Precoated parts are indicated in the component illustrations by the symbol "*".

7. When necessary, use a sealer on gaskets to prevent leaks.

8. Carefully observe all specifications for bolt tightening torques. Always use a torque wrench.

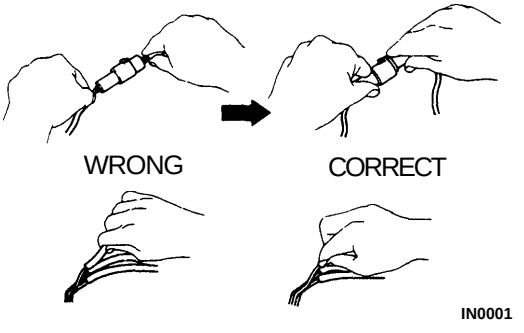
9. Use of special service tools (SST) and special service materials (SSM) may be required, depending on the nature of the repair. Be sure to use SST and SSM where specified and follow the proper work procedure. A list of SST and SSM can be found at the back of this manual.

10. When replacing fuses, be sure the new fuse is the correct amperage rating. DO NOT exceed the fuse amp rating or use one of a lower rating.

11. Care must be taken when jacking up and supporting the vehicle. Be sure to lift and support the vehicle at the proper locations (See page IN-7).

(a) If the vehicle is to be jacked up only at the front or rear end, be sure to block the wheels in order to ensure safety.

(b) After the vehicle is jacked up, be sure to support it on stands. It is extremely dangerous to do any work on the vehicle raised on jack alone, even for a small job that can be finished quickly.



12. Observe the following precautions to avoid damage to parts:

(a) To disconnect vacuum hoses, pulí on the end, not the middle of the hose.

(b) To pulí apart electrical connectors, pulí on the connector itself, not the wires.

(c) Be careful not to drop electrical components, such as sensors or relays. If they are dropped on a hard floor, they should be replaced and not reused.

(d) When steam cieaning an engine, protect the HA, air filter, and VCV from water.

(e) Never use an impact wrench to remove or install thermo switches or thermo sensors.

(f) When checking continuity at the wire connector, insert the tester probé carefully to prevent terminái s from bending.

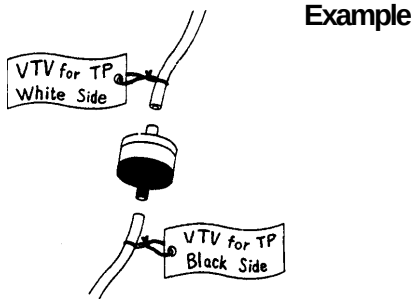
(g) When using a vacuum gauge, never forcé the hose onto a connector that is too large. Use a step-down adapter instead. Once the hose has been stretched, it may leak.

13. Tag hoses before disconnecting them:

(a) When disconnecting vacuum hoses, use tags to identify how they should be reconnected.

(b) After completing a job, double check that the vacuum hoses are properly connected. A label under the hood shows the proper layout.

Example



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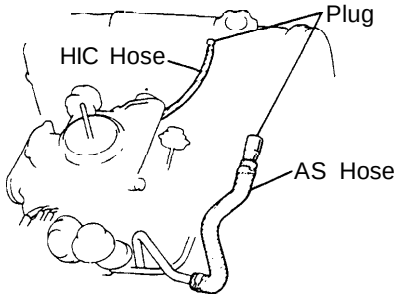


14. When air cleaner is removed, plug the HIC hose and AS hose to prevent rough idling and leakage of exhaust gas.

PRECAUTIONS FOR VEHICLES EQUIPPED WITH CATALYTIC CONVERTER

WARNING: If large amounts of unburned gasoline flow into the converter, it may overheat and créate a fire hazard. To prevent this, observe the following precautions and explain them to your customer.

1. **Use only unleaded gasoline.**

2. **Avoid prolonged idling.**

   Avoid running the engine at fast ¡dle speed for more than 10 minutes and at ¡dle speed for more than 20 minutes.

3. **Avoid spark jump test.**

   (a) Spark jump test only when absolutely necessary. Perform this test as rapidly as possible.

   (b) While testing, never race the engine.

4. **Avoid prolonged engine compression measurement.**

   Engine compression tests must be made as rapidly as possible.

5. **Do not run engine when fuel tank is nearly empty.**

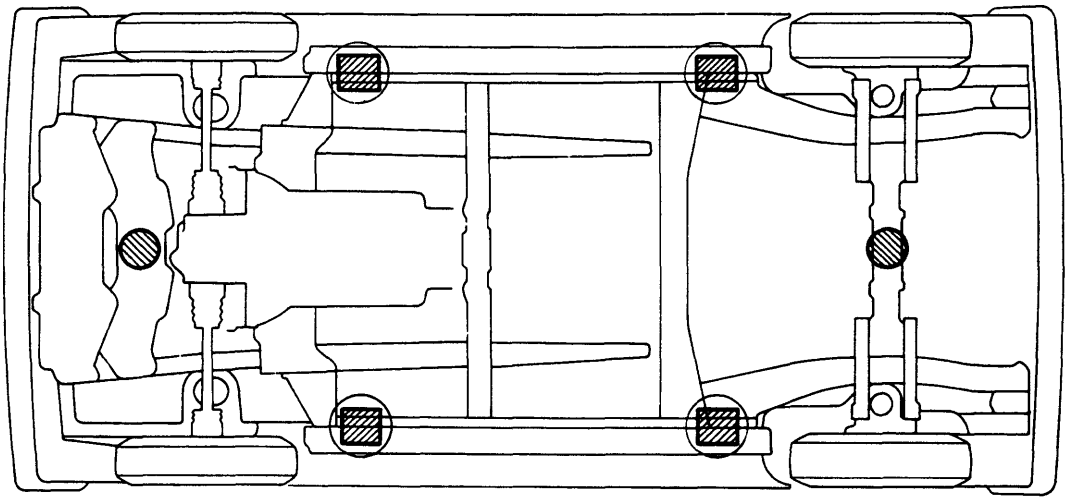
   This may cause the engine to misfire and créate an extra load on the converter.

6. **Avoid coasting with ignition turned off and prolonged braking.**

7. **Do not dispose of used catalyst along with parts contaminated with gasoline or oil.**

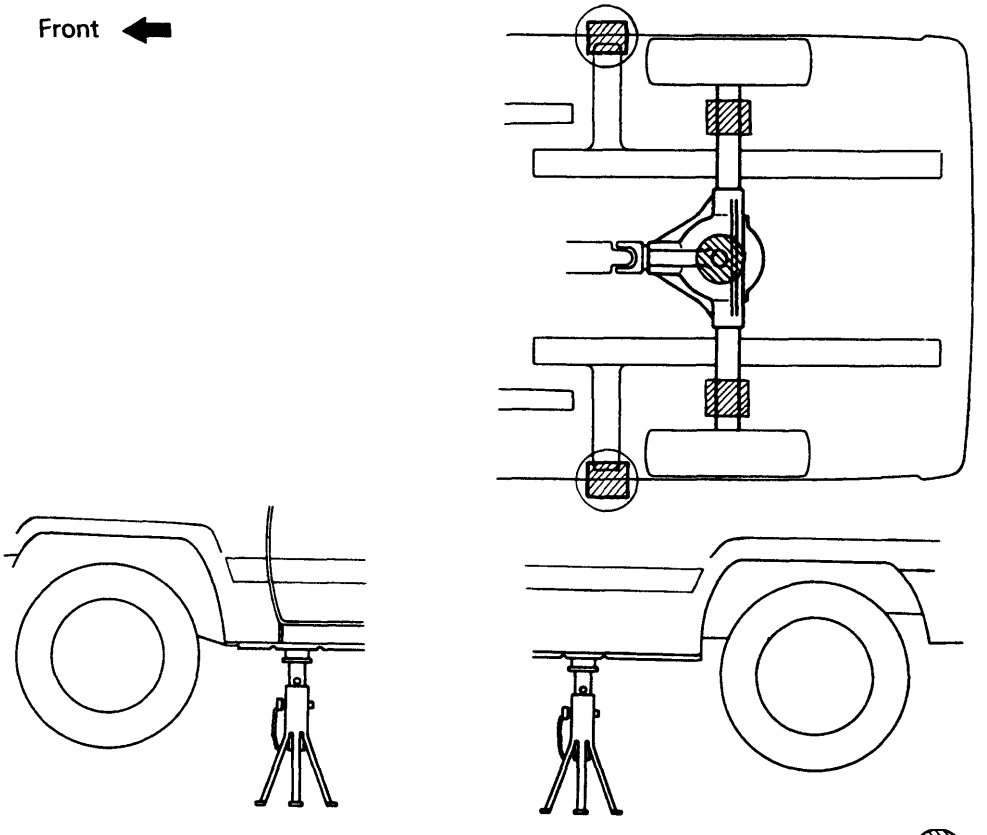
VEHICLE LIFT AND SUPPORT LOCATIONS

FWD



4WD

Front



JACK POSITION ——— ⊖

Front . . . . . Center of crossmember
Rear . . . . . Rear floor crossmember (FWD)
Center of rear axie housing (4WD)

PANTOGRAPH JACK POSITION ——— **Q**

SUPPORT POSITION

Safety stand . . . . . .

ABBREVIATIONS USED IN THIS MANUAL

AAP	Auxiliary Acceleration Pump
A/C	Air Conditioner
AS	Air Suction
ASV	Air Switching Valve
A/T	Automatic Transmission
BTDC	Before Top Dead Center
CALIF.	Vehicles Sold In California
CB	Choke Breaker
CMH	Cold Mixture Heater
EBCV	Electronic Air Bleed Control Valve
ECU	Electronic Control Unit
EGR	Exhaust Gas Recirculation
EL	Extra Low (Gear)
EVAP	Evaporative (Emission Control)
EX	Exhaust (manifold, valve)
Ex.	Except
FED.	Vehicles Sold In USA Except California
FWD	Front Wheel Drive
HAC	High Altitude Compensation
HAI	Hot Air Intake
HIC	Hot Idle Compensation
IG	Ignition
HA	Integrated Ignition Assembly
IN	Intake (manifold, valve)
in.	Inch
LH	Left-hand
MC	Mixture Control
MP	Multipurpose
M/T	Manual Transmission
OC	Oxdation Catalyst
O/S	Oversized
PCV	Positive Crankcase Ventilation
PS	Power Steering
RH	Right-hand
SSM	Special Service Materials
SST	Special Service Tools
STD	Standard
S/W	Switch
TDC	Top Dead Center
TP	Throttle Positioner
TVSV	Thermostatic Vacuum Switching Valve
TWC	Three Way Catalyst
U/S	Undersized
VSV	Vacuum Switching Valve
VTV	Vacuum Transmitting Valve
w/	With
w/o	Without
4WD	Four-Wheel Drive

MAINTENANCE

GENERAL NOTES:

- Every service item in the periodic maintenance list must be performed.
- Failure to do even one item can cause the engine to run poorly and increase exhaust emissions.

MAINTENANCE SCHEDULE

Maintenance operations: A = Check and/or adjust if necessary;
R = Replace, change or lubrícate;
I = Inspect and correct or replace if necessary

NORMAL CONDITION SCHEDULE

System	Service interval (Odometer reading (>r months, whichever comes first) / Maintenance items		Maintenance services beyond 60,000 miles (96,000 km) should be performed at the same intervals shown in each maintenance schedule.								See page (item No.)
		Miles x 1,000	10	15	20	30	40	45	50	60	
		Km x 1,000	16	24	32	48	64	72	80	96	
		Months	12	18	24	36	48	54	60	72	
ENGINE	Valve clearance **			A		A		A		A	MA-8(item14)
	Drive beltsC)	V-ribbed belt (Alternator)								I	MA-4(item 1)
		Conventional belt (PS and A/C)				I				I	MA-4(item 2)
	Engine oil and oil filter **		R		R	R	R		R	R	MA-6(item7)
	Engine coolant(2)									R	MA-6(item 8)
	Exhaust pipes and mountings					I				I	MA-8(item 12)
FUEL	Idle speed and fast idle speed*	3A-C engine<3)		A							MA-9(item 15)
		3A engine		A		A		A		A	MA-10(item16)
	Chokesystem**					I				I	MA-8(item 13)
	Throttle positioner system *	3A-C engine(3)		A							MA-11(item17)
		3A engine		I		I		I		I	MA-12(item 18)
	Air filter**					R				R	MA-5(item4)
	Fuel line and connections					I				I	MA-7(item 11)
	Fuel filler cap gasket									R	MA-7(item 10)
IGNITION	Spark plugs	3A-Cengine**				R				R	MA-5(item5)
		3A engine*		R		R		R		R	
EVAP	Charcoal canister									I	MA-6(item 9)
BRAKES	Brake lining and drums									I	MA-13 (item 20)
	Brake pads and discs									I	MA-13 (item 21)
	Brake line pipes and hoses									I	MA-13 (item 19)
CHASSIS	Steering linkage									I	MA-14(item22)
	Drive shaft boots									I	MA-14(item 24)
	Ball joints and dust covers									I	MA-14(item25)
	Automatic transmission, manual transmission, differential and steering gear housing oil									I	MA-14(item23) MA-15 (item 26)
	Rear wheel bearing grease (ex. wagón) W-							R			MA-17(item30)
	Bolts and nuts on chassis and body			I				I			MA-17(item31)

Maintenance services indicated by a star (*) or asterisk (*) are required under the terms of the Emission Control Systems Warranty. See Owner's Guide for complete warranty information.

- For vehicles sold in California
  For vehicles sold outside California

NOTE:
(1) After 60,000 miles (96,000 km) or 72 months, inspect every 10,000 miles (16,000 km) or 12 months.
(2) After 60,000 miles (96,000 km) or 72 months, replace every 30,000 miles (48,000 km) or 36 months.
(3) After 15,000 miles (24,000 km) or 18 months, adjustment is not necessary.
(4) Change every 45,000 miles (72,000 km) or 54 months.

Follow the severe condition schedule if vehicle is operated mainly under one or more of the following severe conditions:

- Pulling a trailer
- Repeated short trips
- Driving on rough and/or muddy roads
- Driving on dusty roads
- Driving in extremely cold weather and/or on salted roads

SEVERE CONDITION SCHEDULE

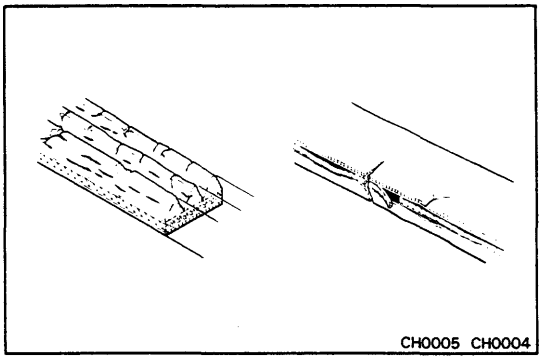
System	Service ¡nterval (Odometer reading or months, whichever comes first)		Maintenance services beyond 60,000 miles (96,000 km) should be performed at the same intervals shown in each maintenance schedule.																See page (item No.)
		Miles x 1,000	5	7.5	10	15	20	22.5	25	30	35	37.5	40	45	50	52.5	55	60	
		Kmx 1,000	8	12	16	24	32	36	40	48	56	60	64	72	80	84	88	96	
		Months	6	9	12	18	24	27	30	36	42	45	48	54	60	63	66	72	
ENGINE	Valve clearance *					A				A				A				A	MA-8(item 14)
	Drive beltsC)	V-ribbed belt (Alternator)																I	MA-4(item 1)
		Conventional belt (PS and A/C)								I								I	MA-4(item 2)
	Engine oil and oil filter *		R		R	R	R		R	R	R		R	R	R		R	R	MA-6(item 7)
	Engine coolanr^)																	R	MA-6(item 8)
	Exhaust pipes and mountings					I				I				I				I	MA-8(item 12)
FUEL	Idle speed and fast idie speed	3A-C engine^)				A													MA-9(item 15) MA-10(item 16)
		3A engine				A				A				A				A	
	Choke system *									I								I	MA-8(item 13)
	Throttle positioner system	3A-C engine^				A													MA-11(ítem 17)
		3A engine				I				I				I				I	MA-12(item 18)
	Air filter** (6)		I		I	I	I		I	R	I		I	I	I			R	MA-5(ítem 3,4)
	Fuel line and connections									I								I	MA-7(ítem 11)
	Fuel filler cap gasket																	R	MA-7(item 10)
IGNITION	Spark plugs	3A-C engine *								R								R	MA-5(item 5)
		3A engine				R				R				R				R	
	Ignition wiring and distributor cap *		(4)																MA-6(item 6)
EVAP	Charcoal canister													I					MA-6(item 9)
BRAKES	Brake lining and drums																		MA-13(ítem20)
	Brake pads and discs			I				I				I				I			MA-13(item21)
	Brake line pipes and hoses																		MA-13(item 19)
CHASSIS	Steering linkage^			I				I				I				I			MA-14(item22)
	Drive shaft boots			I				I				I				I			MA-14(item24)
	Ball joints and dust covers			I				I				I				I			MA-14(item25)
	Automatic transmission, manual transmission, differential and steering gear housing (8) $_{0}$ i |					R				R				R				R	MA-14(item23) MA-15 (item 27) MA-16 (item 28) MA-16 (item 29)
	Rear wheel bearing grease (ex. wagón) (5)													R					MA-17 (item 30)
	Bolts and nuts on chassis and body(7)					I				I				I				I	MA-17(item31)

Maintenance services indicated by a star (*) or asterisk (*) are required under the terms of the Emission Control Systems Warranty. See Owner's Guide for complete warranty information.

* For vehicles sold in California
* For vehicles sold outside California

NOTE:

(1) After 60,000 miles (96,000 km) or 72 months, inspect every 10,000 miles (16,000 km) or 12 months.
(2) After 60,000 miles (96,000 km) or 72 months, replace every 30,000 miles (48,000 km) or 36 months.
(3) After 15,000 miles (24,000 km) or 18 months, adjustment is not necessary.
(4) In áreas where road salt is used, inspect and clean each year just after the snow season.
(5) Change every 45,000 miles (72,000 km) or 54 months.
(6) Applicable when operating mainly on dusty roads. If not, follow the normal condition schedule.
(7) Applicable when operating mainly on rough and/or muddy roads. If not, follow the normal condition schedule.
(8) Inspect the steering gear housing for oil leakage only.



MAINTENANCE OPERATIONS

ENGINE

Cold Engine Operations

1. INSPECT V-RIBBED TYPE DRIVE BELT (ALTERNATOR)

(a) Visually check the belt for separation of the adhesive rubber above and below the core, core separation from the belt side, severed core, separation of the rib from the adhesive rubber, cracking or separation of the ribs, tom or wom ribs or cracks in the inner ridges of the ribs.

If necessary, replace the drive belt.

(b) Using a belt tensión gauge, check the drive belt tensión.

Belt tensión gauge:

Nippondenso	BTG-20 (95506-00020) or
Borroughs	No. BT-33-73F

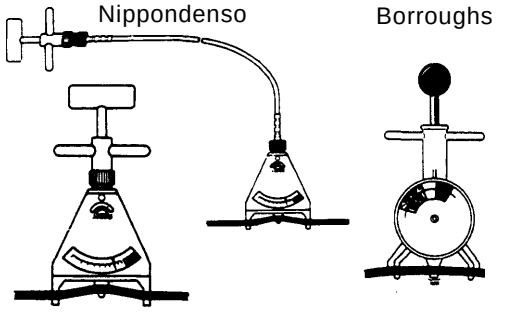
Drive belt tensión:

Used belt	80 ± 20 lb
New belt	125 ± 25 lb

If necessary, adjust the drive belt tensión.

NOTE:

- "New belt" refers to a brand new belt which has never been used.
- "Used belt" refers to a belt which has been used on a running engine for 5 minutes or more.
- After replacing the drive belt, check that if fits properly in the ribbed grooves, especially in the places difficult to see.



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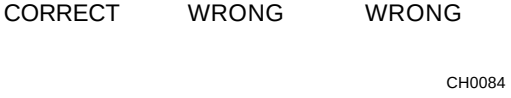

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2. INSPECT CONVENTIONAL TYPE DRIVE BELTS (PS PUMP AND A/C COMPRESSOR)

(a) Visually check the drive belt for cracks, oiliness or wear. Check that the belt does not touch the bottom of the pulley groove.

If necessary, replace the drive belt.

(b) Using a belt tensión gauge, check the drive belt tensión.

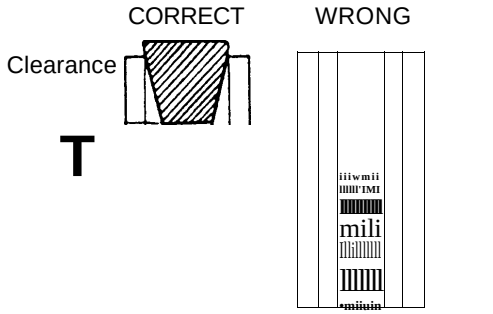
Belt tensión gauge:

Nippondenso	BTG-20 (95506-00020) or
Borroughs	No. BT-33-73F

Drive belt tensión

Used belt	**80 ± 20 lb**
New belt	**125 ± 25 lb**

If necessary, adjust the drive belt tensión.



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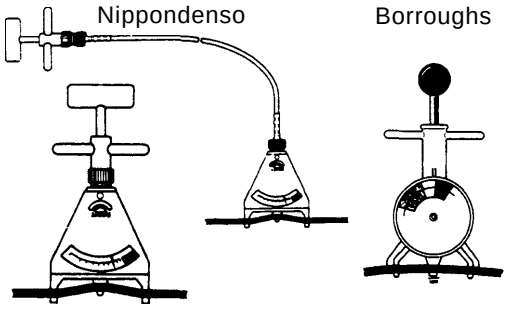

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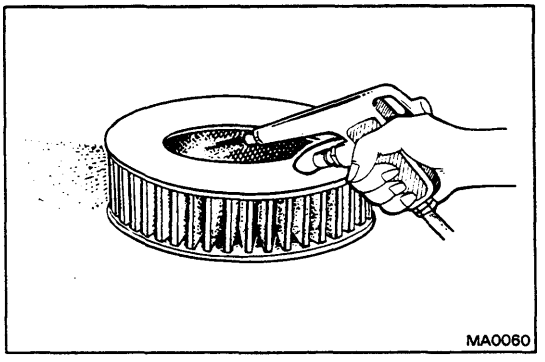


INSPECT AIR FILTER

(a) Visually check that the air cleaner element is not excessively dirty, damaged or oily.

NOTE: Oiliness may indícate a stuck PCV valve.

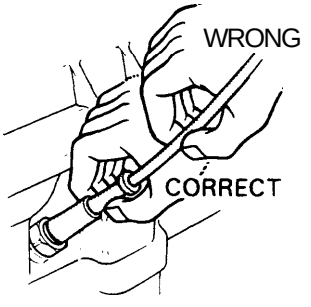
If necessary, replace the air cleaner element.

(b) Clean the element with compressed air.

First blow from inside thoroughiy, then blow off the outside of the element.

4. REPLACE AIR FILTER

Replace the used air cleaner element with a new one.



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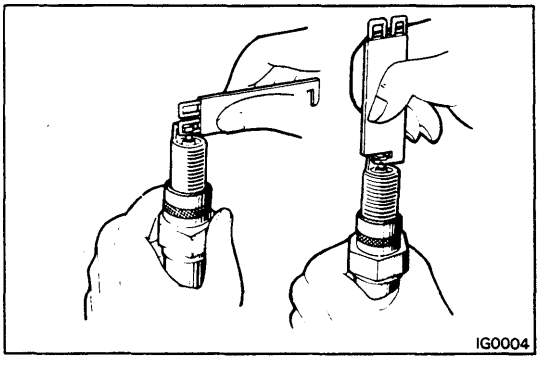
REPLACE SPARK PLUGS

(a) Disconnect the spark plug wires at the boot. DO NOT pulí on the wires.

(b) Remove the spark plugs.



(c) Set the gap on the new plugs.

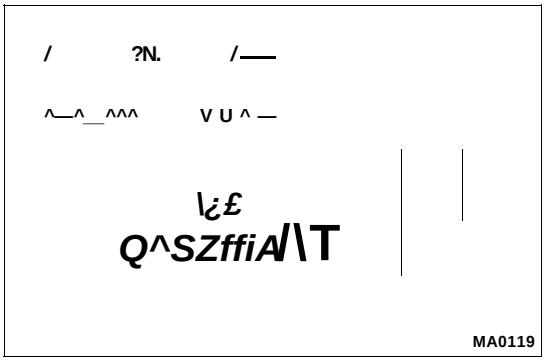
Gap: 3A-C (ex. Canadá Wagón M/T)
1.1 mm (0.043 in.)
3A & 3A-C (for Canadá Wagón M/T)
0.8 mm (0.031 in.)

Recommended spark plugs:

Federal
ND W14EXR-U11 orW16EXR-U11
NGK BPR4EY11 or BPR5EY11

Calif. & Canadá 3A-C (ex. Wagón M/T)
ND W16EXR-U11
NGK BPR5EY11

3A & Canadá 3A-C (for Wagón M/T)
ND W14EXR-U or W16EXR-U
NGK BPR4EY or BPR5EY



6. INSPECT IGNITION WIRING AND DISTRIBUTOR (IIA) CAP

(a) Remove the distributor (HA) cap with wire.

(b) Clean the distributor (HA) cap and wires with a clean cloth.

(c) Visually inspect the wiring for cracks or damage.

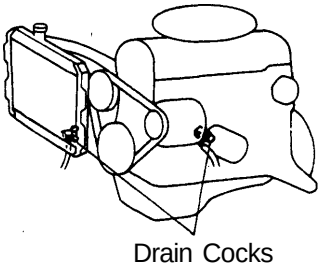
(d) Visually inspect the cap for cracks, carbón tracks or wear.

NOTE: In áreas where road salt is used, inspection and cleaning should be performed each year just after the snow season.

7. REPLACE ENGINE OIL AND OIL FILTER
(See page LU-3)

Engine oil grade:
API grade SF or SF/CC, multigrade viscosity and fuel-efficient oil

Engine oil capacity (Drain and refill with oil filter change):
3.3 liters (3.5 US qts, 2.9 Imp. qts)


Drain Cocks

8. REPLACE ENGINE COOLANT

(a) Drain the coolant from radiator and engine drain cocks. (Engine drain is on the left next to the oil filter.)

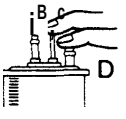
(b) Cióse the drain cocks.

(c) Fill system with coolant.

Coolant capacity (w/ heater or air conditioner):
5.3 liters (5.6 US qts, 4.7 Imp. qts)

Use a good brand of ethylene-glycol base coolant, mixed according to the manufacturéis instructions.

3A-C Engine (Ex. Canadá Wagón M/T)



Air should flow through freely and no charcoal should come out. ECH24

9. INSPECT CHARCOAL CANISTER

(a) Disconnect the hoses to the charcoal canister. Label hoses for correct installation.

(b) Plug pipe C and D (ex. Canadá Wagón M/T) with your fingers and blow compressed air (3 kg/cm^2, 43 psi or 294 kPa) through pipe B (fuel tank side).

- Check that air comes out of the bottom pipe A without resistance.
- Check that no activated charcoal comes out.

If necessary, replace the charcoal canister.

NOTE: Do not attempt to wash the charcoal.

(c) Connect the hoses to the charcoal canister.

3A & 3A-C (Canadá Wagón M/T only) Engine

B C

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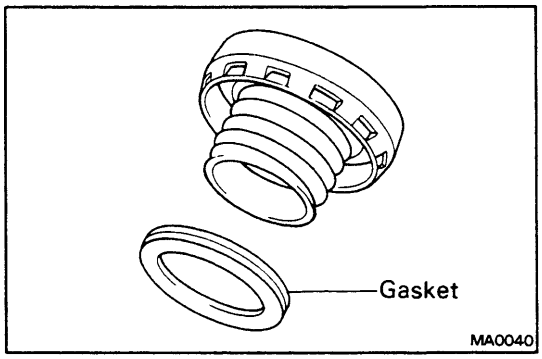
Air should flow through freely and no charcoal should come out.



10. REPLACE GASKET IN FUEL FILLER CAP

(a) Remove the oíd gasket (O-ring) from the fuel filler cap.
Do not damage the cap.

(b) Install the new gasket by hand.

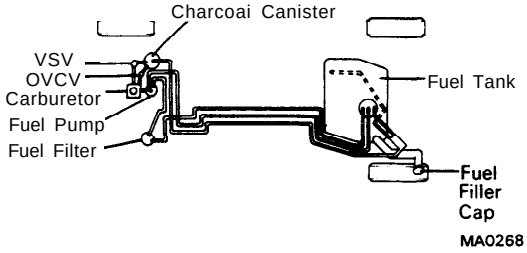
(c) Inspect the cap for damage or cracks.

(d) Install the cap and check the torque limiter.

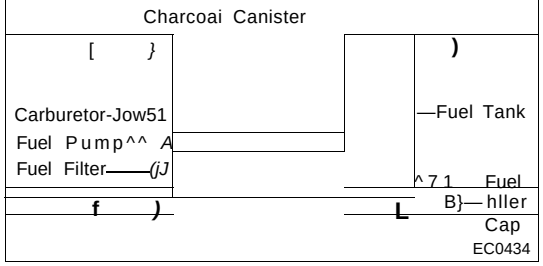
11. INSPECT FUEL LINES AND CONNECTIONS

Visually inspect the fuel lines for cracks, leakage, loóse connections, deformation or tank band looseness.

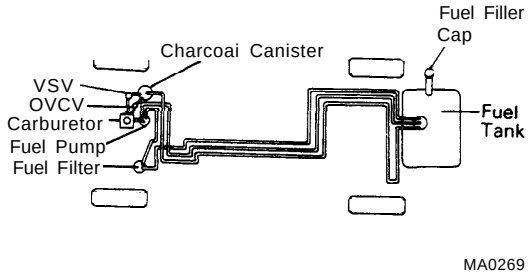
USA Sedan and Wagón FWD,
Canadá Sedan (3A-C Engine only)
and Wagón FWD w/ A/T



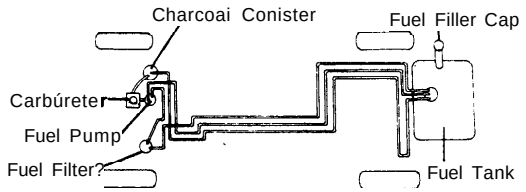
**Canadá Sedan (3A Engine only)
and Wagón FWD w/ M/T**



USA Wagón 4WD and
Canadá Wagón 4WD w/ A/T



Canadá Wagón **4WD** w/ M/T



12. INSPECT EXHAUST PIPES AND MOUNTINGS

Visually inspect the pipes, hangers and connections for severe corrosión, leaks or damage.

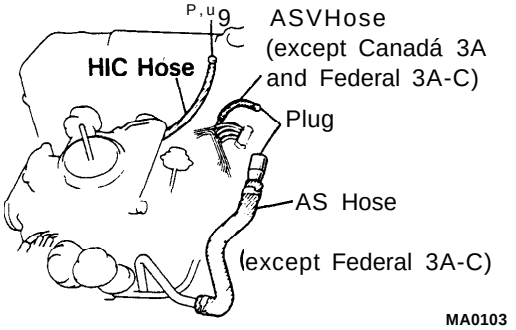
13. INSPECT CHOKE SYSTEM

(a) Remove the air cleaner.

(b) Clean the choke shaft and linkage.

- Spray carburetor (or choke) cleaner on the choke linkage to remove dirt and dust.
- Spray carburetor (or choke) cleaner on both ends of the choke shaft while opening and closing the choke valve by hand.

Hot Engine Operations

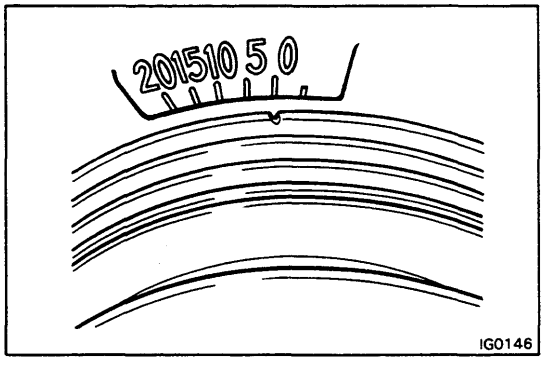


14. ADJUST VALVE CLEARANCE

NOTE: (If air cleaner is removed) Before starting the engine, plug the air suction (AS) hose to prevent leakage of exhaust gas and the HIC hose to prevent rough idling.

(a) Warm up the engine to normal operating temperature.

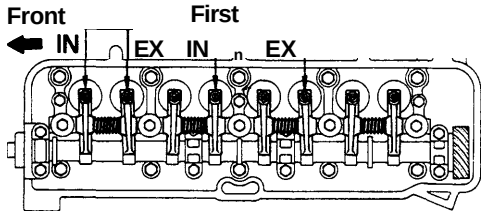
(b) Stop the engine and remove the valve cover.



(c) Set No. 1 cylinder to TDC/compression.

- Turn the crankshaft with a wrench to align the timing marks at TDC. Set the groove on the pulley to the 0 position.
- Check that the rocker arms on No. 1 cylinder are loóse and rockers on No. 4 are tight

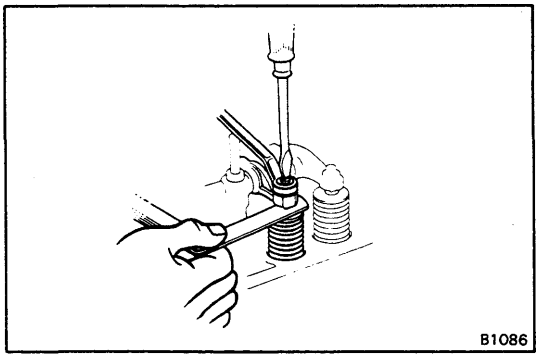
If not, turn the crankshaft one complete revolution and align marks as ábove.



(d) Adjust the clearance of half of the valves.

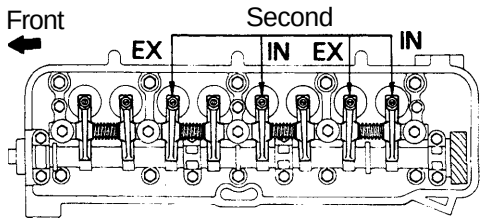
- Adjust only those valves indicated by arrows.

Valve clearance: Intake 0.20 mm (0.008 in.)
Exhaust 0.30 mm (0.012 in.)



- Use a feeler gauge to measure between the valve stem and rocker arm. Loosen the lock nut and tum the adjusting screw to set the proper clearance. Hold the adjusting screw ¡n position and tighten the lock nut.
- Reckeck the clearance. The feeler gauge should move with a very slight drag.

Tum the crankshaft one complete revolution (360°) and align timing marks in the manner mentioned above. Adjust only the valves ¡ndicated by arrows.



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(f) Reinstall the valve cover.

(g) Reinstall the air cleaner.

K*

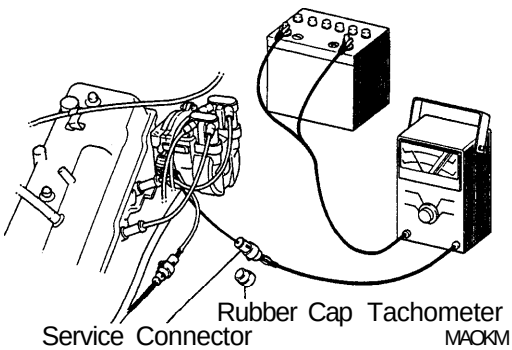
15. ADJUST IDLE SPEED

(a) Preparation

- Air cleaner installed
- Choke valve fully open
- Accessories switched off
- All vacuum lines connected (i.e., AS, EGR systems, etc.)
- Transmission in N range
- Engine idiing at normal operating temperature
- Engine cooling fan OFF

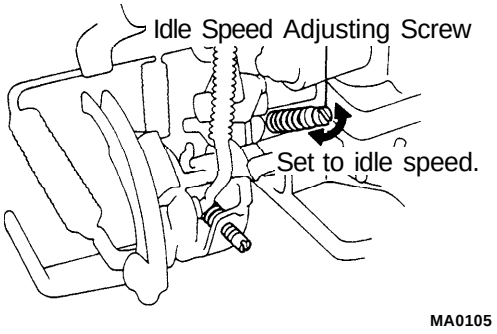
(b) Connect a tachometer to the engine.

Remove the rubber cap and connect the tachometer positive (+) terminal to the service connector of the distributor (HA).



CAUTION:

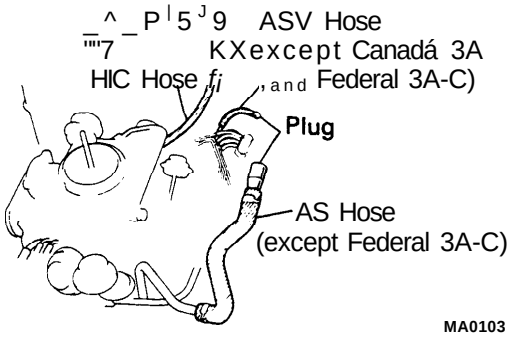
1. **NEVER allow the ignition coil terminái s to touch ground as it could result in damage to the igniter and/or ignition coil.**
2. **As some tachometers are not compatible with this ignition system, it is recommended that you consult with the manufacturer.**



(c) Set the idle speed by turning the IDLE SPEED ADJUSTING SCREW.

Idle speed:	**3A-C**	**550 rpm**	**4-speed M/T**
		650 rpm	**5 or 6-speed M/T w/o PS**
		800 rpm	**5 or 6-speed M/T w/PS & A/T w/o PS**
		900 rpm	**A/T w/PS**
	3A	**650 rpm**	**M/T w/o PS**
		800 rpm	**M/T w/PS & A/T w/o PS**
		900 rpm	**A/T w/PS**

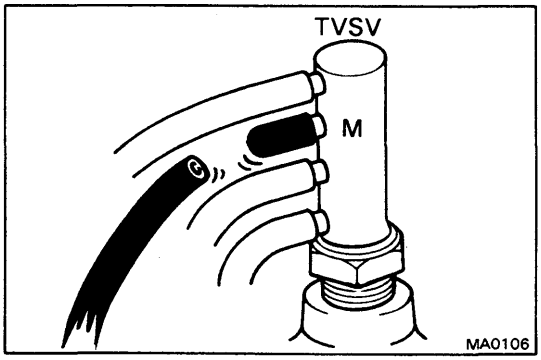
NOTE:
- Make adjustments with the engine cooling fan OFF.
- Leave tachometer connected for further adjustments.



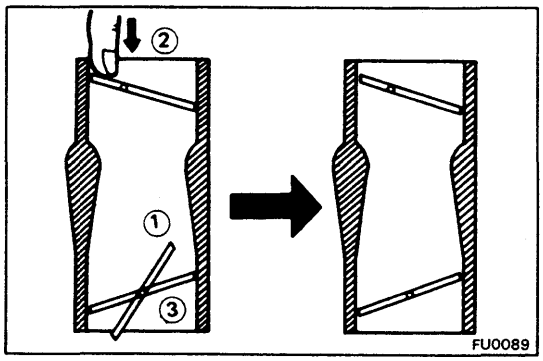
16. ADJUST FAST IDLE SPEED

(a) Stop the engine and remove the air cleaner.

(b) Plug the AS hose to prevent leakage of exhaust gas and HIC hose to prevent rough idling.

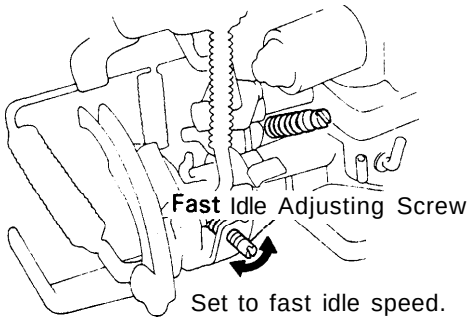


(c) Disconnect the hose from the TVSV M port and plug the M port.
This will shut off the choke opener and EGR systems.



(d) Set the fast idle cam.
While holding the throttle valve slightly open, push the choke valve closed and hold it closed as you reléase the throttle valve.

(e) Start the engine, but do NOT touch the accelerator pedal.



(f) Set the fast idle speed by turning the fast idle adjusting screw.

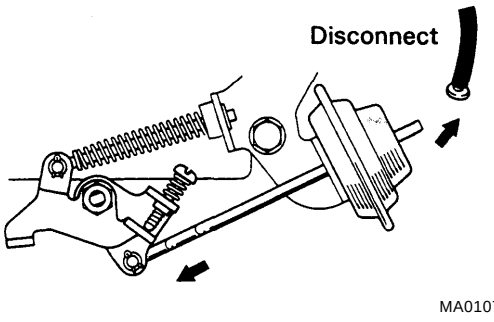
Fast idle speed: 3,000 rpm

NOTE:
- Make adjustments with the engine cooling fan OFF.
- Leave the tachometer connected for f urther adjustment.

17. 3A-C ENGINE ONLY:
ADJUST THROTTLE POSITIONER (TP) SETTING SPEED

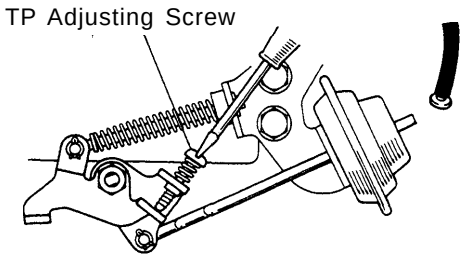
(a) Preparation
- Air cleaner removed
- Choke opener and EGR systems OFF

(b) Disconnect the hose f rom the TP diaphragm and plug the hose end.
Check that the TP is set.



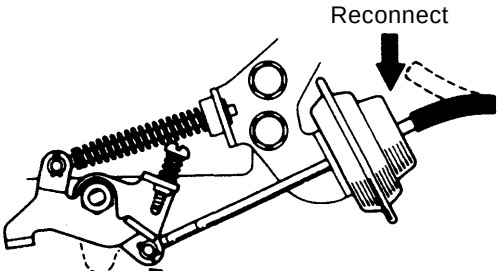
(c) Set the TP setting speed by turning the TP adjusting screw.

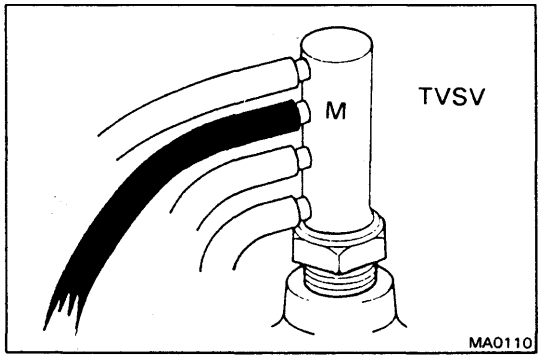
TP setting speed: 1,400 rpm



(d) Reconnect the hose to the TP diaphragm. Check that the engine speed slowly returns to idle speed.

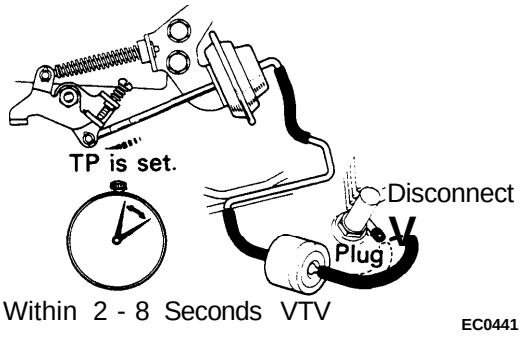
(e) Stop the engine and remove the tachometer.

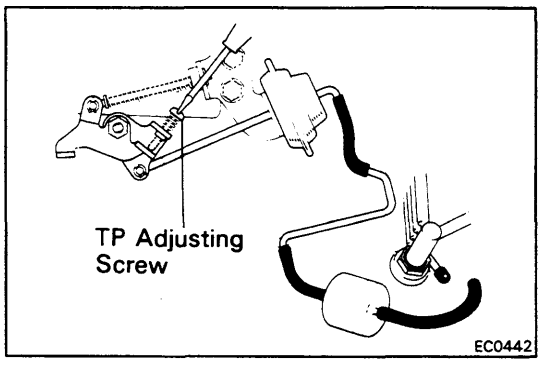


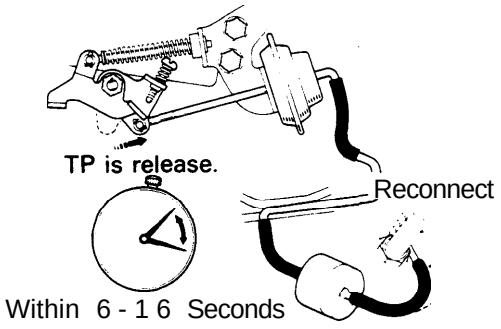


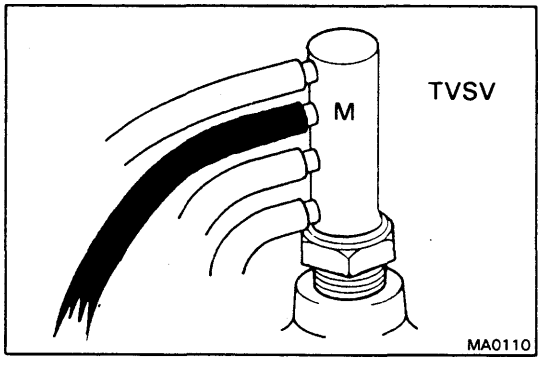
(f) Reconnect the hose to the TVSV M port

(g) Reinstall the air cleaner.









18. CANADÁ 3A ENGINE ONLY:

INSPECT THROTTLE POSITIONER (TP) SYSTEM

(a) Preparation

- Air cleaner removed
- EGR systems OFF

(b) Disconnect the vacuum hose between the VTV and vacuum pipe at the vacuum pipe side and plug the vacuum pipe end.

(c) Check that engine rpm increases to TP setting speed within 2 - 8 seconds after disconnecting the hose.

(d) Check that the engine rpm has increased to the specified rpm.

TP setting speed: 1,700 rpm M/T
1,400 rpm A/T

NOTE: Make adjustments with the engine cooling fan OFF.

If not, tum the TP adjusting screw until the specified rpm is reached.

(e) Reconnect the vacuum hose to the vacuum pipe.

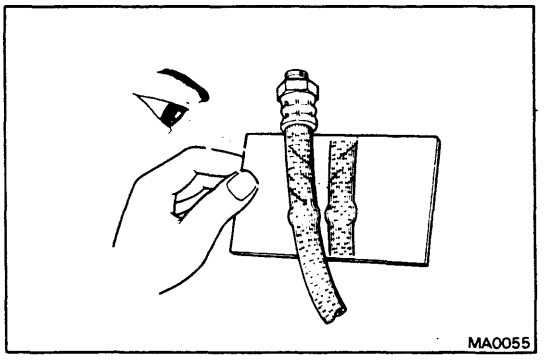
(f) Check that the engine returns to idle speed within 6 - 16 seconds after reconnecting the hose.

If a probiem is found, check the TP diaphragm, linkage and VTV.

(g) Stop the engine and remove the tachometer.

(h) Reconnect the hose to the TVSV M port.

(i) Reinstall the air cleaner.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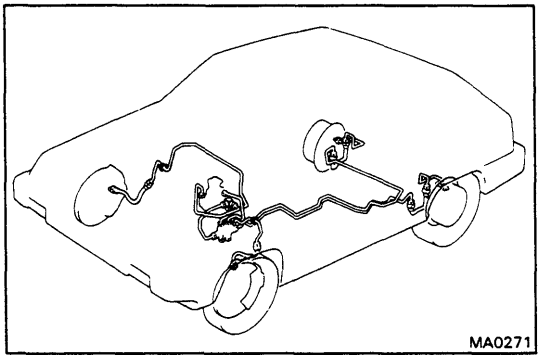
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BRAKES

19. INSPECT BRAKE LINE PIPES AND HOSES

NOTE: Inspect in a well lighted área. Inspect the entire circumference and length of the brake hoses using a mirror as required. Turn the front wheels fully right or left before inspecting the front brake.

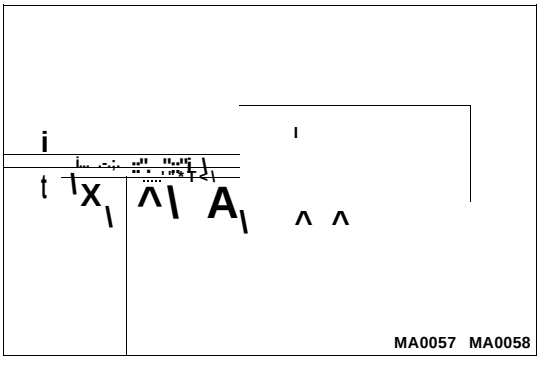
(a) Check all brake Unes and hoses for:

- Damage
- Wear
- Deformation
- Cracks
- Corrosión
- Leaks
- Bends
- Twists

(b) Check all clamps for tightness and connections for leakage.

(c) Check that the hoses and lines are clear of sharp edges, moving parts and the exhaust system.

(d) Check that the lines installed in grommets pass through the center of the grommets.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20. INSPECT REAR BRAKE LININGS AND DRUMS (See page BR-22, 29 or 36)

(a) Check the linings for wear.

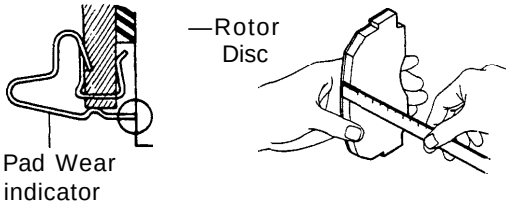
Mínimum lining thickness: 1.0 mm (0.039 in.)

(b) Check the brake drums for scoring or wear.

Máximum drum inside diameter:
181.0 mm (7.126 in.) - Sedan
201.0 mm (7.913 in.) - Wagón

(c) Clean the brake parts with a damp cloth.

NOTE: Do not use compressed air to cleah the brake parts.



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21 INSPECT FRONT BRAKE PADS AND DISCS (See page BR-16)

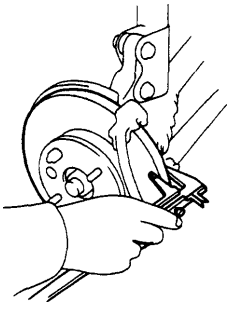
(a) Check the thickness of the disc brake pads and check for irregular wear.

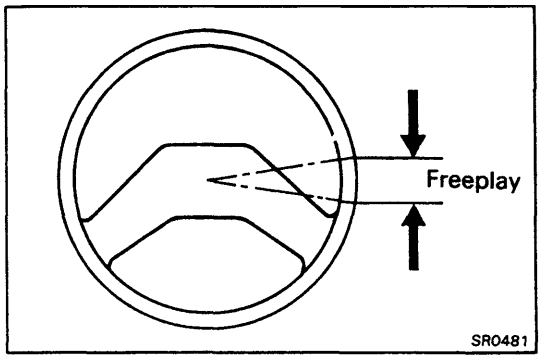
Mínimum pad thickness: 1.0 mm (0.039 in.)

NOTE: If a squealing or scraping noise occurs from the front-brake during driving, check the pad wear indicator. If there are traces of the indicator contacting the disc rotor, the disc pad should be replaced.

(b) Check the disc for wear or runout.

Mínimum disc thickness: 10.0 mm (0.394 in.)
Máximum disc runout: 0.15 mm (0.0059 in.)





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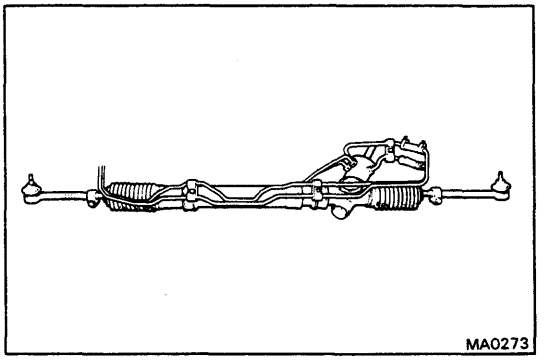
22. INSPECT STEERING LINKAGE

(a) Check that the steering wheel freeplay.

Máximum steering wheel freeplay: 30 mm **(1.18** in.)

With the vehicle stopped and pointed straight ahead, rock the steering wheel gently back and forth with light finger pressure.



(b) Check the steering linkage for looseness and damage.

Check that:

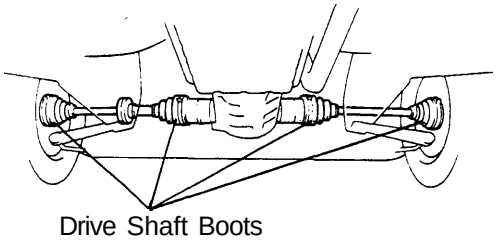
- Tie rod ends do not have excessive play.
- Dust seáis and boots are not damaged.
- Boot clamps are not loóse.

23. INSPECT STEERING GEAR HOUSING OIL

Check the steering gear housing for oil leakage.

24. INSPECT DRIVE SHAFT BOOTS

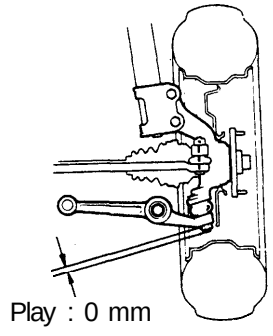
Inspect the drive shaft boots for clamp looseness, grease leakage or damage.



25. INSPECT BALL JOINTS AND DUST COVERS

(a) Inspect the ball joints for excessive looseness.

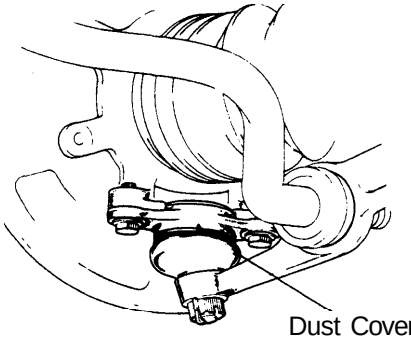
- Jack up the front of the vehicle and place wooden blocks with a height of 180 - 200 mm (7.09 - 7.87 in.) under the front tires.
- Lower the jack until there is about half a load on the front coil springs. Place stands under the vehicle for safety.
- Make sure the front wheels are in a straightforward position, and block them with chocks.
- Using a lever, pry up the end of the lower arm, and check the amount of play.



Ball joint vertical play: 0 mm (0 in.)

If there is play, replace the ball joints.

(b) Inspect the dust cover for damage.



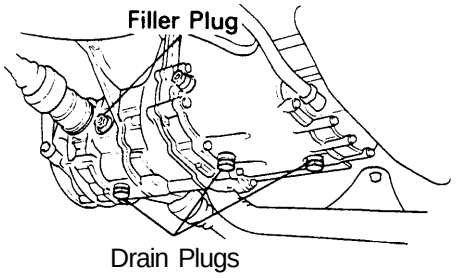
26. CHECK TRANSMISSION (A/T OR M/T) AND DIFFERENTIAL OIL

Visually check the transmission (A/T or M/T) and differential for oil leakage.

If leakage is found, check for cause and repair.

27. REPLACE MANUAL TRANSMISSION AND DIFFERENTIAL OIL

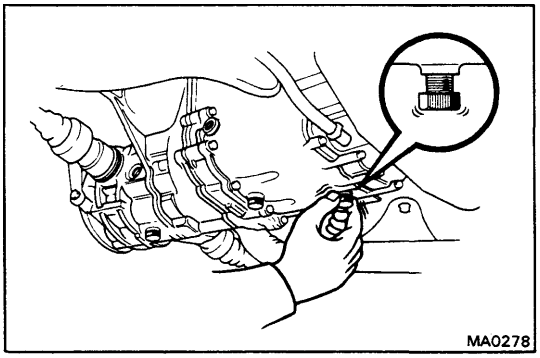
A. FWD



MA0277

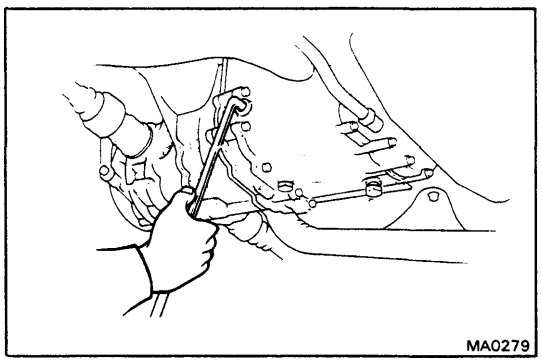
(a) Remove the three drain plugs and drain the oil.

(b) Reinstall drain plugs and tighten the front two securely.



MA0278

(c) Leave the extensión housing drain plug loóse about 7 or 8 turns.

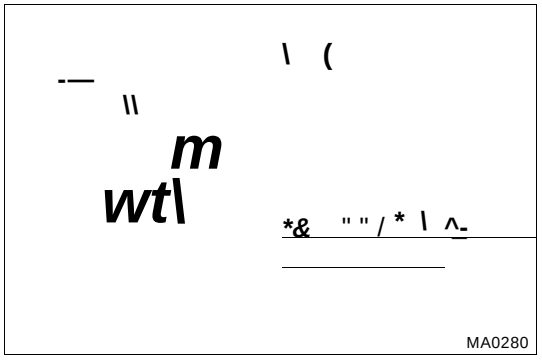


MA0279

(d) Add new oil until it begins to run out of the filler holes.

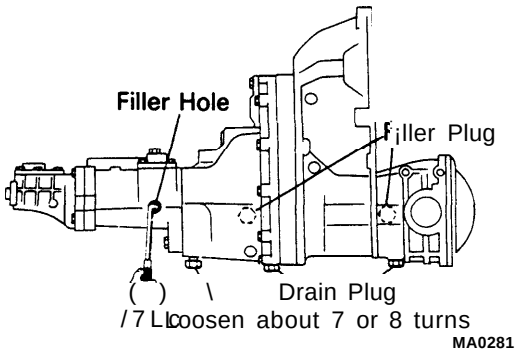
Transmission and differential oil —
Oil grade: API GL-4 or GL-5
Viscosity: Above -18°C (0°F)
SAE 75W-90, 80W-90 or 90
Below -18°C (0°F)
SAE 75W-90, 80W-90 or 80W

Oil capacity (transmission and differential):
3.3 liters (3.5 US qts, 2.9 Imp. qts)



MA0280

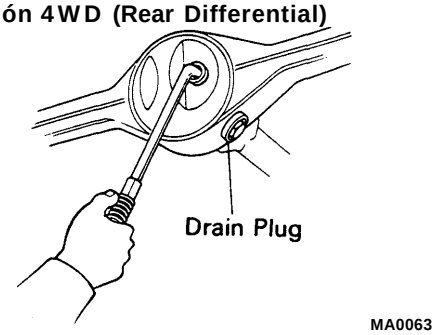
(e) Tighten the extensión housing drain plug securely.



B. For Wagón 4WD with M/T

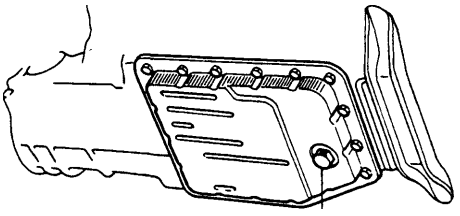
Oil replacement procedure (See page MT-70)
Oil grade: See page MA-15
Viscosity: See page MA-15
Oil capacity:
3.9 liters (4.1 US qts, 3.4 Imp. qts)

Wagón 4WD (Rear Differential)



28. REPLACE REAR DIFFERENTIAL OIL (for Wagón 4WD)

Rear differential oil —
Oil grade: API GL-5 hypoid gear oil
Viscosity: Above -18°C(0°F) SAE 90
Below -18°C(0°F) SAE 80W or 80W-90
Capacity: 1.0 liters (1.1 US qts, 0.9 Imp. qts)



Drain Plug

29. REPLACE AUTOMATIC TRANSMISSION FLUID AND DIFFERENTIAL OIL

Automatic Transmission

(a) Remove the drain plug and drain the fluid.

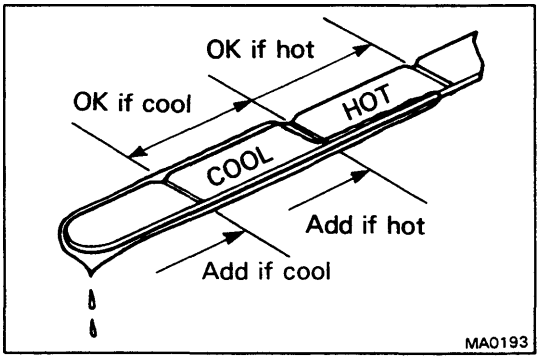
(b) Reinstall the drain plug securely.

(c) With the engine OFF, add new fluid through the dipstick tube.

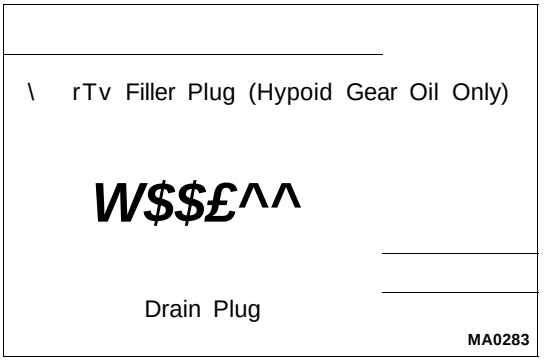
A/T fluid: ATF DEXRON H
Drain and refill capacity:
A55 2.2 liters (2.3 US qts, 1.9 Imp. qts)
A55F 4.2 liters (4.4 US qts, 3.7 Imp. qts)
Dry fill capacity:
A55 4.5 liters (4.8 US qts, 4.0 Imp. qts)
A55F 6.5 liters (6.9 US qts, 5.7 Imp. qts)

(d) Start the engine and shift the selector into all the positions from P through L, and then shift into P.

(e) With the engine idling, check the fluid level.
Add fluid up to the COOL level on the dipstick.



NOTE: Do not overfill. The automatic transmission and differential are sepárate units. Do not attempt to replenish transmission fluid by way of the differential filler hole.



Front Differential (With Automatic Transmission)

(a) Remove drain plug and drain the oil.

(b) Reinstall drain plug securely.

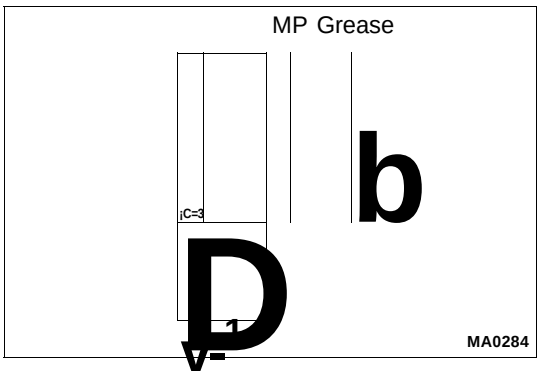
(c) Add new oil until it begins to run out of the filler hole.

Front differential oil —

Oil grade: API GL-5 hypoid gear oil
Viscosity: Above -18°C (0°F)
SAE 90
Below -18°C (0°F)
SAE 80W or 80W-90
Capacity: 0.95 liters (1.0 US qts, 0.8 Imp. qts)

NOTE: The differential and automatic transmission are sepárate units. Do not attempt to replenish differential oil by way of the transmission filler tube.

30. REPACK REAR WHEEL BEARINGS (ex. Wagón)



(a) Change rear wheel bearing grease.

- Remove the hub and inner and outer bearing. Clean in solvent and inspect the bearings for damage.
- Pack the bearings and axle hubs with multipurpose grease.

Wheel bearing grease grade:
Lithium base multipurpose grease (NLGI No. 2)

(b) Install inner bearing and new oil seal.

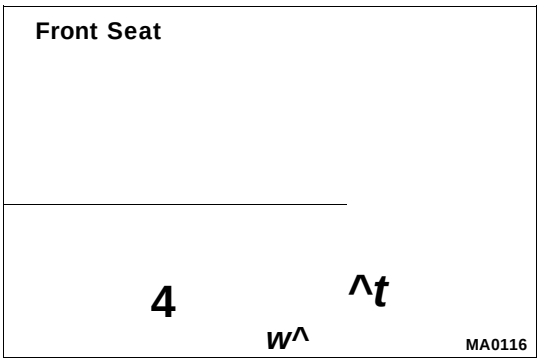
(c) Install the hub and adjust the wheel bearing preload. (See pages RA-5 to 11)

31. TIGHTEN BOLTS AND NUTS ON CHASSIS AND BODY

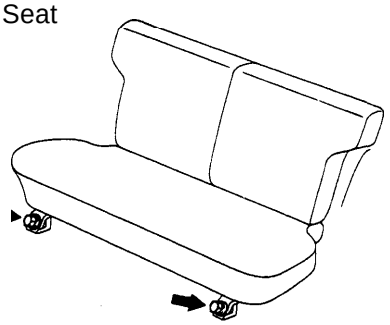
Tighten the following parts:

- Front and rear seats mounting bolts and nuts

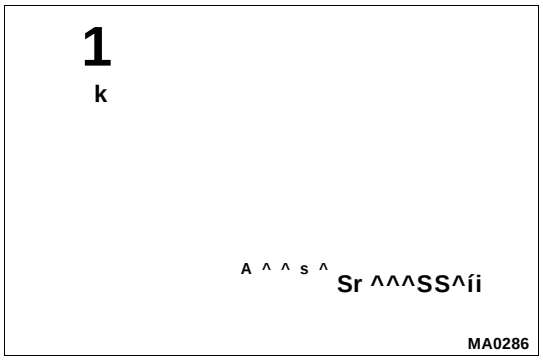
Torque: Front 375 kg-cm (27 ft-lb, 37 N-m)



Rear Seat



Torque: Rear 185 kg-cm (13 ft-lb, 18 N-m)



- Front suspensión member-to-body mounting bolts and nuts.

Torque: 900 kg-cm (65 ft-lb, 88 N-m)

32. FINAL INSPECTION

(a) Check the operation of the body parts:

- Hood
  Auxiliary catch operates properly
  Hood locks securely when closed
- Front and rear doors
  Door locks opérate properly
  Doors cióse properly
- Back door
  Door lock operates properly
- Seats
  Seats adjust easily and lock securely in any position
  Front seat back locks securely in any position
  Fold-down rear seat backs lock securely

(b) Road test

- Check the engine and chassis for abnormal noises.
- Check that the vehicle does not wander or pulí to one side.
- Check that the brakes work properly and do not drag.

(c) Be sure to deliver a clean car and especíally check:

- Steering wheel
- Shift lever knob
- All switch knobs
- Door handles
- **Seats**

GENERAL MAINTENANCE

These are the maintenance and inspection ¡tems which are considered to be the owner's responsibility. They can be performed by the owner or he can have them done at a service shop. These items include those which should be checked on a daily basis, those which, in most cases, do not require (special) tools and those which are considered to be reasonable for the owner to perform.
ítems and procedures for general maintenance are as follows.

OUTSIDE VEHICLE

1. TIRES

(a) Check the pressure with a gauge. If necessary, adjust.

(b) Check for cuts, damage or excessive wear.

2. WHEEL NUTS

When checking the tires, check the nuts for looseness or for missing nuts. If necessary, tighten them.

3. TIRE ROTATION

It is recommended that the tires be rotated every 7,500 miles (12,000 km).

4. WINDSHIELD WIPER BLADES

Check for wear or cracks whenever they do not wipe clean. If necessary, replace.

5. FLUID LEAKS

(a) Check undemeath for leaking fuel, oil, water or other fluid.

(b) If you smell gasoline fumes or notice any leak, have the cause found and corrected.

6. DOORS AND ENGINE HOOD

(a) Check that all doors including the trunk lid and back hatch opérate smoothly, and that all latches lock securely.

(b) Check that the engine hood secondary latch secures the hood from opening when the primary latch is released.

INSIDE VEHICLE

7. LIGHTS

(a) Check that the headlights, stop lights, tail lights, turn signal lights, and other lights are all working.

(b) Check the headlight aim.

8. WARNING LIGHTS AND BUZZERS

Check that all warning lights and buzzers function properly.

9. HORN

Check that it is working.

10. WINDSHIELD GLASS

Check for scratches, pits or abrasions.

11. WINDSHIELD WIPER AND WASHER

(a) Check operation of the wipers and washer.

(b) Check that the wipers do not streak.

12. WINDSHIELD DEFROSTER

Check that air comes out from the defroster outlet when operating the heater or air conditioner.

13. REAR VIEW MIRROR

Check that it is mounted securely.

14. SUN VISORS

Check that they move freely and are mounted securely.

15. STEERING WHEEL

Check that it has specified freeplay. Be alert for changes in steering condition, such as hard steering, excessive freeplay or strange noise.

16. SEATS

(a) Check that all front seat controls such as seat adjusters, seatback recliner, etc. opérate smoothly.

(b) Check that all latches lock securely in any position.

(c) Check that the locks hold securely in any latched position.

(d) Check that the head restraints move up and down smoothly and that the locks hold securely in any latched position.

(e) For fold-down rear seat backs and bottom cushion, check that the latches lock securely.

17. SEAT BELTS

(a) Check that the seat belt system such as the buckles, retractors and anchors opérate properly and smoothly.

(b) Check that the belt webbing is not cut, frayed, wom or damaged.

18. ACCELERATOR PEDAL

Check the pedal for smooth operation and uneven pedal effort or catching.

19. CLUTCH PEDAL (See page CL-3)

Check the pedal for smooth operation.
Check that the pedal has the proper freeplay.

20. BRAKE PEDAL (See page BR-6)

(a) Check the pedal for smooth operation.

(b) Check that the pedal has the proper reserve distance and freeplay.

(c) Check the brake booster function.

21. BRAKES

At a safe place, check that the brakes do not pulí to one side when applied.

22. PARKING BRAKE (See page BR-8)

(a) Check that the lever has the proper travel.

(b) On a safe incline, check that vehicle is held securely with only the parking brake applied.

23. AUTOMATIC TRANSMISSION "PARK" MECHANISM

(a) Check the lock reléase button of the selector lever for proper and smooth operation.

(b) On a safe incline, check that vehicle is held securely with the selector lever in "P" position and all released.

UNDER HOOD

24. WINDSHIELD WASHER FLUID

Check that there is sufficient fluid in the tank.

25. ENGINE COOLANT LEVEL

Check that the coolant level is between the "FULL" and "LOW" lines on the see-through reservoir.

26. RADIATOR AND HOSES

(a) Check that the front of the radiator is clean and not blocked with leaves, dirt or bugs.

(b) Check the hoses for cracks, kinks, rot or loóse connections.

27. BATTERY ELECTROLYTE LEVEL

Check that the electrolyte level of all battery cells is between the upper and lower level lines on the case. If level is low, add distilled water only.

28. BRAKE FLUID LEVELS

Check that the brake fluid level is near the upper level line on the see-through reservoir.

29. ENGINE DRIVE BELTS

Check all drive belts for fraying, cracks, wear or oiliness.

30. ENGINE OIL LEVEL

Check the level on the dipstick with the engine turned off.

31. POWER STEERING FLUID LEVEL

Check the level on the dipstick.
The level should be in the "HOT" or "COLD" range depending on the fluid temperature.

32. AUTOMATIC TRANSMISSION FLUID LEVEL

(a) Park the vehicle on a level surface.

(b) With the engine idling and the parking brake applied, shift the selector into all positions from P to L, and then shift into P.

(c) Pulí out the dipstick and wipe off the fluid with a clean rag. Reinsert the dipstick and check that the fluid level is in the HOT range.

(d) Perform this check with the fluid at normal driving temperature (70 - 80°C or 158 - 176°F).

NOTE: Wait until the engine cools down (about 30 min.) before checking the fluid level after extended high-speed driving in hot whether, driving in heavy traffic or pulling a trailer.

33. **EXHAUST SYSTEM**

Visually inspect for cracks, holes or loóse supports.
If any change in the sound of the exhaust or smell of the exhaust fumes is noticed, have the cause located and corrected.

ENGINE MECHANICAL

TROUBLESHOOTING

Problem	Possible cause	Remedy	Page
Engine overheats	Cooling system faulty Incorrect ignition timing	Troubleshoot cooling system Reset timing	CO-2 IG-13
Engine will not crank or cranks slowly	Starting system faulty	Troubleshoot starting system	ST-2
Engine will not start/ Hard to start (cranks OK)	No fuel supply to carburetor Carburetor probiems Ignition probiems Vacuum leaks • HIC line • PCV line • EGR line • MC line • Intake manifold Compression low Feed back system probiems	Check fuel line Troubleshoot fuel system Troubleshoot ignition system Repair as necessary Check compression Check air bleed feed back system	 FU-2 IG-2 EM-6 EM-32
Rough idle or stalls	Vacuum leaks • PCV line • MC line • EGR line • Intake manifold • HAC line Ignition probiems Carburetor probiems HAI system faulty Engine overheats EGR valve faulty Incorrect valve clearance Compression low Feed back system probiems	Repair as necessary Troubleshoot ignition system Troubleshoot fuel system Check HAI system Troubleshoot cooling system Check EGR valve Adjust valve clearance Check compression Check air bleed feed back system	 IG-2 FU-3 EC-43 CO-2 EC-20 EM-35 EM-6 EC-32
Engine hesitates/ Poor acceleration	Ignition probiems Vacuum leaks • HIC line • PCV line • EGR line • HAC line • Intake manifold • Carburetor hoses Air cleaner clogged Fuel line clogged Carburetor probiems Emission control system problem • HAI system always on (hot engine) • AAP system faulty (cold engine) • EGR system always on (cold engine) • HAC system faulty • CMH system faulty (cold engine)	Troubleshoot ignition system Repair as necessary Check air filter Check fuel line Troubleshoot fuel system Check HAI system Check AAP system Check EGR system Check HAC system Check CMH system	IG-2 MA-5 FU-2 EC-43 EC-54 EC-20 EC-40 EC-61

TROUBLESHOOTING (Cont'd)

Problem	Possible cause	Remedy	Page
	Engine overheats Compression low Feed back system problem	Troubleshoot cooling system Check compression Check air bleed feed back system	CO-2 EM-6 EC-32
Engine dieseling (runs after ignition switch is turned off)	Carburetor problems Incorrect ignition timing	Troubleshoot fuel system Reset timing	FU-3 IG-13
Muffler explosión (after fire) on deceleration only	AS system faulty TP system faulty Deceleration fuel cut system alway off	Check AS system Check TP system Check fuel cut system	EC-27 EC-15 EC-56
Muffler explosión (after fire) all the time	Air cleaner clogged Choke system faulty Incorrect ignition timing Incorrect valve clearance	Check air filter Check choke system Reset timing Adjust valves	MA-5 EC-47 IG-13 EM-35
Engine backfires	Choke valve open (cold engine) Carburetor vacuum leak EBCV vacuum leak Insufficient fuel flow Incorrect ignition timing Incorrect valve clearance	Check choke system Check hoses and repair as necessary Check air bleed with fleed back system Troubleshoot fuel system Reset timing Adjust valve clearance	EC-47 EC-32 FU-2 IG-13 EM-35
Excessive oil consumption	Oil leak PCV line clogged Pistón ring worn or damaged Valve stem worn Valve stem oil seal worn or damaged	Repair as necessary Check PCV system Check rings Check valves an guides Check oil seal	 EC-7 EM-47 EM-22
Poor fuel mileage	Fuel leak Air cleaner clogged Ignition problems Carburetor problems EGR system always on EVAP system problems Compression low Tires improperly inflated Clutch slips Brakes drag	Repair as necessary Check air filter Troubleshoot ignition system Troubleshoot fuel system Check EGR system Check EVAP system Check compression ínflate tires to proper pressure Troubleshoot clutch Troubleshoot brakes	 MA-5 IG-2 FU-2 EC-20 EC-9 EM-6 FA-3 CL-2 BR-2
Unpleasant odor	Incorrect idle speed Incorrect ignition timing Vacuum leaks • PCV line • EGR line • MC line • Intake manifold • Carburetor hoses AS system faulty Feed back system proglems	Adjust idle speed Reset timing Repair as necessary Check air bleed with feed back system	FU-25 IG-13 EC-27 EC-32

ENGINE TUNE-UP

1. INSPECT ENGINE COOLANT (See page CO-3)

2. INSPECT ENGINE OIL LEVEL
(See step 2 on page LU-2)

3. INSPECT BATTERY SPECIFIC GRAVITY
(See page CH-3)

4. INSPECT AIR FILTER (See page MA-5)
Clean or replace the air filter as necessary.

5. INSPECT SPARK PLUGS (See page IG-4)
Gap: 3A-C (ex. Canadá Wagón M/T)
1.1 mm (0.043 in.)
3A & 3A-C (Canadá Wagón M/T)
0.8 mm (0.031 in.)

6. INSPECT DRIVE BELTS
Alternater (See page CH-3)
PS Pump (See page SR-24)
A/C compressor (See page AC-10)

7. INSPECT VALVE CLEARANCE
(See pages EM-35)
Valve clearance (hot):
Intake 0.20 mm (0.008 in.)
Exhaust 0.30 mm (0.012 in.)

8. INSPECT IGNITION TIMING (See page IG-13)
Ignition timing (Vacuum advancer OFF):
5°BTDC@ Max. 950 rpm

9. INSPECT CARBURETOR FLOAT LEVEL
(See page FU-24)

10. INSPECT FAST IDLE SPEED
(See page FU-26)
Fast idle speed: 3,000 rpm
(Transmission in N range and cooling fan OFF)

11. ADJUSTIDLE SPEED
(See page FU-25)
Idle speed:

3A-C	550 rpm	4-speed M/T
	650 rpm	5 or 6 speed M/T w/o PS
	800 rpm	5 or 6 speed M/T w/ PS
	800 rpm	A/T w/o PS
	900 rpm	A/T w/ PS
3A	650 rpm	M/T w/o PS
	800 rpm	M/T w/ PS & A/T w/o PS
	900 rpm	A/T w/ PS

NOTE: Adjust the idle mixture if necessary.
(See page FU-28)

IDLE HC/CO CONCENTRATION CHECK METHOD

NOTE: This check ¡s used only to determine whether or not the idle HC/CO complies with the state or city regulations.

PRECHECK

INITIAL CONDITIONS

(a) Normal engine operating temperature

(b) Choke fully open

(c) Air cleaner installed

(d) All accessories switched off

(e) All vacuum lines properly connected

NOTE: All vacuum hoses for EGR systems, etc. should be properly connected.

(f) Ignition timing set correctly

(g) Transmission in N range

(h) Carburetor float level even with the correct level in the sight glass

(i) Tachometer and HC/CO meter at hand and calibrated

MEASUREMENT

1. INSERT TESTING PROBÉ OF HC/CO METER INTO TAILPIPE AT LEAST 40 cm (1.3 ft)

2. MEASURE HC/CO CONCENTRATION AT IDLE

Wait at least one minute before measuring to allow the concentration to stabilize.
Complete the measuring within three minutes.

If the HC/CO concentration does not conform to regulations, see the table below for possible causes.

TROUBLESHOOTING

HC	CO	Problems	Causes
High	Normal	Rough idle	1. Faulty ignition: • Incorrect timing • Fouled, shorted or improperly gapped plugs • Open or crossed ignition wires • Cracked distributor cap 2. Incorrect valve clearance 3. Leaky EGR valve 4. Leaky exhaust valves 5. Leaky cylinder
High	Low	Rough idle Fluctuating HC reading	Vacuum leak: • Vacuum hose • Intake manifold • PCV line • Carburetor base
High	High	Rough idle Black smoke from exhaust	1. Restricted air f ilter 2. Plugged PCV valve 3. AS system problem 4. Faulty carburetor: • Faulty choke action • Incorrect float setting • Leaking needle or seat

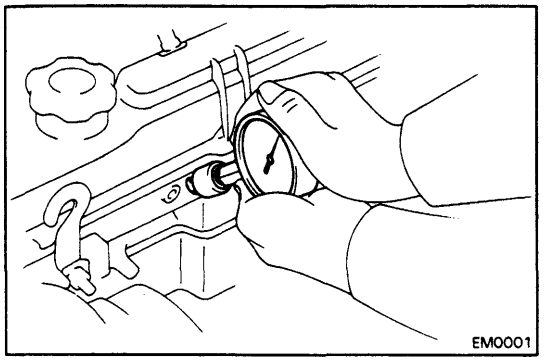
NOTE: If the HC/CO concentration cannot be corrected in accordance with this troubleshooting table, adjust the idle mixture.

COMPRESSION CHECK

NOTE: If there is lack of power, excessive oil consumption or poor fuel milage after engine tune up, measure the cylinder compression pressure.

1. WARM UP ENGINE

2. REMOVE FOUR SPARK PLUGS



MEASURE CYLINDER COMPRESSION PRESSURE

(a) Irísert a compression gauge into the spark plug hole.

(b) Fully open the throttle.

(c) While cranking the engine with the starter motor, measure the compression pressure.

NOTE: Always use a fully charged battery to insure that at least 250 rpm can be attained.

(d) Repeat steps (a) through (c) for each cylinder.

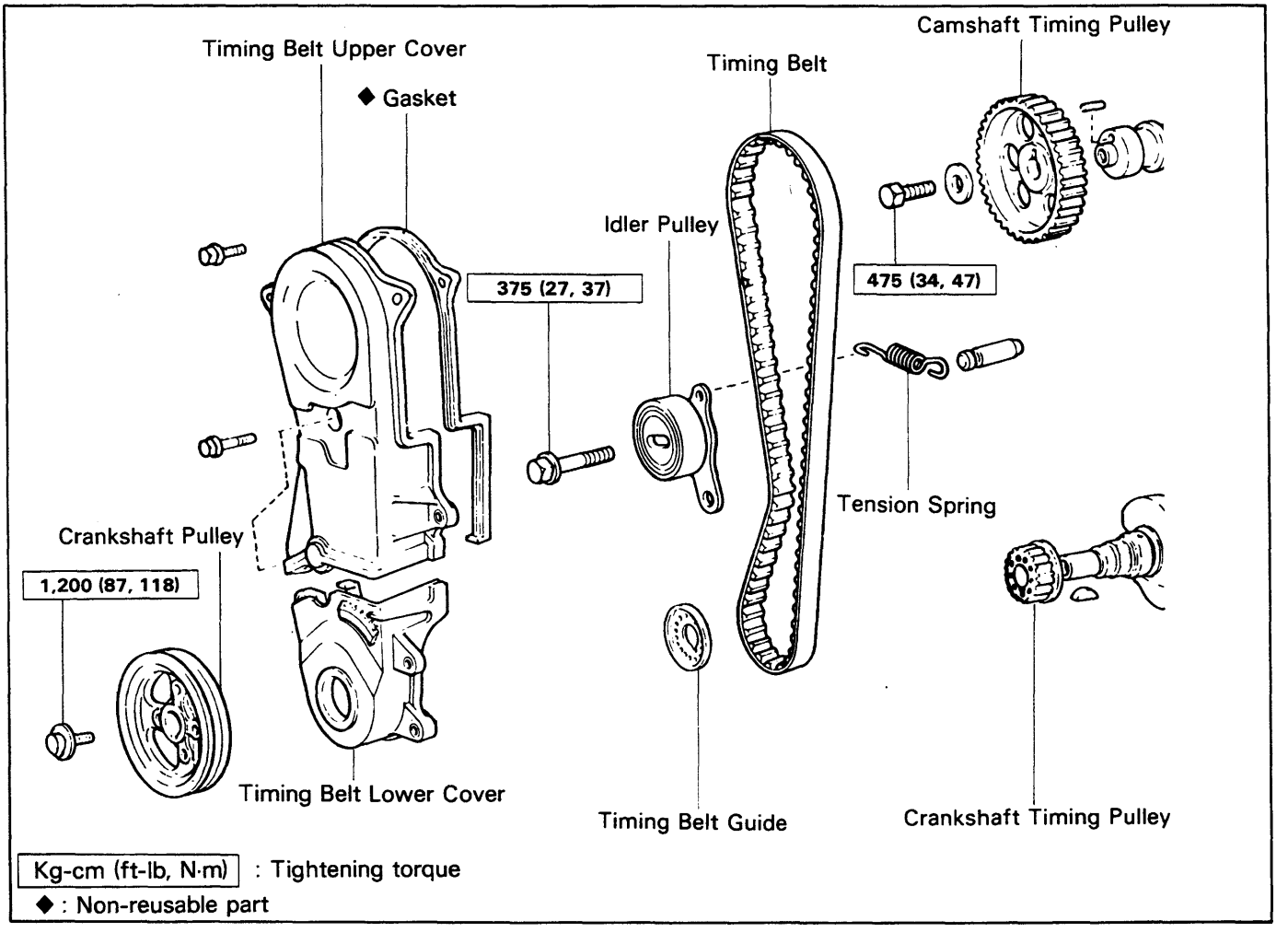
Compression pressure:
12.5 kg/cm^2 (178 psi, 1,226 kPa)
Minimum pressure:
9 kg/cm^2 (128 psi, 883 kPa)
Difference between each cylinder:
1.0 kg/cm^2 (14 psi, 98 kPa) or less

(e) If compression of one or more cylinders is low, pour a small amount of engine oil into that cylinder through the spark plug hole and repeat steps (a) through (c) for the cylinder with low compression.

- If adding oil helps the compression, chances are that the pistón rings and/or cylinder bore are worn or damaged.
- If pressure remains low, a valve may be sticking or seated improperly, or there may be leakage past the gasket.

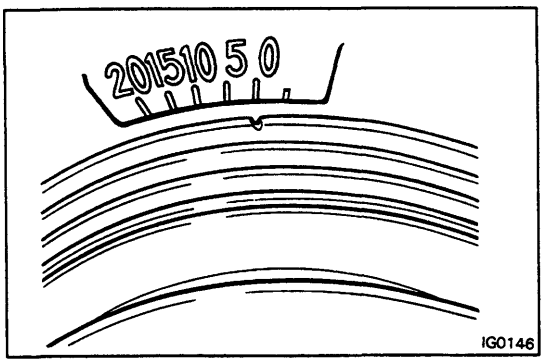
TIMING BELT

COMPONENTS



REMOVAL OF TIMING BELT

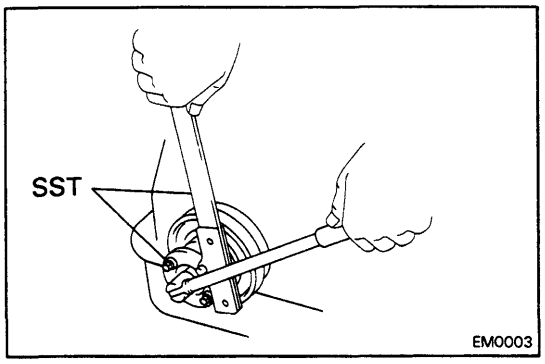
1. **REMOVE RADIATOR (See page CO-12)**
2. **REMOVE AIR CLEANER ASSEMBLY (See page FU-7)**
3. **REMOVE DRIVE BELTS**
4. **REMOVE WATER PUMP PULLEY**
5. **(w/ A/C) REMOVE IDLER PULLEY BRACKET TOGETHER WITH PULLEY**
6. **REMOVE CYLINDER HEAD COVER**
   (a) Disconnect the PCV hose from the PCV valve.
   (b) Remove the three cap nuts, seal washers, cylinder head cover and gasket.



REMOVE CRANKSHAFT PULLEY

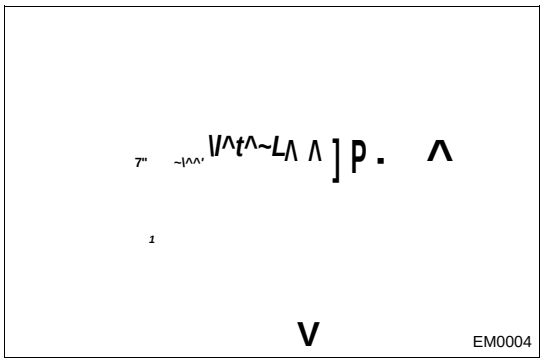
(a) Set No. 1 cylinder at TDC/compression.
Turn the crankshaft pulley until the timing mark is aligned with the TDC mark.

NOTE: Check that the rocker arms on the No. 1 cylinder are loóse. If not, turn the crankshaft one full turn.



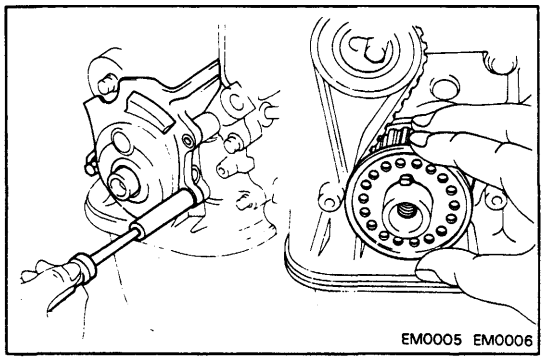
(b) Using SST, remove the crankshaft pulley mount bolt.

SST 09213-70010 and 09330-00020



(c) Using SST, remove the crankshaft pulley.

SST 09213-31021

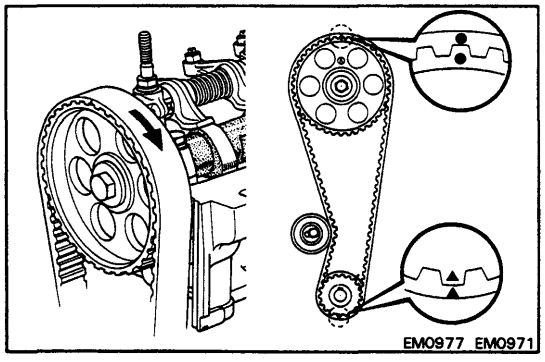


8. REMOVE TIMING BELT COVERS

(a) Remove the four bolts, timing belt upper cover and gasket.

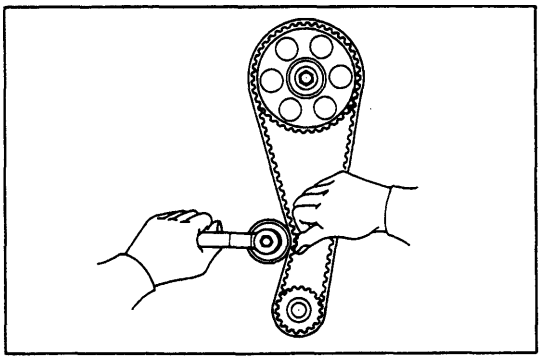
(b) Remove the three bolts and timing belt lower cover.

9. REMOVE TIMING BELT GUIDÉ



10. REMOVE TIMING BELT AND IDLER PULLEY

NOTE: If reusing the timing belt, draw a direction arrow on the belt (in direction of engine revolution), and place matchmarks on the pulleys and belt as shown in the figure.

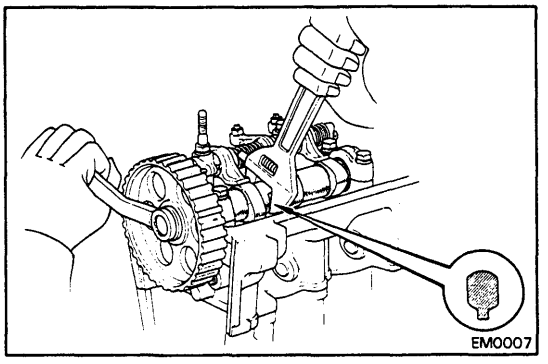


(a) Loosen the ¡dler pulley mount bolt, push it left as far as it will go and then temporarily tighten it.

(b) Remove the belt.

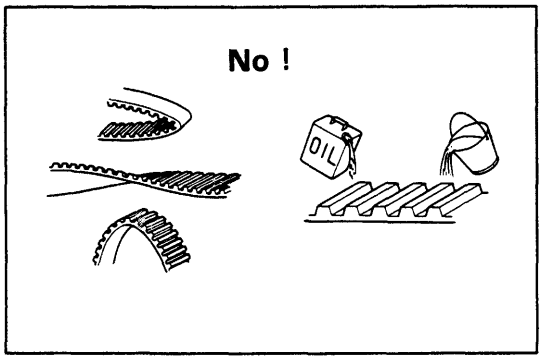
(c) Remove the idler pulley mount bolt, pulley and retum spring.

11. REMOVE CRANKSHAFT TIMING PULLEY



12. REMOVE CAMSHAFT TIMING PULLEY

Secure the camshaft and remove the camshaft timing pulley mount bolt, píate washer and pulley.

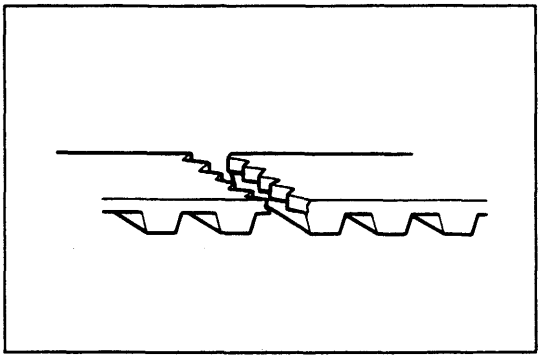


INSPECTION OF COMPONENTS

1. INSPECT TIMING BELT

CAUTION:

1. **Do not bend, twist or turn the belt inside out.**
2. **Do not allow the belt to come into contact with oí l, water or steam.**
3. **Do not utilize belt tensión when installing or removing the set bolt of the camshaft timing pulley.**

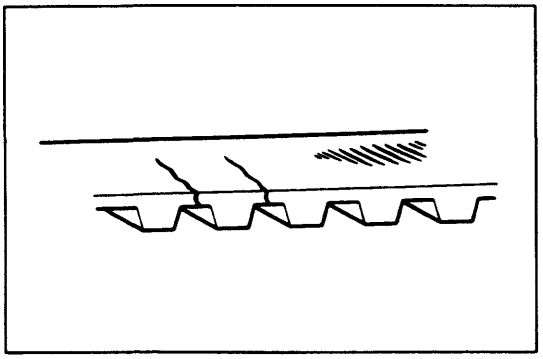


If there are defects, as shown in the figures, check the following points and replace the timing belt if necessary.

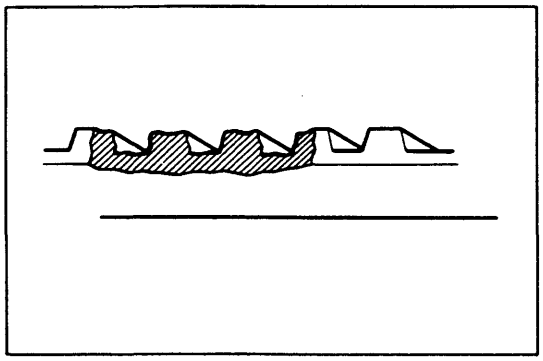
(a) Premature severance

- Check for proper installation.
- Check the timing cover gaskets for damage, and check for installation.

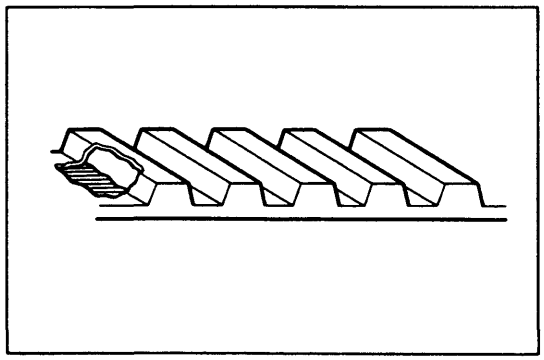
(b) If the belt teeth are cracked or damaged, check to see if the camshaft, water pump or oil pump is locked.



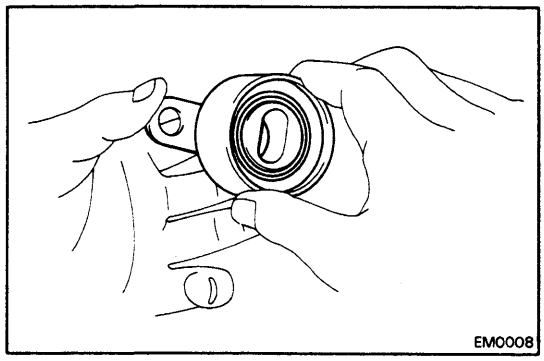
(c) If there is noticeable wear or cracks on the belt face, check to see if there are nicks on one side of the idler pulley lock.



(d) If there is wear or damage on only one side of the belt, check the belt guide and the alignment of each pulley.



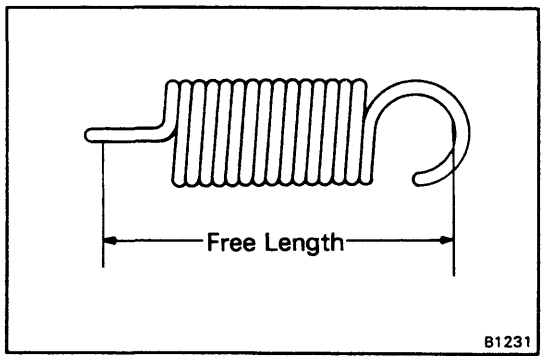
(e) If there is noticeable wear on the belt teeth, check the timing cover gasket for damage and check for córrect gasket installation. Check for foreigh matter on the pulley teeth.



2. INSPECT IDLER PULLEYS

Check the turning smoothness of the timing belt idler pulleys.

If not smooth, replace the idler pulley.



3. INSPECT TENSIÓN SPRING

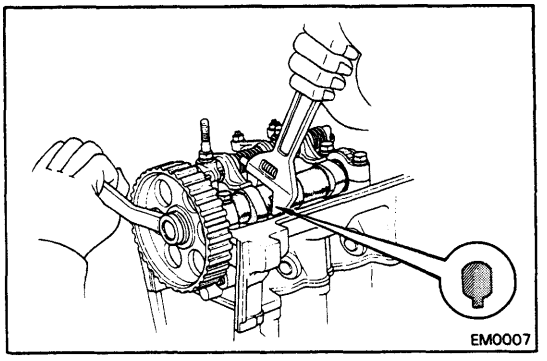
(a) Check the free length of the spring.

Free length: 38.4 mm (1.512 in.)

(b) Check the tensión of the spring at the specified installed length.

Installed tensión:
3.83 kg (8 lb, 37 N) at 50.2 mm (1.976 in.)

If it does not meet specification, replace the spring.



INSTALLATION OF TIMING BELT

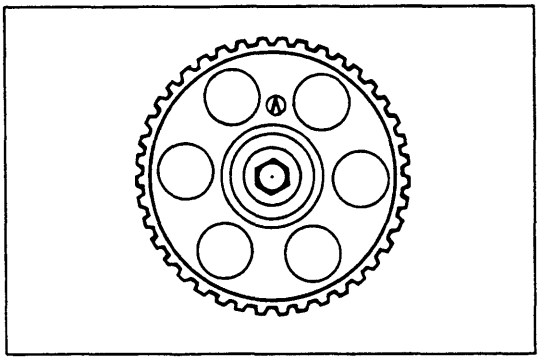
(See page EM-7)

1. INSTALL CAMSHAFT TIMING PULLEY

(a) Align the knock pin of the camshaft with the pin hole of the camshaft, and install the camshaft with the píate washer and mount bolt.

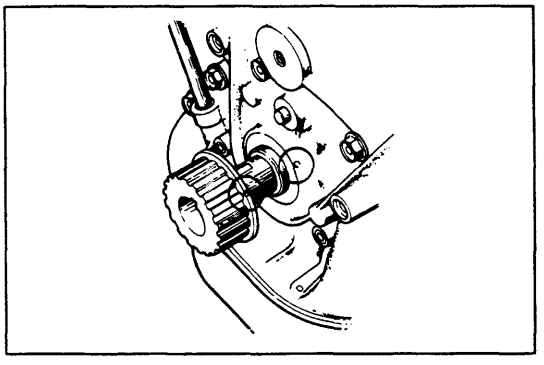
(b) Secure the camshaft and tighten the mount bolt.

Torque: 475 kg-cm (34 ft-lb, 47 Nm)



(c) Align the bearing cap mark and the center of the small hole on the camshaft timing pulley.

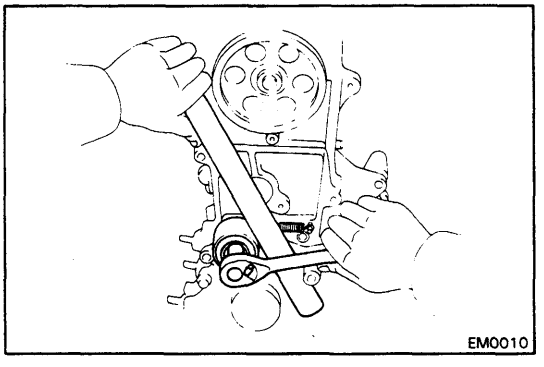
NOTE: Remove any oil or water on the camshaft timing pulley and keep it clean.



2. INSTALL CRANKSHAFT TIMING PULLEY

Install the crankshaft timing pulley and align the TDC marks on the oil pump body and crankshaft timing pulley.

NOTE: Remove any oil or water on the crankshaft timing pulley and keep it clean.



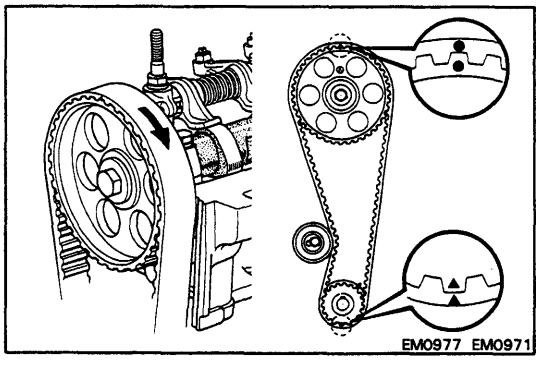
3. INSTALL TIMING BELT IDLER PULLEY

(a) Temporarily install the timing belt idler pulley with the mount bolt.

(b) Install the tensión spring.

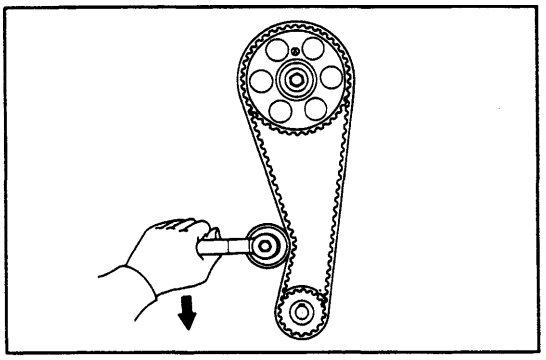
(c) Pry the timing belt idler pullay toward the left as far as it will go and temporarily tighten it.

NOTE: Remove any oil or water on the idler pulley and keep it clean.



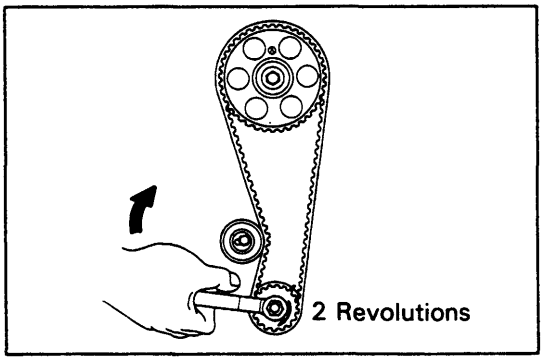
INSTALL TIMING BELT

NOTE: If reusing the timing belt, align the points marked during removal and install the belt with the arrow pointing in the direction of engine revolution.



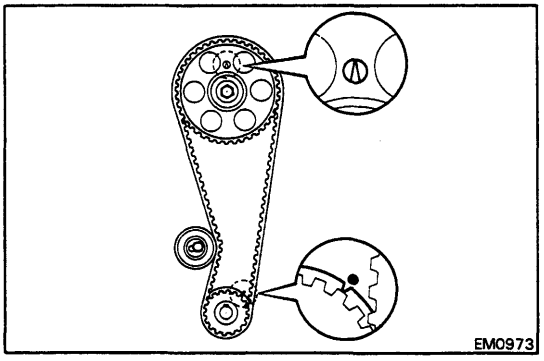
5. CHECK VALVE TIMING AND TIMING BELT TENSIÓN

(a) Loosen the mount bolt of the timing belt idler pulley.



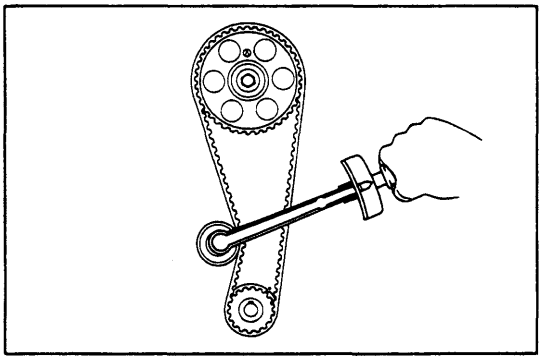
(b) Temporarily install the crankshaft pulley mount bolt and turn the crankshaft two revolutions from TDC to TDC.

CAUTION: Always turn the crankshaft clockwise.



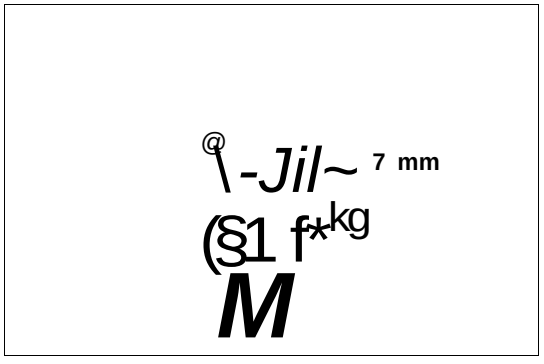
(c) Check the valve timing.

Insure that each pulley aligns with the marks as shown in the figure.



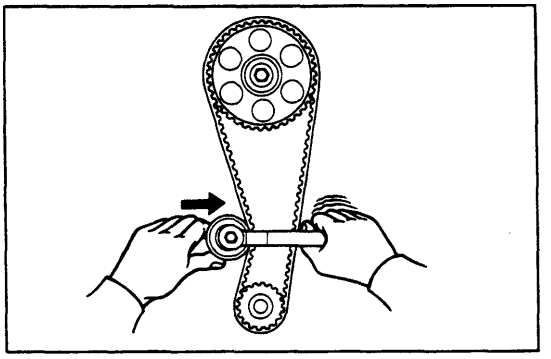
(d) Tighten the mount bolt of the timing belt idler pulley.

Torque: 375 kg-cm (27 ft-lb, 37 N-m)



(e) Measure the timing belt tensión as shown in the figure.

Timing belt tensión: 6 — 7 mm at 2 kg
(0.24 - 0.28 in. at 4.4 lb, 20 N)



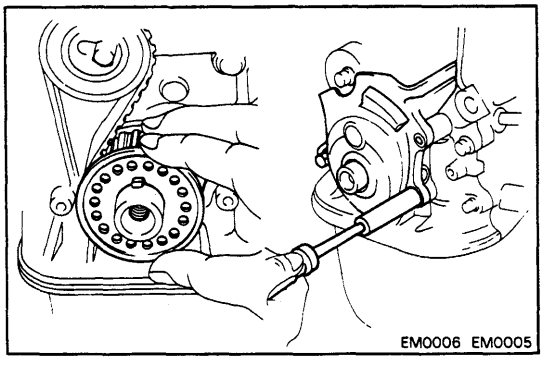
(f) If the measured valué is not within standard, readjust with the idler pulley.

(g) Remove the temporarily installed crankshaft pulley mount bolt.

6. INSTALL CYLINDER HEAD COVER

(a) Install the half circular plug and cylinder head cover with gasket.

(b) Connect the PCV hose to the PCV valve.



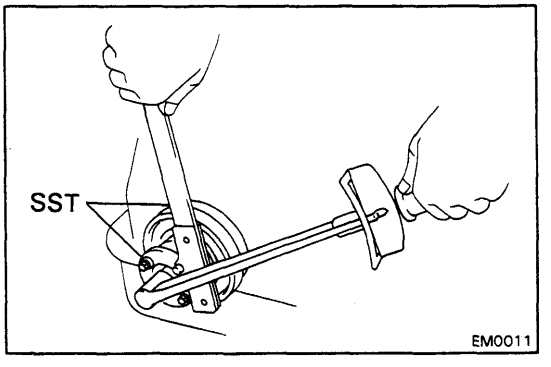
7. INSTALL TIMING BELT GUIDE

8. INSTALL TIMING BELT COVERS

9. CRANKSHAFT PULLEY

(a) Apply a light coating of engine oil on the threads and heads under of the pulley set bolt.

(b) Align the pulley set key with the key groove of the pulley and install.



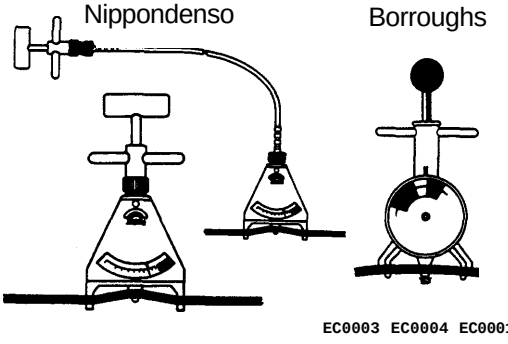
(c) Using SST, install and torque the mount bolt

SST 09213-70010 and 09330-00020

Torque: 1,200 kg-cm (87 ft-lb, 118 Nm)

10. (w/A/C)
INSTALL A/C IDLER PULLEY BRACKET AND PULLEY

11. INSTALL WATER PUMP PULLEY



12. INSTALL AND ADJUST DRIVE BELTS

Using a beit tensión gauge, check the drive beit tensión.

Beit tensión gauge:
Nippondenso BTG-20 (95506-00020) or
Borroughs No. BT-33-73F

Drive **beit** tensión: Used beit 80 ± **20 lb**
New **beit** 125 ± 25 lb

If necessary, adjust the drive beit tensión.

NOTE:
- "New beit" refers to a brand new beit which has never been used.
- "Used beit" refers to a beit which has been used on a running engine for 5 minutes or more.
- After ¡nstalling the drive beit, check that it fits properly in the ribbed grooves. (V-ribbed type)

CORRECT WRONG WRONG

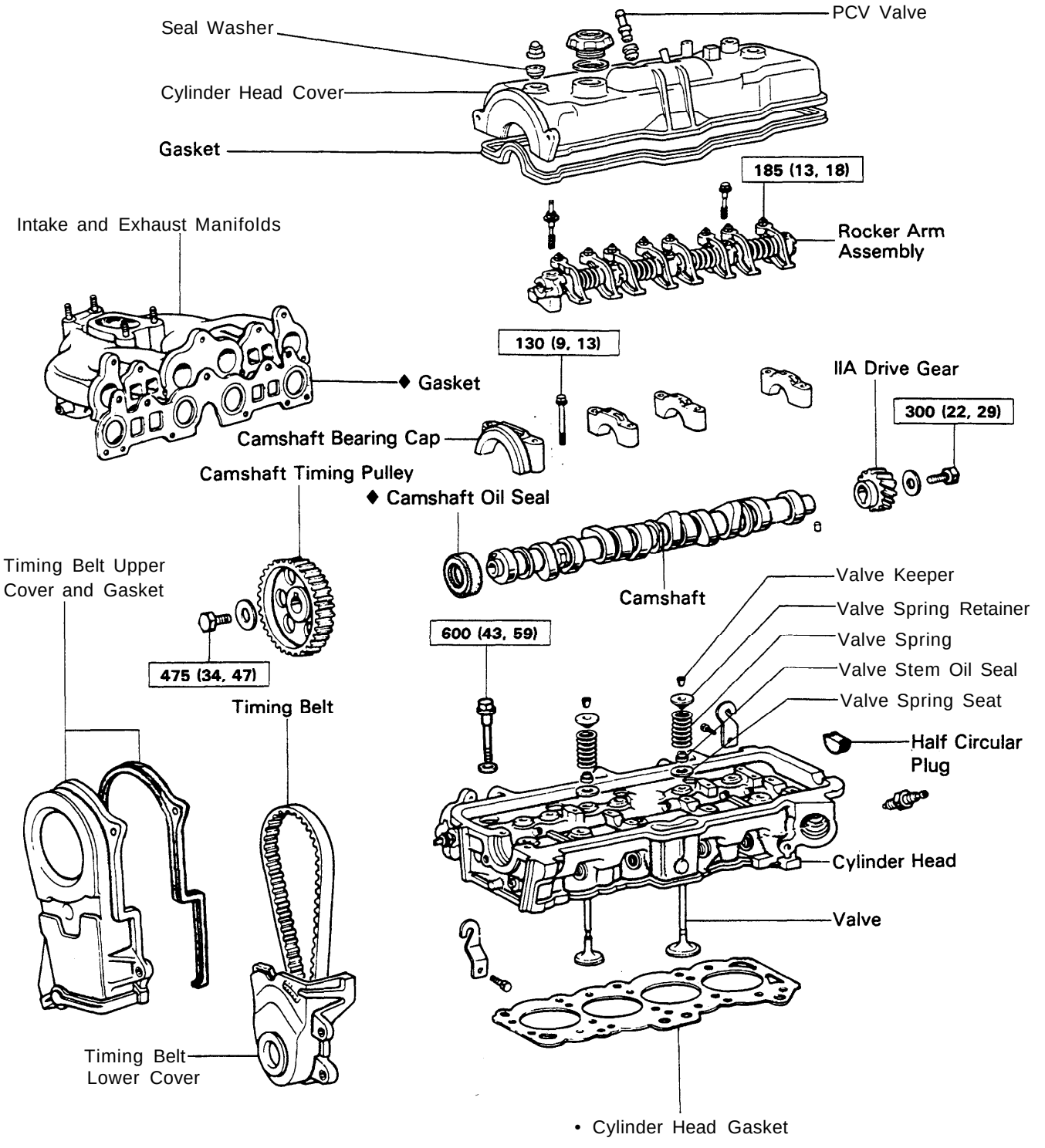
13. INSTALL AIR CLEANER ASSEMBLY
(See page FU-24)

14. INSTALL RADIATOR (See page CO-17)

15. START ENGINE AND CHECK FOR LEAKS

CYLINDER HEAD

COMPONENTS



Kg-cm (ft-lb, Nm) | : Tightening torque

•: Non-reusable part

PREPARATION FOR REMOVAL

1. DISCONNECT CABLE FROM NEGATIVE TERMINAL OF BATTERY

2. DRAIN ENGINE COOLANT (See page CO-3)

3. DRAIN ENGINE OIL (See page LU-3)

4. REMOVE AIR CLEANER ASSEMBLY (See page FU-7)

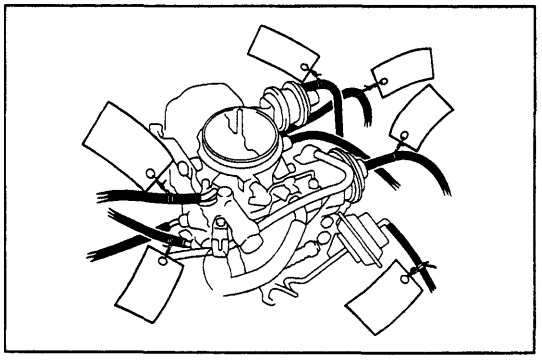
5. DISCONNECT FOLLOWING HOSES:

(a) Heater inlet hose from cylinder head rear píate

(b) Brake booster hose from intake manifold

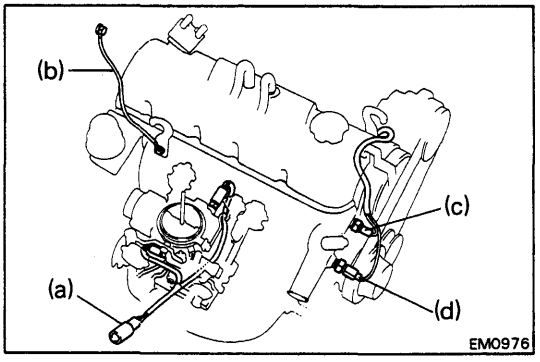
(c) Fuel hoses from fuel pump

(d) (w/ A/C)
Vacuum hose of VSV for idle-up



(e) Emission control hoses

NOTE: Before disconnecting the vacuum hoses, always use tags to identify how they should be reconnected.



6. DISCONNECT FOLLOWING CONNECTORS AND

(a) Carburetor connector

(b) [3A-C (ex. Canadá Wagón M/T)]
Thermo switch connector

(c) (w/ A/T)
Water temperature warning switch connector

(d) Water temperature sender gauge connector

(e) Ground wire

7. DISCONNECT ACCELERATOR CABLE FROM CARBURETOR

**8. (w/ A/T)
DISCONNECT THROTTLE LINK FROM CARBURETOR**

9. DISCONNECT EXHAUST PIPE FROM EXHAUST MANIFOLD

**10. [3A-C (ex. Canadá Wagón M/T)]
DISCONNECT Ox SENSOR CONNECTOR**

11. DISCONNECT RADIATOR OUTLET HOSE

REMOVAL OF CYLINDER HEAD

(See page EM-14)

1. **REMOVE DRIVE BELTS**

2. **REMOVE WATER PUMP PULLEY**

3. **(w/ A/C)**
   REMOVE A/C IDLER PULLEY BRACKET TOGETHER WITH IDLER PULLEY

4. **REMOVE ALTERNATOR UPPER BRACKET**

   Remove the bolts, nut and altemator upper bracket from the cylinder head.

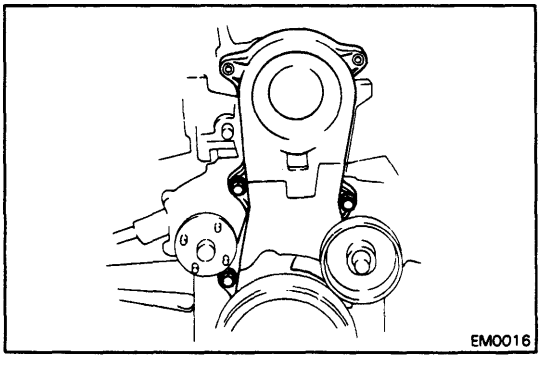
5. **REMOVE WATER OUTLET**

   (a) Disconnect the emission control hoses from the TVSV on the water outlet.

   (b) Remove the two bolts and water outlet.

6. **REMOVE DISTRIBUTOR (See page IG-7)**

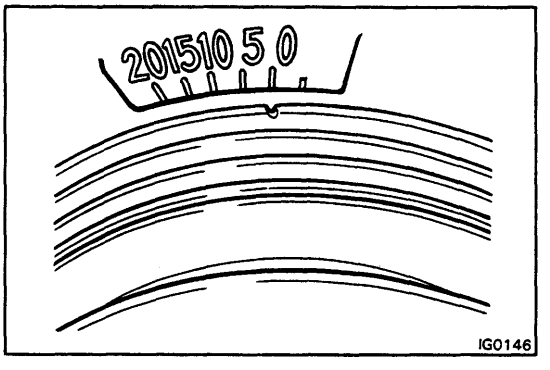
7. **REMOVE SPARK PLUGS**



8. **REMOVE CYLINDER HEAD COVER AND HALF CIRCULAR**

9. **REMOVE TIMING BELT UPPER COVER**

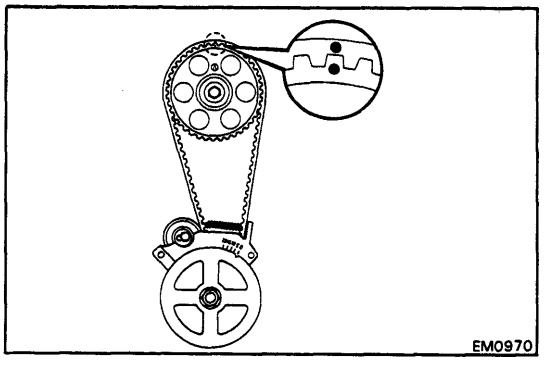
   Remove the three bolts, upper cover and gasket.



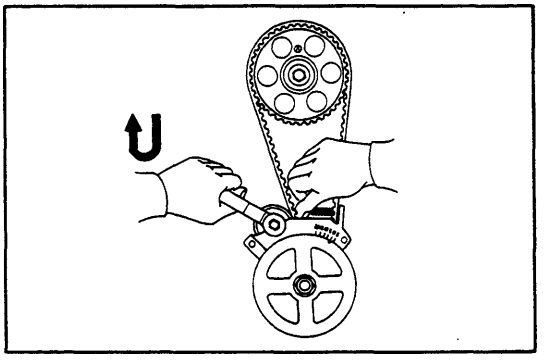
10. **REMOVE TIMING BELT FROM CAMSHAFT TIMING PULLEY**

    (a) Turn the crankshaft ciockwise, and set No. 1 cylinder at TDC/compression.

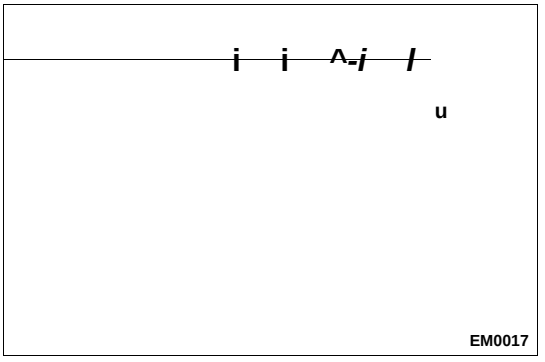
    NOTE: Check that the rocker arms on the No. 1 cylinder are loóse. If not, tum the crankshaft one full turn.



    (b) Place matchmarks on the camshaft timing pulley and belt.

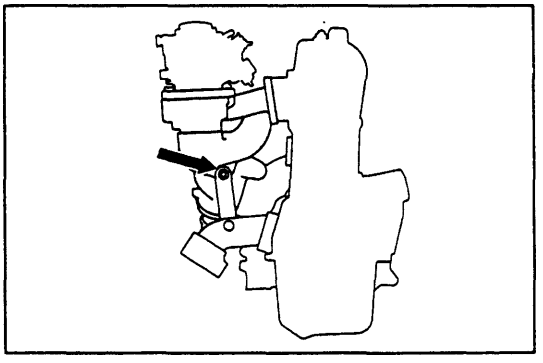


(c) Loosen the idler puliey mount bolt and push the idler pulley toward the left as far as it will go and temporarily tighten it.



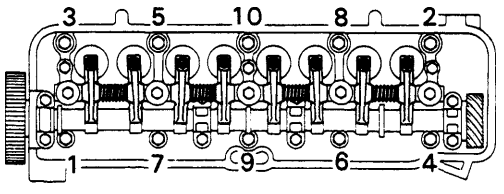
(d) Remove the timing belt from the camshaft timing pulley.

NOTE:
- Support the belt so the meshing of the crankshaft timing pulley and timing belt does not shift.
- Be careful not to drop anything inside the timing belt cover.
- Do not allow the belt to come into contact with oil, water and dust.



11. REMOVE MANIFOLD STAY MOUNT BOLT FROM EXHAUST MANIFOLD

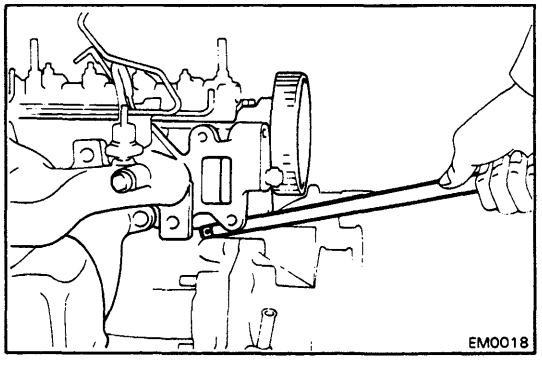
12. REMOVE CYLINDER HEAD



EM0979

(a) Uniformly loosen and remove the head bolts in several passes and in the sequence shown.

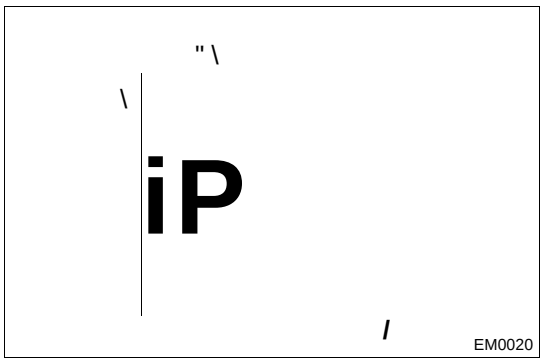
CAUTION: Head warpage or cracking could result from removing in incorrect order.



(b) Lift the cylinder head from the doweis on the cylinder block and place it on wooden blocks on a bench.

If the cylinder head is difficult to lift off, pry with a bar between the head and block projection.

CAUTION: Be careful not damage the cylinder head and block surfaces of cylinder head gasket side.



DISASSEMBLY OF CYLINDER HEAD

(See page EM-14)

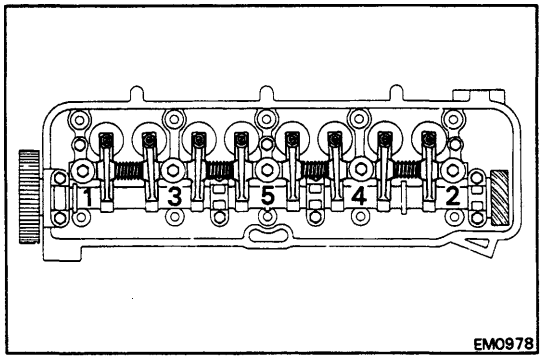
1. REMOVE CARBURETOR (See page FU-7)

2. REMOVE FUEL PUMP

REMOVE INTAKE AND EXHAUST MANIFOLDS

(a) Remove the nuts and bolts.

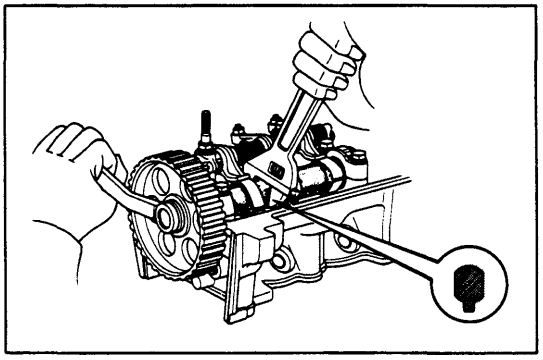
(b) Remove the vacuum pipes with hoses, and remove the manifolds.



4. REMOVE ROCKER ARM ASSEMBLY

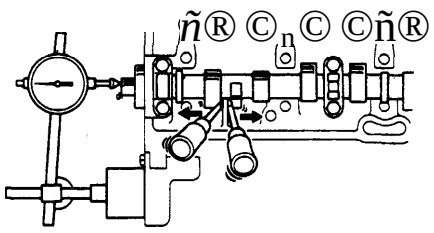
(a) Uniformly loosen and remove each support bolt in several passes and in sequence shown.

(b) Remove the rocker arm assembly.



REMOVE CAMSHAFT TIMING PULLEY FROM CAMSHAFT

Secure the camshaft and remove the camshaft timing pulley mount bolt, píate washer and pulley.

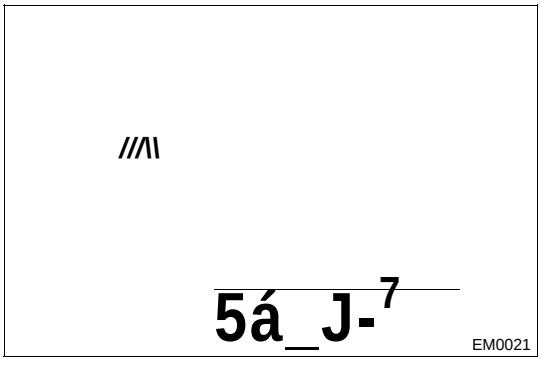


6. MEASURE CAMSHAFT THRUST CLEARANCE

Standard clearance: 0.08 — 0.18 mm (0.0031 - 0.0071 in.)

Máximum clearance: 0.25 mm (0.0098 in.)

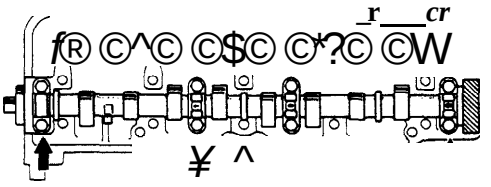
If clearance is greater than máximum, replace the head.

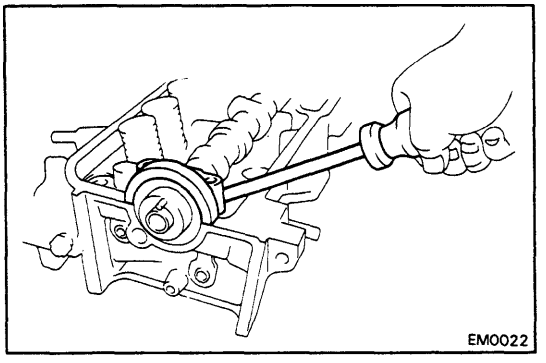


7. REMOVE BEARING CAPS AND CAMSHAFT

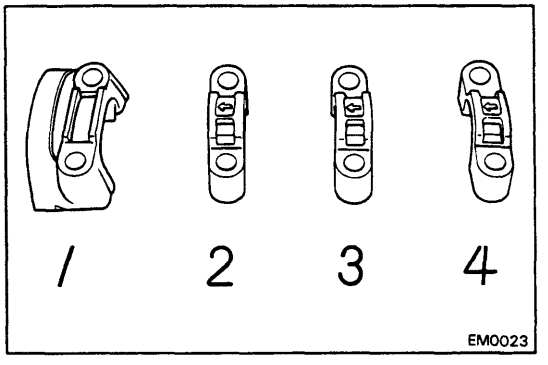
(a) Secure the camshaft and loosen the HA drive gear bolt.

(b) Remove the each bearing cap bolt.



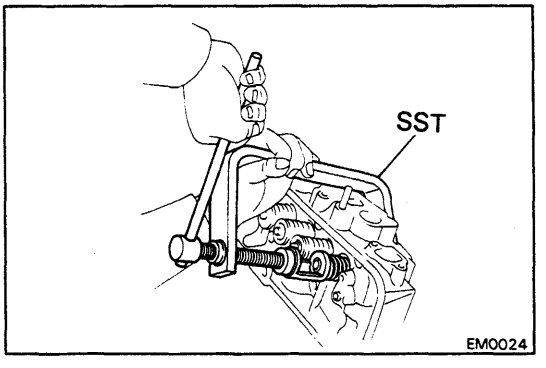


(c) Remove the camshaft, oil seal and camshaft bearing caps.



NOTE: Arrange the camshaft bearing caps in correct order.

(d) Remove the HA drive gear mount bolt, píate washer and drive gear from the camshaft.



8. REMOVE VALVES

(a) Using SST, remove the two keepers, spring retainer and spring.

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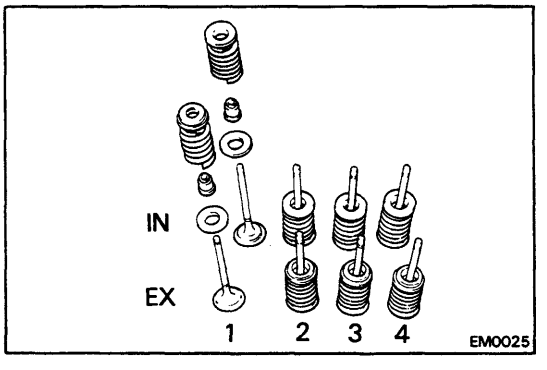
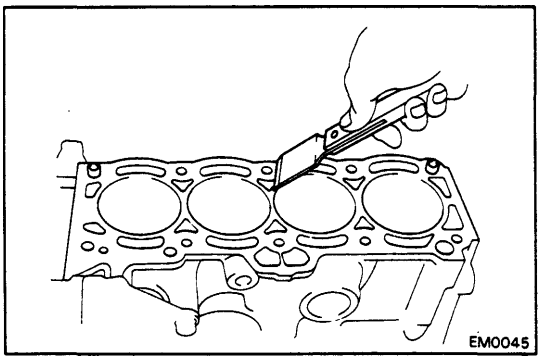
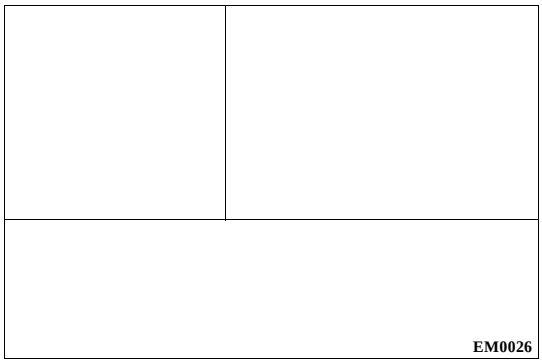
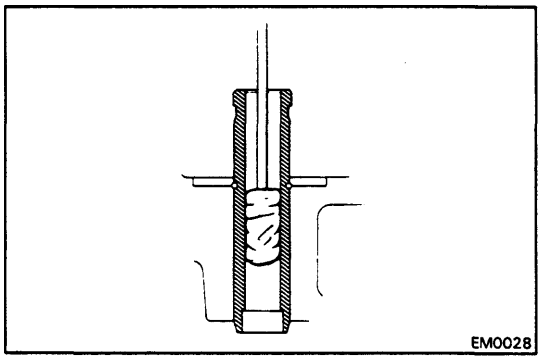
(b) Remove the valve, oil seal and spring seat.

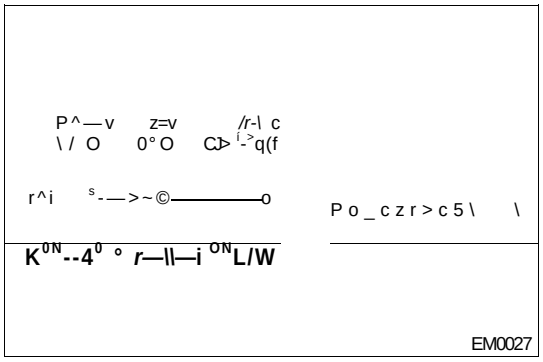


NOTE: Arrange the disassembled parts in correct order.


EM0045


EM0026


EM0028


EM0027

INSPECTION, CLEANING AND REPAIR OF CYLINDER HEAD COMPONENTS

1. CLEAN TOP OF PISTONS AND TOP OF BLOCK

(a) Turn the crankshaft and bring each pistón to top dead center. Scrape the carbón from the pistón top.

(b) Remove all the gasket meterial from the top of the block.
Blow carbón and oil from the bolt holes.

CAUTION: Protect your eyes when using high pressure air.

2. CLEAN COMBUSTIÓN CHAMBERS

Using a wire brush, remove all the carbón from the combustión chambers.

CAUTION: Be carefui not to scratch the head gasket contact surface.

3. CLEAN VALVE GUIDE BUSHINGS

Using a valve guide brush and soivent, clean all the guide bushings.

4. REMOVE GASKET MATERIAL

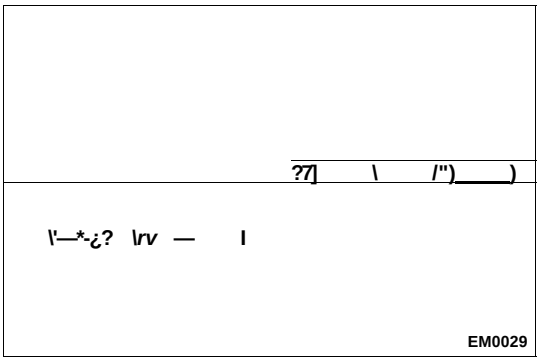
Using a gasket scraper, remove all the gasket material from the manifold and head surface.

CAUTION: Be carefui not to scratch the surfaces.

5. CLEAN CYLINDER HEAD

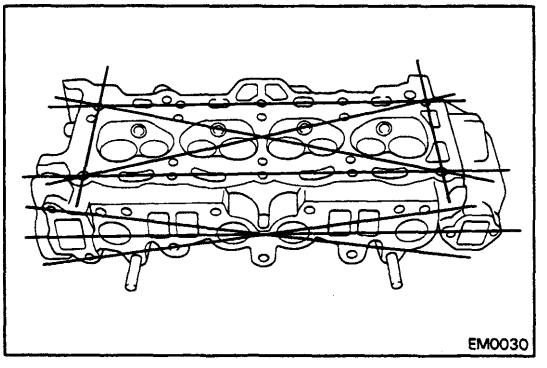
Using a soft bruch and soivent, clean the head.

CAUTION: Do not clean the head in a hot tank as this would seriously damage it.



5. INSPECT CYLINDER HEAD FLATNESS

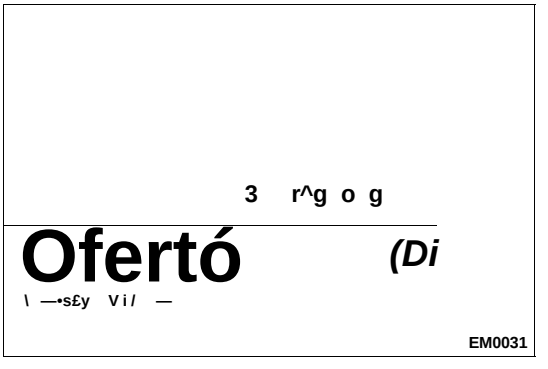
(a) Using a precisión straight edge and feeler gauge, check that the head and manifold surfaces are not warped.



(b) Measure warpage on all sides and diagonally as illustrated.

Máximum cylinder block surface warpage:
0.05 mm (0.0020 in.)
Máximum manifold surface warpage:
0.1 mm (0.004 in.)

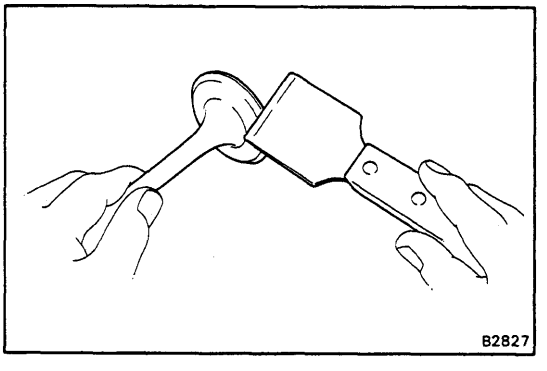
If warpage is exceeds máximum, replace the head.



6. INSPECT CYLINDER HEAD FOR CRACKS

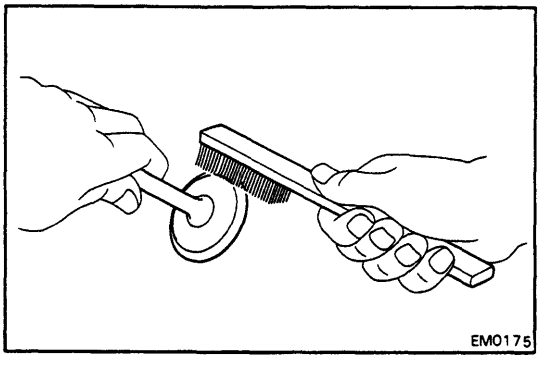
Using a dye penetrant, check the combustión chamber, intake and exhaust ports, head surface and the top of the head for cracks.

If cracked, replace the cylinder head.

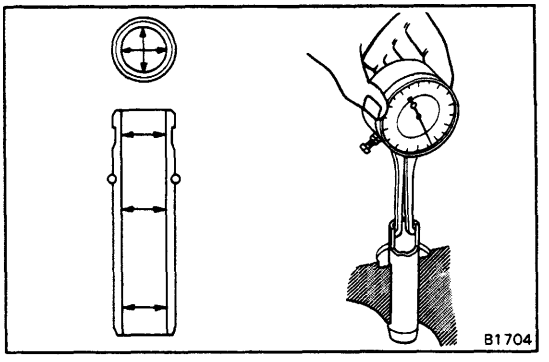


7. CLEAN VALVES

(a) Using a gasket scraper, chip any carbón from the valve head.



(b) Using a wire brush, thoroughly clean the valve.



8. INSPECT VALVE STEMS AND VALVE GUIDE BUSHINGS

(a) Using a dial indicator or telescoping gauge, measure the inside diameter of the valve guide.

Guide inside diameter:
7.01 - 7.03 mm (0.2760 - 0.2768 in.)

(b) Using a micrometer, measure the diameter of the valve stem.

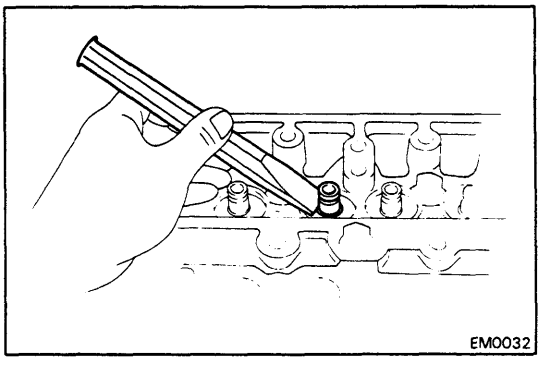
Valve stem diameter
Intake 6.970 - 6.985 mm (0.2744 - 0.2750 in.)
Exhaust 6.965 - 6.980 mm (0.2742 - 0.2748 in.)

(c) Subtract the valve stem measurement from the valve guide bushing measurement.

Standard stem oil clearance:
Intake 0.025 - 0.060 mm (0.0010 - 0.0024 in.)
Exhaust 0.030 - 0.065 mm (0.0012 -0.0026 in.)

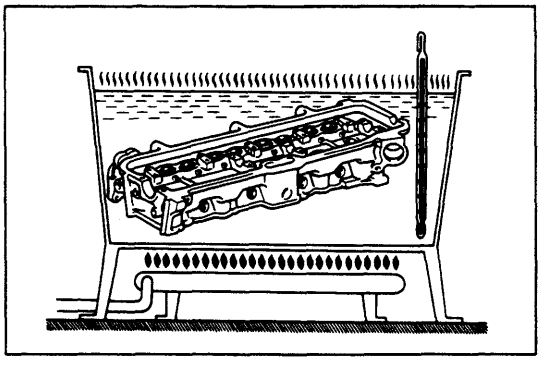
Máximum stem oil clearance:
Intake 0.08 mm (0.0031 in.)
Exhaust 0.10 mm (0.0039 in.)

If the clearance is exceeds than máximum, replace the valve and guide:

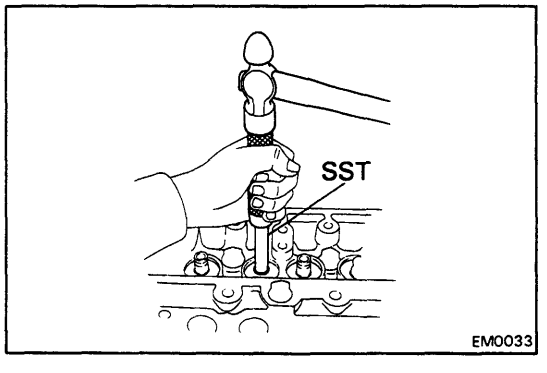


9. IF NECESSARY, REPLACE VALVE GUIDE BUSHINGS

(a) Using a brass punch and hammer, break the guide bushing.



(b) Gradually heat the cylinder head to about 90°C (194°F).



(c) Using SST and a hammer, drive out the guide bushing.

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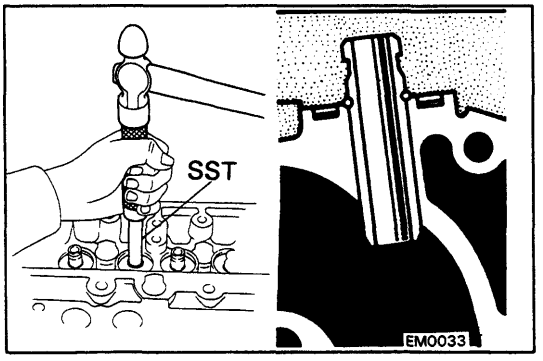
(d) Using calipers, measure the valve guide bore of the cylinder head.

(e) Select a new valve guide. (STD or 0/S 0.05)

If the valve guide bore diameter of the cylinder head is more than 11.527 mm (0.4538 in.), machine the bore to the following dimensión.

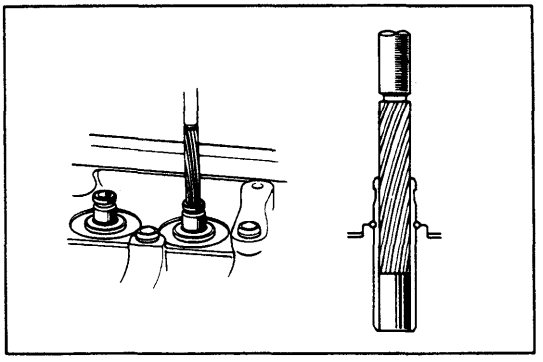
Rebored cylinder head bushing bore dimensión:
11.550 - 11.577 mm (0.4547 - 0.4558 in.)



(f) Gradually heat the cylinder head to about 90°C (194°F).

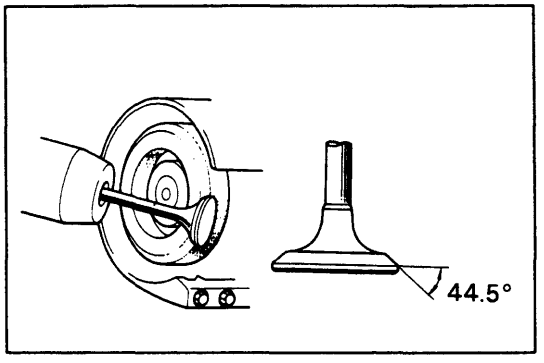
(g) Using SST and a hammer, drive in a new valve guide until the snap ring contacts the cylinder head.

SST 09201-60011



(h) Using a sharp 7 mm reamer, ream the valve guide to obtain specified oil clearance between the guide and new valve.

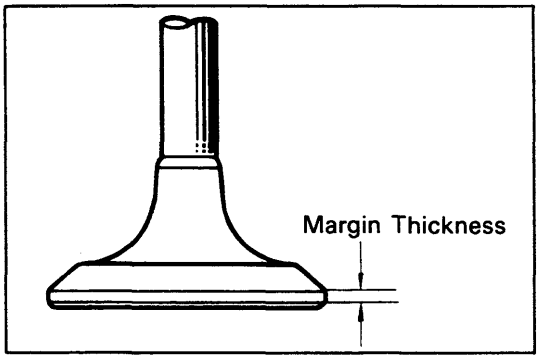
Intake oil clearance: 0.025 - 0.060 mm (0.0010- 0.0024 in.)
Exhaust oil clearance: 0.030 - 0.065 mm (0.0012-0.0026 in.)



10. INSPECT AND GRIND VALVES

(a) Grind the valves only enough to remove pits and carbón. Make sure the valves are fround at the correct valve face angle.

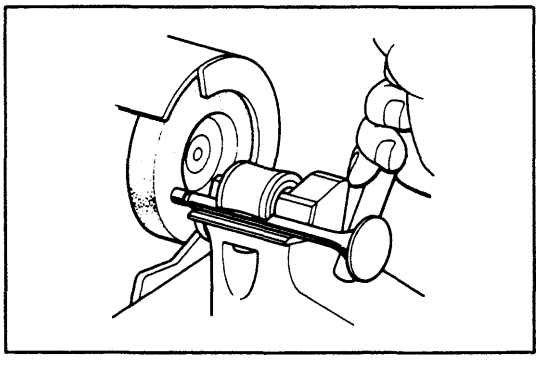
Valve face angle: 44.5°



(b) Check the valve head margin

Minimum margin: Intake 0.5 mm (0.020 in.)
Exhaust 1.0 mm (0.039 in.)

If the valve head margin is less than minimum, replace the valve.

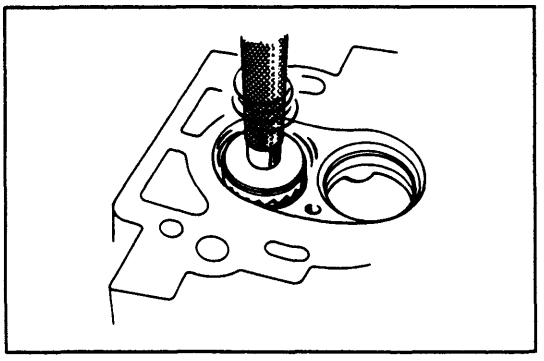


(c) Check the surface of the valve stem tip for wear.

If the valve stem tip is worn, resuf ace the tip with a grinder or replace the valve.

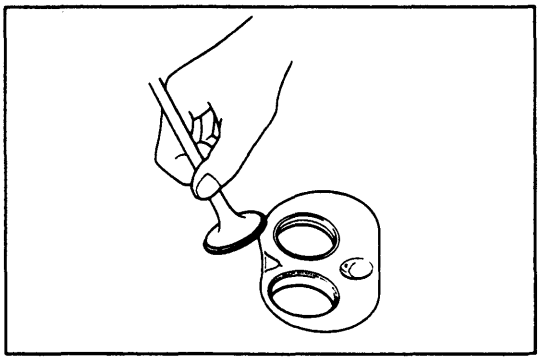
CAUTION: Do not grind more than 0.5 mm (0.020 in.).

Standard overa» length:
Intake 106.88 mm (4.2079 in.)
Exhaust 106.78 mm (4.2039 in.)



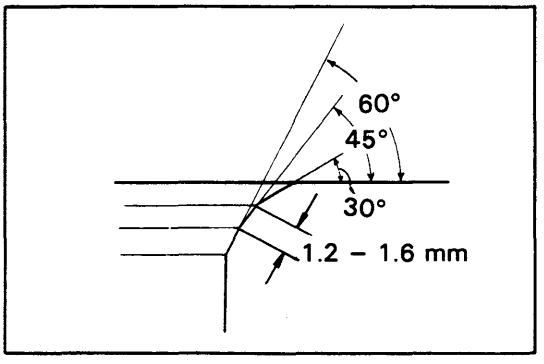
11. INSPECT AND CLEAN VALVE SEATS

(a) Using a 45° carbide cutter, resurface the valve seats. Remove only enough metal to clean the seats.



(b) Check the valve seating position.

Apply a thin coat of prussian blue (or white lead) to the valve face. Install the valve. While applying light pressure to the valve, rotate the valve against the seat.



(c) Check the valve face and seat for the following:

- If blue appears 360° around the face, the valve is concentric. If not, replace the valve.
- If blue appears 360° around the valve seat, the guide and seat are concentric. If not, resurface the seat.
- Check that the seat contact is on the middle of the valve face with the following width:

1.2 - 1.6 mm (0.047 - 0.063 in.)

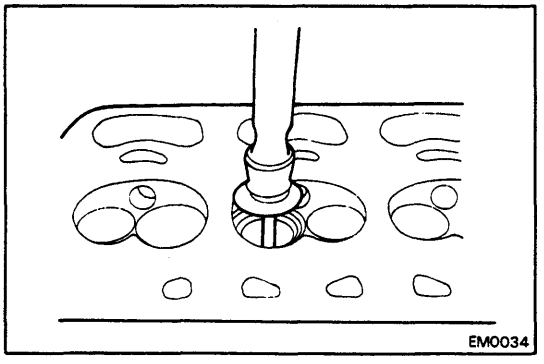
If not correct the valve seat as follows:

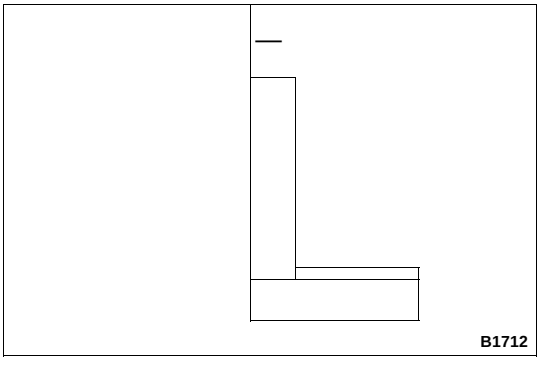
(1) If the seating is too high on the valve face, use 30° and 45° cutters to correct the seat.

(2) If seating is too low on the valve face, use 65° and 45° cutters to correct the seat.

(d) Hand lap the valve and valve seat together with abrasive compound.

(e) After hand-lapping, clean the valve and valve seat.



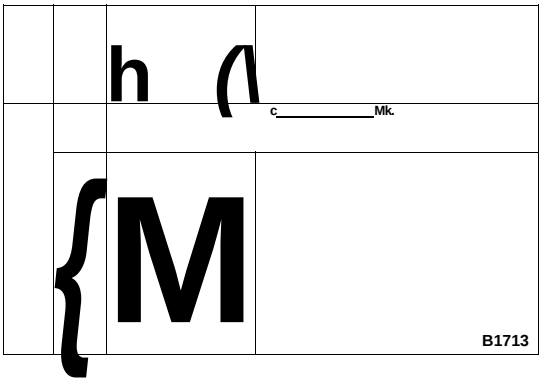


12. INSPECT VALVE SPRING

(a) Using a steel square, check the squareness of the valve springs.

Máximum squareness: 2.0 mm (0.079 in.)

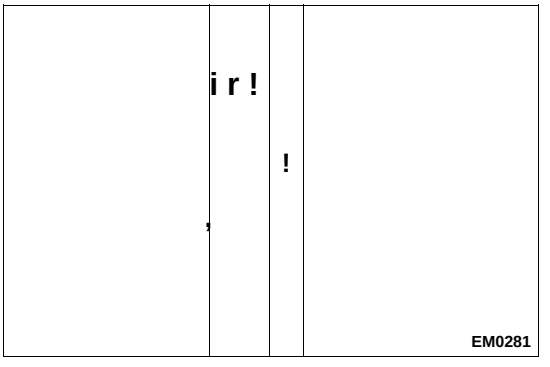
If squareness is greater than máximum, replace the valve spring.



(b) Using calipers, measure the free length of the vaive spring.

Free height: 44.6 mm (1.756 in.)

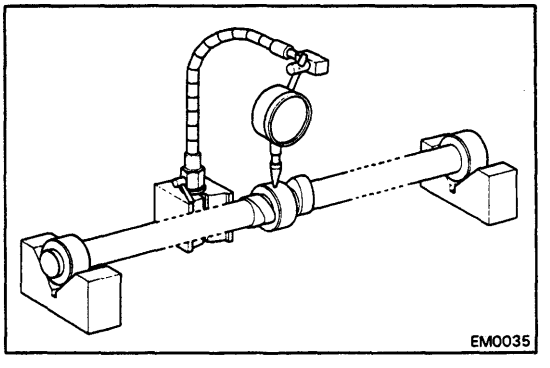
If the free height is not as specified, replace the valve spring.



(c) Using a spring tester, measure the tensión of the valve spring at the specified installed length.

Standard installed tensión:
22.0 - 25.2 kg (48.5 - 55.6 Ib, 216 -247 N) at 38.6 mm (1.520 in.)
Minimum installed tensión:
21 kg (46.3 Ib, 206 N) at 38.6 mm (1.520 in.)

If the installed tensión is less than minimum, replace the valve spring.

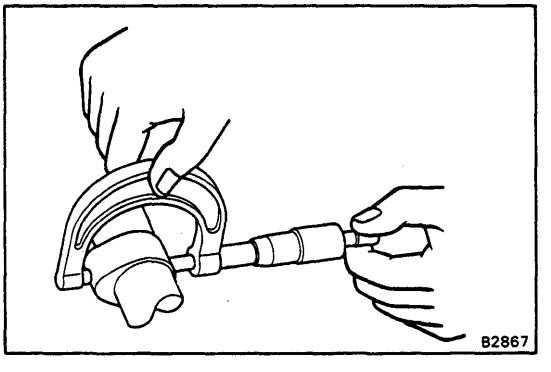


13. INSPECT CAMSHAFT

(a) Place the camshaft on V-blocks and, using a dial indicator, measure the circle runout at the center journal.

Máximum circle runout: 0.06 mm (0.0024 in.)

If the circle runout is exceeds máximum, replace the camshaft.



(b) Using a micrometer, measure the cam lobe height.

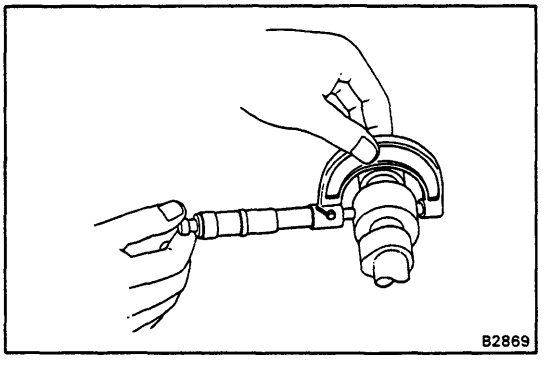
Standard lobe height:

3A-C 4-speed M/T	**39.03 - 39.04 mm (1.5366- 1.5370 in.)**
Others	**39.44 - 39.45 mm (1.5528- 1.5531 in.)**

Minimum lobe height:

3A-C 4-speed M/T	**38.73 mm (1.5248 in.)**
	39.14 mm (1.5409 in.)

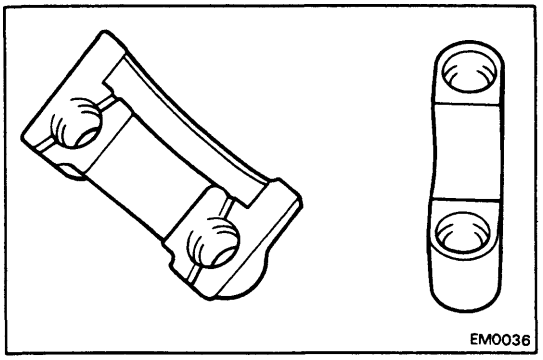
If the lobe height is less than minimum, replace the camshaft.



(c) Using a micrometer, measure the journal diameter.

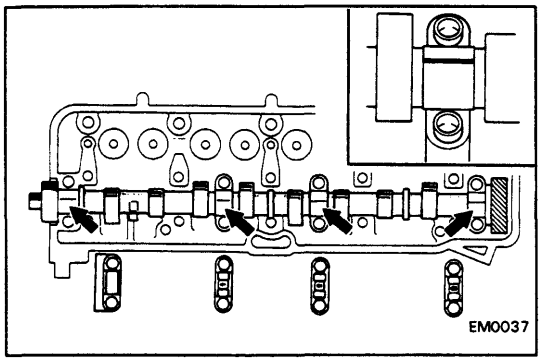
Journal diameter: 27.979 - 27.995 mm (1.1015- 1.1022 in.)

If the journal diameter is not within specification, check the oil clearance (See page EM-26)



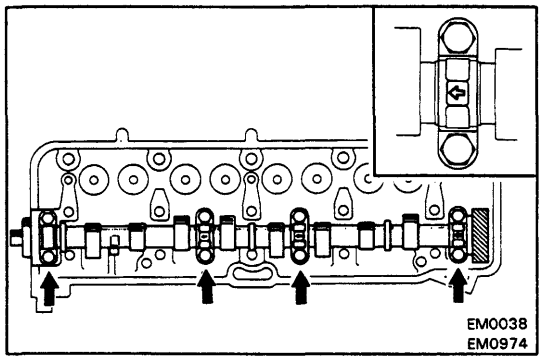
(d) Check the bearings for flaking or scoring.

If bearings are damaged, replace the cylinder head and camshaft as a set.



(e) Measure the clearance of each camshaft journal.

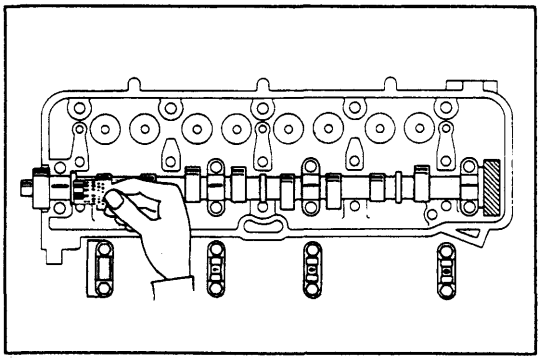
- Clean the bearing caps and camshaft journal.
- Lay a strip of Plastigage across each journal.



- Install the No. 1, 2, 3 and 4 bearing caps on each journal with the arrows pointing toward the front Torque each bolt

Torque: 130 kg-cm (9 ft-lb, 13 N-m)

NOTE: Do not turn the camshaft while the Plastigage is in place.



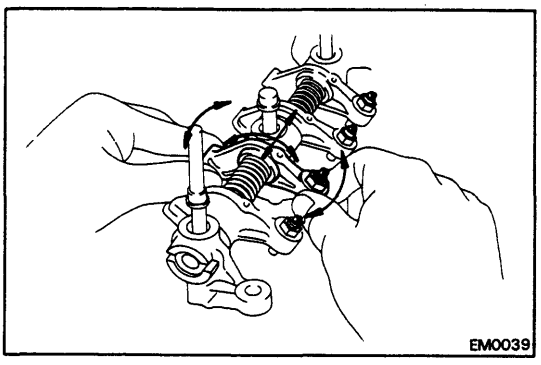
- Remove the caps. Measure the Plastigage at its widest point.

Standard clearance: 0.037 - 0.073 mm (0.0015 - 0.0029 in.)

Máximum clearance: 0.1 mm (0.004 in.)

If the clearance is exceeds máximum, replace the camshaft. Replace the cylinder head if necessary.

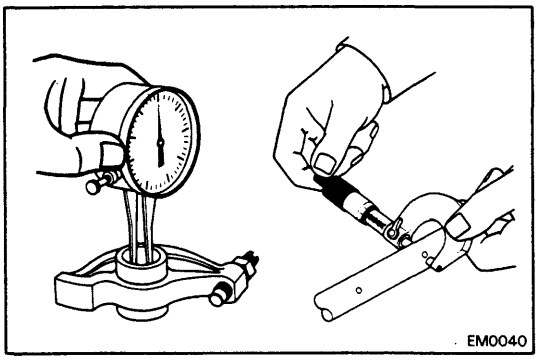
(f) Complerely remove the Plastigage.



14. INSPECT ROCKER ARMS

Check the clearance between the rocker arms and shaft by moving the rocker arms as shown. Little or no movement should be felt.

If movement is felt, disassemble the rocker arm assembly and measure the oil clearance as follows:

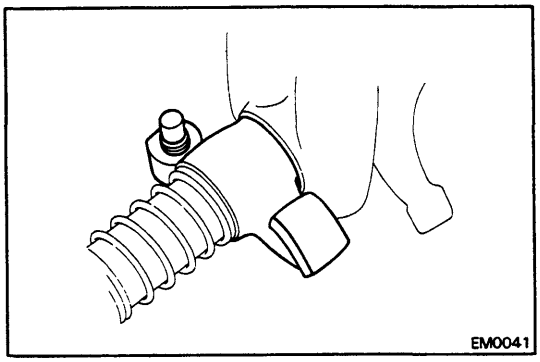


(a) Using calipers, measure the inside diameter of the rocker arm. Using a micrometer, measure the outside diameter of the shaft. Subtract the shaft diameter from the rocker arm diameter.

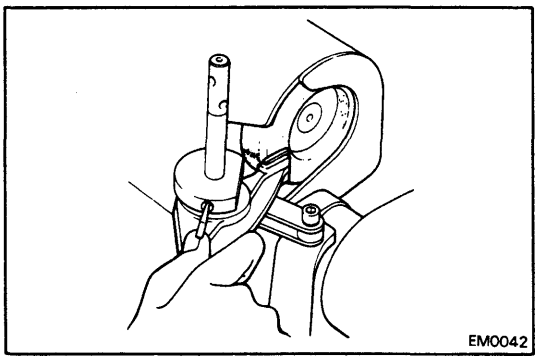
Standard oil clearance: 0.010 -0.048 mm (0.0004- 0.0019 in.)

Máximum oil clearance: 0.06 mm (0.0024 in.)

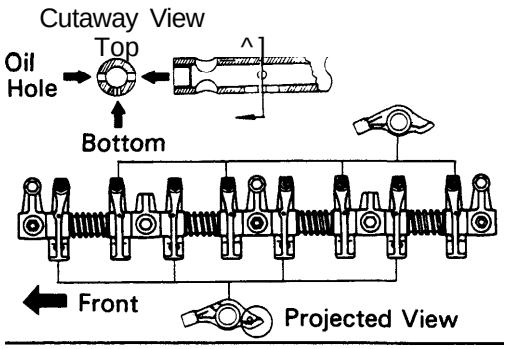
If the oil clearance is exceeds máximum, replace the rocker arm and/or shaft.



(b) Check the contact surface of the valve rocker arm cam end.

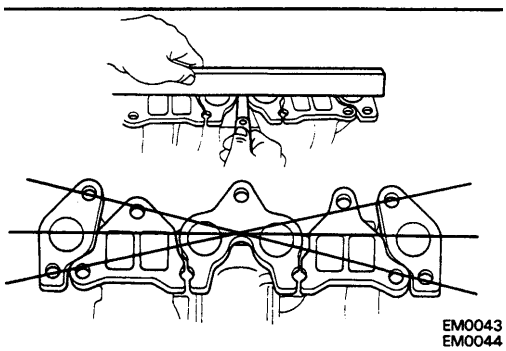


If the cam end is worn excessively, either grind or replace the rocker arm.



(c) Assemble the rocker arm assembly as shown.

NOTE: Face oil holes of the rocker shaft to the right, left and bottom.



15. INSPECT INTAKE AND EXHAUST MANIFOLDS

Using a precisión straight edge and feeler gauge, check the surfaces contacting the cylinder head for warpage.

Máximum warpage:

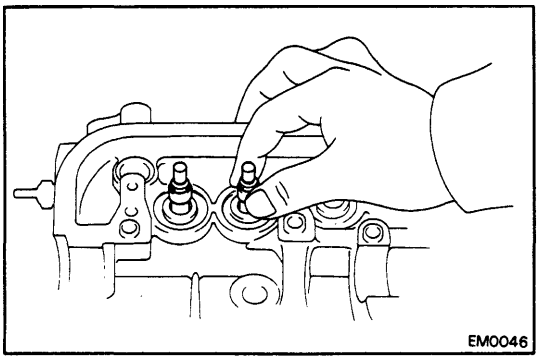
Intake 0.2 mm (0.008 in.)
Exhaust 0.3 mm (0.012 in.)

If warpage is exceeds máximum, replace the manifold.

ASSEMBLY OF CYLINDER HEAD

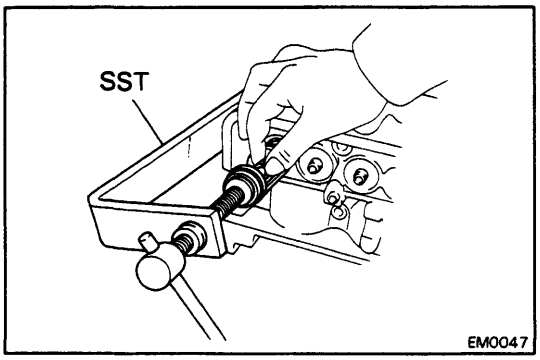
(See page EM-14)

NOTE:
(a) Thoroughly clean all parts to be assembled.
(b) Before installing the parts, apply new engine oil to all sliding and rotating surfaces.
(c) Replace all gaskets and oil seáis with new parts.



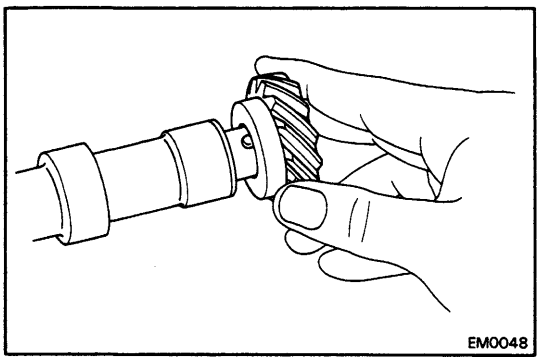
1. INSTALL VALVES

(a) Lubrícate and insert valves in the cylinder head valve guides. Make sure the valves are installed in the correct order.
(b) Install the valve spring seat and oil seal.



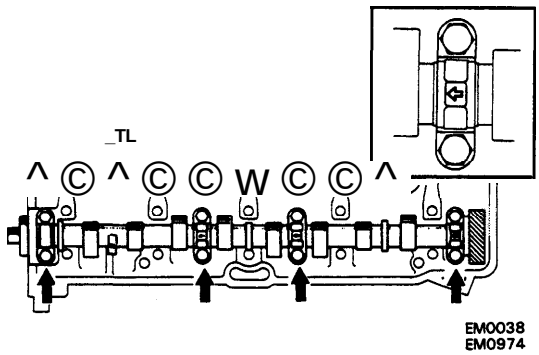
(c) Install spring and spring retainer on the valve.
(d) Using SST, compress the valve retainer and place the two keepers around the valve stem. Tap the stem lightly with a plastic-faced hammer to assure proper fit

SST 09202-43013

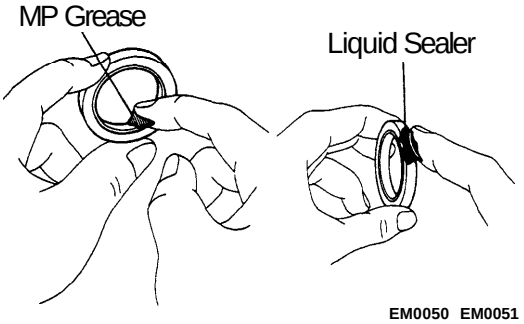


2. INSTALL CAMSHAFT

(a) Install the HA drive gear with the píate washer and mount bolt onto the camshaft.
(b) Coat all bearing journals with engine oil.
(c) Place the camshaft in the cylinder head.



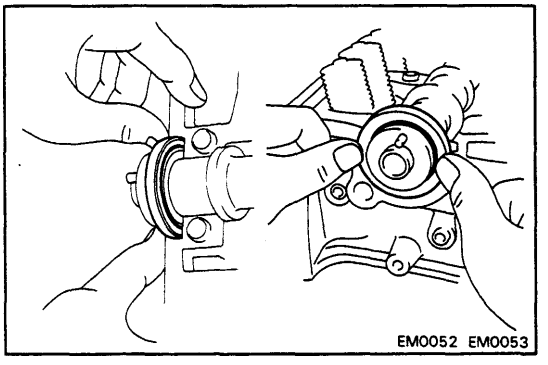
(d) Place the Nos. 2, 3 and 4 bearing caps on each Journal with the arrows pointing toward the front.



EM0050 EM0051

(e) Apply MP grease to a new oil seal.

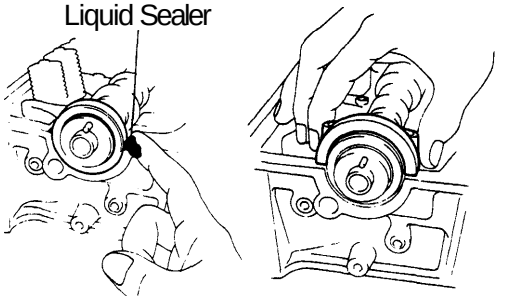
(f) Apply liquid sealer to the oil seal outside circumference.



EM0052 EM0053

(g) Install the oil seal.

NOTE: Be careful not to install the oil seal slantwise.



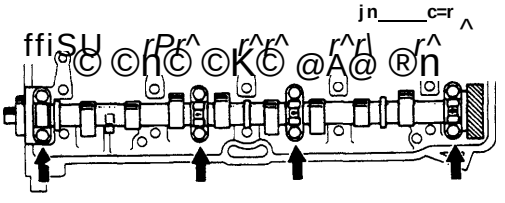
EM0054 EM0055

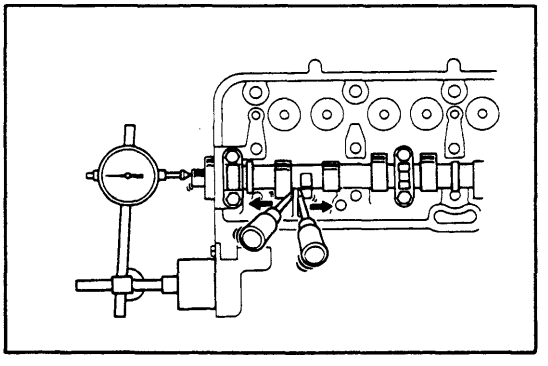
(h) Install the No.1 bearing cap.

NOTE: Apply liquid sealer to the áreas indicated in the figure.

(i) Install and torque each bearing cap.

Torque: 130 kg-cm (9 ft-lb, 13 N-m)

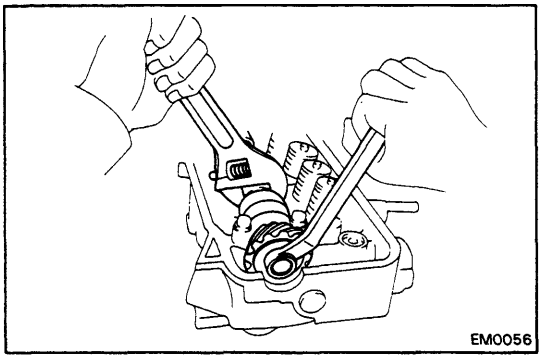




(j) Check the camshaft thrust clearance.

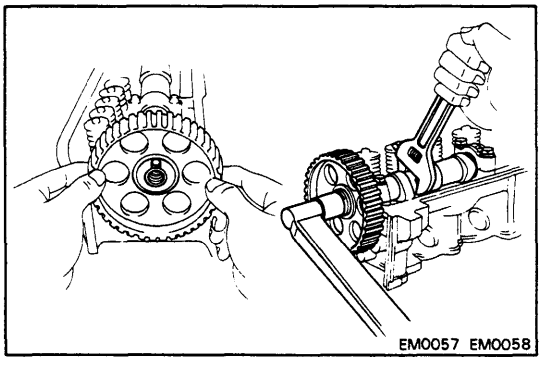
Standard clearance: 0.08 - 0.18 mm (0.0031 - 0.0071 in.)

Máximum clearance: 0.25 mm (0.0098 in.)



(k) Secure the camshaft and tighten the HA dríve gear mount bolt.

Torque: 300 kg-cm (22 ft-lb, 29 N-m)

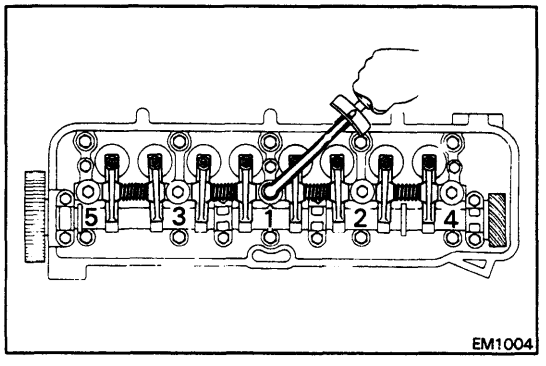


3. **INSTALL CAMSHAFT TIMING PULLEY**

Install the camshaft timing pulley to the camshaft Secure the camshaft and tighten the camshaft timing pulley bolt

Torque: 475 kg-cm (34 ft-lb, 47 N-m)

NOTE: Remove any oil or water on the camshaft timing pulley and keep it clean.

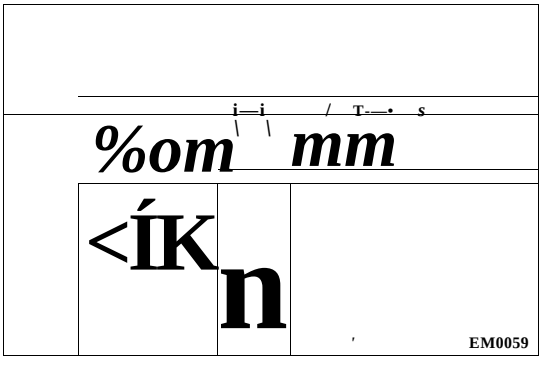


4. **INSTALL ROCKER ARM ASSEMBLY**

(a) Install the rocker arm assembly on the cylinder head.

(b) Install and gradually tighten the rocker support bolts in three passes and in the sequence shown. Torque the bolts on the final pass.

Torque: 250 kg-cm (18 ft-lb, 25 N-m)

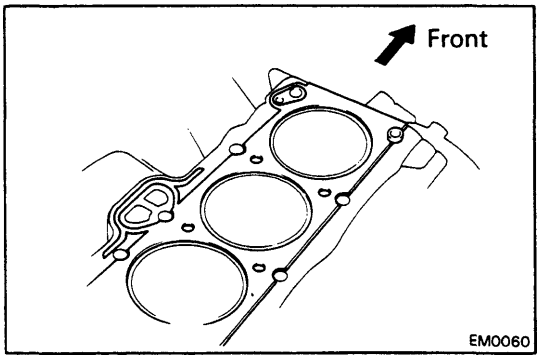


5. **INSTALL INTAKE AND EXHAUST MANIFOLDS WITH VACUUM PIPES**

Torque: 250 kg-cm (18 ft-lb, 25 N-m)

6. INSTALL FUE.L PUMP

7. INSTALL CARBURETOR (See page FU-23)

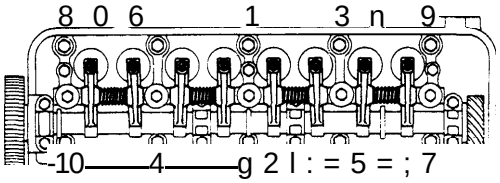


INSTALLATION OF CYLINDER HEAD

1. INSTALL CYLINDER HEAD

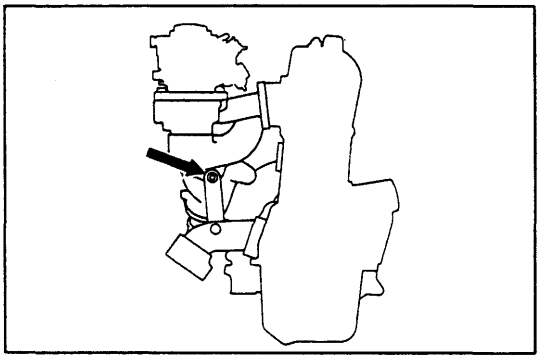
(a) Instali a new cylinder head gasket.

NOTE: Instali the gasket with the surface applied with sealer facing upward.



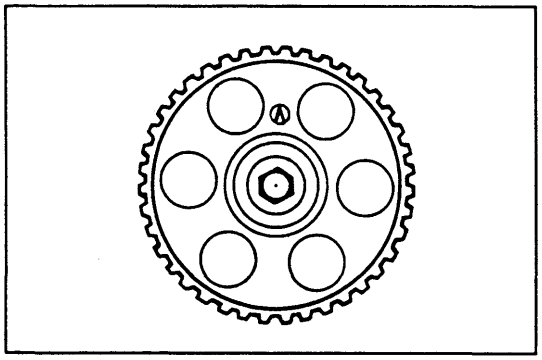
(b) Gradually instali and tighten the head bolts in three passes and in the sequence shown. Torque the bolts on the final pass.

Torque: 600 kg-cm (43 ft-lb, 59 N-m)



2. INSTALL MANIFOLD STAY BOLT

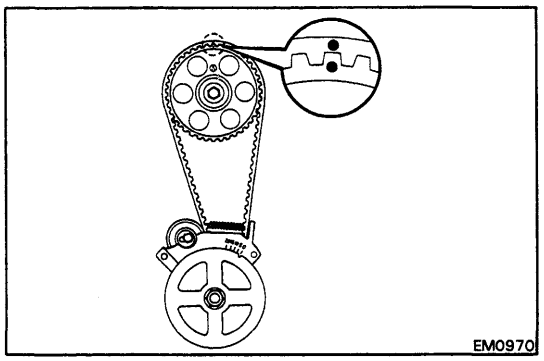
3. INSTALL WATER OUTLET OVER GASKET



4. INSTALL TIMING BELT

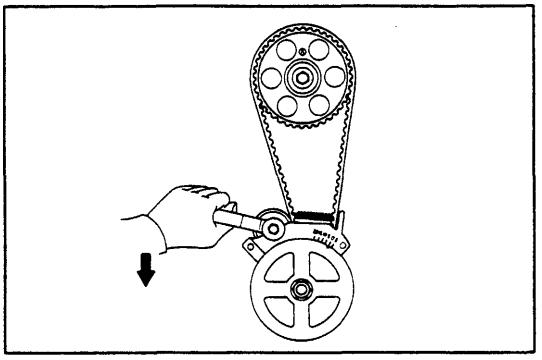
(a) Align the camshaft bearing cap mark and the center of the small hole on the camshaft timing pulley.

NOTE: Remove any oil or water on the camshaft timing pulley and keep it clean.

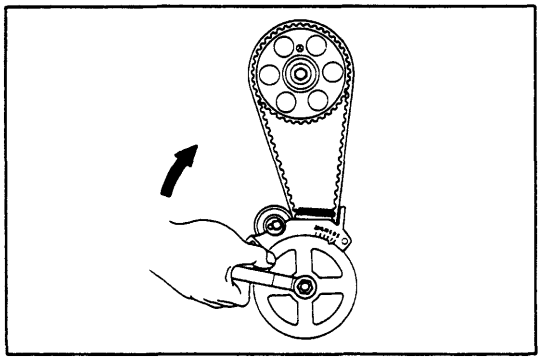


(b) Align the points marked during removal and instali the timing pulley.

CAUTION: Be careful not to shift the meshing of the crankshaft timing pulley and timing belt.



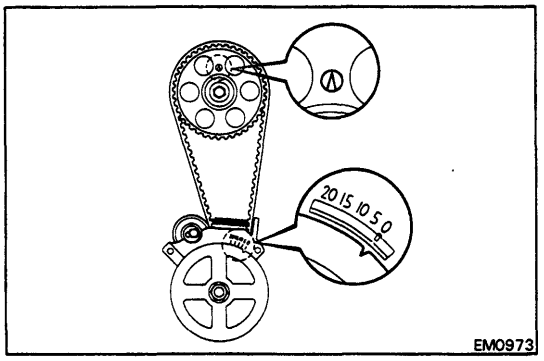
(c) Loosen the mount bolt of the timing belt idler pulley.



5. CHECK VALVE TIMING AND TIMING BELT TENSIÓN

(a) Turn the crankshaft two revolutions from TDC to TDC.

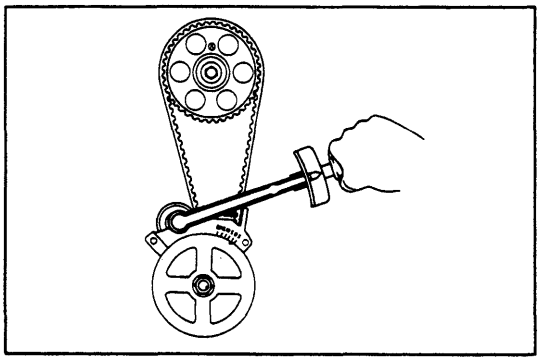
CAUTION: Always turn the crankshaft clockwise.



(b) Check the valve timing.

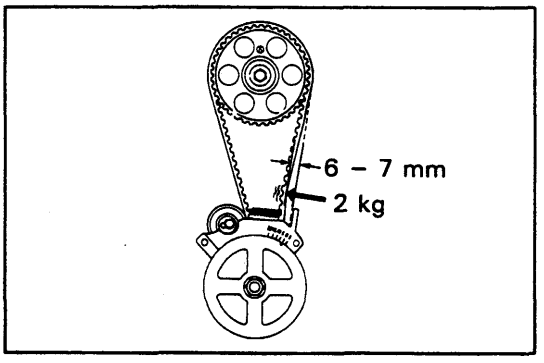
Insure that each pulley aligns with the mark as shown in the figure.

NOTE: If the pulleys are not aligned with the mark, shift the meshing of the timing belt and timing pulley and re-adjust according to steps (4) to (6).



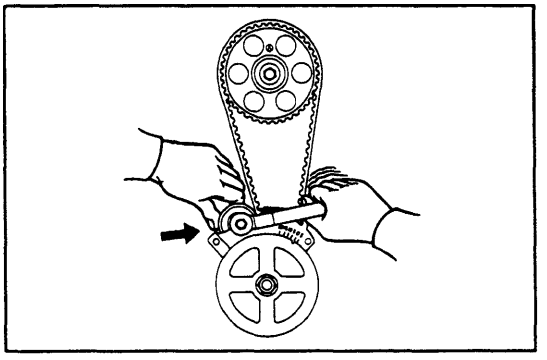
(c) Tighten the mount bolt of the idler pulley.

Torque: 375 kg-cm (27 ft-lb, 37 N-m)

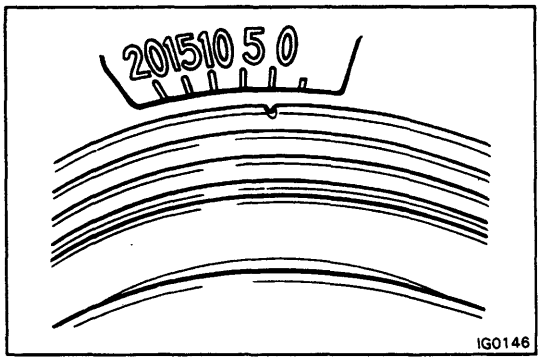


(d) Measure the timing belt tensión as shown in the figure.

Timing belt tensión: 6 — 7 mm at 2 kg
(0.24 - 0.28 in. at 4.4 lb, 20 N)



(e) If the measured valué ¡s not within standard, readjust with the idler pulley.

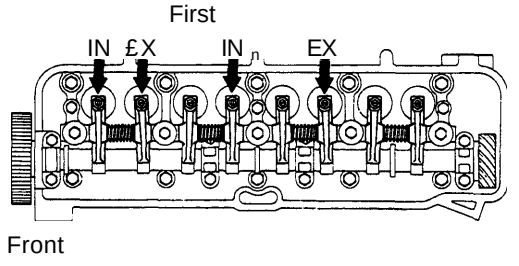


6. ADJUST VALVE CLEARANCE

(a) Set the No. 1 cylinder to TDC/compression.

- Turn the crankshaft with a wrench to align the timing marks at TDC. Set the groove on the pulley to 0 position.
- Check that the rocker arms on No. 1 cylinder are loóse and the rockers on No. 4 are tight.

If not, turn the crankshaft one complete revolution and align the marks as above.



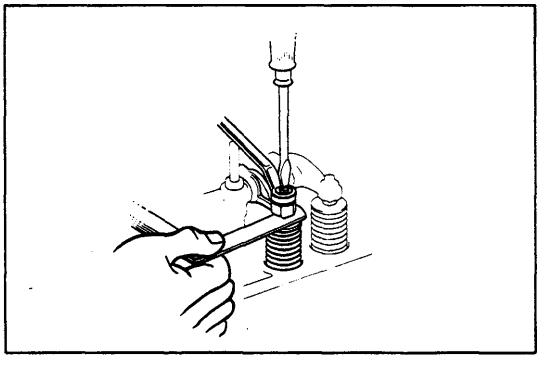
EM0980

(b) Adjust the clearance of half of the valves.

- Adjust only those valves indicated by arrows.

Valve clearance (cold):

Intake	**0.18 mm (0.007 in.)**
Exhaust	**0.28 mm (0.011 in.)**

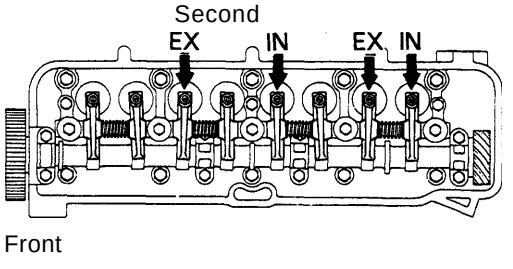


- Use a feeler gauge to measure between the valve stem and rocker arm. Loosen the lock nut and turn the adjusting screw to set the proper clearance. Hold the adjusting screw in position and tighten the lock nut.

Torque: 160 kg-cm (12 ft-lb, 16 N-m)

- Recheck clearance. The feeler gauge should move with a very slight drag.

(c) Turn the crankshaft one revolution and adjust the other valves.



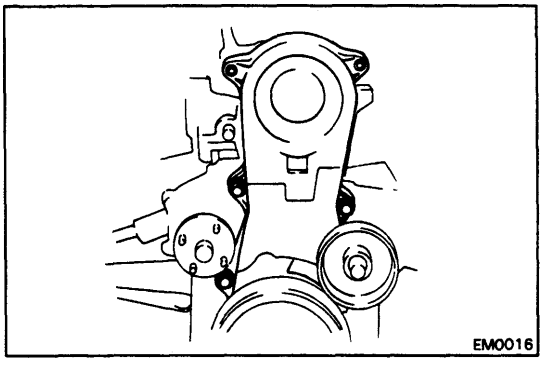
EM0980

7. INSTALL DISTRIBUTOR
(See steps 1 to 3 on page IG-13)

8. INSTALL SPARK PLUGS

Install the four spark plugs and connect the high-tension cords.

Torque: 180 kg-cm (13 ft-lb, 18 N-m)



9. INSTALL TIMING BELT UPPER COVER

10. (w/A/C)
INSTALL A/C IDLE PULLEY BRACKET AND PULLEY

11. INSTALL WATER PUMP PULLEY

12. INSTALL HALF CIRCULAR PLUG AND CYLINDER HEAD COVER

(a) Install the half circular plug on the cylinder head.

(b) Install the gasket to the cylinder head cover.

(c) Install the cylinder head cover with the seal washer and cap nuts.

(d) Connect the PCV hose to the PCV valve.

13. CONNECT EXHAUST PIPE TO EXHAUST MANIFOLD

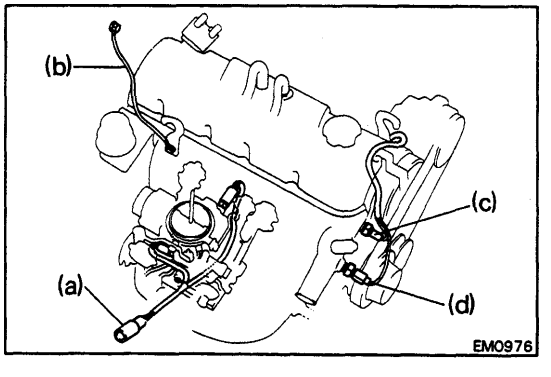
Torque: 630 kg-cm (46 ft-lb, 62 N-m)

14. [3A-C (ex. Canadá Wagón M/T)]
CONNECT Ox SENSOR CONNECTOR

15. CONNECT RADIATOR OUTLET HOSE

16. CONNECT THROTTLE CABLE TO CARBURETOR

17. (w/A/T)
CONNECT THROTTLE LINK TO CARBURETOR



18. CONNECT FOLLOWING CONNECTORS AND WIRE:

(a) Carburetor connector

(b) [3A-C (ex. Canadá Wagón M/T)]
Thermo switch connector

(c) (w A/T)
Water temperature warning switch connector

(d) Water temperature sender gauge connector

(e) Ground wire

19. CONNECT FOLLOWING HOSES:

(a) Heater inlet hose to cylinder head rear píate

(b) Brake booster hose

(c) Fuel hoses to fuel pump

(d) (w/ A/C)
Vacuum hose of VSV for idle-up

(e) Emission control hoses (See system layout in the emission control section or the layout printed under the hood) (See pages EC-3 to 6)

20. INSTALL AIR CLEANER ASSEMBLY (See page FU-24)

21. INSTALL DRIVE BELT

22. CONNECT CABLE TO NEGATIVE TERMINAL OF BATTERY

23. FILL WITH ENGINE COOLANT (See page CO-3)

24. FILL WITH ENGINE OIL (See page LU-3)

25. START ENGINE AND CHECK FOR LEAKS

26. ADJUST DRIVE BELT (See page EM-13)

27. PERFORM ENGINE ADJUSTMENT

(a) Retighten the cylinder head bolts. (See page EM-31)

Torque: 600 kg-cm (43 ft-lb, 59 N-m)

(b) Readjust the valve clearance. (See page EM-33)

Valve clearance (hot):

Intake	**0.20 mm (0.008 in.)**
Exhaust	**0.30 mm (0.012** in.)

(c) Adjust the ignition timing. (See page IG-13)

(d) Adjust the idle speed. (See page FU-25)

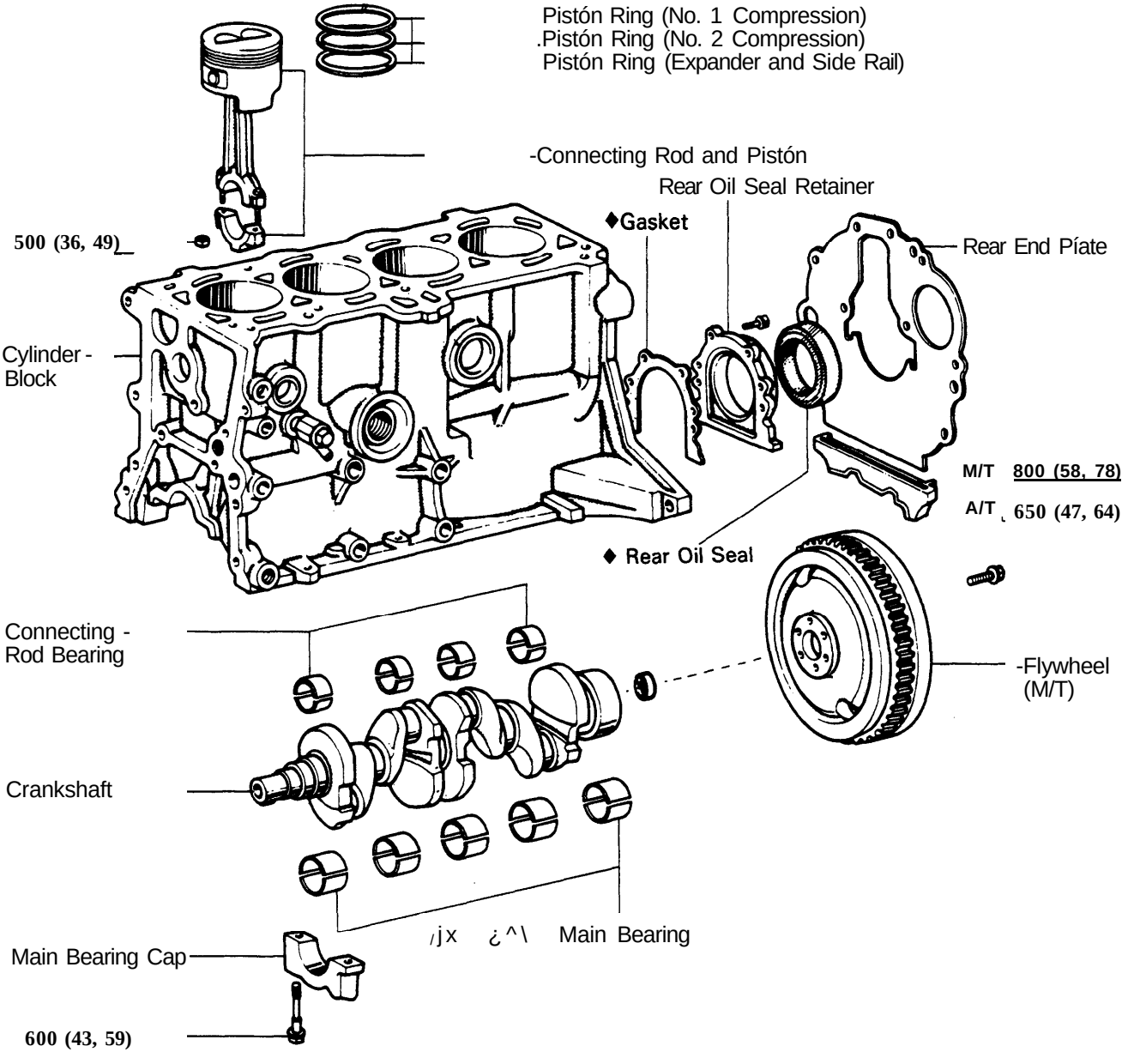
28. ROADTEST

Perform a road test.

29. RECHECK COOLANT AND ENGINE OIL LEVEL

CYLINDER BLOCK

COMPONENTS



Crankshaft Thrust Bearing

Kg-cm (ft-lb, N m)| : Tightening torque
4: Non-reusable part

REMOVAL OF ENGINE

1. DISCONNECT CABLE FROM NEGATIVE TERMINAL OF BATTERY

2. REMOVE ENGINE HOOD

3. DRAIN ENGINE OIL (See page LU-3)

4. DRAIN ENGINE COOLANT (See page CO-3)

5. REMOVE BATTERY AND BATTERY CARRIER

6. REMOVE AIR CLEANER ASSEMBLY (See page FU-7)

7. REMOVE RADIATOR (See page CO-12)

8. (w/ A/C)
REMOVE A/C CONDENSER FAN

9. (w/ A/C)
REMOVE A/C COMPRESSOR WITHOUT DICONNECTING HOSES

(a) Remove the drive belt.

(b) Remove the compressor mount bolts, and disconnect the compressor from the engine.

10. (w/PS)
REMOVE POWER STEERING (PS) PUMP WITHOUT DISCONNECTING HOSES

(a) Remove the drive belt.

(b) Remove the pump mount bolts, and disconnect the pump from the engine.

11. DISCONNECT FOLLOWING CONNECTORS AND WIRES:

(a) Carburetor connector

(b) [3A-C (ex. Canadá Wagón M/T)]

- Ox sensor connector
- Thermo switch connector
- CMH relay connector

(c) (w/ A/T)
Water temperature warning switch connector

(d) Water temperature sender gauge connector

(e) Oil pressure switch connector

(f) Distributor connector

(g) Starter connector and wire

(h) Alternator connector and wire

(i) Ground wire from left side of cylinder block

(j) Ground wire from dash panel

12. DISCONNECT ACCELERATOR CABLE

13. (w/A/T)
DISCONNECT THROTTLE LINKAGE FOR AUTOMATIC TRANSMISSION (A/T)

14. DISCONNECT FOLLOWING HOSES:

(a) Heater Inlet and outlet hoses

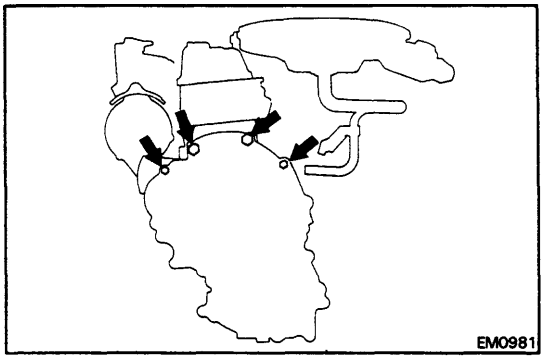
(b) Fuel pump inlet and return hoses

(c) Brake booster hose from intake manifold.

(d) Vacuum hose of VSV for idle-up

(e) Emission control hoses

NOTE: Before disconnecting the emission control hoses, use tags to indicatify how they should be reconnected.

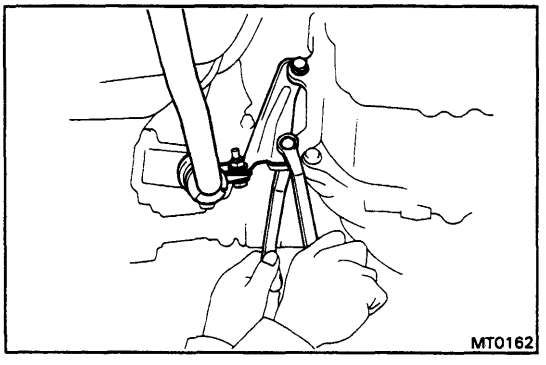


15. (FED.)
DISCONNECT AIR SUCTION (AS) FILTER FROM CYLINDER BLOCK

Remove the AS filter mount bolt.

16. REMOVE TRANSAXLE UPPER MOUNT BOLTS

17. RAISE VEHICLE (See page IN-8)
CAUTION: Be sure the vehicle is supported securely.

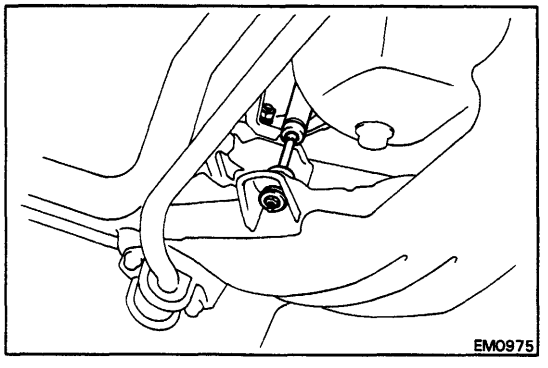


18. REMOVE EXHAUST FRONT PIPE

19. (w/A/T)
REMOVE OIL COOLER PIPES (See page AT-24)

20. (w/ M/T)
DISCONNECT CLUTCH RELÉASE CABLE

21. REMOVE STIFFENER PLATES (See page LU-4)



22. DISCONNECT ENGINE MOUNTING ABSORBER

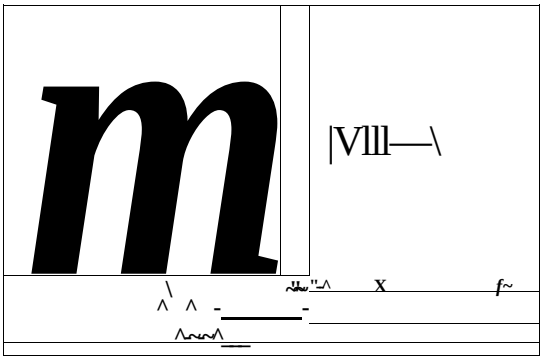
Remove the nut holding the absorber to the crossmember.

23. REMOVE ENGINE MOUNT BOLTS

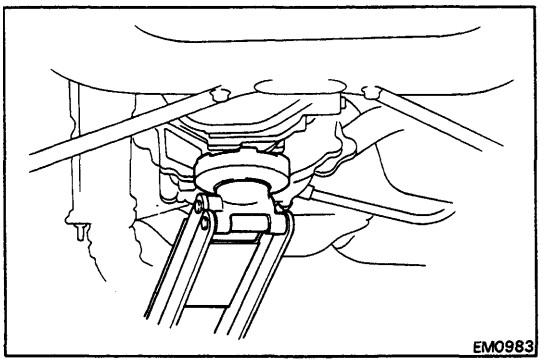
Remove the two bolts holding the mounting insulator to the crossmember.

24. (w/A/T)
REMOVE TORQUE CONVERTER COVER
(See page AT-25)

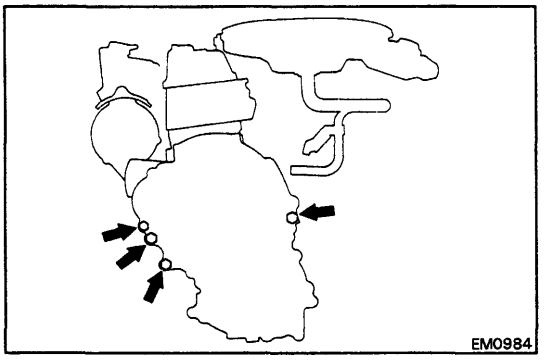
25. REMOVE TORQUE CONVERTER MOUNT BOLTS
(See page AT-25)



26. WRAP BOTH DRIVE SHAFT BOOTS IN SHOP TOWEL

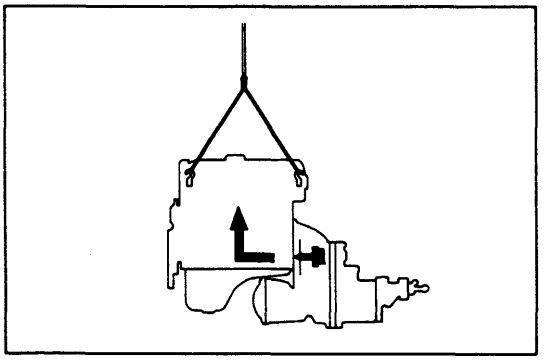


27. PLACE JACK UNDER TRANSAXLE



28. REMOVE TRANSAXLE LOWER MOUNT BOLTS

NOTE: Hold the starter.



29. REMOVE ENGINE FROM VEHICLE

(a) Attach the engine hoist chain to the lift brackets of the engine.

(b) Lift the engine out of the vehicle slowly and carefully.

NOTE: Make sure the engine is clear of all wiring and hoses.

PREPARATION FOR DISASSEMBLY

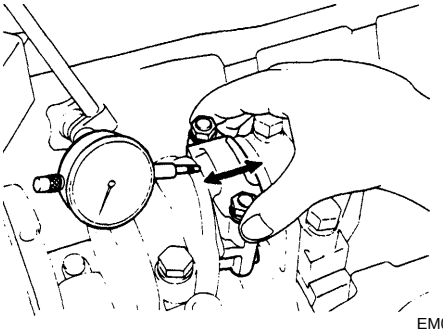
1. **(w/M/T)**
   REMOVE CLUTCH COVER AND DISC
   (See page CL-8)
2. **(w/ M/T)**
   REMOVE FLYWHEEL
3. **(w/ A/T)**
   REMOVE DRIVE PLATE
4. **REMOVE REAR END PLATE**
5. **INSTALL ENGINE STAND**
6. **REMOVE ALTERNATOR**
7. **REMOVE TIMING BELT**
   (See steps 6 to 11 on pages EM-7 to 9)
8. **REMOVE CYLINDER HEAD**
   (See step 12 on page EM-17)
9. **REMOVE WATER PUMP**
   (See page CO-4)
10. **REMOVE OIL PAN, STRAINER AND PUMP**
    (See page LU-4)

DISASSEMBLY OF CYLINDER BLOCK

(See page EM-36)

1. **REMOVE REAR OIL SEAL RETAINER**

   Remove the six bolts, rear oil seal retainer and gasket

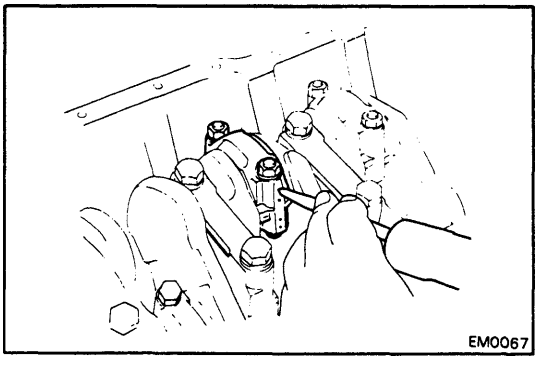

EM0065

2. **CHECK CONNECTING ROD THRUST CLEARANCE**

   Using a feeler gauge, measure the connecting rod thrust clearance.

   Standard clearance: 0.15 - 0.25 mm (0.0059 - 0.0098 in.)
   Máximum clearance: 0.30 mm (0.0118 in.)

   If clearance is exceeds máximum, replace the connecting rod assembly. If necessary, replace the crankshaft.


EM0067

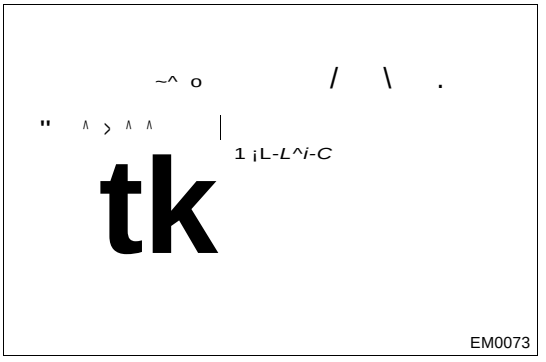
3. **REMOVE CONNECTING ROD CAPS AND CHECK OIL CLEARANCE**

   (a) Using a punch or numbering stamp, place the connecting rods and caps to ensure correct reassembly.

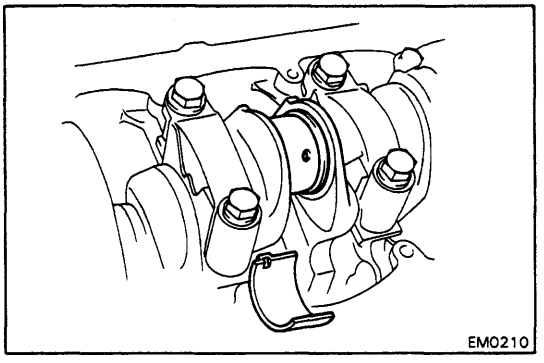
(b) Remove the connecting rod cap nuts.

(c) Using a plastic-faced hammer, lightly tap the connecting rod bolts and lift off the rod connecting cap.

NOTE: Keep the lower bearing insert with the connecting rod cap.



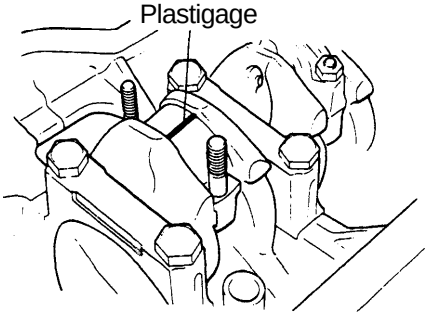
(d) Cover the connecting rod bolts with a short piece of hose to protect the crankshaft from damage.



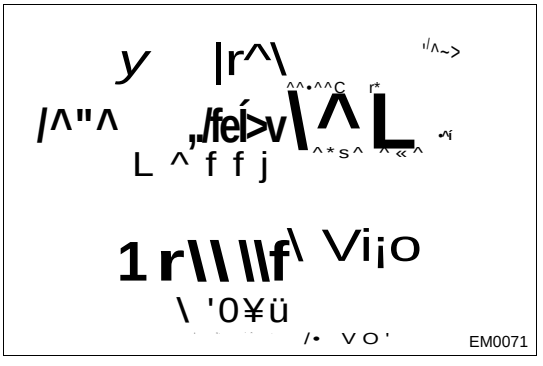
(e) Clean each crank pin and bearing.

(f) Check each crank pin and bearing for pitting and scratches.

If the crank pin or bearing are damaged, replace the bearings. If necessary, replace the crankshaft



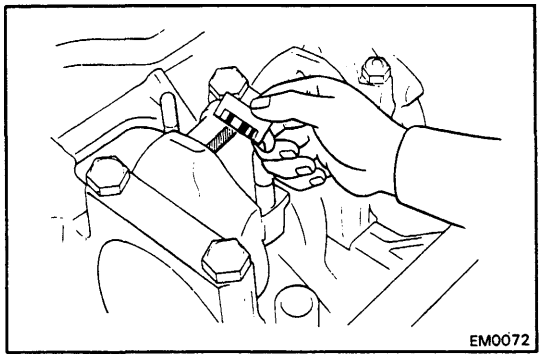
(g) Lay a strip of Plastigage across the crank pin.



(h) Install the connecting rod. (See page EM-52)

Torque: 500 kg-cm (36 ft-lb, 49 N-m)

NOTE: Do not turn the crankshaft.



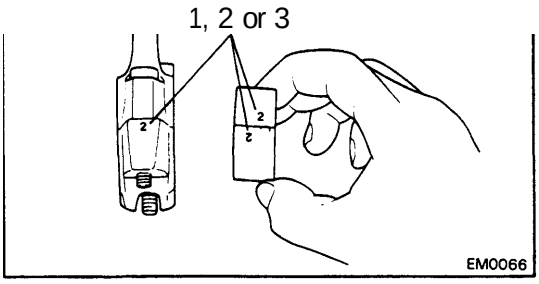
(i) Remove the connecting rod cap.

(j) Measure the Plastigage at its widest point.

Standard clearance: 0.020 - 0.051 mm (0.0008 - 0.0020 in.)

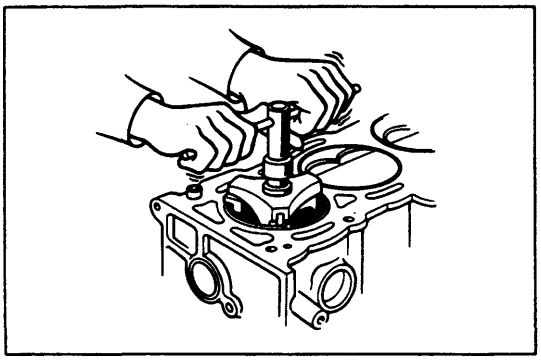
Máximum clearance: 0.08 mm (0.0031 in.)

If the clearance is greater than máximum, replace the bearing. If necessary, replace the crankshaft



NOTE: If using standard bearing, replace with one having the same number as maked on the connecting rod cap. There are three sizes of standard bearings, marked 1, 2 or 3 accordingly.

(k) Completely remove the Plastigage.

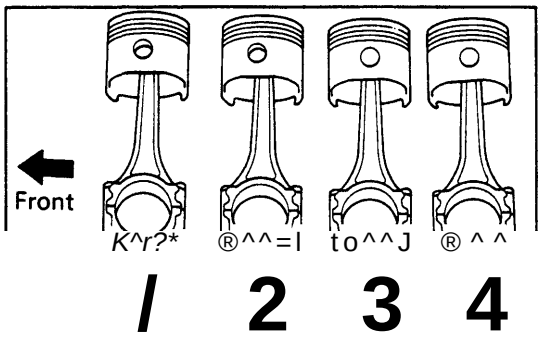


4. **REMOVE PISTÓN AND CONNECTING ROD ASSEMBLIES**

(a) Remove all the carbón from the pistón ring ridge.

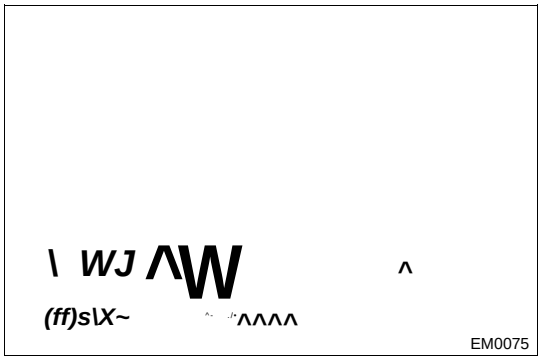
(b) Cover the connecting rod bolts (See page EM-41)

(c) Push the pistón, connecting rod.assembly and upper bearing out through the tap of the cylinder.



NOTE:

- Keep the bearings, connecting rod and cap together.
- Arrange the pistón and connecting rod assembly in correct order.



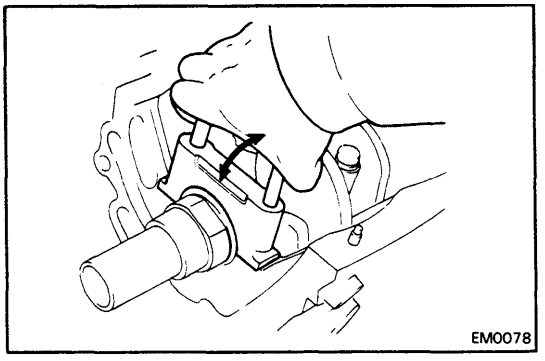
5. CHECK CRANKSHAFT THRUST CLEARANCE

Using a dial indicator, measure the thrust clearance while prying the crankshaft back and forth with a screwdriver.

Standard thrust clearance: 0.020 - 0.185 mm (0.0008 - 0.0073 in.)

Máximum thrust clearance: 0.30 mm (0.0118 in.)

If the clearance is exceeds máximum, replace the thrust washers as a sel



REMOVE MAIN BEARING CAPS AND CHECK OIL CLEARANCE

(a) Remove the main bearing cap bolts.

(b) Using the removed main bearing cap bolts, pry the cap fore-and-aft, and remove the main bearing caps, lower bearings and lower thrust washers (No. 3 main bearing cap only.)

NOTE:
- Keep the lower bearing, the main bearing cap together.
- Arrange the main bearing caps and lower thrust washers in correct order.

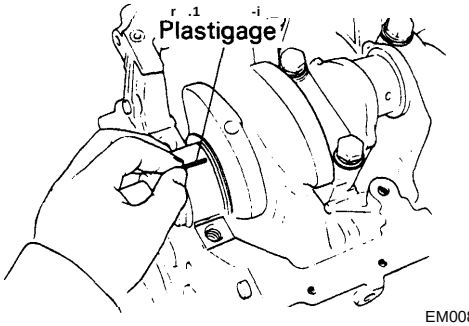
(c) Lift out the crankshaft.

NOTE: Keep the upper bearings and upper thrust washers together with the cylinder block.

(d) Clean each main journal and bearing.

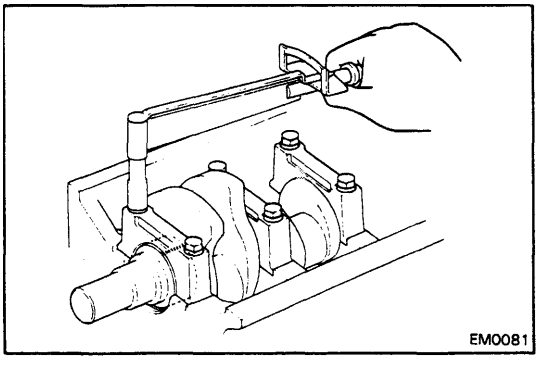
(e) Check each main journal and bearing for pitting and scratches.

If the journal or bearing are damaged, replace the bearing. If necessary, replace the crankshaft.



(f) Place the crankshaft on the cylinder block.

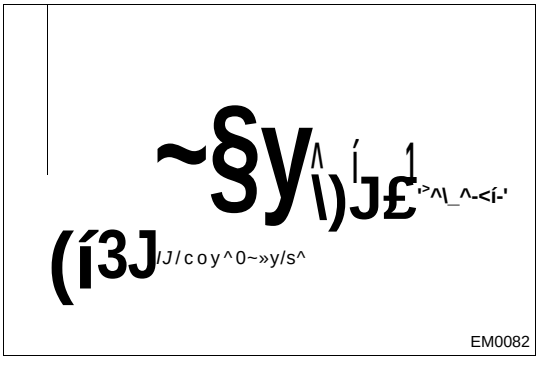
(g) Lay a strip of Plastigage across each main journals.



(h) Install the main bearing caps. (See page EM-51

Torque: 600 kg-cm (43 ft-lb, 59 N-m)

NOTE: Do not turn the crankshaft.



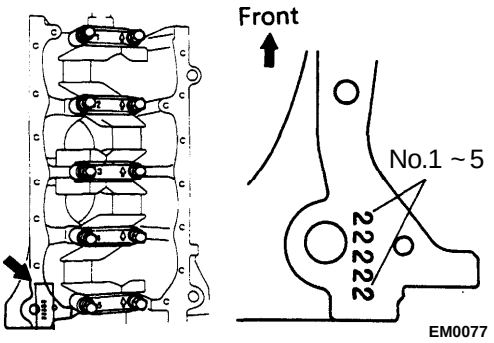
(i) Remove the main bearing caps.

(j) Measure the Plastigage at its widest point.

Standard clearance: 0.030 - 0.065 mm (0.0012- 0.0026 in.)

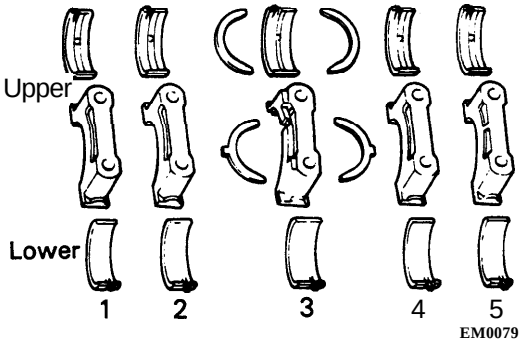
Máximum clearance: 0.08 mm (0.0031 in.)

If the clearance is exceeds máximum, replace the main bearing. If necessary, replace the crankshaft.



NOTE: If using a standard bearing, replace with one having the same number as marked on the main bearing cap. There are three sizes of standard bearings, marked 1, 2, 3 accordingly.

(k) Completely remove the Plastigage.



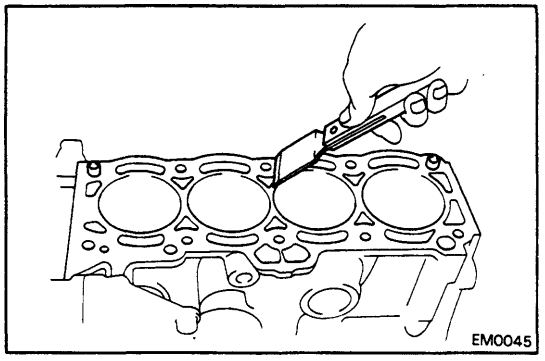
REMOVE CRANKSHAFT

(a) Lift out the crankshaft.

(b) Remove the upper bearings and upper thrust washers from the cylinder block.

NOTE: Arrange the main bearing caps, bearings and thrust washers in correct order.

INSPECTION OF CYLINDER BLOCK

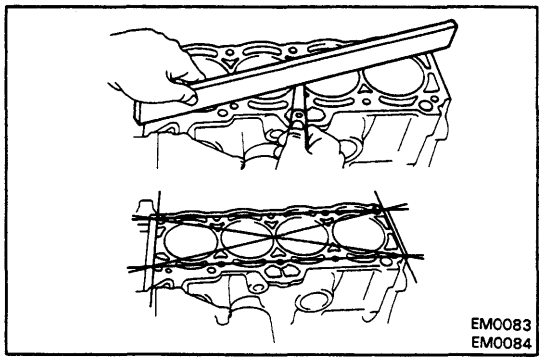


1. REMOVE GASKET MATERIAL

Using a gasket scraper, remove all the gasket material from the cylinder block surface.

2. CLEAN CYLINDER BLOCK

Using a soft brush and solvent, clean the block.

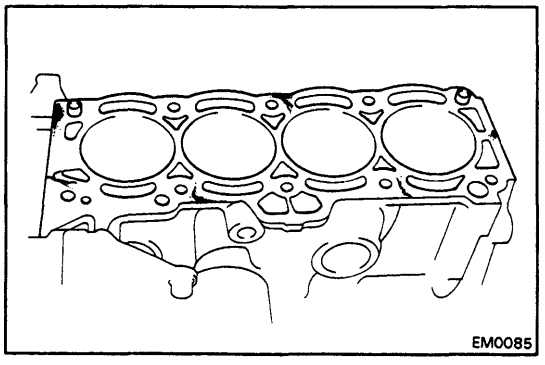


3. INSPECT TOP OF CYLINDER BLOCK FOR FLATNESS

Using a precisión straight edge and feeler gauge, measure the surfaces contacting the cylinder head gasket for warpage.

Máximum warpage: 0.05 mm (0.0020 in.)

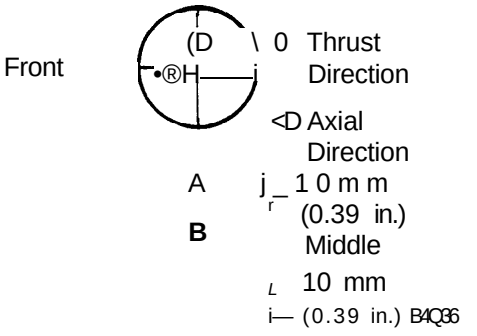
If warpage is exceeds máximum, replace the cylinder block.

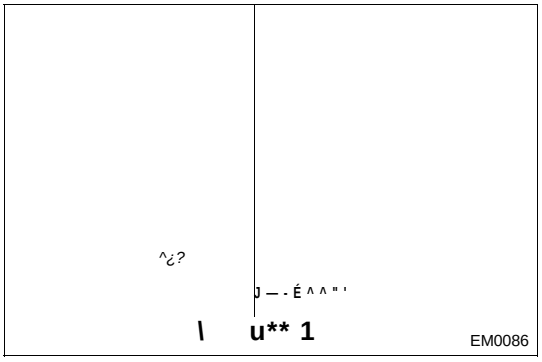


INSEPCT CYLINDERS FOR VERTICAL SCRATCHES

Visually check the cylinder for vertical scratches.

If deep scratches are present, rebore all four cylinders.





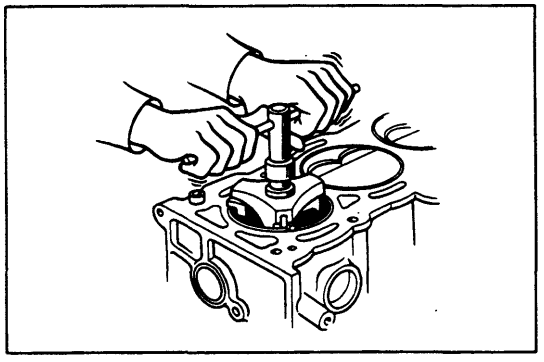
5. INSPECT CYLINDER BORE DIAMETER

Using a cylinder gauge, measure the cylinder bore diameter at positions A, B and C in the thrust and axial directions.

Máximum diameter

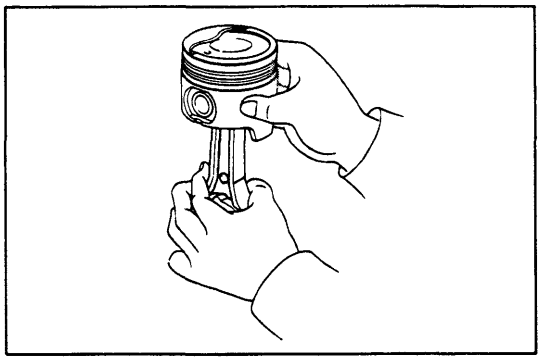
Pistón size	Cylinder bore diameter mm (in.)
STD	77.73 (3.0602)
0/S 0.50	78.23 (3.0799)
0/S 0.75	78.48 (3.0898)
O/S 1.00	78.73 (3.0996)

If the diameter is exceeds máximum, rebore all four cylinders. If necessary, replace the cylinder bolck.



6. REMOVE CYLINDER RIDGE

If the wear is less than 0.2 mm (0.008 in.), use a ridge reamer to machine the pistón ring ridge at the top of the cylinder.

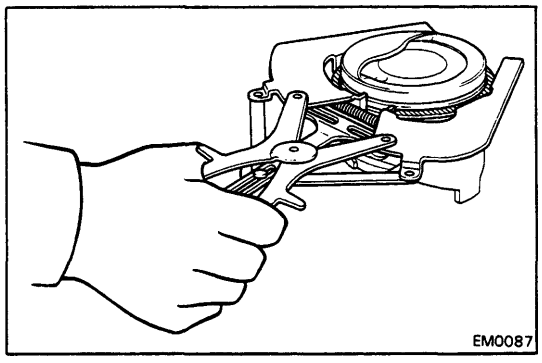


DISASSEMBLY OF PISTÓN AND CONNECTING ROD ASSEMBLIES

i. CHECK FIT BETWEEN PISTÓN AND PIN

Try to move the pistón back and forth on the pistón pin.

If any movement is felt, replace the pistón and pin as a set.

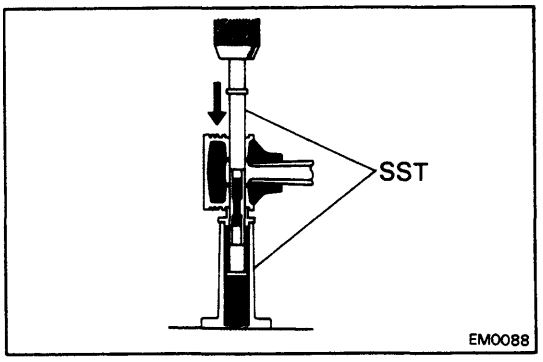


2. REMOVE PISTÓN RINGS

(a) Using a pistón ring expander, remove the compression rings.

(b) Remove the two side rails and oil ring expander by hand.

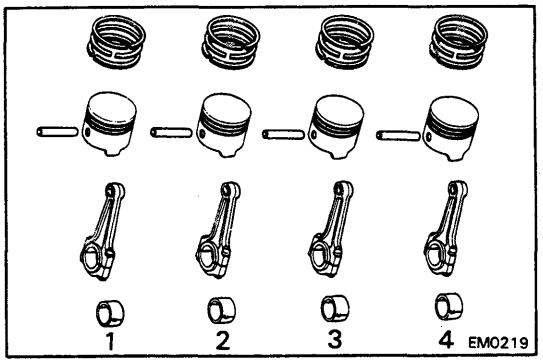
NOTE: Arrange the rings in correct order only.



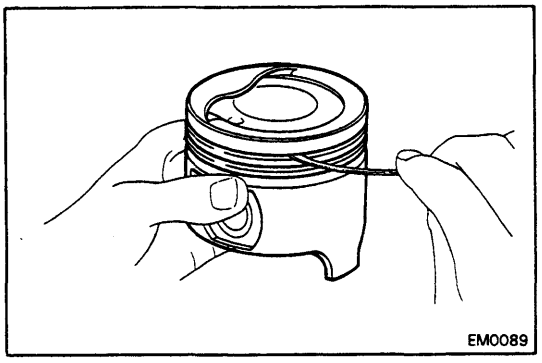
3. DISCONNECT CONNECTING ROD FROM PISTÓN

(a) Using SST, press the pistón pin out of the pistón.

SST 09221-25018



NOTE:
- The pistón and pin are a matched set.
- Arrange the pistons, pins, rings, connecting rods and bearings in correct order only.



INSPECTION OF PISTÓN AND CONNECTING ROD ASSEMBLIES

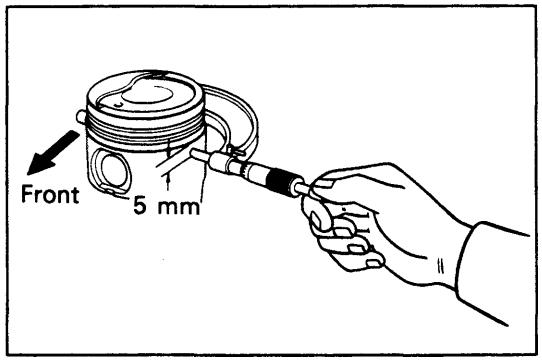
1. CLEAN PISTÓN

(a) Scrape carbón from the pistón top.

(b) Using a groove cleaning tool or broken ring, clean the ring grooves.

(c) Using solvent and brush, thoroughly clean the pistón.

CAUTION: Do not use a **wire brush.**



2. INSPECT PISTÓN DIAMETER AND OIL CLEARANCE

(a) Using a micrometer, measure the pistón diameter at right angles to the pistón pin hole center line, 5 mm (0.20 in.) from the lower edge of oil ring groove.

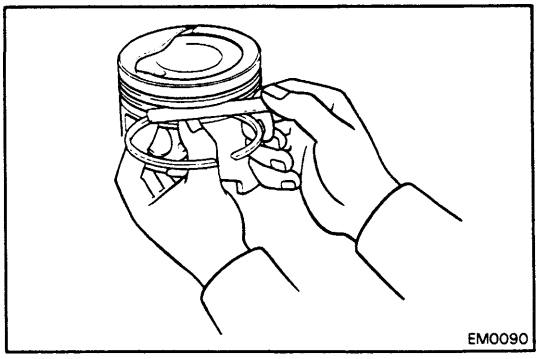
Standard diameter

Size	Diameter mm (in.)
STD	77.39 - 77.42 (3.0468 - 3.0480)
O/S 0.50	77.89 - 77.92 (3.0665 - 3.0677)
O/S 0.75	78.14 - 78.17 (3.0764 - 3.0776)
O/S 1.00	78.39 - 78.42 (3.0862 - 3.0874)

(b) Measure the cylinder bore diameter in the thrust directions (See page EM-45) and subtract the pistón diameter measurement from the cylinder bore diameter.

Oil clearance: 0.10 - 0.12 mm
(0.0039 - 0.0047 in.)

If the oil clearance is not within specification, replace all four pistons. If necessary, rebore all four cylinders or replace the cylinder block.



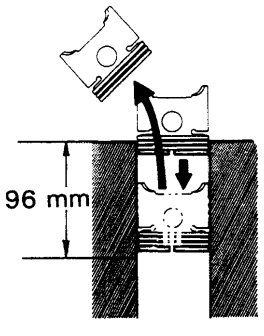
3. INSPECT CLEARANCE BETWEEN WALL OF PISTÓN RING GROOVE AND NEW PISTÓN RING

Using a feeler gauge, measure the clearance between new pistón ring and the wall of the pistón ring groove.

Ring groove clearance:

No.1 0.04 - 0.08 mm (0.0016 - 0.0031 in.)
No.2 0.03 - 0.07 mm (0.0012 - 0.0028 in.)

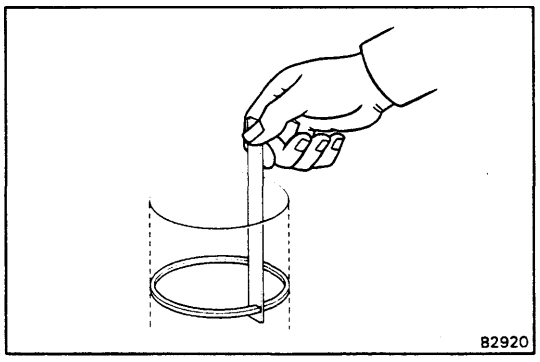
If the clearance is not within specification, replace the pistón.



INSPECT PISTÓN RING END GAP

(a) Inserí the pistón ring into the cylinder bore.

(b) Using a pistón, push the pistón ring a little beyond the bottom of the ring travel.
(96 mm (3.78 in.) from top surface of cylinder block)



(c) Using a feeler gauge, measure the end gap.

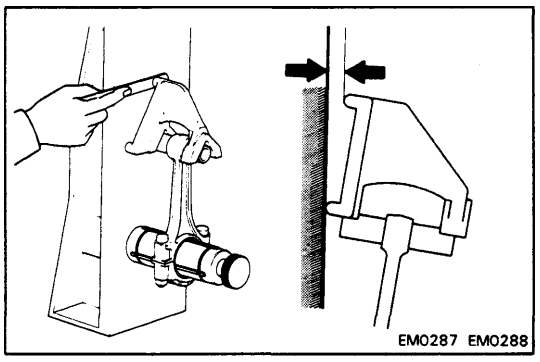
Standard end gap:

No. 1 0.20 - 0.47 mm (0.0079 - 0.0185 in.)
No. 2 0.20 - 0.52 mm (0.0079 - 0.0205 in.)
Oil (side rail)
0.30 - 1.02 mm (0.0118 - 0.0402 in.)

Máximum end gap:

No. 1 1.07 mm (0.0421 in.)
No. 2 1.12 mm (0.0441 in.)
Oil (side rail) 1.62 mm (0.0638 in.)

If the gap exceeds the specified máximum, replace the pistón ring.
If the gap exceeds the specified máximum even with a new pistón ring, rebore the cylinder and use an o/s pistón ring.



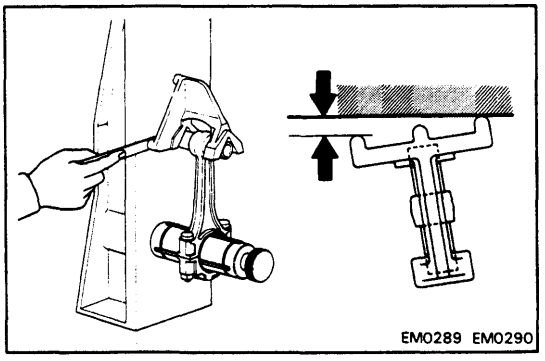
INSPECT CONNECTING RODS

(a) Using a rod aligner, check the connecting rod alignment.

- Check for bend.

Máximum bend:

0.05 mm (0.0020 in.) per 100 mm (3.94 in.)



• Check for twist.

Máximum twist:
0.05 mm (0.0020 in.) per 100 mm (3.94 in.)

If the rod is bent or twisted, replace the connecting rod assembly.

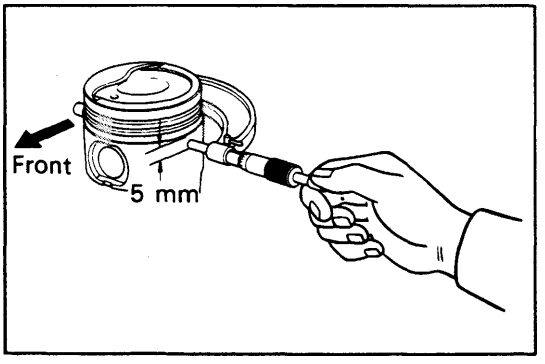
BORING OF CYLINDERS

NOTE:
- Bore all four cylinders for the oversized piston's outside diameter.
- Replace the pistón rings with ones to match the oversized pistons.

1. SELECT OVERSIZED PISTÓN

Oversized pistón diameter:

O/S 0.50	**77.89 - 77.92 mm (3.0665 - 3.0677 in.)**
O/S 0.75	**78.14 - 78.17 mm (3.0764 - 3.0776 in.)**
O/S 1.00	**78.39 - 78.42 mm (3.0862 - 3.0874 in.)**



2. CALCÚLATE AMOUNT TO BORE CYLINDER

(a) Using a micrometer, measure the pistón diameter at right angles to the pistón pin center line, 5 mm (0.20 in.) from the lower edge of oil ring groove.

(b) Calcúlate the amount each cyiinder is to be rebored as follows:

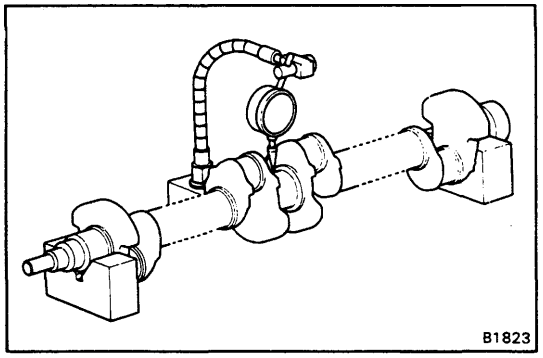
Size to be rebored = P + C - H

P = Pistón diameter
C = Pistón clearance
0.10 - 0.12 mm (0.0039 - 0.0047 in.)
H = Allowance for honing
Less than 0.02 mm (0.0008 in.)

3. BORE AND HONE CYLINDERS TO CALCULATED DIMENSIONS

Máximum honing: 0.02 mm (0.0008 in.)

CAUTION: Excess honing will destroy the finished roundness.



INSPECTION OF CRANKSHAFT

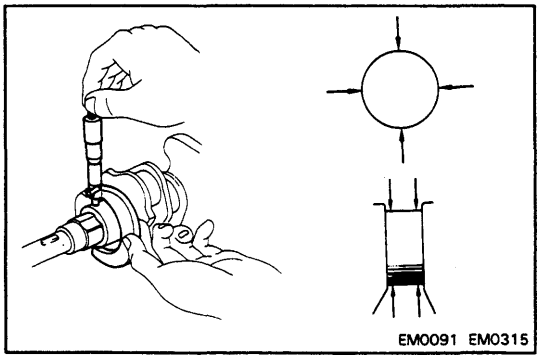
1. INSPECT CRANKSHAFT FOR RUNOUT

(a) Place the crankshaft on V-blocks.

(b) Using a dial indicator, measure the circle runout at the center journal.

Máximum circle runout: 0.06 mm (0.0024 in.)

If the circle runout is exceeds máximum, replace the crankshaft.



2. INSPECT MAIN JOURNALS AND CRANK PINS

(a) Using a micrometer, measure the diameter of each main journal and crank pin.

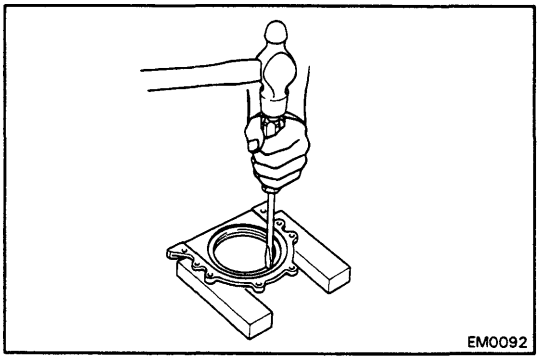
Main journal diameter:
47.985 - 48.000 mm (1.8892 - 1.8898 in.)
Crank pin diameter:
39.985 -40.000 mm (1.5742 - 1.5748 in.)

If the diameter is not within specification, check the oil clearance.

(b) Check each main journal and crank pin for taper and out-of-round as shown.

Máximum taper and out-of-round:
0.02 mm (0.0008 in.)

If taper and out-of-round are exceeds máximum, replace the crankshaft.



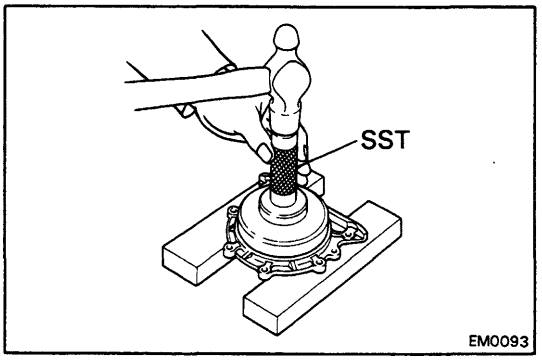
REPLACEMENT OF REAR OIL SEAL

NOTE: There are two methods of oil seal replacement described as follows.

REPLACE CRANKSHAFT REAR OIL SEAL

If rear oil seal retainer is removed from cylinder block:

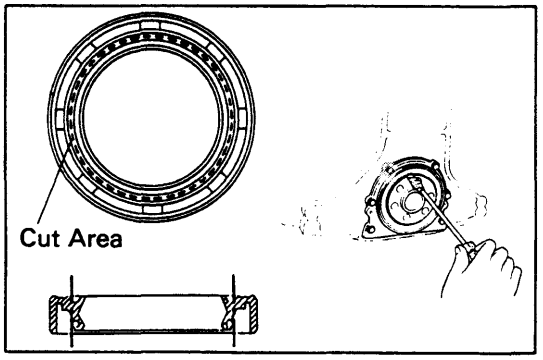
(a) Using a screwdriver and hammer, drive out the oil seal.



(b) Using SST and a hammer, drive in a new oil seal until its surface is flush with the rear oil seal retainer edge.

SST 09223-41020

(c) Apply MP grease to the oil seal.

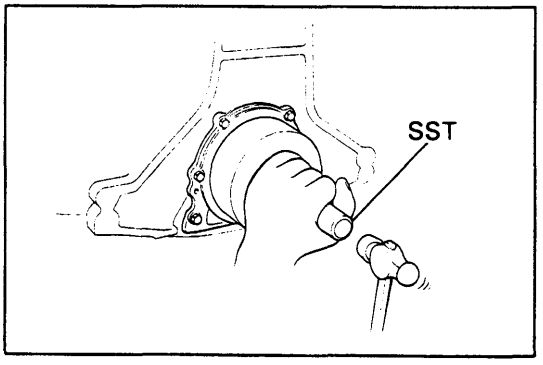


If rear oil seal retainer is installed in the cylinder block:

(a) Using a knife, cut off the oil seal lip.

(b) Using a screwdriver, pry out the oil seal.

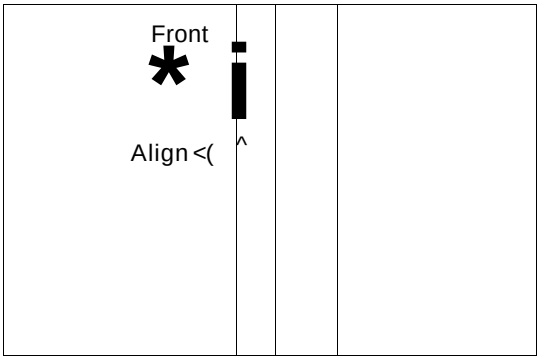
CAUTION: To prevent damage to the crankshaft, tape the screwdriver.



(c) Apply MP grease to a new oil seal.

(d) Using SST and a hammer, drive in the oil seal until its surface is flush with the rear oil seal retainer edge.

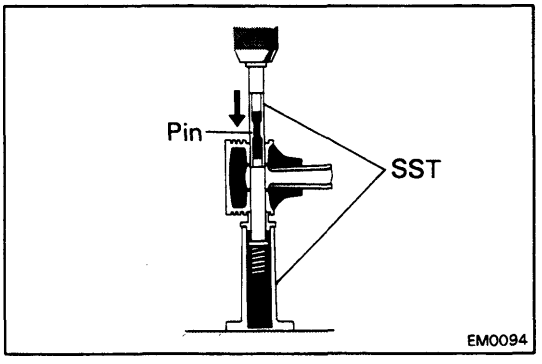
SST 09223-41020



ASSEMBLY OF PISTÓN AND CONNECTING ROD ASSEMBLIES

1. ASSEMBLE PISTÓN AND CONNECTING ROD

(a) Align the cavity on the pistón with the protrusion on the connecting rod.



(b) Using SST, press in the pistón pin.

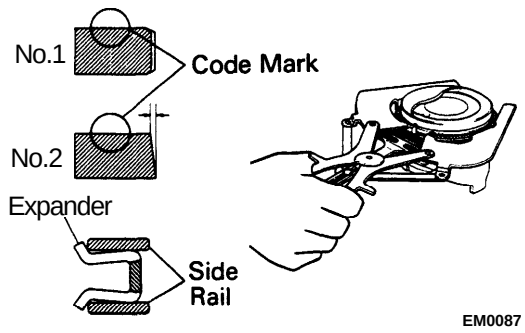
SST 09221-25018

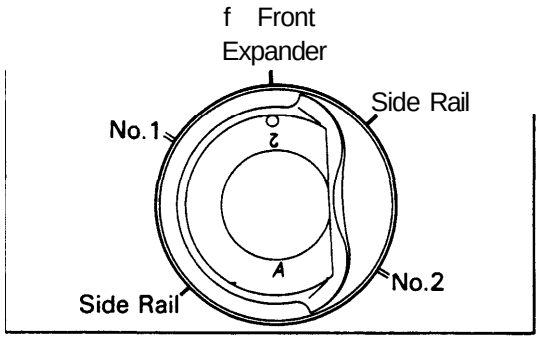
NOTE: Coat the pistón pin and hole with engine oil.

2. INSTALL PISTÓN RINGS

(a) Install the oil ring expander and two side rails by hand.

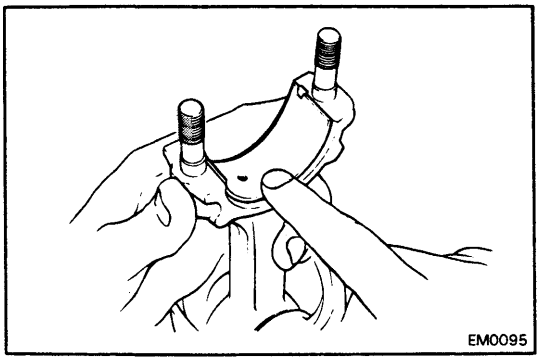
(b) Using a ring expander, install the two compression rings with the code marks facing upward.





(c) Position the pistón rings so that the ring ends are as shown.

CAUTION: Do not align the end gaps.



3. INSTALL BEARINGS

Install the bearings ¡n the connecting rods and rod caps.

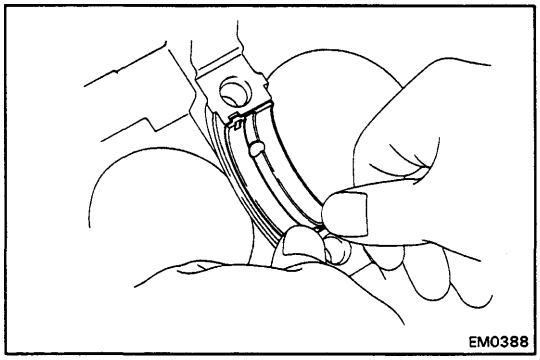
CAUTION: Install the bearing with the oil hole in the connecting rod.

ASSEMBLY OF CYLINDER BLOCK

(See page EM-36)

NOTE:

- Thoroughly clean all parts to be assembled.
- Before installing the parts, apply new engine oil to all sliding and rotaing surfaces.
- Replace all gaskets, and oil seáis with new parts.



1. INSTALL MAIN BEARINGS

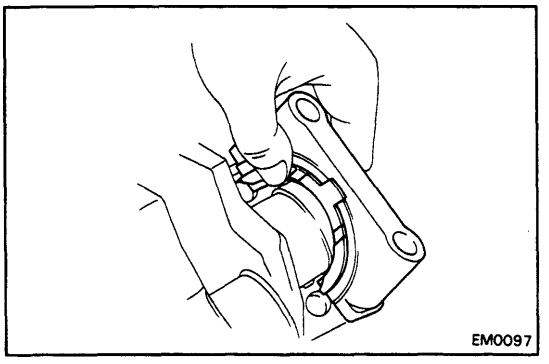
Install the bearing in the cylinder block and bearing caps.

CAUTION: Install the bearing with the oil hole in the block.

2. INSTALL UPPER THRUST WASHERS

Install the thrust washers under the No. 3 main bearing cap position of the block with the oil grooves facing outward.

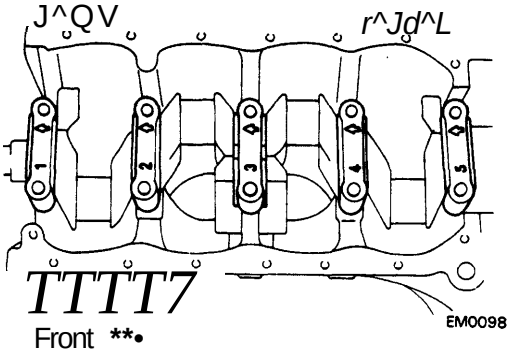
3. PLACE CRANKSHAFT ON CYLINDER BLOCK



4. INSTALL MAIN BEARING CAPS

NOTE: Each main bearing cap is numbered.

(a) Install the upper thrust washers on the No. 3 main bearing cap with the oil grooves facing outward.



(b) Install the main bearing caps in numerical o.rder with the arrows facing forward.

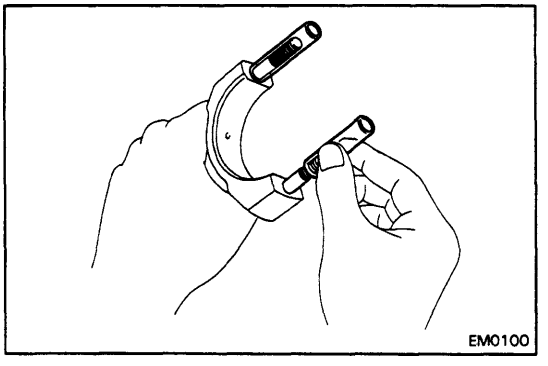
(c) Apply a light coating of engine oil on the threads and under the connecting rod cap bolt heads.

(d) Install and uniformly tighten the cap bolts in several passes, in the sequence shown.

Torque: 600 kg-cm (43 ft-lb, 59 N-m)

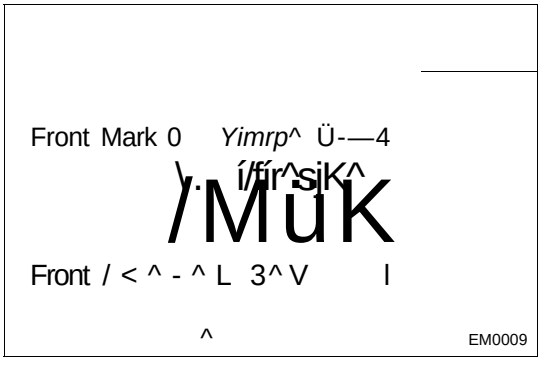
(e) Check that the crankshaft turns.

(f) Check the crankshaft thrust clearance.
(See page EM-43)

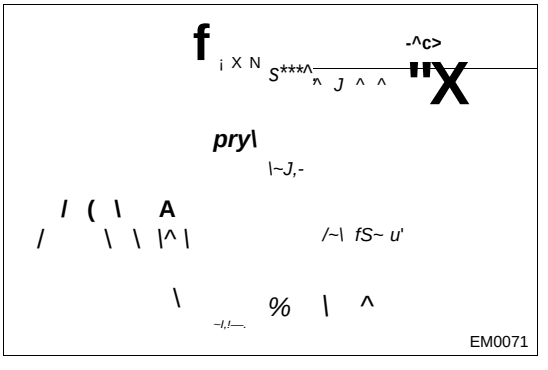


5. INSTALL PISTÓN AND CONNECTING ROD ASSEMBLIES

(a) Cover the rod bolts with a short piece of hose to protech the crankshaft and cylinder bore from damage.



(b) Using a pistón ring compressor, push the correctly numbered pistón and connecting rod assembly into the cylinder. Make sure the marks on the connecting rod and pistón are facing forward.



6. INSTALL CONNECTING ROD BEARING CAPS

(a) Match the numbered connecting rod cap with the numbered connecting rod.

(b) Align the marks punched on the connecting rod and cap and install.

(c) Apply a light coat of the engine oil on the threads and under the rod nuts.

(d) Install and alternately tighten the connecting rod nuts and in several passes.

Torque: 500 kg-cm (36 ft-lb, 49 N-m)

(e) Check that the crankshaft turns smoothly.

(f) Check the connecting rod thrust clearance. (See page EM-40)

INSTALL REAR OIL SEAL RETAINER

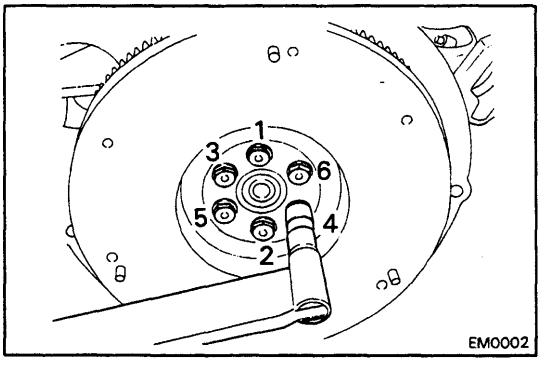
Touque the six bolts.

Torque: 95 kg-cm (82 ¡n.-lb, 9.3 Nm)

POST ASSEMBLY

1. **INSTALL OIL PUMP, STRAINER AND OIL PAN (See steps 1 to 4 on pages LU-7 and 8)**
2. **INSTALL WATER PUMP (See steps 1 to 3 on pages CO-9)**
3. **INSTALL CYLINDER HEAD**

   (See steps 1 to 3 on pages EM-31)
4. **INSTALL TIMING BELT (See page EM-11)**
5. **INSTALL HA (See page IG-13)**
6. **INSTALL SPARK PLUGS (See page EM-34)**
7. **INSTALL ALTERNATOR AND BRACKET**
8. **REMOVE ENGINE STAND**
9. **INSTALL REAR END PLATE**

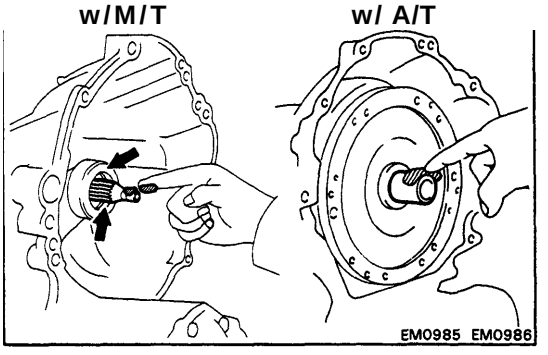


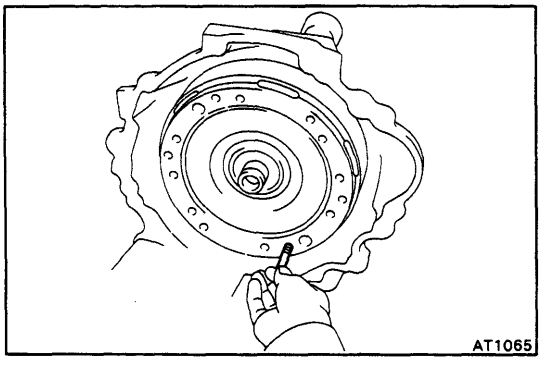
10. **(w/M/T)**
    INSTALL FLYWHEEL

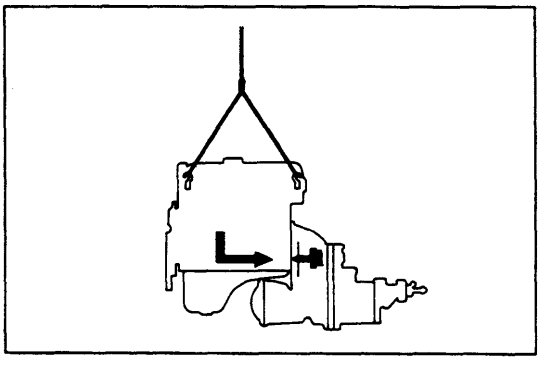
    Torque: 800 kg-cm (58 ft-lb, 78 Nm)
11. **(w/A/T)**
    INSTALL DRIVE PLATE

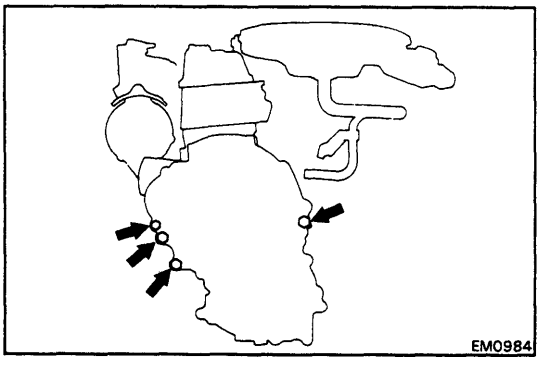
    Torque: 650 kg-cm (47 ft-lb, 64 Nm)
12. **(w/M/T)**
    INSTALL CLUTCH DISC AND CLUTCH COVER (See page CL-12)

    NOTE: If necessary, inspect the clutch unit before installation (See page CL-9).









INSTALLATION OF ENGINE

1. APPLY MOLYBDENUM DISULPHIDE LITHIUM BASE GREASE (NLGI NO. 2) OR MP GREASE

(a) (w/ M/T)
Apply molybdenum disulphide lithium base grease to the input shaft spline.

(b) Apply MP grease to the following parts:
- (w/ M/T)
  Input shaft end
- (w/ M/T)
  Front of the reléase bearing
- (w/ A/T)
  Center hub of torque converter

2. INSTALL GUIDE PIN TO TORQUE CONVERTOR

3. PLACE ENGINE IN VEHICLE

(a) Attach the engine hoist chain to the life brackets on the engine.

(b) Lower the engine into the engine compartment

(c) (w/ A/T)
Align the guide pin with one of the drive píate holes.

(d) Connect the engine and transaxle.

4. INSTALL STARTER AND TRANSAXLE LOWER MOUNT BOLTS

(a) Place the starter in position.

(b) Instad and torque the lower mount bolts.

Torque:
14 mm bolt head **400** kg-cm (29 ft-lb, 39 Nm)
17 mm bolt head **600** kg-cm (43 **ft-lb,** 59 Nm)

(c) Remove the hoist chain.

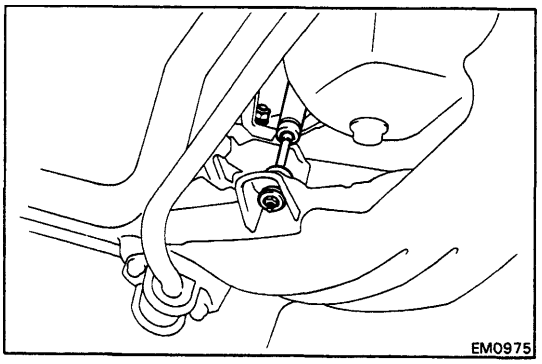
5. REMOVE GUIDE PIN

6. (w/ A/T)
INSTALL TORQUE CONVERTER MOUNT BOLTS (See page AT-28)

Torque: 185 kg-cm (13 ft-lb, 18 Nm)

7. INSTALL TORQUE CONVERTER COVER (See page AT-28)

8. TAKE OUT JACK FROM UNDER TRANSAXLE



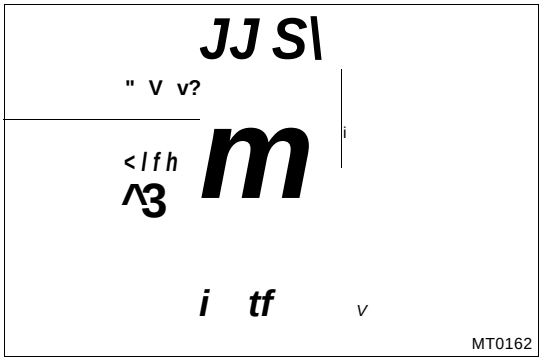
9. INSTALL ENGINE MOUNT NUTS
   Torque: 450 kg-cm (33 ft-lb, 44 N-m)

10. CONNECT ENGINE MOUNTING ABSORBER

11. INSTALL STIFFENER PLATES (See gape LU-8)
    Torque: 400 kg-cm (29 ft-lb, 39 N-m)

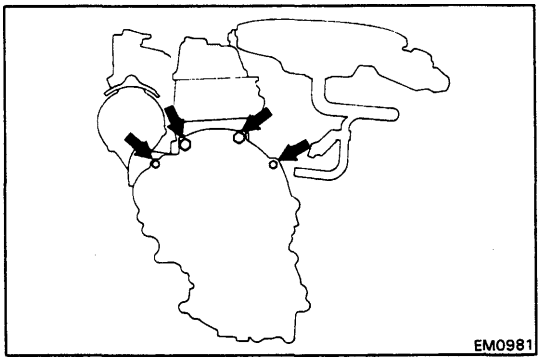
12. (w/M/T)
    CONNECT CLUTCH RELÉASE CABLE

13. (w/A/T)
    INSTALL COOLER PIPES
    Torque the unión nuts.
    Torque: 350 kg-cm (25 ft-lb, 34 N-m)



14. INSTALL EXHAUST FRONT PIPE
    Torque the two nuts holding the front pipe to the exhaust manifold.
    Torque: 630 kg-cm (46 ft-lb, 62 N-m)

15. LOWERVEHICLE



16. INSTALL TRANSAXLE UPPER MOUNT BOLTS
    Torque: 600 kg-cm (43 ft-lb, 59 N-m)

17. (FED.)
    CONNECT AIR SUCTION (AS FILTER)

18. CONNECT FOLLOWING WIRES:

(a) Heater inlet and outlet hoses

(b) Fuel pump inlet and return hoses

(c) Brake booster hose

(d) Vacuum hose of VSV for ilde-up

(e) Emission control hose (See system layout in the emission control section or the layout printed under the hood.)

19. (w/A/T)
CONNECT THROTTLE LINKAGE FOR AUTOMATIC TRANSMISSION (A/T)

20. CONNECT ACCERATOR CABLE

21. CONNECT FOLLOWING CONNECTORS AND WIRES:

(a) Carburetor connector

(b) [3A-C (ex. Canadá Wagón M/T)]

- Ox sensor connector
- Thermo switch connector
- CMH relay connector

(c) (w/ A/T)
Water temperature waming switch connector

(d) Water temperature sender gauge connector

(e) Oil pressure switch connector

(f) Distributor connector

(g) Starter connector and wire

(h) Altemator connector and wire

(i) Ground wire from left side of cylinder block

(j) Ground wire from dash panel

22. (w/PS)
INSTALL POWER STEERING (PS) PUMP (See page SR-30)

Torque: 375 kg-cm (27 ft-lb, 37 Nm)

23. (w/A/C)
INSTALL A/C COMPRESSOR (See page AC-30)

24. (w/A/C)
INSTALL A/C CONDENSER FAN

25. INSTALL RADIATOR (See page CO-17)

26. TAKE OFF SHOP TOWELS FROM BOTH DRIVE SHAFTS

27. INSTALL AIR CLEANER ASSEMBLY (See page FU-24)

28. CONNECT CABLE TO NEGATIVE TERMINAL OF BATTERY

29. FILL WITH ENGINE COOLANT (See page CO-3)

30. FILL WITH ENGINE OIL (See page LU-3)

31. ADJUST DRIVE BELT (See page **EM-13)**

32. PERFORM ENGINE ADJUSTMENT
(See page EM-35)

33. INSTALL AND ADJUST ENGINE HOOD (See page BO-2)

34. ROADTEST

Perform a road test.

35. RECHECK COOLANT AND ENGINE OIL LEVEL

EMISSION CONTROL SYSTEMS

NOTE: TROUBLESHOOTING

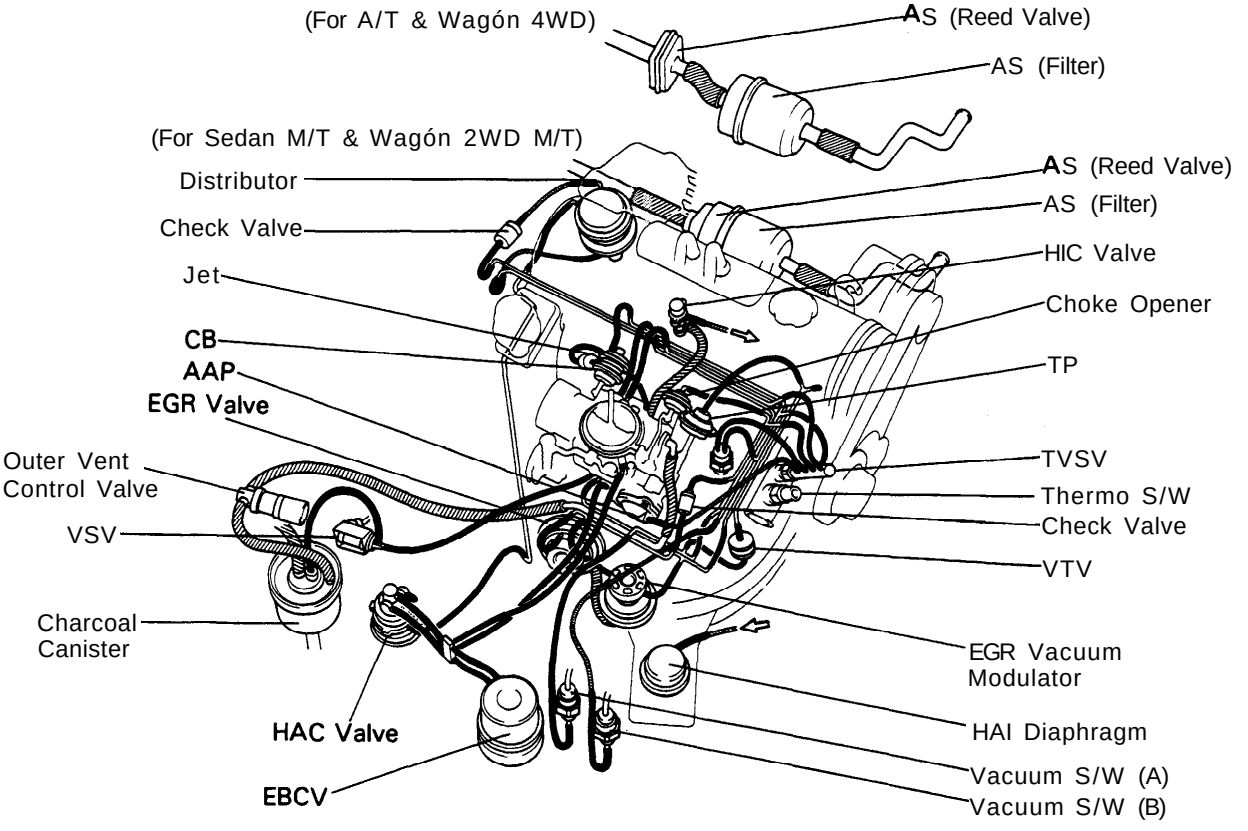
See page EM-2

SYSTEM PURPOSE

System	Abbreviation	Purpose	USA				
			Fed	Calif	/ *3A-C l 4-Spee vWagon A		
Positive crankcase ventilation	PCV	Reduces blow-by gas (HC)	•	•	•		
Fuel evaporative emission control	EVAP	Reduces evaporative HC	•	•	•		
Throttie positioner	TP	Reduces HC and CO	•	•	•		
Mixture control	MC	Reduces HC and CO					
Exhaust gas recirculation	EGR	Reduces NOx	•	•	•		
Air suction	AS	Reduces HC and CO	•	•	•		
Carburetor feedback		Maintains air-fuel ratio for TWC and reduces HC, CO and NOx in TWC	•	•	•		
Three-way and oxidation catalyst	TWC-OC	Reduces HC, CO and NOx	•				
Three-way catalyst	TWC	Reduces HC, CO and NOx		•	•		
Oxidation catalyst	OC	Reduces HC and CO					
High altitude compensation	HAC	Insures air-fuel mixture at high altitude	•				
Auxiliary system:							
1. Automatic hot air intake	HAI	Improves driveability - cold	•				
2. Hot idle compensation	HIC	Controls air-fuel mixture - hot	•				
3. Automatic choke		Improves driveability - cold	•				
4. Choke breaker	CB	Improves driveability - cold	•				
5. Choke opener		Improves driveability - hot	•				
6. Auxiliary acceleration pump	AAP	Improves driveability - cold	•				
7. Deceleration fuel cut		Prevents overheating OC and/or TWC, and after burning	•				
8. Heat control valve		Improves driveability - cold	•				
9. Cold mixture heater	CMH	Improves driveability - cold	•				

Remarks: « This system is the same for california USA.

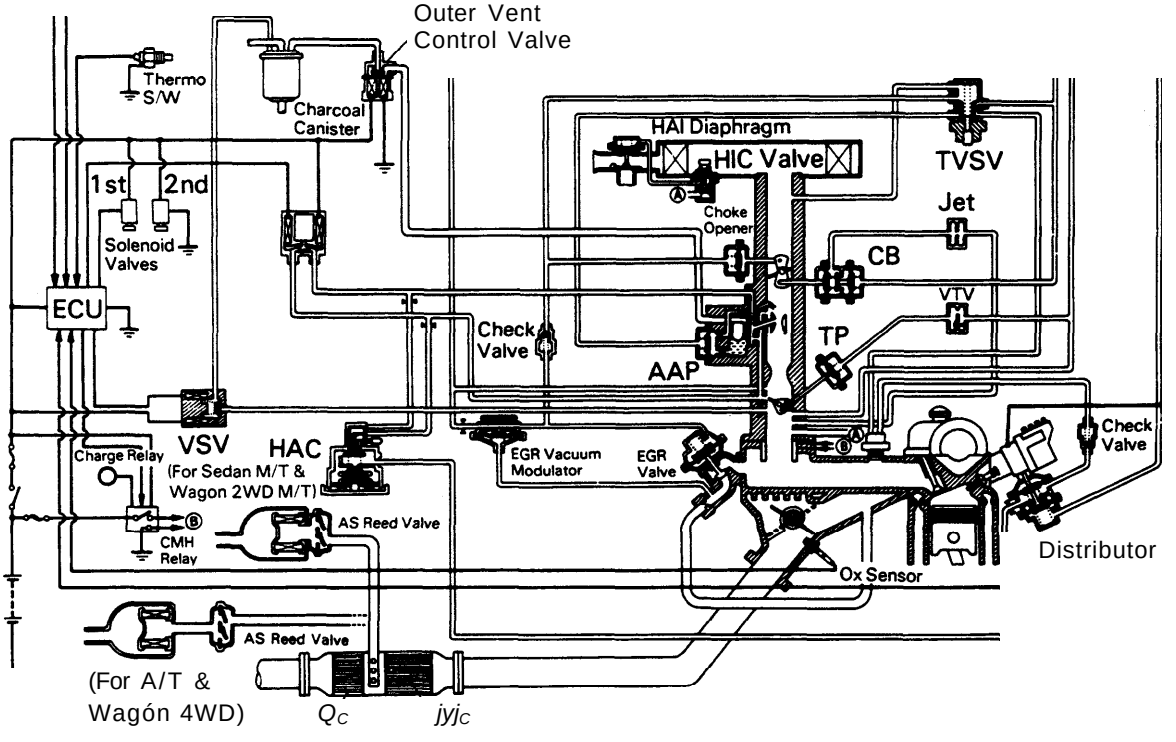
COMPONENT LAYOUT AND SCHEMATIC DRAWING (Federal Vehicles)



EC0420

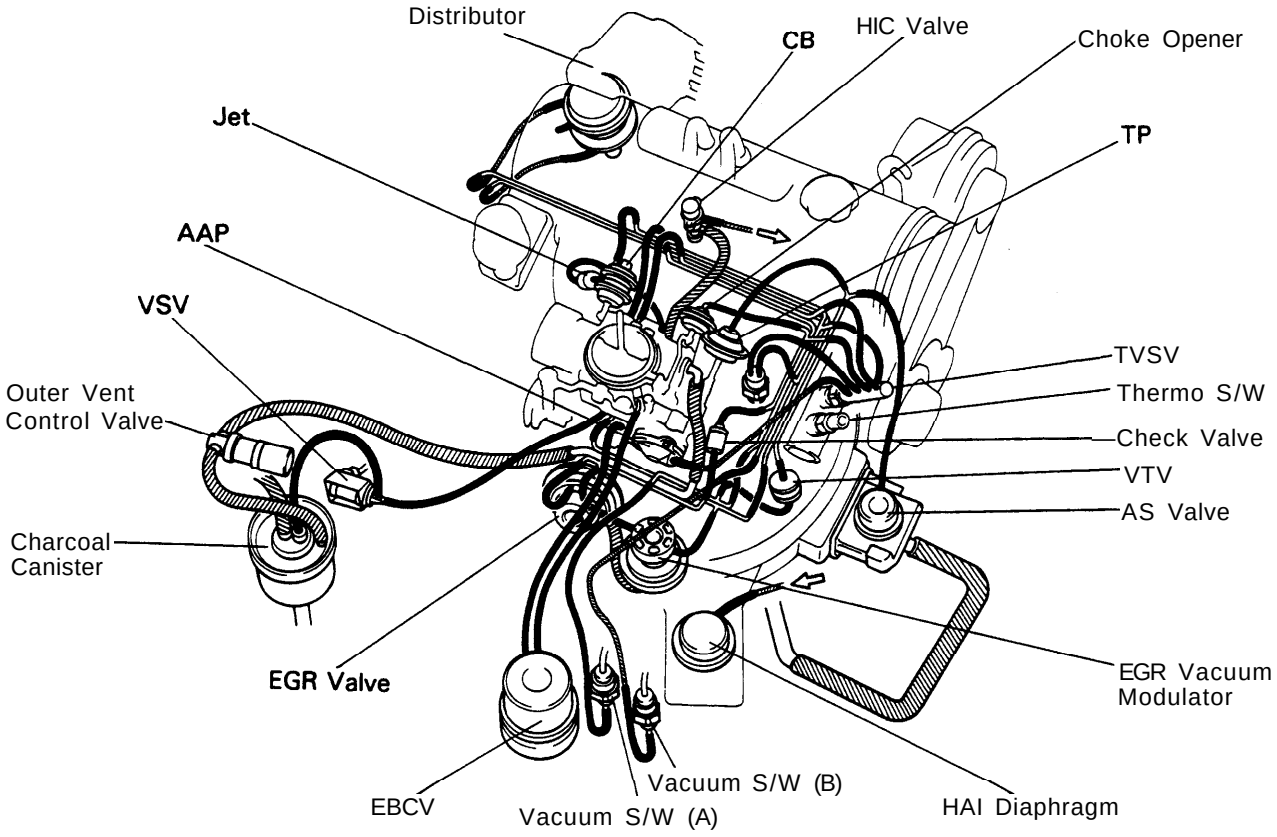
Vacuum S/W (A)

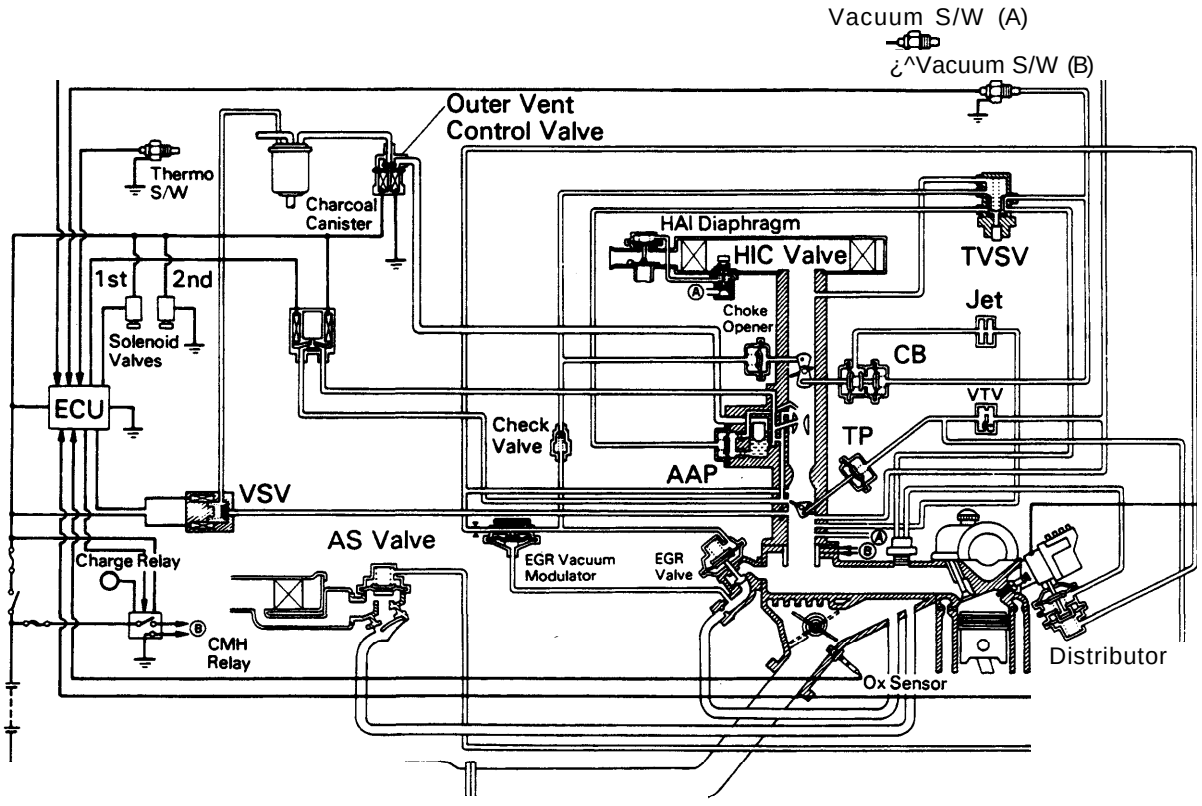
¿ Vacuum S/W (B)



EC0421

COMPONENT LAYOUT AND SCHEMATIC DRAWING (California Vehicles and Canadá 3A-C Engine 4-Speed & Wagón A/T)

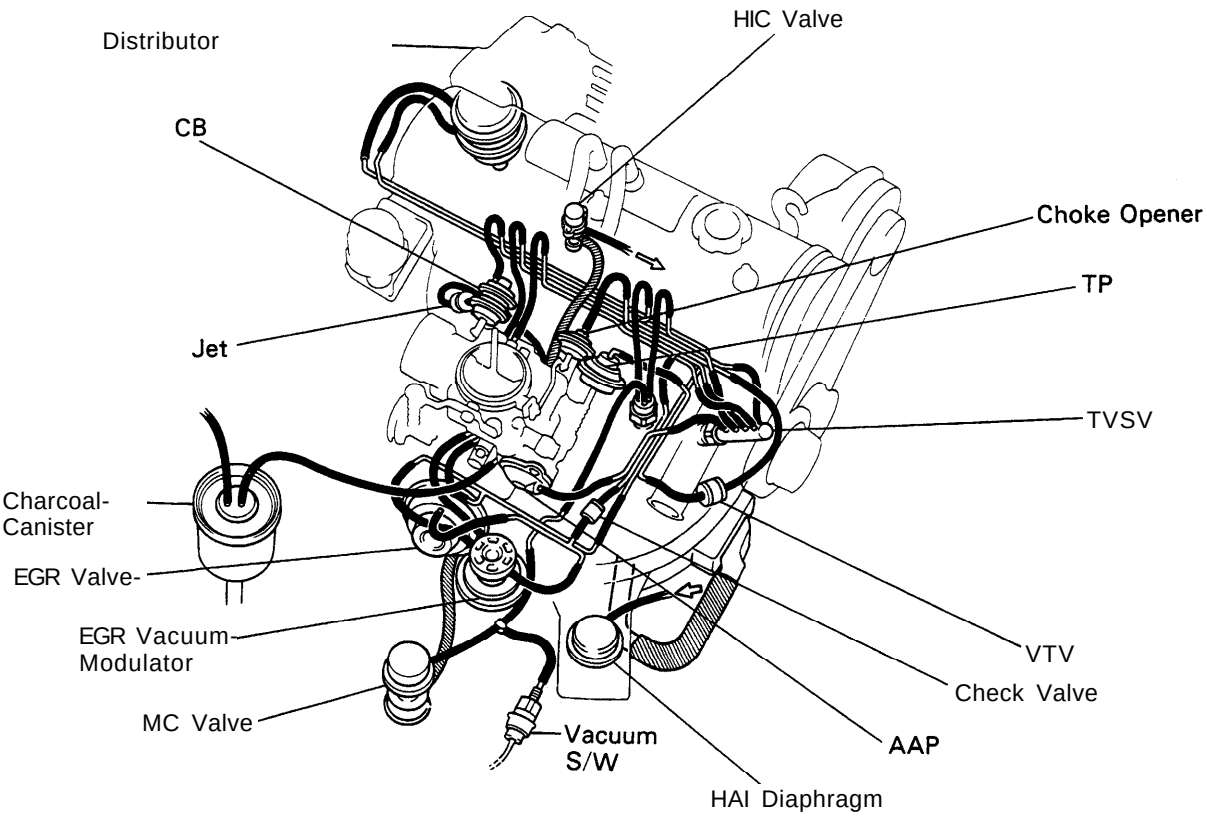


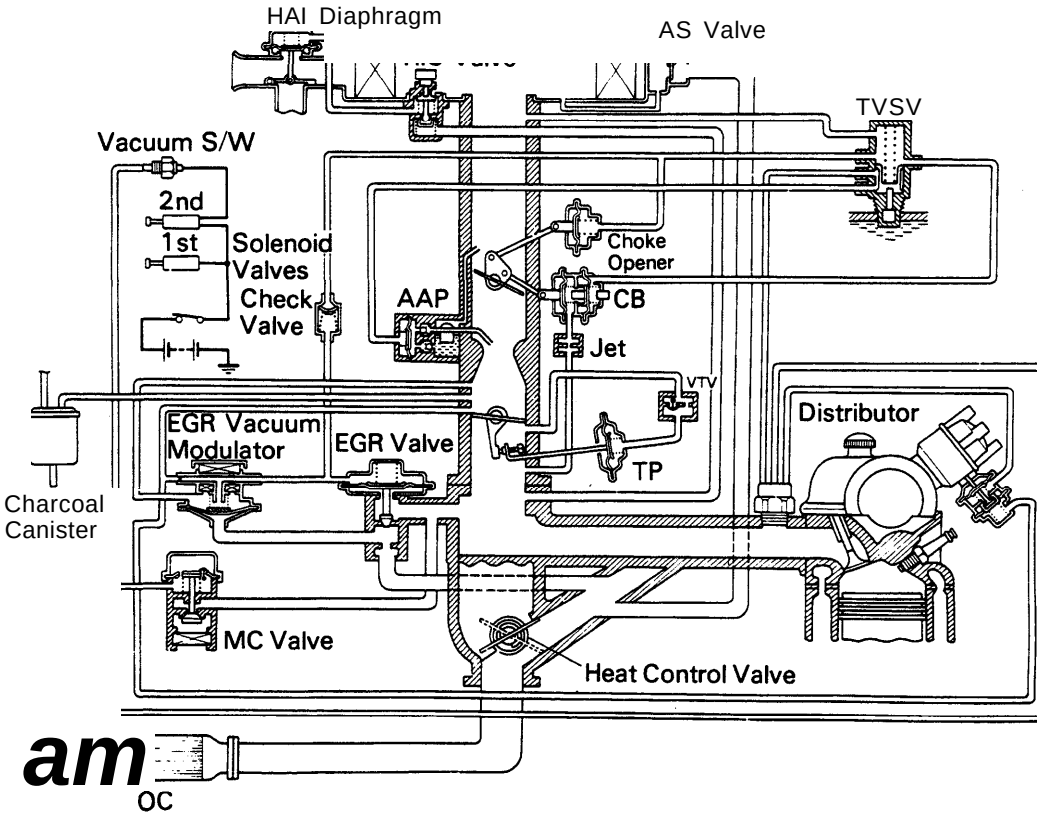


TWC

EC0423

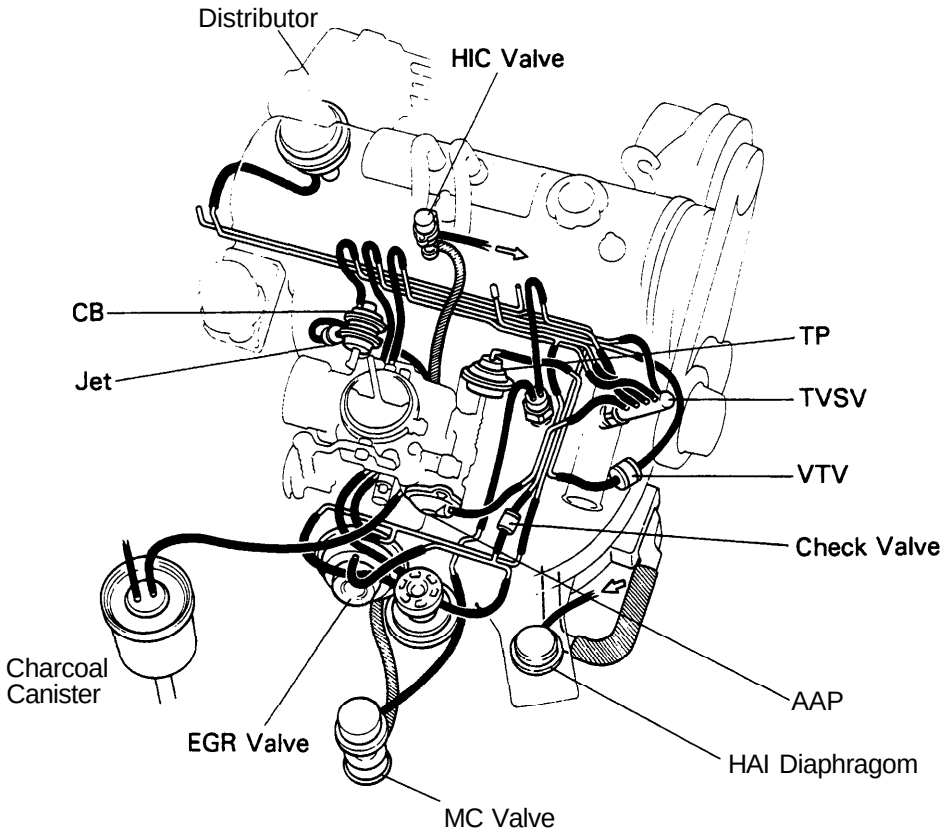
COMPONENT LAYOUT AND SCHEMATIC DRAWING (Canadá Vehicles Wagón M/T)

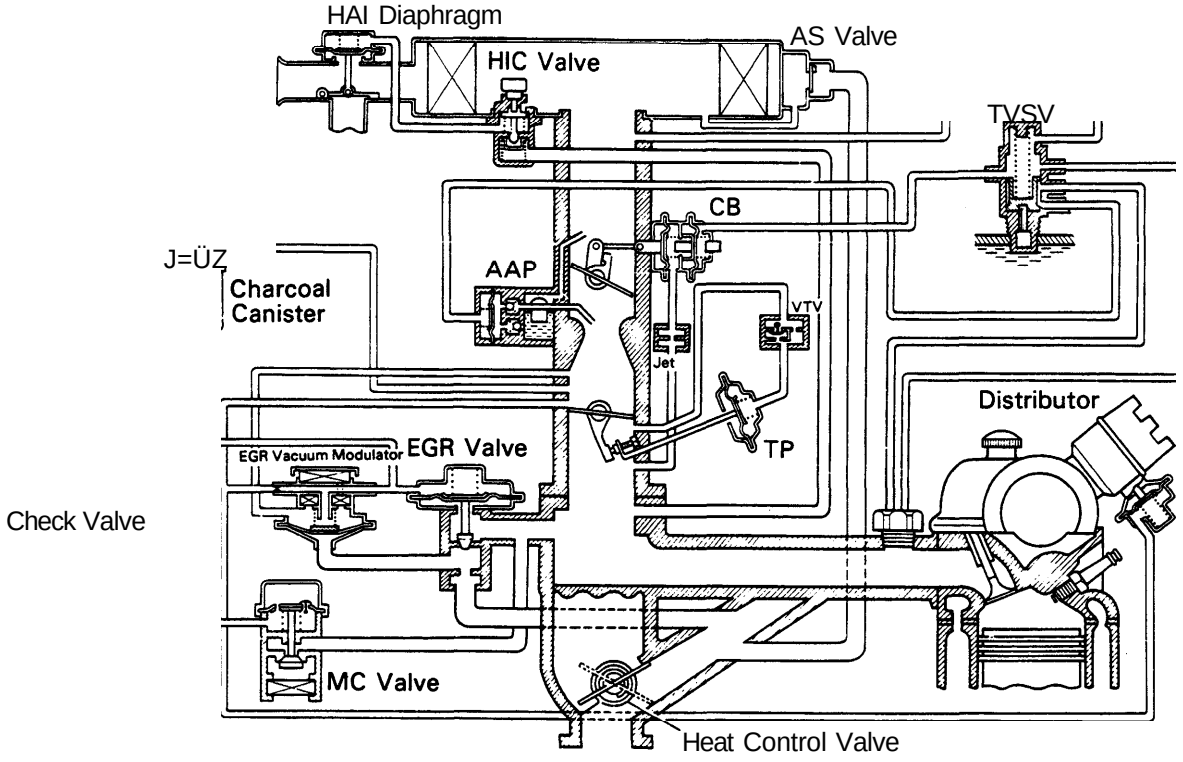




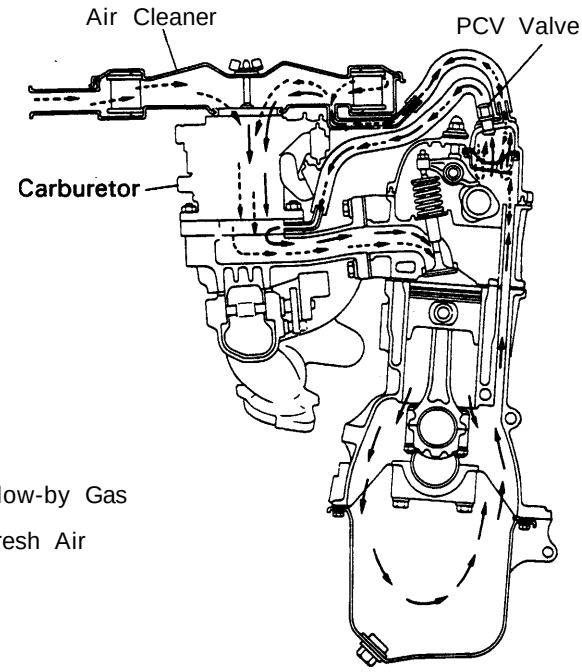
EC0425

COMPONENT LAYOUT AND SCHEMATIC DRAWING (Canadá Vehicles 3A Engine)





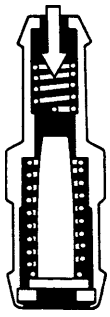
POSITIVE CRANKCASE VENTILATION (PCV) SYSTEM



EC1030

To reduce HC emission, crankcase blow-by gas (HC) is routed through the PCV valve to the intake manifold for combustión in the cylinders.

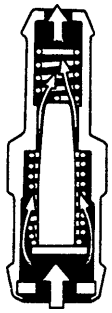
Engine not Running or if backfiring



O PCV VALVE IS CLOSED.

EC1007

Normal Operation

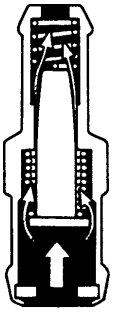


O PCV VALVE IS OPEN.

O VACUUM PASSAGE IS LARGE.

EC1008

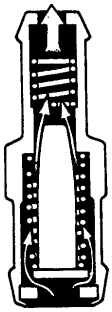
Idling or Decelerating



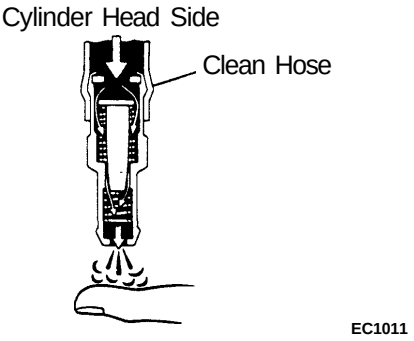
O PCV VALVE IS OPEN.

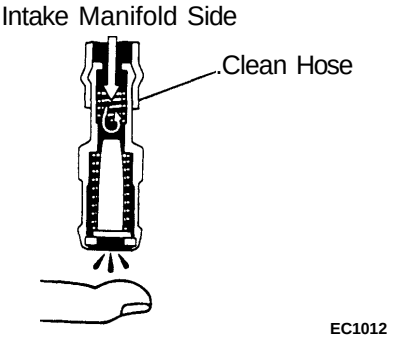
O VACUUM PASSAGE IS SMALL

Acceleration or High Load



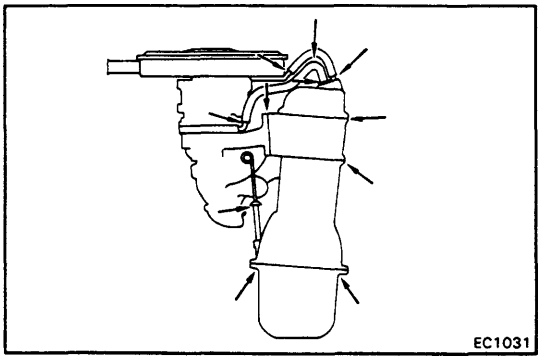
O PCV VALVE IS FULLY OPEN.





INSPECTION OF PCV VALVE

1. **REMOVE PCVVALVE**
2. **ATTACH CLEAN HOSE TO PCV VALVE**
3. **BLOW FROM CYLINDER HEAD SIDE**
   Check that air passes through easily.
   CAUTION: Do not suck air through the valve. Petroleum substances inside the valve are harmful.
4. **BLOW FROM INTAKE MANIFOLD SIDE**
   Check that air passes through with difficulty.
   If the PCV valve fails either of the checks, replace it.
5. **REINSTALL PCV VALVE**

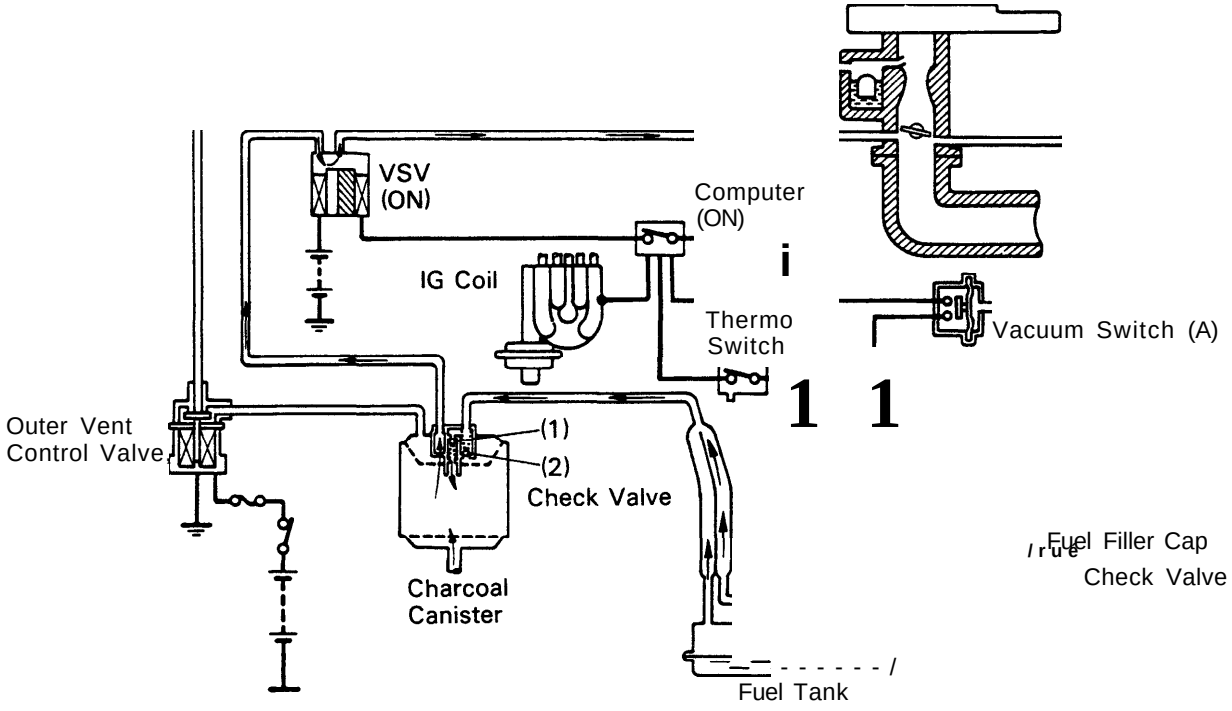


INSPECTION OF PCV HOSES AND CONNECTIONS

VISUALLY INSPECT HOSES, CONNECTIONS AND GASKETS

Check for cracks, leaks or damage.

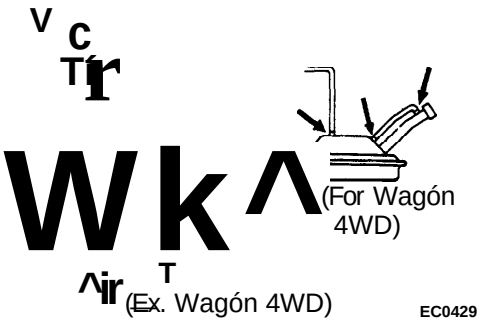
FUEL EVAPORATIVE EMISSION CONTROL (EVAP) SYSTEM (USA Vehicles and Canadá Vehicle 3A-C Engine 4-Speed & Wagón A/T)



To reduce HC emission, evaporated fuel from the fuel tank and float chamber is routed through the charcoal canister to the intake manifold for combustión in the cylinders.

IG S/W	Outer Vent Control Valve	Coolant Temp.	Thermo Temp.	Engine RPM	Vacuum S/W (A)	VSV	Canister Check Valve (1)	Canister Check Valve (2)	Check Valve in Fuel Filler Cap	Evaporation Fuel (HC)
OFF	OPEN									HC from tank and float chamber is absorbed into the canister.
ON	CLOSED	Below 43°C (109°F)	**ON**	—	OFF	OFF	—	—	—	HC from tank is absorbed into the canister.
		Above 55°C (131°F)	OFF	Below 1,180 rpm	—	OFF	—	—	—	
				Between 1,600 and 1,900 rpm	—	**ON**	—	—	—	HC from canister is led into the intake manifold.
				Above 2,290 rpm	OFF	OFF*	—	—	—	HC from tank is absorbed into the canister
					ON	**ON**	—	—	—	HC from canister is led into the intake manifold.
High pressure in tank							OPEN	CLOSED	CLOSED	HC from tank is absorbed into the canister.
High vacuum in tank							CLOSED	OPEN	OPEN	Air is led into the tank.

Remarks: *When the deceleration fuel cut system is on, however, the computer turns the VSV off and HC is not led into the intake manifold (See page EC-56).



EC0429

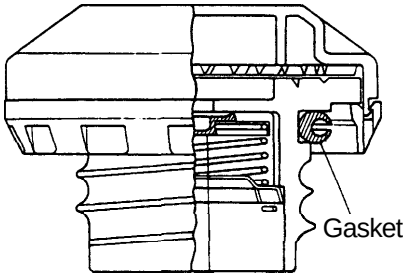
INSPECTION OF FUEL VAPOR LINES, FUEL TANK AND FUEL FILLER CAP

1. VISUALLY INSPECT LINES AND CONNECTIONS

Look for loóse connections, sharp bends or damage.

2. VISUALLY INSPECT FUEL TANK

Look for deformation, cracks or fuel leakage.

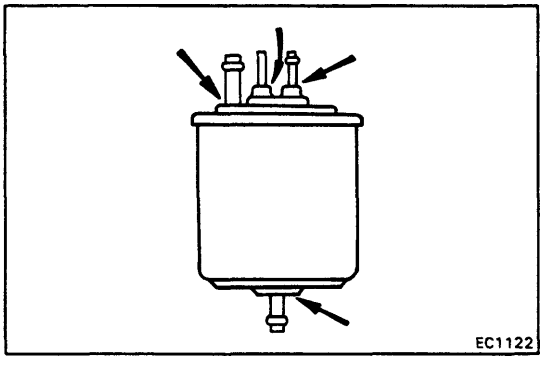


EC1102

3. VISUALLY INSPECT FUEL FILLER CAP

Look for damaged or deformed gasket and cap.

If necessary, repair or replace the cap.


EC1122

INSPECTION OF CHARCOAL CANISTER

1. REMOVE CHARCOAL CANISTER

2. VISUALLY INSPECT CHARCOAL CANISTER

Look for cracks or damage.

Purge Pipe

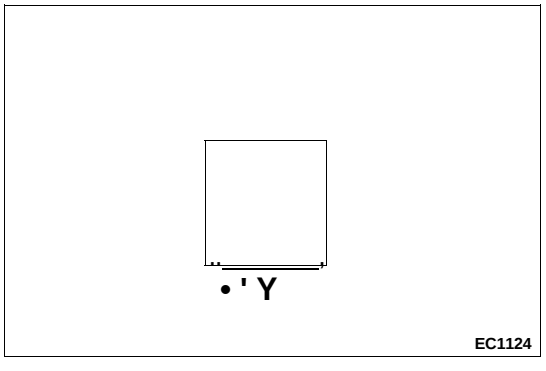

Tank Pipe

3. CHECK FOR CLOGGED FILTER AND STUCK CHECK VALVE

Using low pressure compressed air, blow into the tank pipe and check that the air flows without resistance from the other pipes.

If a problem is found, replace the charcoal canister.

EC1123


EC1124

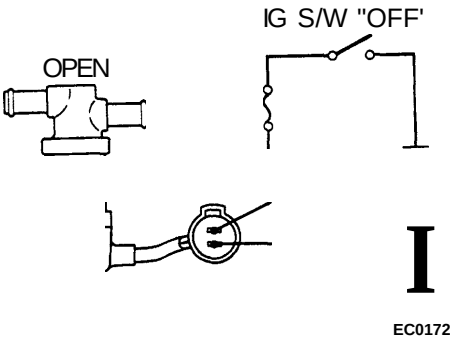
4. CLEAN FILTER IN CANISTER

Clean the filter by blowing 3 kg/cm^2 (43 psi, 294 kPa) of compressed air into the pipe to the outer vent control valve while holding the other upper canister pipes closed.

NOTE:

- Do not attempt to wash the canister.
- No activated carbón should come out.

5. INSTALL CHARCOAL CANISTER



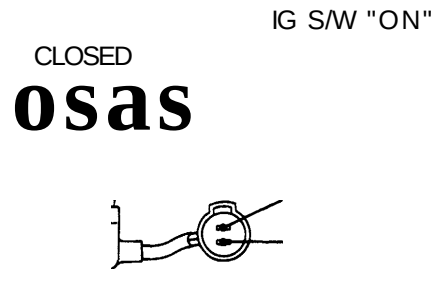
EC0172

INSPECTION OF OUTER VENT CONTROL VALVE

CHECK OUTER VENT CONTROL VALVE OPERATION

(a) Disconnect the hoses from the valve.

(b) Check that the valve is open when the ignition switch is OFF.



EC0173

(c) Check that the valve is closed when the ignition switch is ON.

(d) Reconnect the hoses to the proper locations.

If the valve does not opérate, check the fuse and the wiring connections.

INSPECTION OF THERMO SWITCH

CHECK THERMO SWITCH BY USING OHMMETER

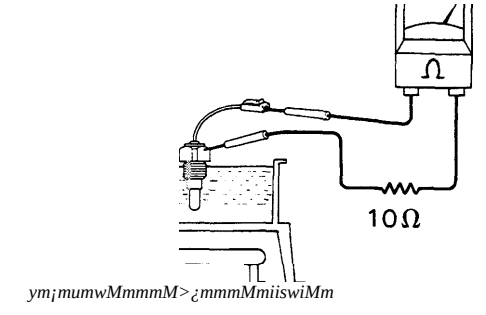
(a) Drain the coolant from the radiator into a suitable container.

(b) Remove the thermo switch from the intake manifold.

(c) Cool the thermo switch to below 43°C (109°F).

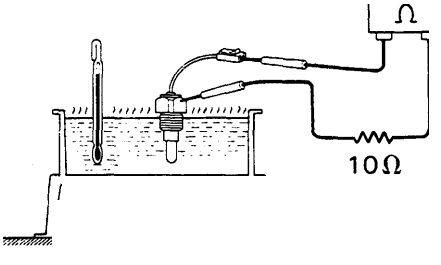
(d) Using an ohmmeter, check that there is continuity.

Below 43°C



ym¡mumwMmmmM>¿mmmMmiiswiMm

Abobe 55°C

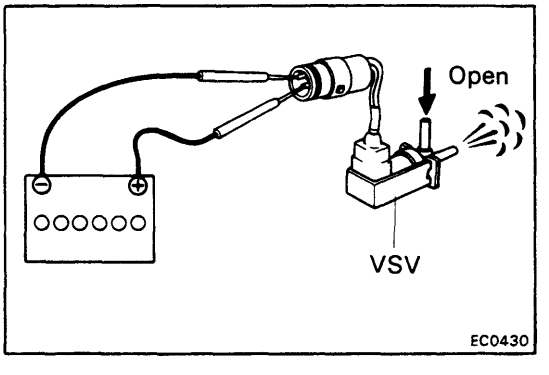


(e) Heat the switch to above 55°C (131°F) with hot water.

(f) Check that there is no continuity.

(g) Apply liquid sealer to the threads of the switch and reinstall.

(h) Fill the radiator with coolant.

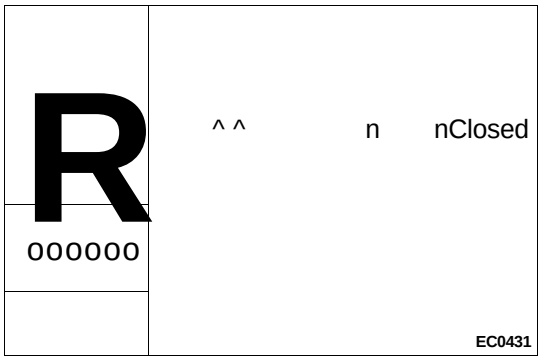


INSPECTION OF VSV

1. CHECK VACUUM CIRCUIT CONTINUITY IN VSV BY BLOWING AIR INTO PIPE

(a) Connect the VSV terminàis to the battery terminàis as shown.

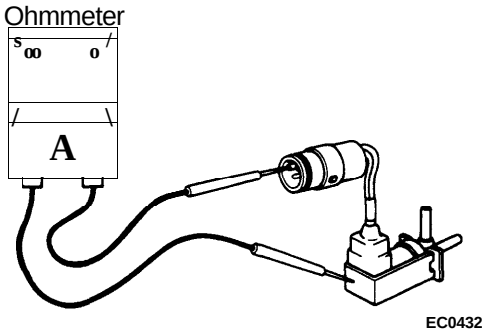
(b) Blow into the pipe, and check that the VSV is open.



(c) Disconnect the battery positive (+) terminal.

(d) Blow into the pipe and check that the VSV is closed.

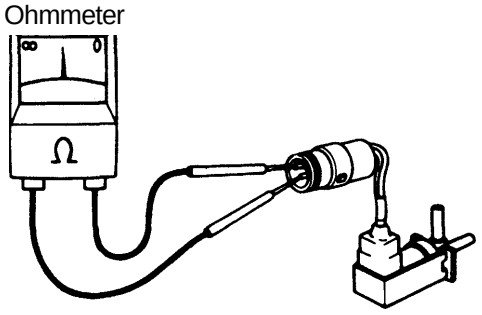
If a problem is found, repiace the VSV.



2. CHECK FOR SHORT CIRCUIT

Using an ohmmeter, check that there is no continuity between the positive (+) terminal and the VSV body.

If there is continuity, repiace the VSV.



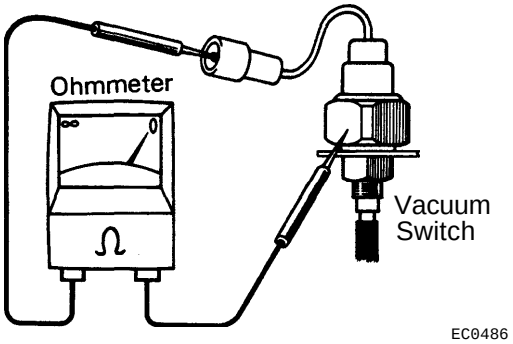
3. CHECK FOR OPEN CIRCUIT

Using an ohmmeter, measure the resistance between the positive (+) terminal and the other terminái as shown.

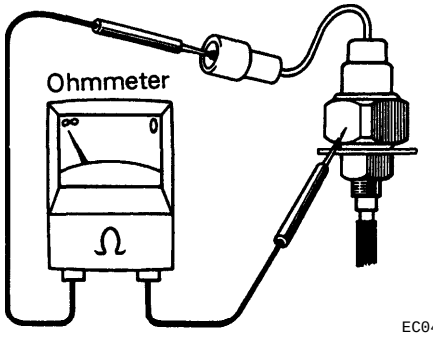
Specified resistance: 38 - 44 fí at 20°C (68°F)

If the resistance is not within specification, repiace the VSV.

INSPECTION OF VACUUM SWITCH (A)



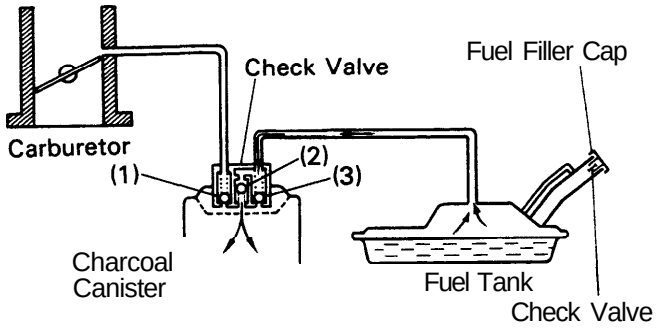
(a) Using an ohmmeter, check for continuity between the switch terminal and switch body.



(b) Start the engine and warm up the engine to normal operating temperature.

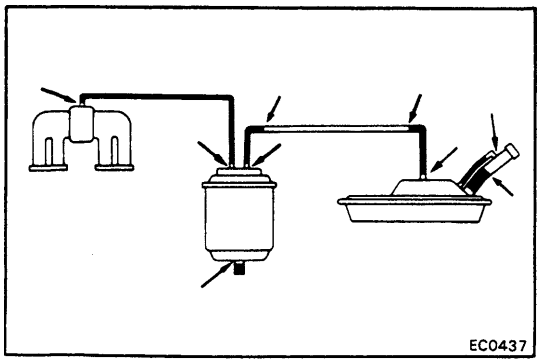
(c) Using an ohmmeter, check that there is no continuity between the switch terminal and the body.

FUEL EVAPORATIVE EMISSION CONTROL (EVAP) SYSTEM (Canadá Wagón M/T & 3A Engine)



To reduce HC emission, evaporated fuel from the fuel tank is routed through the charcoal canister to the carburetor for combustión in the cylinders.

Condition	Canister Check Valve			Check Valve in Fuel Filler Cap	Evaporated Fuel (HC)
	(1)	(2)	(3)		
Parking, idling and low speed	CLOSED	—	—	—	HC from tank is absorbed in the canister.
Médium and high speed	OPEN	—	—	—	HC from canister is led into carburetor.
High pressure in tank	—	OPEN	CLOSED	CLOSED	HC from tank is absorbed in the canister.
High vacuum in tank	—	CLOSED	OPEN	OPEN	(Air is led into the tank.)



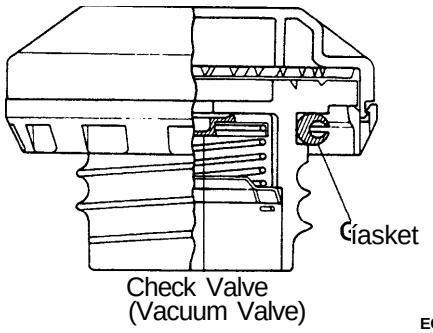
INSPECTION OF FUEL VAPOR LINES, FUEL TANK AND FUEL FILLER CAP

1. VISUALLY INSPECT LINES AND CONNECTIONS

Look for loóse connections, sharp bends or damage.

2. VISUALLY INSPECT FUEL TANK

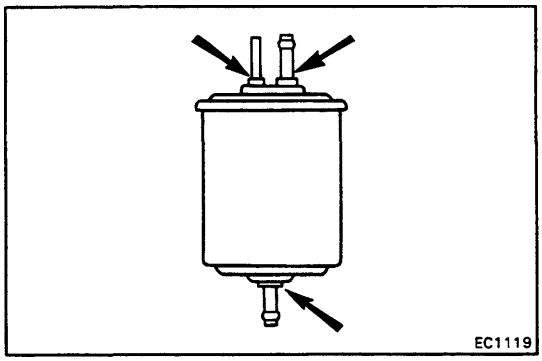
Look for deformation, cracks of fuel leakage.



3. VISUALLY INSPECT FUEL FILLER CAP

Look for a damaged or deformed gasket and cap.

If necessary, repair or replace the cap.


EC1119

INSPECTION OF CHARCOAL CANISTER

1. REMOVE CHARCOAL CANISTER

2. VISUALLY INSPECT CHARCOAL CANISTER

Look for cracks or damage.

3. CHECK FOR CLOGGED FILTER AND STUCK CHECK VALVE

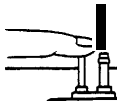
(a) Using low pressure compressed air, blow into the tank pipe and check that air flows without resistance from the other pipes.

(b) Blow into the purge pipe and check that air does not flow from the other pipes.

If a problem is found, replace the charcoal canister.

Purge Pipe—jj ft- Tank Pipe

EC1120


Pruge Pipe •Tank Pipe

4. CLEAN FILTER IN CANISTER

Clean the filter by blowing 3 kg/cm^2 (43 psi, 294 kPa) of compressed air into the tank pipe while holding the purge pipe closed.

NOTE:
- Do not attempt to wash the canister.
- No activated carbón should come out.

5. INSTALL CHARCOAL CANISTER

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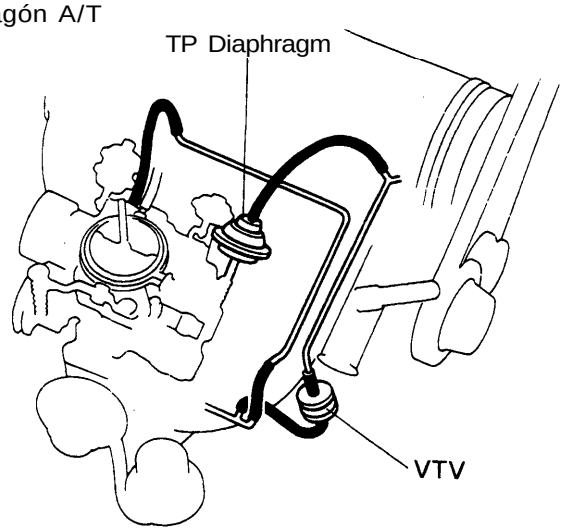
4

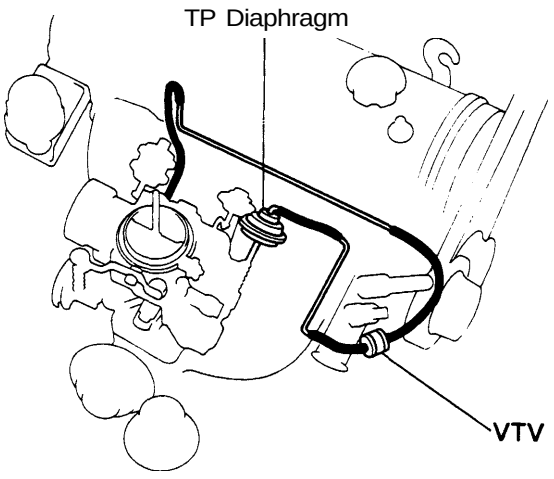
EC1121

THROTTLE POSITIONER (TP) SYSTEM

USA and Canadá 3A-C Engine, 4-Speed & Wagón A/T

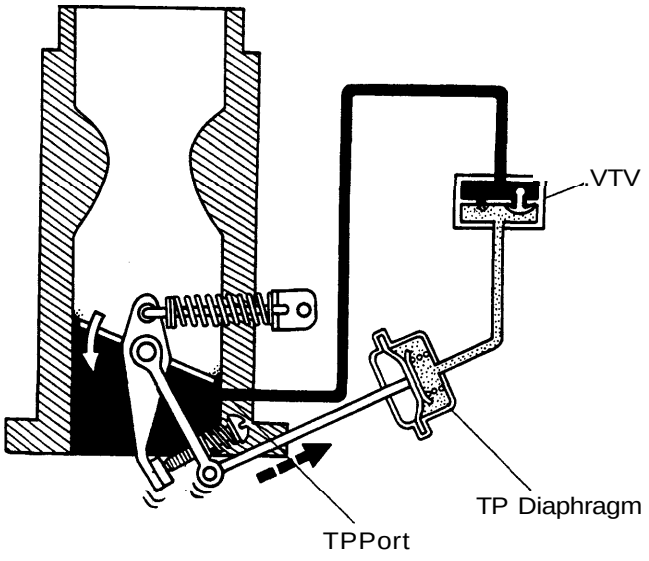


Canadá Wagón M/T & 3A Engine



EC0438

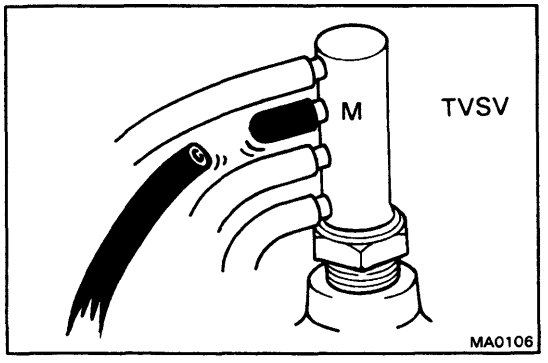
Deceleration



ECOA40

To reduce HC and CO emissions, the throttie positioner opens the throttie valve slightly more than at idle when decelerating. This causes the air-fuel mixture to burn completely.

Condition	TP Port Vacuum	TP Diaphragm	Throttie Valve
Idling	Intake manifold vacuum	Pulled by intake manifold vacuum	Idle speed position
Cruising	Nearly atmospheric pressure	Pushed out by diaphragm spring	High speed position
Deceleration	Intake manifold vacuum	* Pulled by intake manifold vacuum	* Slightly opens and slowly closes to the idling position
Remarks: * This action is delayed by the VTV.			



INSPECTION OF TP SYSTEM

1. WARM UP ENGINE

2. CHECK IDLING SPEED AND ADJUST, IF NECESSARY

3. DISCONNECT HOSE FROM TVSV M PORT AND PLUG M PORT

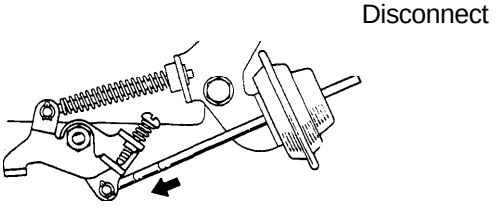
This will shut off the choke opener and EGR systems.

4. CHECK TP SETTING SPEED AND OPERATION OF VTV (For 3A-C Engine)

(a) Disconnect the vacuum hose from the TP diaphragm and plug the hose end.

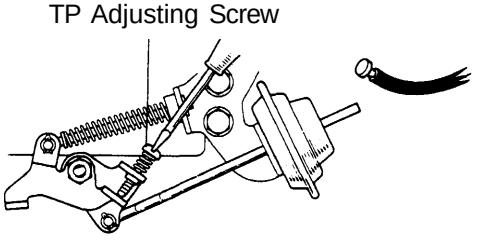
(b) Check that the TP is sel

TP setting speed: 1,400 rpm

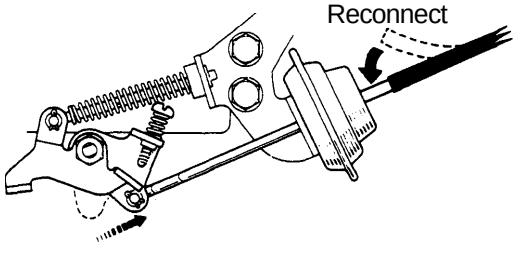


If not at specified speed, adjust with the TP adjusting screw.

NOTE: Make adjustment with the cooling fan OFF.



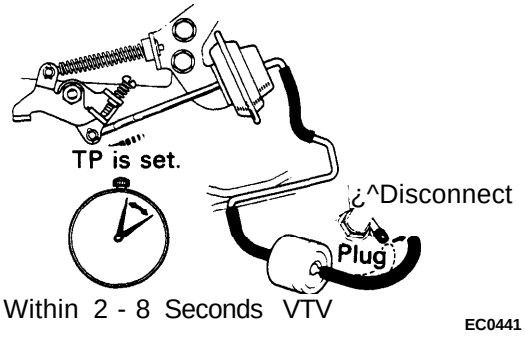
(c) Reconnect the vacuum hose to the TP diaphragm, and check that the engine returns to idle speed within 2-6 seconds.

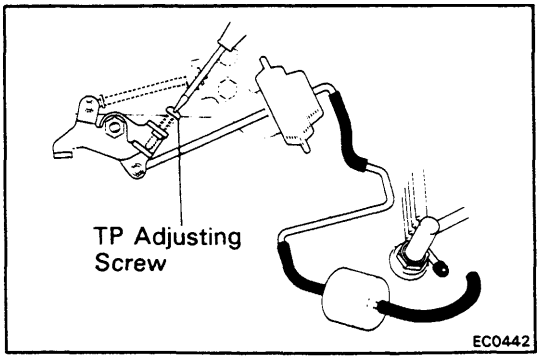


5. CHECK TP SETTING SPEED AND OPERATION OF VTV (For 3A Engine)

(a) Disconnect the vacuum hose between the VTV and vacuum pipe at the vacuum pipe side and plug the vacuum pipe end.

(b) Check that engine rpm increases to TP setting speed within 2-8 seconds after disconnecting the hose.



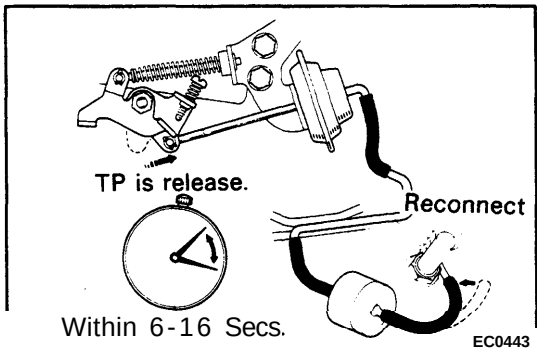


(c) Check that the engine rpm has increased to specification.

TP setting speed: 1,700 rpm M/T
1,400 rpm A/T

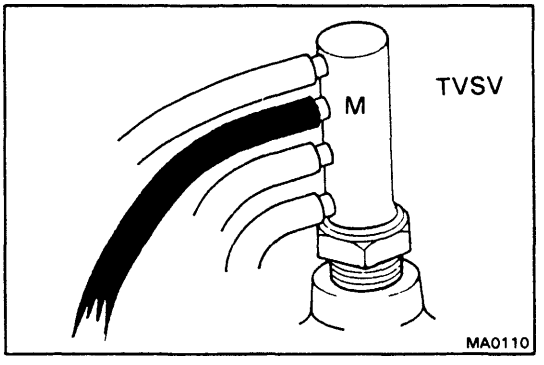
NOTE: Make adjustments with the engine cooling fan OFF.

If not, turn the TP adjusting screw until the specified rpm is reached.



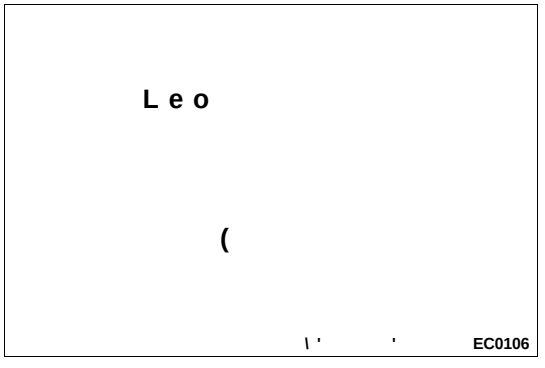
(d) Reconnect the vacuum hose to the vacuum pipe.

(e) Check that the engine returns to idle speed within 6 - 16 seconds after reconnecting the hose.



RECONNECT HOSE TO TVSV M PORT

IF NO PROBLEM IS FOUND WITH THIS INSPECTION, THE SYSTEM IS OKAY; OTHERWISE INSPECT EACH PART



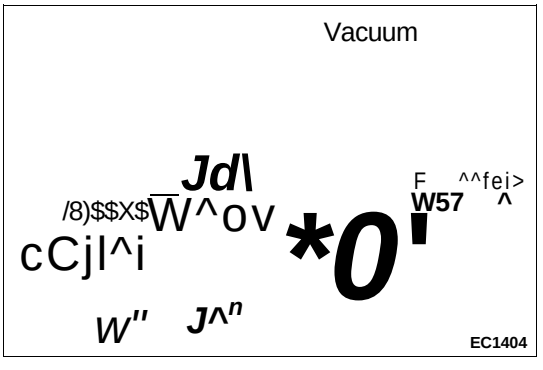
INSPECTION OF VTV

CHECK VTV BY BLOWING AIR INTO EACH SIDE

(a) Check that air flows without resistance from B to A.

(b) Check that air flows with difficulty from A to B.

If a problem is found, replace the VTV.

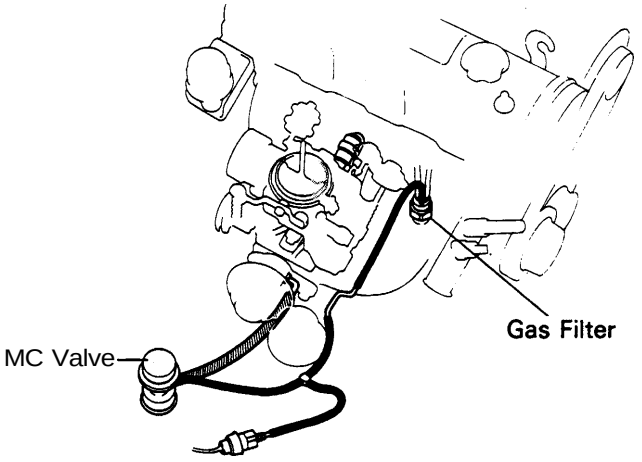


INSPECTION OF DIAPHRAGMS

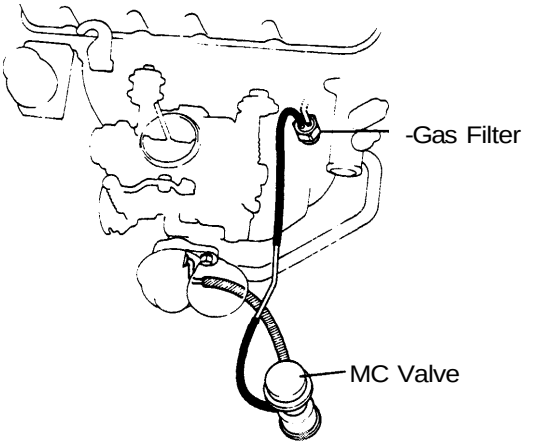
Check that the linkage moves in accordance with applied vacuum.

MIXTURE CONTROL (MC) SYSTEM (Canadá Wagón M/T & 3A Engine)

Wagón M/T

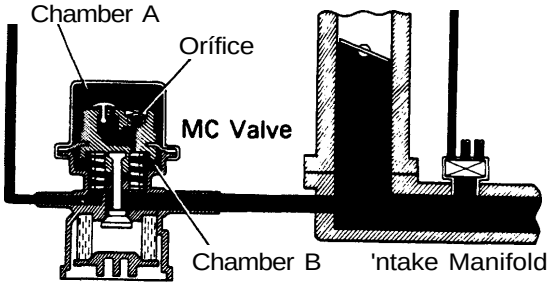


3A Engine

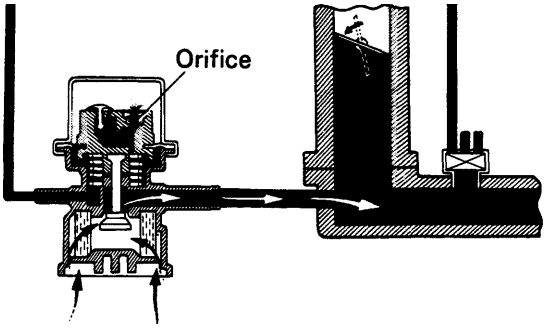


EC0445

CONSTANT RPM

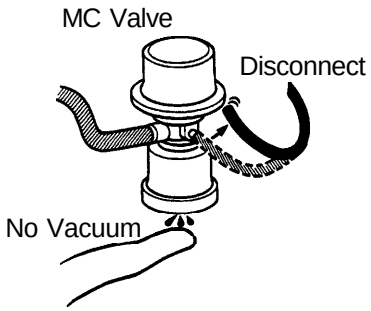


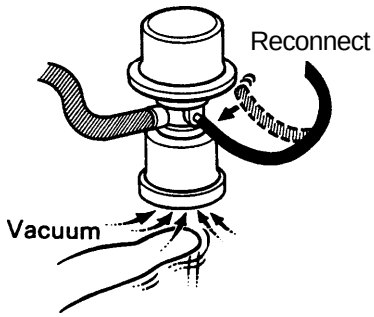
SUDDEN DECELERATION, STEP (1)



To reduce HC and CO emissions, this system allows air to enter the intake manifold on sudden deceleration.

Condition		Vacuum in Chambers A and B	MC Valve	Fresh Air
Constant RPM		Same vacuum	CLOSED	No air flow
Sudden deceleration	Step (1)	High vacuum acts on chamber B. .	OPEN	Air is routed through MC valve to intake manifold.
	Step (2)	After a few seconds, vacuum in both chambers equalize through the orífice.	CLOSED	No air flow





INSPECTION OF MC SYSTEM

1. START ENGINE

2. CHECK MC VALVE

(a) Disconnect the vacuum hose from the MC valve.

(b) Place your fingers over the air inlet of the MC valve.

(c) Check that vacuum is not felt.

(d) Reconnect the vacuum hose and check that vacuum is felt momentarily.

NOTE: At this time, the engine will idle rough or die, but this is normal.

IF NO PROBLEM IS FOUND WITH THIS INSPECTION, THE SYSTEM IS OKAY; OTHERWISE INSPECT EACH PART

EXHAUST GAS RECIRCULATION (EGR) SYSTEM (USA Vehicles and Canadá 3A-C Engine 4-Speed & Wagón A/T)

5rü

if/í

EGR Valve

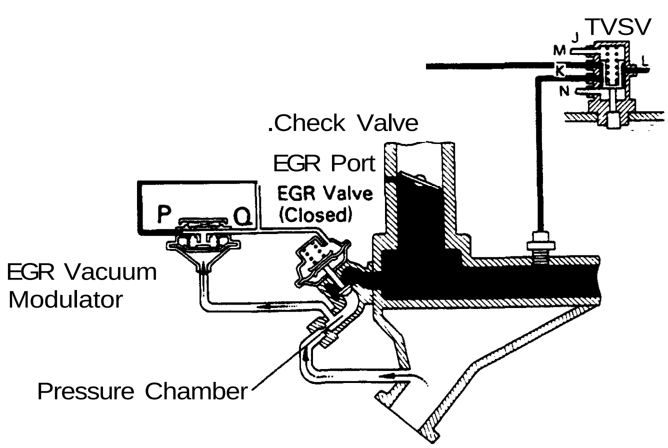
^Gas Filter

EGR Vacuum Modulator

^Check Valve

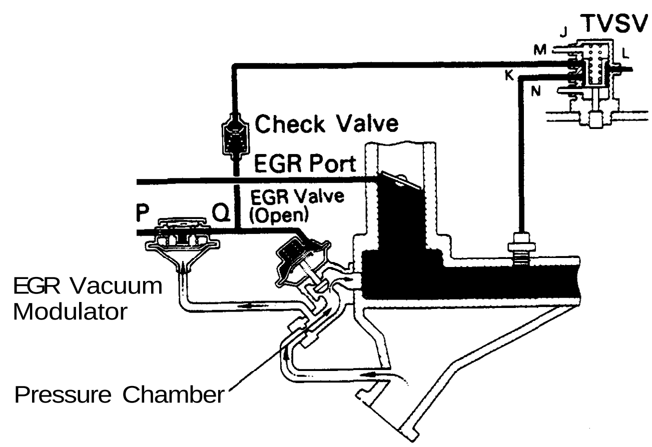
ECO450

(1)



EC0451

(2)

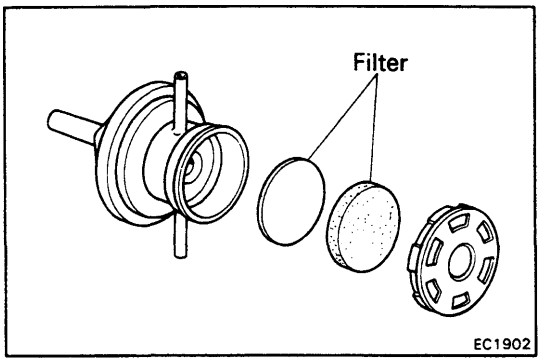


EC0452

To reduce NOx emission, part of thé exhaust gases is recirculated through the EGR valve to the intake manifold to lower the máximum combustión temperature.

Cooiant Temp.	TVSV	Throttle Valve Opening Angle	Pressure in EGR Valve Pressure Chamber		EGR Vacuum Modulator	EGR Valve	Exhaust Gas
Below 50°C (122°F)	OPEN (J-M)	—	—		—	CLOSED	Not recirculated
Above 68°C (154°F)	OPEN (M-K)	Positioned below EGR port	—		—	CLOSED	Not recirculated
		Positioned above EGR port	(1) LOW	* Pressure continuously alternating between low and high	Opens passage to atmosphere	CLOSED	Not recirculated
			(2) HIGH		Closes passage to atmosphere	OPEN	Recirculated

• rrn , cun vralve el U9C3 -"——IVIUUUiaiUI opens •*—Pres auie ui v|j»—-]

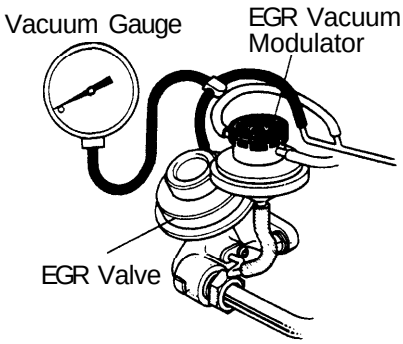


INSPECTION OF EGR SYSTEM

1. CHECK AND CLEAN FILTERS IN EGR VACUUM MODULATOR

(a) Check the filter for contamination or damage.

(b) Using compressed air, clean the filters.

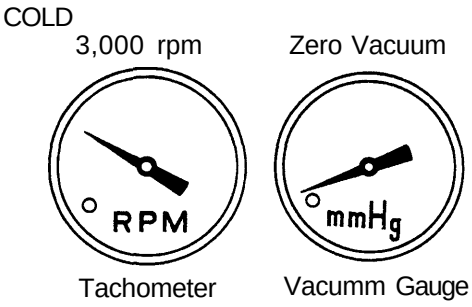


2. PREPARATION

Disconnect the vacuum hose from the EGR valve and, using a 3-way unión, connect a vacuum gauge to it.

3. CHECK SEATING OF EGR VALVE

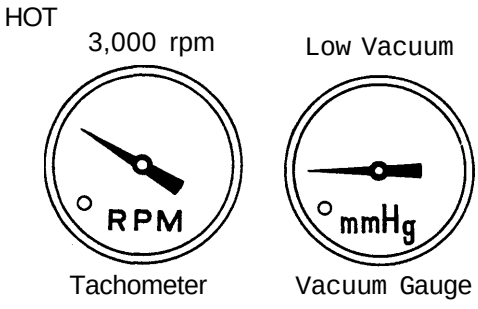
Start the engine and check that the engine starts and runs at idle.



CHECK TVSV WITH COLD ENGINE

(a) The coolant temperature should be below 50°C (122°F).

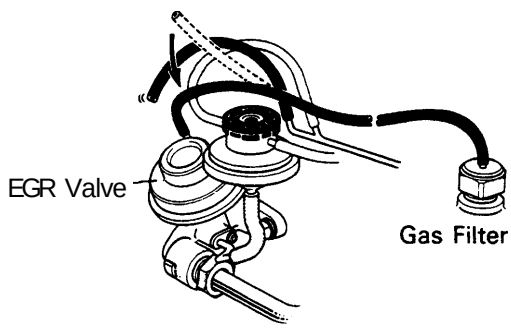
(b) Check that the vacuum gauge indicates zero at 3,000 rpm.



5. CHECK TVSV AND EGR VACUUM MODULATOR WITH HOT ENGINE

(a) Warm up the engine.

(b) Check that the vacuum gauge indicates low vacuum at 3,000 rpm.



6. CHECK EGR VALVE

(a) Apply vacuum directly to the EGR valve with the engine idling.

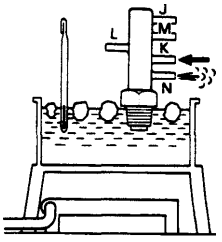
(b) Check that the engine runs rough or dies.

(c) Reconnect the vacuum hose to the proper locations.

IF NO PROBLEM IS FOUND WITH THIS INSPECTION, THE SYSTEM IS OKAY; OTHERWISE INSPECT EACH PART

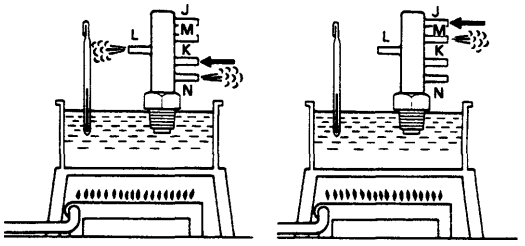
Below 7°C

F»>



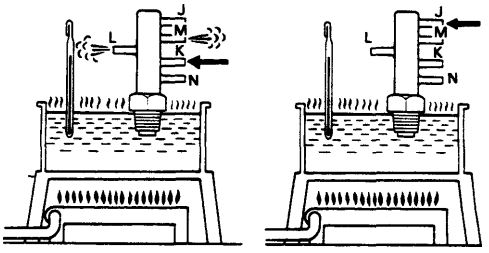
EC0111

17 - 50°C



EC0112

Above 68°C



EC0113

INSPECTION OF TVSV

CHECK TVSV BY BLOWING AIR INTO PIPES

(a) Drain the coolant from the radiator into a suitable container.

(b) Remove the TVSV.

(c) Cool the TVSV to below 7°C (45°F).

(d) Check that air flows from pipe J to pipe M and L, and flows from pipe K to pipe N.

(e) Heat the TVSV to 17 - 50°C (63 - 122°F).

(f) Check that air flows from pipe K to pipe N and L, and flows from pipe J to pipe M.

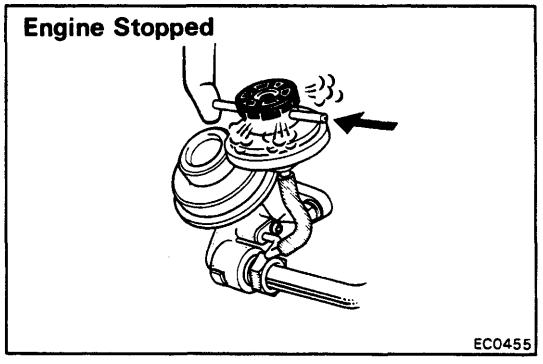
(g) Heat the TVSV to above 68°C (154°F).

(h) Check that air flows from pipe K to pipe M and L, and does not flow from pipe J to the other pipes.

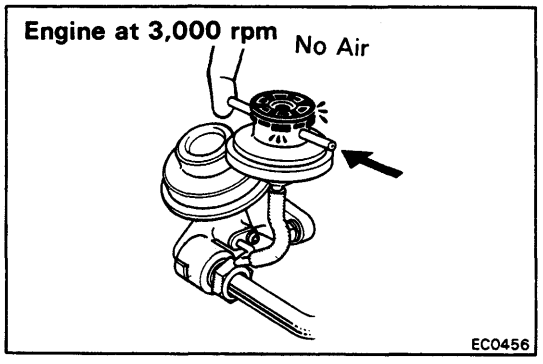
(i) Apply liquid sealer to the threads of the TVSV and reinstall.

(j) Fill the radiator with coolant.

If a problem is found, replace the TVSV.



EC0455



EC0456

INSPECTION OF EGR VACUUM MODULATOR

CHECK EGR VACUUM MODULATOR OPERATION

(a) Disconnect two vacuum hoses from the EGR vacuum modulator.

(b) Plug the pipe with your finger.

(c) Blow air into another pipe and check that the air passes through to the air filter side freely.

(d) Start the engine and maintain engine speed at 3,000 rpm.

(e) Repeat the above test and check that there is a strong resistance to air flow.

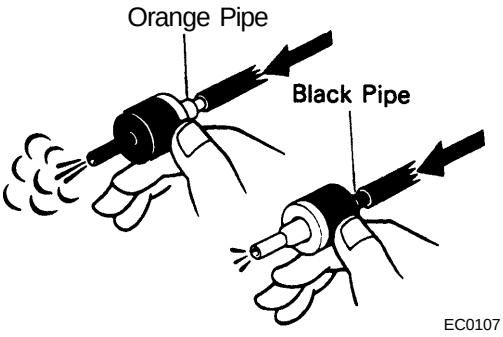
(f) Reconnect the vacuum hoses to the proper locations.

INSPECTION OF EGR VALVE

1. REMOVE EGR VALVE

Check the valve for sticking and heavy carbón deposits. If a problem is found, replace it.

2. REINSTALL EGR VALVE WITH NEW GASKET



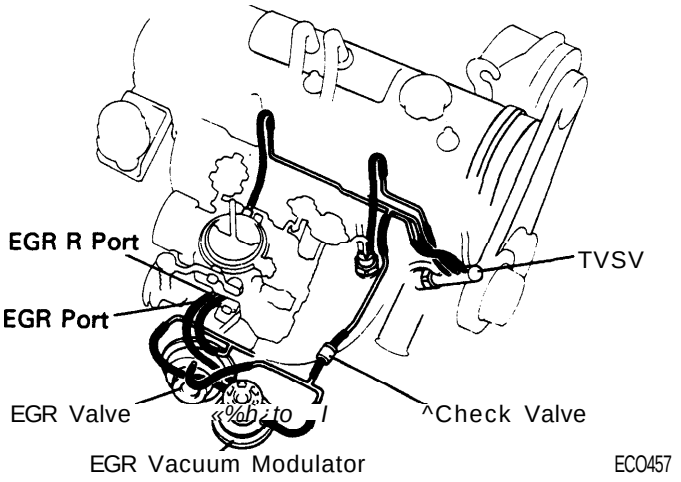
INSPECTION OF CHECK VALVE

CHECK VALVE BY BLOWING AIR INTO EACH PIPE

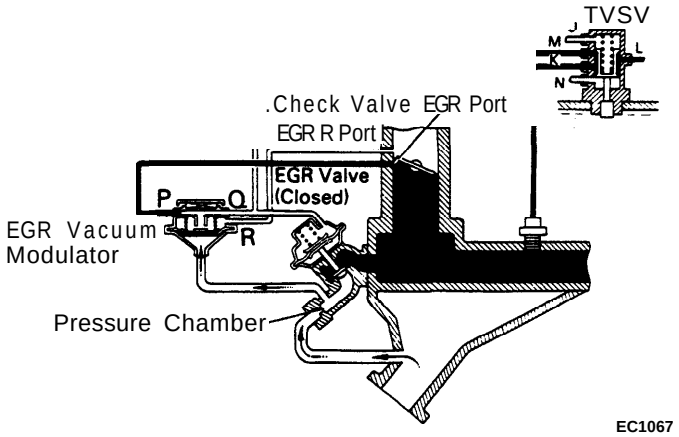
(a) Check that air flows from the orange pipe to the black pipe.

(b) Check that air does not flow from the black pipe to the orange pipe.

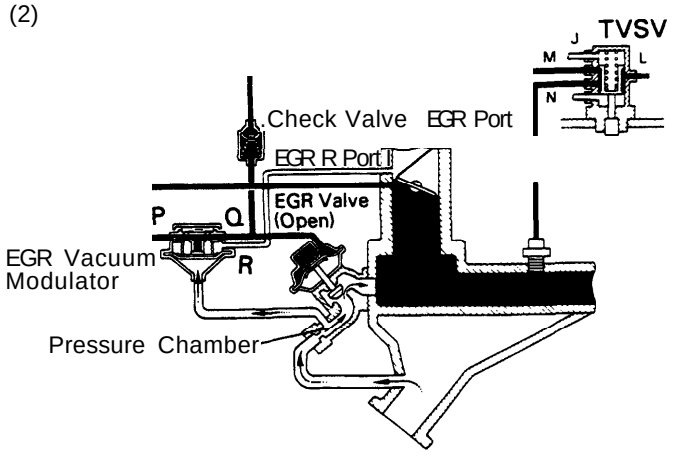
EXHAUST GAS RECIRCULATION (EGR) SYSTEM (Canadá Vehicles Wagón M/T & 3A Engine)



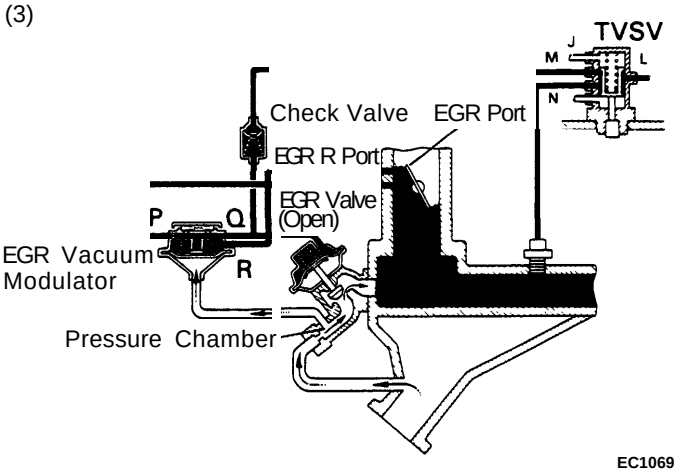
(1)



(2)



(3)

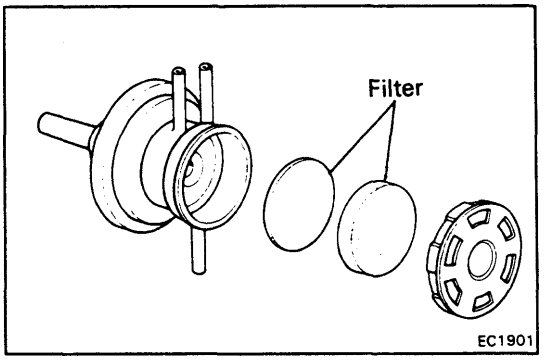


To reduce NOx emission, part of the exhaust gases is recirculated through the EGR valve to the intake manifold to lower the máximum combustión temperature.

Coolant Temp.	TVSV	Throttie Valve Opening Angle	Pressure in the EGR Valve Pressure Chamber		EGR Vacuum Modulator	EGR Valve	Exhaust Gas
Below 50°C (122°F)	OPEN (J-M)					CLOSED	Not recirculated
		Positioned below EGR port				CLOSED	Not recirculated
Above 68°C (154°F)	OPEN (M-K)	Positioned between EGR port and EGR R port	(1) LOW	"Pressure continuously alternating between low and high	OPENS passage to atmosphere	CLOSED	Not recirculated
			(2) HIGH		CLOSES passage to atmosphere	OPEN	Recirculated
		Positioned above EGR R port	(3) HIGH		CLOSES passage to atmosphere	OPEN	Recirculated (increase)

Remarks: * Pressure increases—Modulator closes—EGR valve opens —Pressure drops
*————EGR valve closes--Modulator opens -————1

** When the throttie valve is positioned above the EGR R port, the EGR vacuum modulator will cióse the atmosphere passage and open the EGR valve to increase the EGR gas, even if the exhaust pressure is insufficiently low.

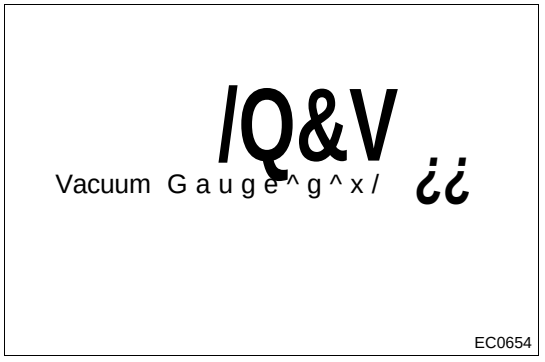


INSPECTION OF EGR SYSTEM

1. CHECK AND OLEAN FILTER IN EGR VACUUM MODULATOR

(a) Check the filters for contamination or damage.

(b) Using compressed air, clean the filters.

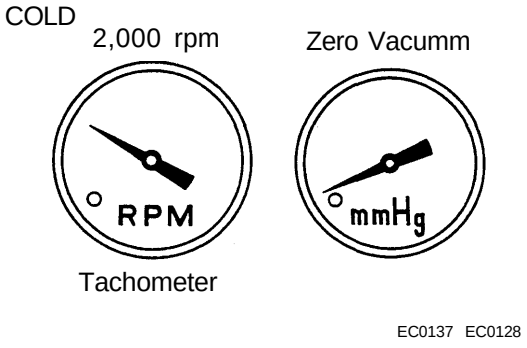


2. PREPARATION

Using a 3-way connector, connect a vacuum gauge to the hose between the EGR valve and vacuum pipe.

3. CHECK SEATING OF EGR VALVE

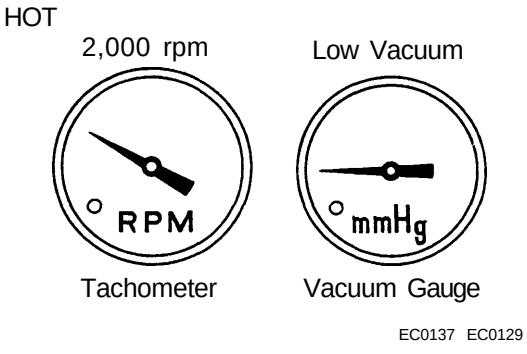
Check that the engine starts and runs at idle.



4. CHECK TVSV WITH COLD ENGINE

(a) The coolant temperature should be below 50°C (122°F).

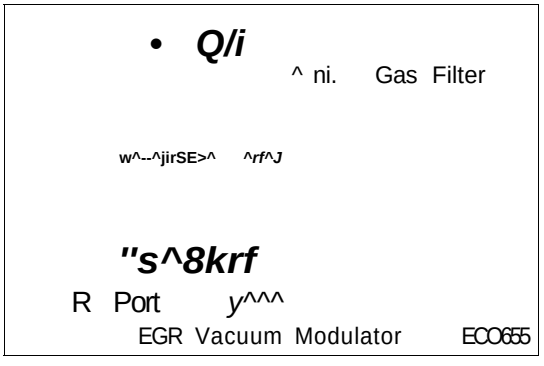
(b) Check that the vacuum gauge indicates zero at 2,000 rpm.



5. CHECK TVSV AND EGR VACUUM MODULATOR WITH HOT ENGINE

(a) Warm up the engine.

(b) Check that the vacuum gauge indicates low vacuum at 2,000 rpm.

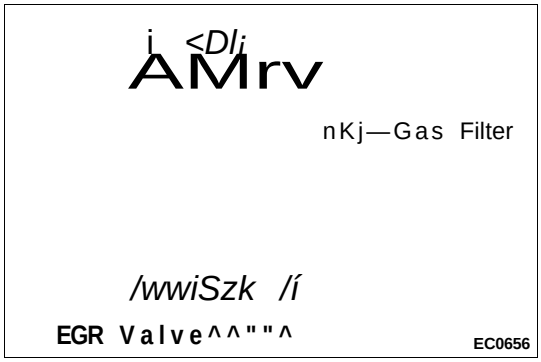


(c) Disconnect the vacuum hose from R port of the EGR vacuum modulator and connect R port directly to the intake manifold with another hose.

(d) Check that the vacuum gauge indicates high vacuum at 2,000 rpm.

NOTE: As a large amount of EGR gas enters, the engine will misfire slightly at this time.

(e) Disconnect the vacuum gauge and reconnect the vacuum hoses to the proper locations.



6. CHECK EGR VALVE

(a) Apply vacuum directly to the EGR valve with the engine idling.

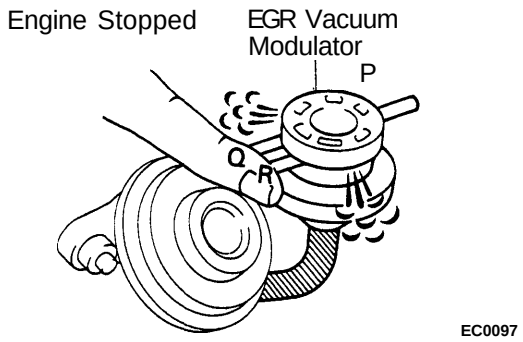
(b) Check that the engine dies.

(c) Reconnect the vacuum hoses to the proper location.

IF NO PROBLEM IS FOUND WITH THIS INSPECTION, THE SYSTEM IS OKAY; OTHERWISE INSPECT EACH PART

INSPECTION OF TVSV

(See page EC-22)



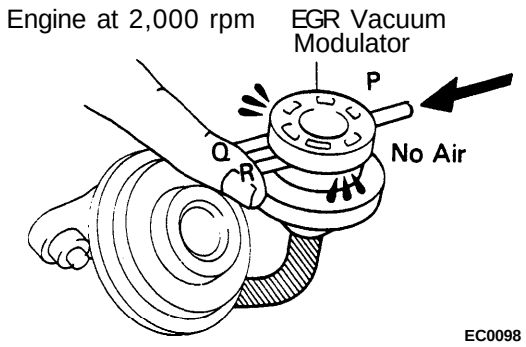
INSPECTION OF EGR VACUUM MODULATOR

CHECK EGR VACUUM MODULATOR OPERATION

(a) Disconnect the vacuum hoses from ports P, Q and R of the EGR vacuum modulator.

(b) Plug ports Q and R with your finger.

(c) Blow air into port P. Check that the air passes through to the air filter side freely.



(d) Start the engine and maintain engine speed at 2,000 rpm.

(e) Repeat the above test. Check that there is a strong resistance to air flow.

(f) Disconnect the vacuum hoses to the proper locations.

INSPECTION OF EGR VALVE

1. REMOVE EGR VALVE

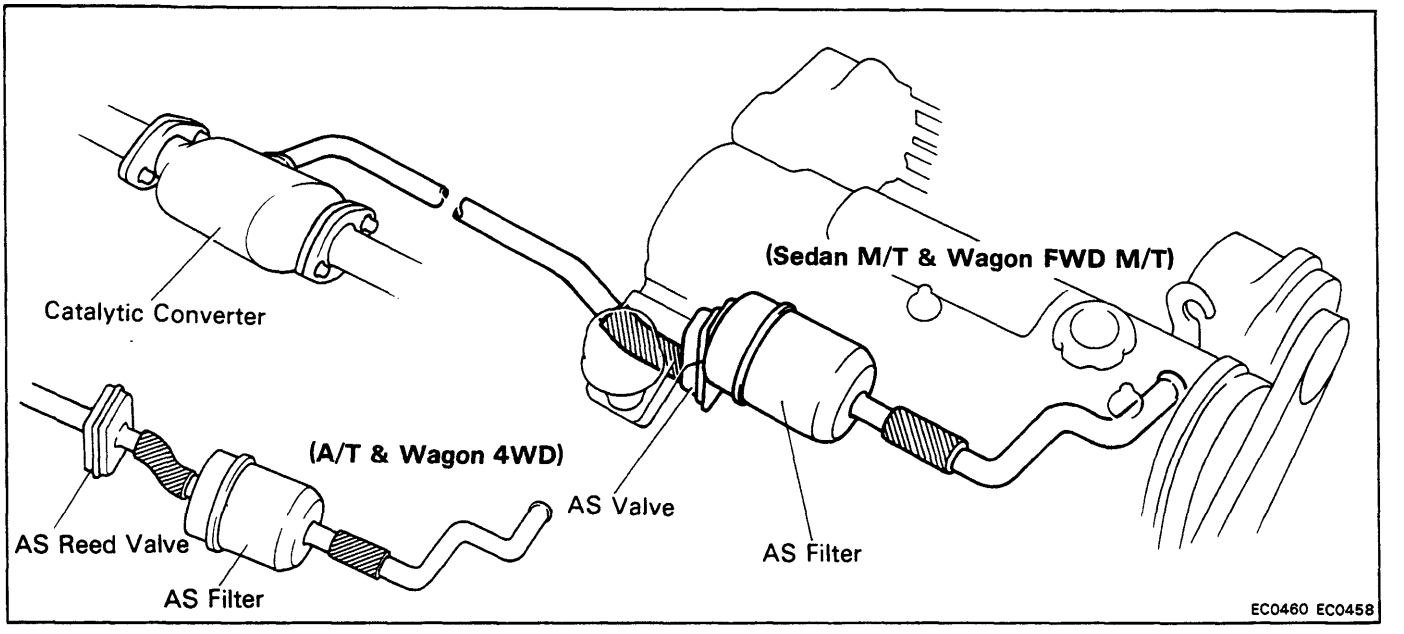
Check the valve for sticking and heavy carbón deposits. If a problem is found, replace it.

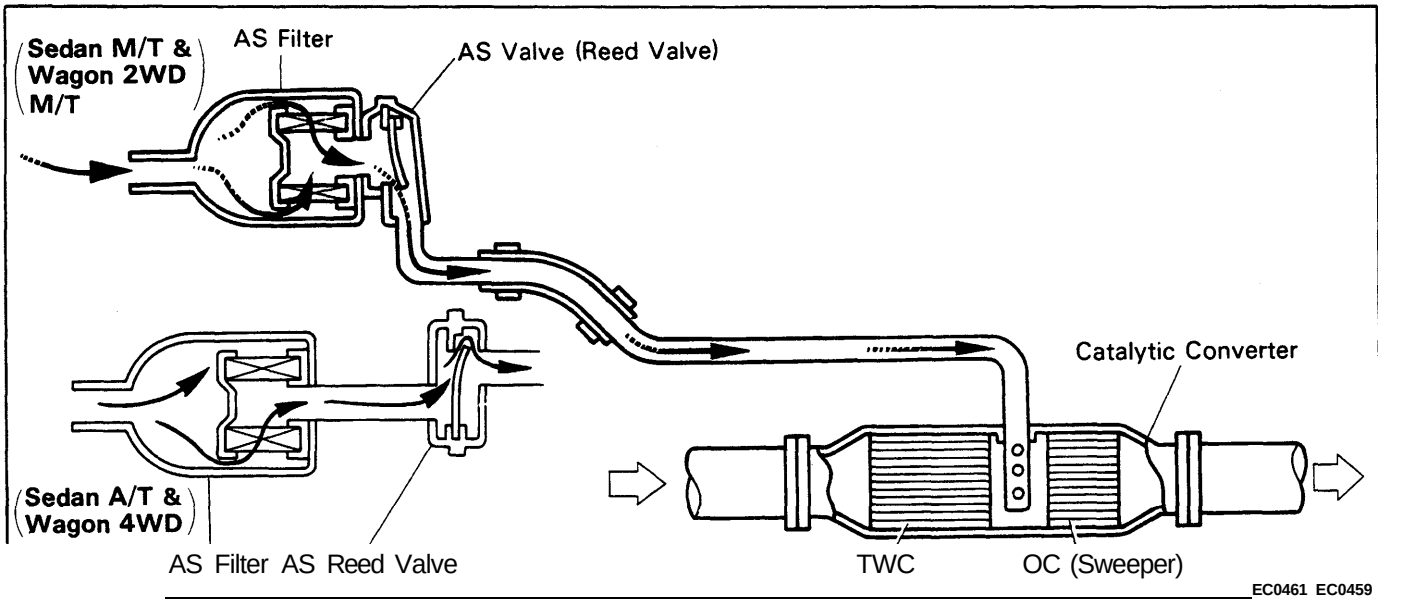
2. REINSTALL EGR VALVE WITH NEW GASKET

INSPECTION OF CHECK VALVE

(See page EC-23)

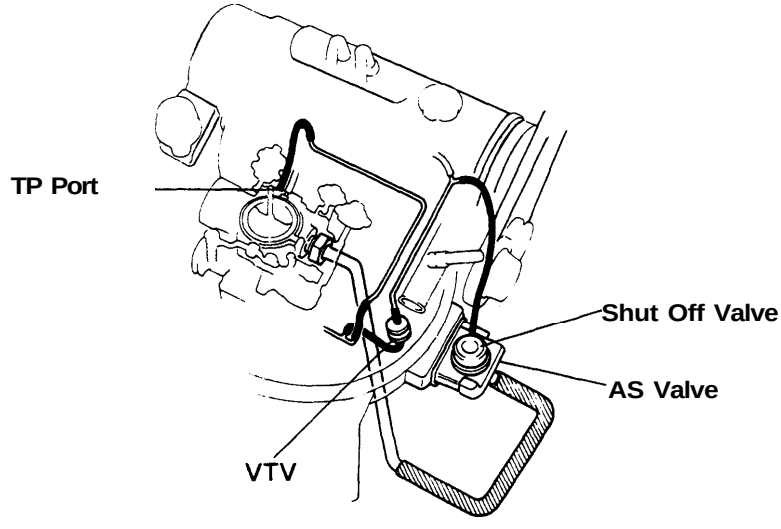
AIR SUCTION (AS) SYSTEM (Federal Vehicles)



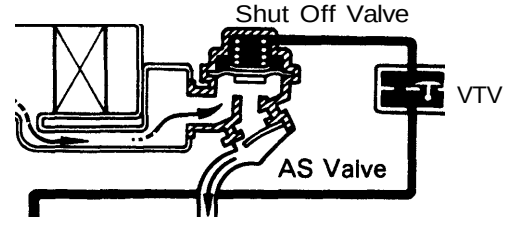


Air is drawn through the air filter and air suction valve into the catalytic converter to burn the HC and CO.		
Pulsation in the Catalytic Converter	**AS Valve**	**Fresh Air from AS Filter**
Vacuum	**OPEN**	**Drawn into the catalytic converter**
Pressure	**CLOSED**	**Not drawn**

AIR SUCTION (AS) SYSTEM (California Vehicíes and Canadá 3A-C Engine 4 Speed & Wagón A/T)



EC0462



VCC^iXVXVNXWVXVXV^WWWWWV

SWK^NC^i^^VCCC^NiMK««:^»NWAkKKmMAnN

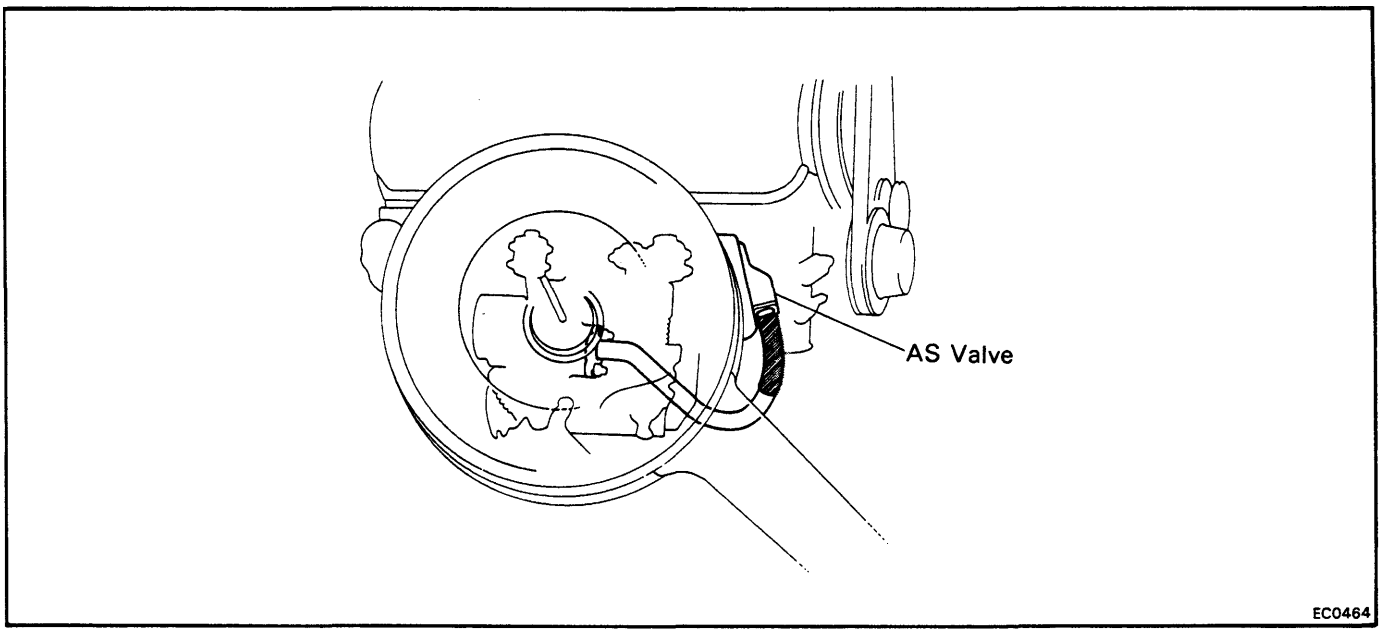
EC0463

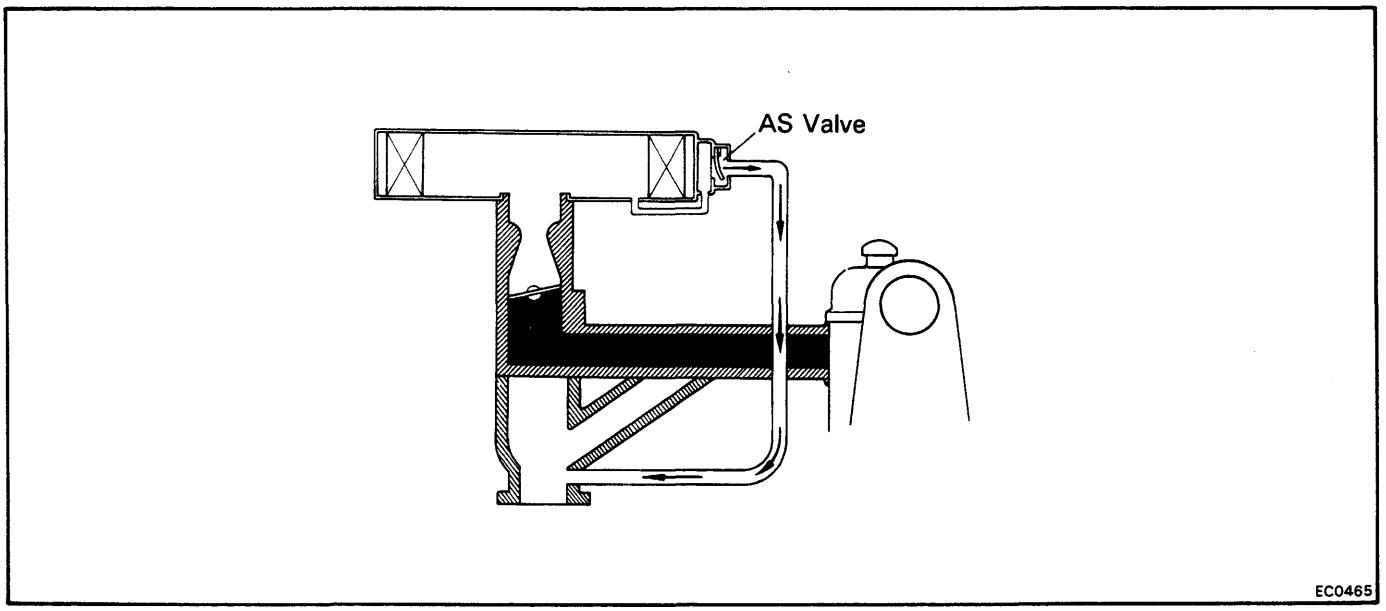
Air is drawn though the air filter and air suction valve into exhaust manifold No. 3 branch to burn the remaining HC and CO.

Condition	Shut Off Valve	Pulsation in the Exhaust Manifold	AS Valve	Fresh Air from Air Filter
Except idling and deceleration	CLOSED	—	CLOSED	Not drawn
Idling and deceleration	* OPEN	Vacuum	OPEN	Drawn into the exhaust manifold
		Pressure	CLOSED	Not drawn

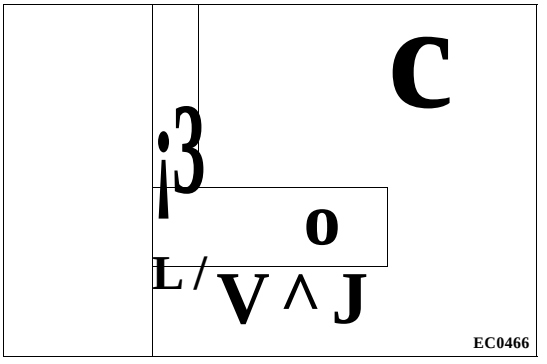
Remarks: *This action is delayed by the VTV.

AIR SUCTION (AS) SYSTEM (Canadá Wagón M/T & 3A Engine)





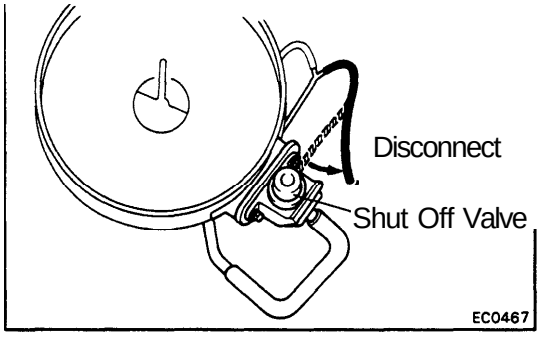
Air is drawn through the air filter and air suction valve into the exhaust manifold to bum the remaining HC and CO.		
Pulsation in the Exhaust Manifold	**AS Valve**	**Fresh Air from Air Filter**
Vacuum	OPEN	Drawn into the exhaust manifold
Pressure	CLOSED	Not drawn



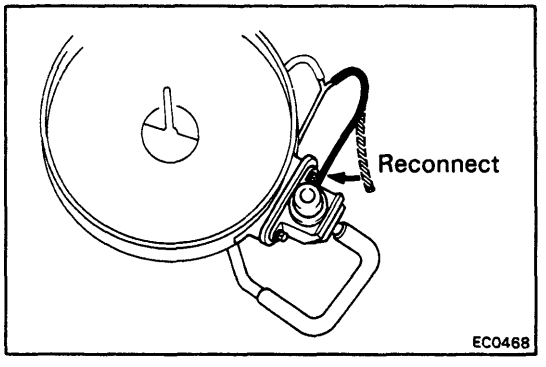
INSPECTION OF AS SYSTEM

1. **VISUALLY CHECK HOSES AND TUBES FOR CRACKS, KINKS, DAMAGE OR LOÓSE CONNECTIONS**

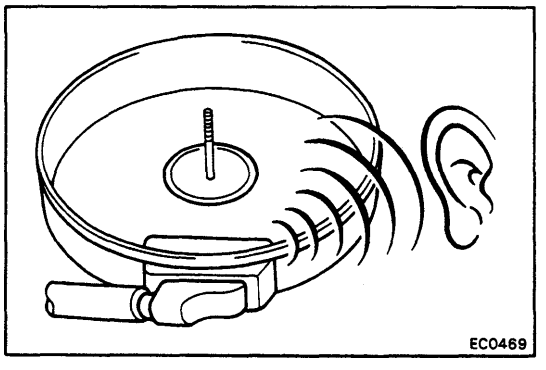
2. **CHECK AS VALVE (Fed. and Canadá 3A-C Engine, 4-Speed)**
   (a) Start the engine.
   (b) With the engine idling, check that air is drawn into the inlet pipe.



3. **CHECK AS VALVE (Calif. and Canadá 3A-C Engine 4-Speed & Wagón A/T)**
   (a) Disconnect the vacuum hose from the shut off valve and plug the hose end.
   (b) Remove the air cleaner cap.
   (c) Start the engine.



   (d) Reconnect the vacuum hose to the shut off valve and check that a bubbling noise is heard from the AS valve inlet within 2 - 6 seconds.
   (e) Reinstall the air cleaner cap.



4. **CHECK AS VALVE (Canadá Wagón M/T & 3A Engine)**
   (a) Remove the air cleaner cap.
   (b) With the engine idling, check that a bubbling noise is heard from the AS valve inlet.
   (c) Reinstall the air cleaner cap.

INSPECTION OF AS VALVE (Fed. only)

CHECK AS VALVE BY BLOWING AND SUCKING ON PIPE

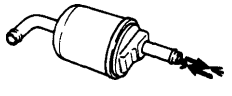
(Sedan M/T & Wagón 2WD M/T)

Check that there is no air passage when blown hard from the converter side, and air passage when sucked.

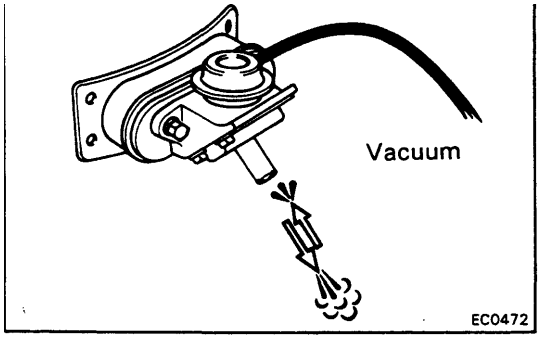
(A/T & **Wagón 4WD)**

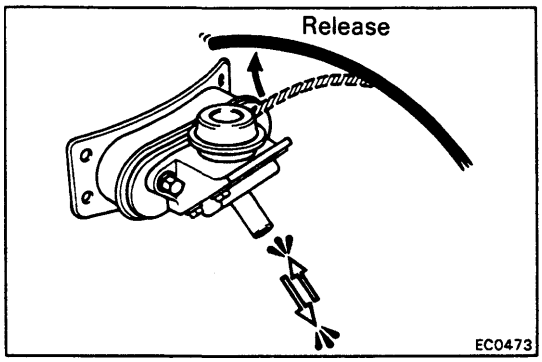
Check that there is no air passage when sucked from the filter side, and air passage when blown hard.

Sedan M/T & Wagón FWD M/T **A/T &** Wagón **4WD**



EC0470 EC0471





INSPECTION OF AS VALVE (Calif. and Canadá 3A-C Engine 4-Speed & Wagón A/T)

CHECK AS VALVE BY BLOWING AIR INTO PIPES

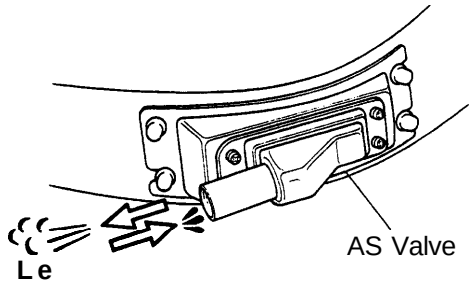
(a) Apply vacuum to the diaphragm.

(b) Check that air flows from the filter side to the outlet pipe.

(c) Check that air does not flow from the outlet pipe to the filter side.

(d) Reléase the vacuum.

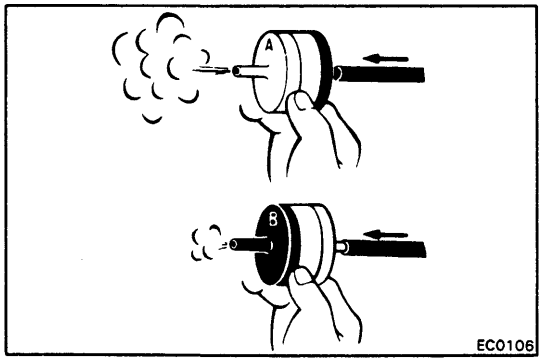
(e) Check that very little air flows from the filter side to the outlet pipe.



INSPECTION OF AS VALVE (Canadá Wagón M/T & 3A Engine)

CHECK AS VALVE BY BLOWING AND SUCKING ON PIPE

Check that there is no air passage when blown hard, and air passage when sucked.



INSPECTION OF VTV (Calif. and Canadá 3A-C Engine 4-Speed & Wogon A/T)

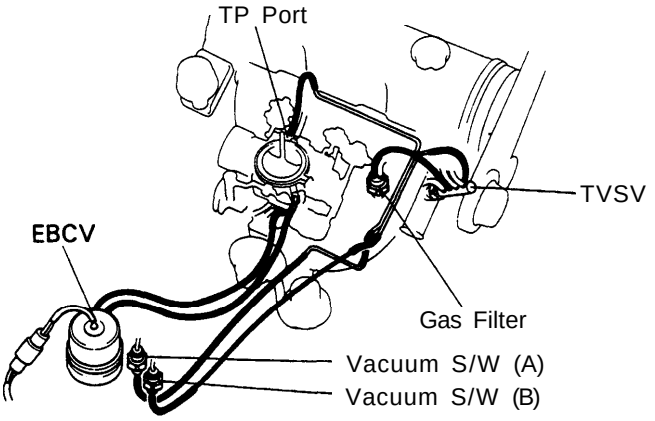
CHECK VTV BY BLOWING AIR INTO EACH SIDE

(a) Check that air flows without resistance from B to A.

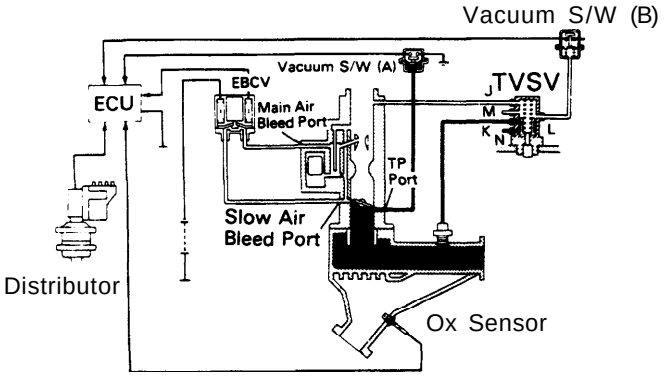
(b) Check that air with difficulty from A to B.

If a problem is found, replace the VTV.

CARBURETOR FEEDBACK SYSTEM (USA Vehicles and Canadá 3A-C Engine 4-Speed & Wagón A/T)

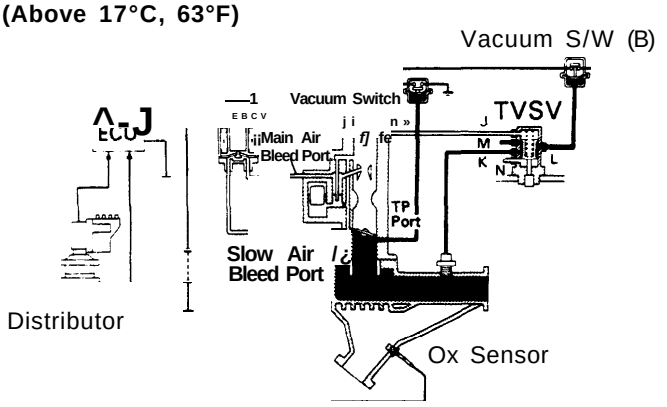


Cold
(Beiow 7°C, 45°F)



EC0477

Hot
(Above 17°C, 63°F)

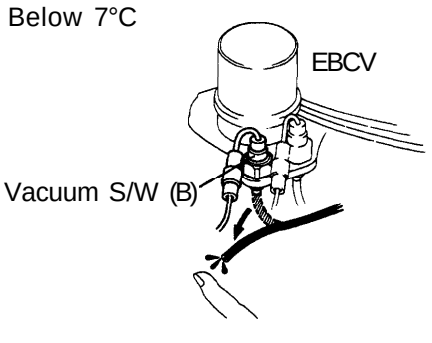


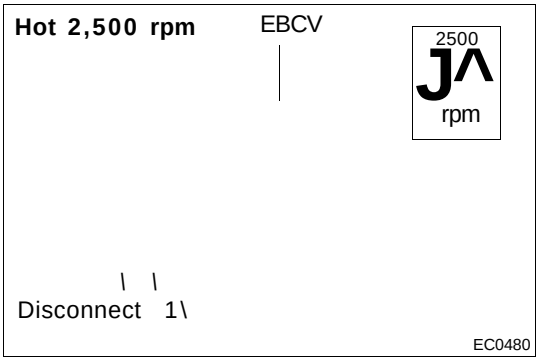
EC0478

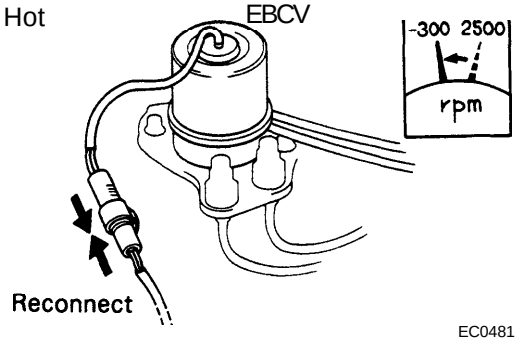
By means of a signal from the Ox sensor, carburetor primary side main air bleed and slow air bleed volume are controlled to maintain optimum air-fuel mixture in accordance with existing driving conditions, thereby cleaning HC, CO and NOx. In addition, driveability and fuel economy are improved.

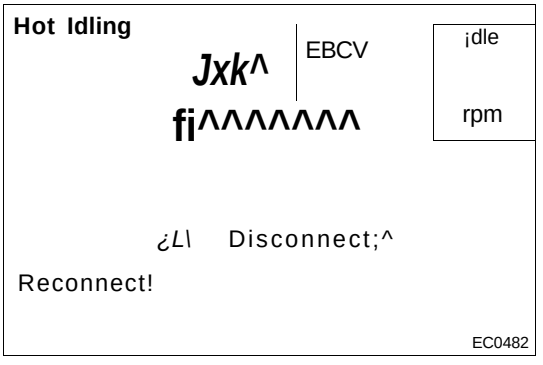
Coolant Temp.	TVSV	Condition	Engine rpm	Vacuum S/W		Air-Fuel Ratio in the Exhaust Manifold	Ox Sensor Signal	Computer	EBCV	Air Bleed
				A	B					
Below 7°C (45 °F)	OPEN (J-U	—	—	—	OFF	—	—	OFF	CLOSED	OFF
Above 17°C (63°F)	OPEN (K-L)	Idling	Below 1,300 rpm	—	—	—	—	OFF	CLOSED	OFF
		Cruising	Between 1,500 and 4,200 rpm	ON	ON	RICH	RICH	ON	OPEN	Feedback air bleed
						LEAN	LEAN	OFF	CLOSED	
			Above 4,400 rpm	—	—	—	—	OFF	CLOSED	OFF
		Heavy loads*	—	ON	OFF	—	—	OFF	CLOSED	OFF
		Deceleration	Above 1,500 rpm	OFF	ON	—	—	ON	OPEN	ON

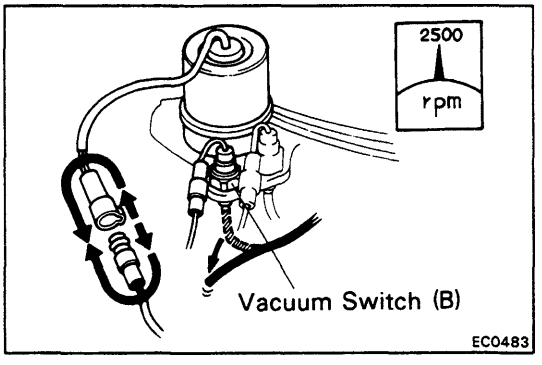
Remark : * Intake vacuum : below 85 mmHg (3.35 in.Hg, 11.3 kPa)











INSPECTION OF CARBURETOR FEEDBACK SYSTEM

1. CHECK TVSV WITH COLD ENGINE

(a) The coolant temperature should be below 7°C (45°F).

(b) Disconnect the vacuum hose from the vacuum switch (B).

(c) Start the engine and check that no vacuum is felt in the disconnected vacuum hose.

(d) Reconnect the vacuum hose.

2. CHECK EBCV WITH HOT ENGINE

(a) Warm up the engine to normal operating temperature.

(b) Disconnect the EBCV connector.

(c) Maintain engine speed at 2,500 rpm.

(d) Reconnect the connector and check that the engine drops about 300 rpm momentarily.

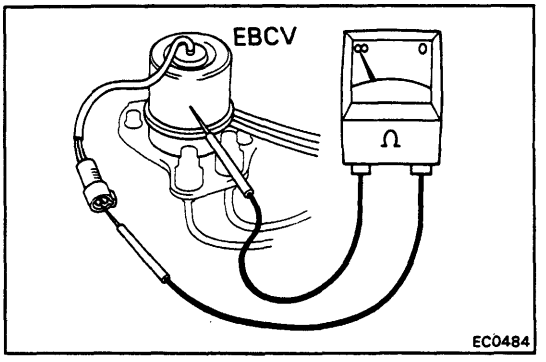
(e) With the engine idling repeat steps (b) and (d) above.

(f) Check that the engine revolution does not change.

(g) Disconnect the vacuum hose from the vacuum switch (B).

(h) Repeat steps (b), (c) and (d) above. Check that engine rpm does not change.

IF NO PROBLEM IS FOUND WITH THIS INSPECTION, THE SYSTEM IS OKAY; OTHERWISE INSPECT EACH PART

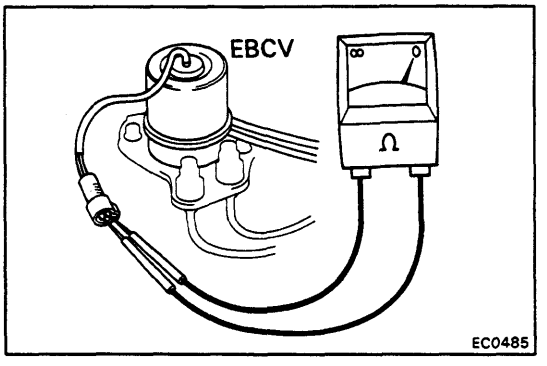


INSPECTION OF EBCV

1. CHECK FOR SHORT CIRCUIT

Using an ohmmeter, check that there is no continuity between the positive (+) terminal and the EBCV body.

If there is continuity, replace the EBCV.



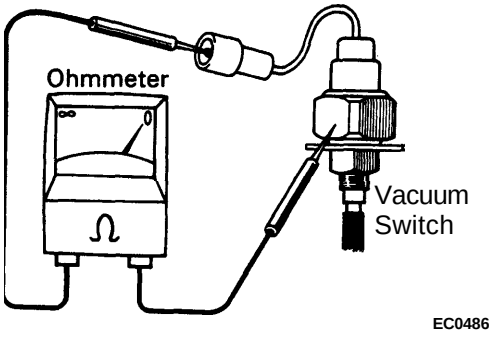
2. CHECK FOR OPEN CIRCUIT

Using an ohmmeter, measure the resistance between the positive (+) terminal and the other terminal as shown.

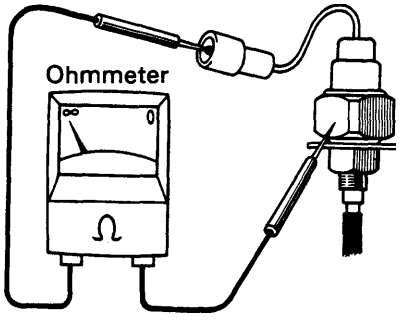
Specified resistance: 11 - 13 H at 20°C (68°F)

If the resistance is not within specification.
Replace the EBCV.

INSPECTION OF VACUUM SWITCH (A)



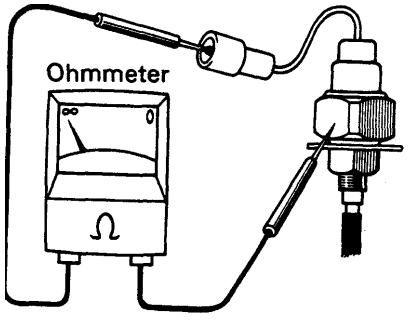
(a) Using an ohmmeter, check for continuity between the switch terminal and switch body.



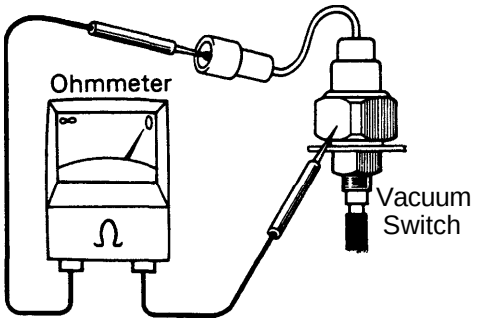
(b) Start the engine and warm up the engine to normal operating temperature.

(c) Using an ohmmeter, check that there is no continuity between the switch terminal and the body.

INSPECTION OF VACUUM SWITCH (B)



(a) Using an ohmmeter, check that there is no continuity between the switch terminal and switch body.

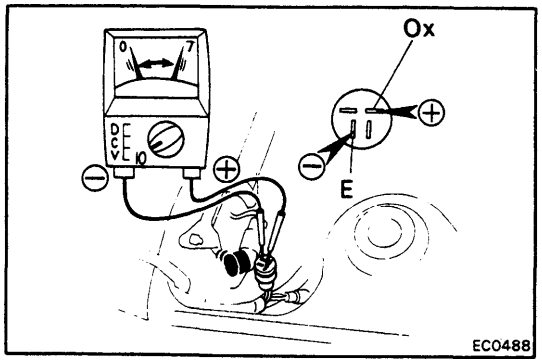


(b) Start the engine and warm up the engine normal operating temperature.

(c) Using an ohmmeter, check for continuity between the switch terminal and the body.

INSPECTION OF TVSV

(See page **EC-22)**



INSPECTION OF Ox SENSOR

CHECK Ox SENSOR WITH VOLTMETER

(a) Warm up the engine to normal operating temperature.

(b) Connect the voltmeter to the service connector.

Service connector location: Right tender apron below the wiper motor.

Connect the (+) testing probé to the Ox terminal and (-) testing probé to terminal E.

(c) Race engine at 2,500 rpm for about 90 seconds.

(d) Maintain the engine speed at 2,500 rpm.

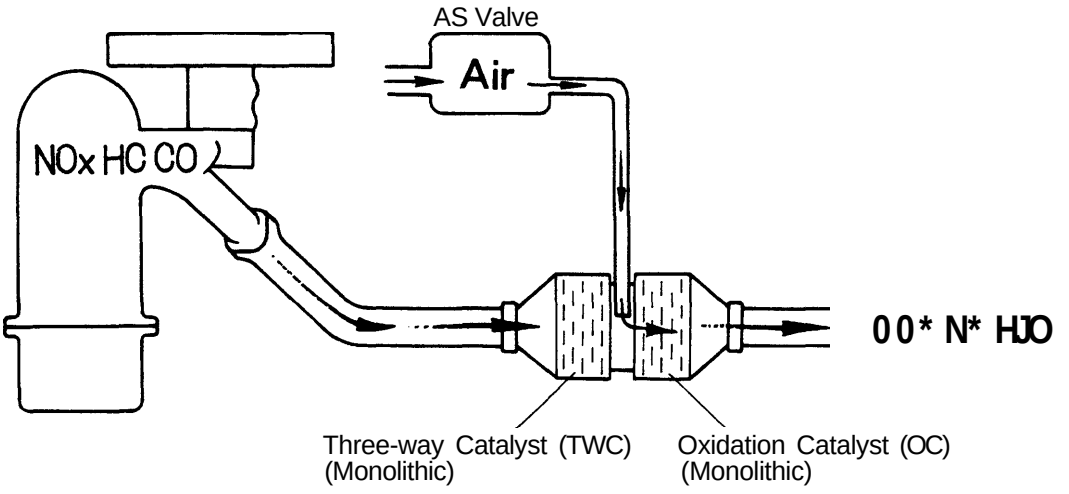
(e) Check that the needle of the voltmeter fluctuates within 0 - 7 volts 8 times or more ¡n 10 seconds.

NOTE:

- If this test is positive, the Ox sensor is OK.
- If not, inspect the other parts, hose connections and wiring of carburetor feedback system. (See from page EC-32).

If no problem is found, replace Ox sensor.

THREE-WAY AND OXIDATION CATALYST (TWC-OC) SYSTEM (Federal Vehicles)



To reduce HC, CO and NOx emissions, they are oxidized, reduced and converted to nitrogen (N_2), carbón dioxide ($C0_2$) and water (H_20) by the catalyst.

Exhaust Port		Three-way Catalyst	Air	Oxidation Catalyst (OC)		Exhaust Gas
HC, CO and NOx	**O**	Oxidation and reduction	*O.*	Oxidation	—*Y*	$C0_2$ H_20 N_2

INSPECTION OF EXHAUST PIPE ASSEMBLY

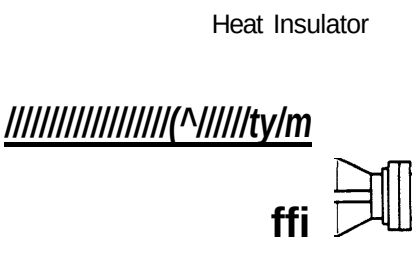
1. **CHECK CONNECTIONS FOR LOOSENESS OR DAMAGE**
2. **CHECK CLAMPS FOR WEAKNESS, CRACKS OR DAMAGE**

INSPECTION OF CATALYTIC CONVERTER

CHECK FOR DENTS OR DAMAGE

If any part of the protector is damaged or dented to the extent that it contacts the catalyst, repair or replace it.

INSPECTION OF HEAT INSULATOR

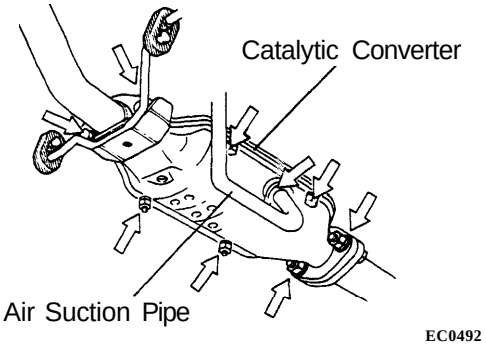


EC0491

1. CHECK HEAT INSULATOR FOR DAMAGE

2. CHECK FOR ADEOUATE CLEARANCE BETWEEN CATALYTIC CONVERTER AND HEAT INSULATOR

REPLACEMENT OF CATALYTIC CONVERTER



EC0492

1. REMOVE CATALYTIC CON VERTER

(a) Jack up the vehicle.

(b) Check that the converter is cool.

(c) Remove the air suction pipe.

(d) Remove the protector bolts and the bolts at the front and rear of the converter.

(e) Remove the converter and gaskets.

2. INSTALL CATALYTIC CONVERTER

(a) Place new gaskets on the converter front and rear pipes, and connect the converter to the exhaust pipes.

(b) Tighten the bolts.

Torque: Catalyst — Exhaust pipe
440 kg-cm (32 ft-lb, 43 Nm)

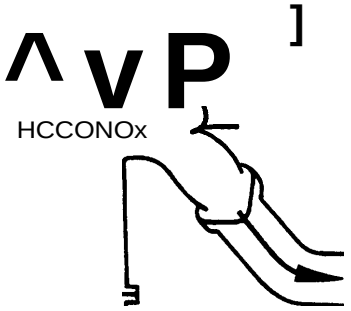
(c) Reinstall the protector and tighten the bolts.

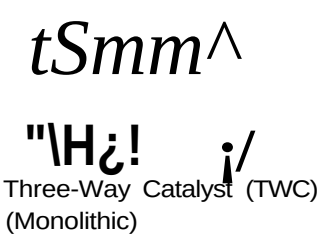
Torque: Catalyst — Protector
210 kg-cm (15 ft-lb, 21 Nm)

(d) Reinstall the air suction pipe and tighten the bolts.

Torque: Catalyst - Air suction pipe
210 kg-cm (15 ft-lb, 20 Nm)

THREE-WAY CATALYST (TWC) SYSTEM
(California and Canadá 3A-C Engine 4-Speed & Wagón A/T)

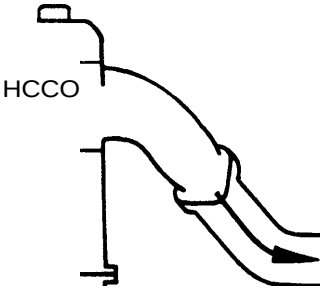


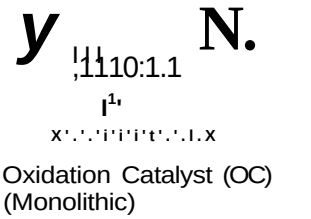


EC2901

To reduce HC, CO and NOx emissions, they are oxidized, reduced and converted to nitrogen (N_2), carbón dioxide ($C0_2$) and water (H_20) by the catalyst.				
Exhaust Port		**Three-Way Catalyst**		**Exhaust Gas**
HC, CO and **NOx**		Oxidation and reduction		**$C0_2$** **H_20** **N_2**

OXIDATION CATALYST (OC) SYSTEM
(For Canadá Wagón M/T)



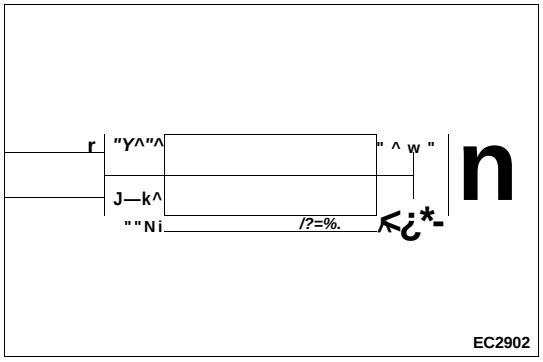


EC1163

To reduce HC and CO emission, HC and CO are oxidized and converted to water (H_20) and carbón dioxide ($C0_2$) by the catalyst.				
Exhaust Port		**Oxidation Catalyst (OC)**		**Exhaust Gas**
Unburnt CO and HC		Oxidation		**CO_2** **H_20**

INSPECTION OF EXHAUST PIPE ASSEMBLY

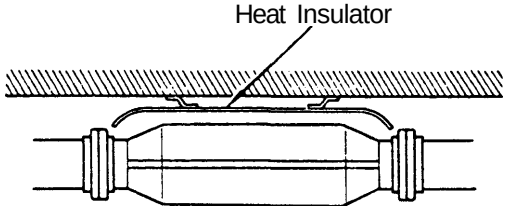
1. **CHECK CONNECTIONS FOR LOOSENESS OR DAMAGE**
2. **CHECK CLAMPS FOR WEAKNESS, CRACKS OR DAMAGE**



INSPECTION OF CATALYTIC CONVERTER

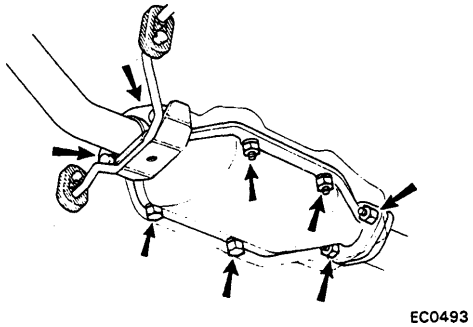
CHECK FOR DENTS OR DAMAGE

If any part of protector is damaged or dented to the extent that it contacts the catalyst, repair or replace it



INSPECTION OF HEAT INSULATOR

1. **CHECK HEAT INSULATOR FOR DAMAGE**
2. **CHECK FOR ADEQUATE CLEARANCE BETWEEN CATALYTIC CONVERTER AND HEAT INSULATOR**



REPLACEMENT OF CATALYTIC CONVERTER

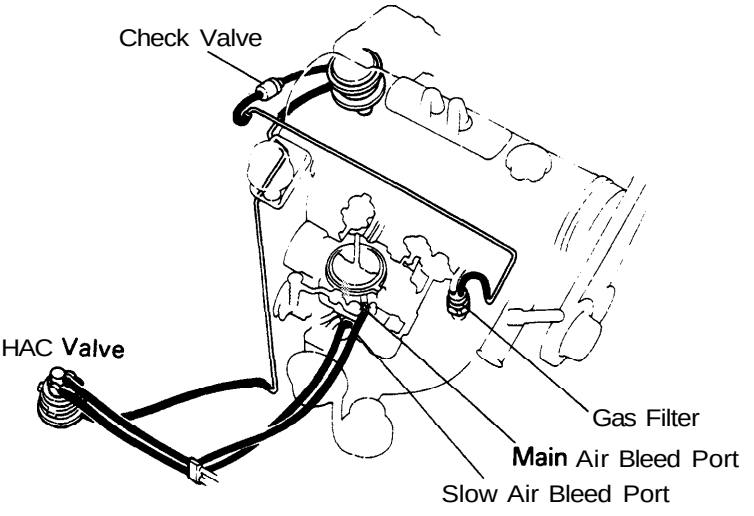
1. **REMOVE CATALYTIC CON VERTER**
   (a) Jack up the vehicle.
   (b) Check that the converter is cool.
   (c) Remove the protector bolts (4WD only).
   (d) Remove the bolts at the front and rear of the converter.
   (e) Remove the converter and gaskets.
2. **INSTALL CATALYTIC CONVERTER**
   (a) Place new gaskets on the converter front and rear pipes, and connect the converter to the exhaust pipes.
   (b) Tighten the bolts.

   Torque: Catalyst — Exhaust. pipe
   440 kg-cm (32 ft-lb, 43 Nm)

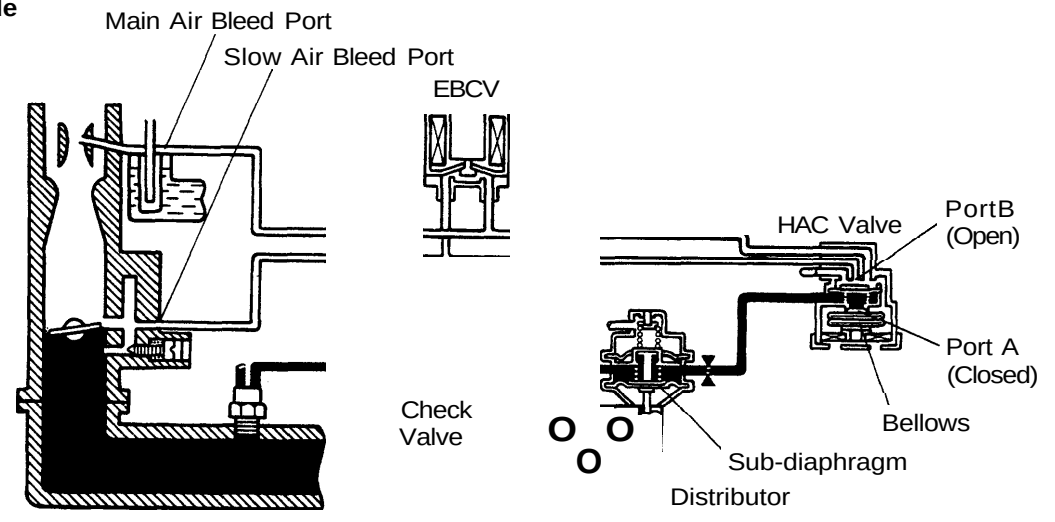
   (c) Reinstall the protector and tighten the bolts (4WD only).

   Torque: Catalyst — Protector
   210 kg-cm (15 ft-lb, 21 Nm)

HIGH ALTITUDE COMPENSATION (HAC) SYSTEM (Federal Vehicles)



At **High Altitude**

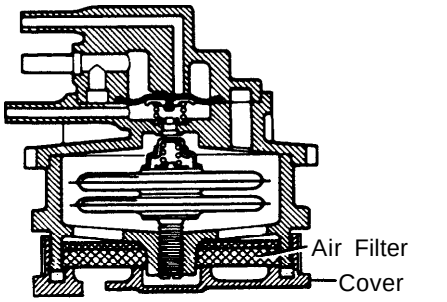


EC0495

As altitude increases, the air-fuel mixture becomes richer. This system insures proper air-fuel mixture by suppying additional air to the primary low and high speed circuit of the carburetor and advances the ignition timing to improve driveability at high altitude above 1,198 m (3,929 ft).

Altitude	Bellows in HAC Valve	Port A inHAC Valve	Port B inHAC Valve	Distributor Sub-diaphragm	Air from HAC Valve	Vacuum Ignition Timing
High Above 1,198 m (3,929 ft)	Expanded	CLOSED	OPEN	Pulled (Always)	Led into primary low and high speed circuit	Advanced (+8°) (Always)
Low Below 783 m (2,568 ft)	Contracted	OPEN	CLOSED	* Not pulled	Stopped	* Not advanced

Remarks: * However, because of an orifice in the distributor sub-diaphragm pipe leading to the HAC valve, the sub-diaphragm is pulled only during high vacuum such as when idling.

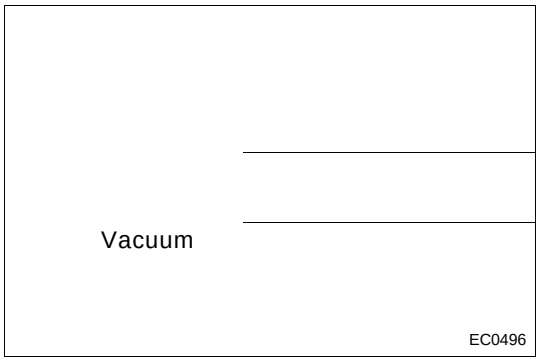


EC1060

INSPECTION OF HAC SYSTEM

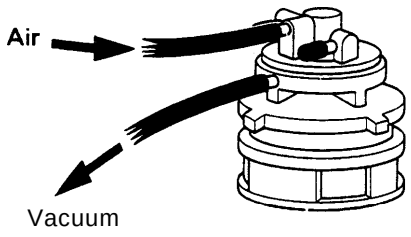
1. CHECK HAC VALVE

(a) Visualiy check and clean the air filter in the HAC valve.



EC0496

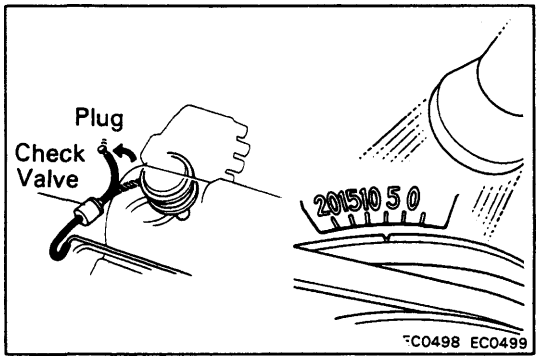
(b) At high altitude [Above 1,198 m (3,929 ft)]
With the engine idling, apply vacuum to the HAC valve lower port and blow into any one of the two ports on top of the HAC valve, and check that the HAC valve ¡s open.



No Air

EC0497

(c) At low altitude [Below 783 m (2,568 ft)]
With the engine idling, apply vacuum to the HAC valve lower port and blow into any one of the two ports on top of the HAC valve, and check that the HAC valve is closed.

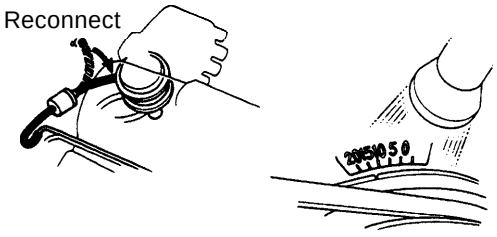


2. CHECK IGNITION TIMING

(a) Disconnect the vacuum hose from the distributor sub-diaphragm and plug the hose end.

(b) Check the ignition timing.

Ignition timing: 5° BTDC @ Max. 950 rpm

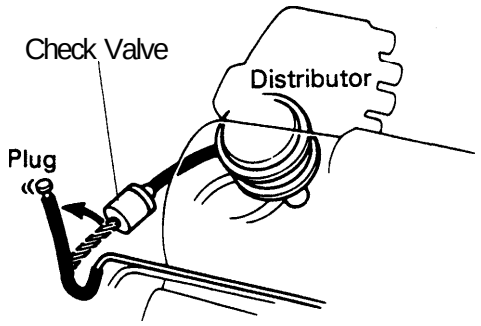


EC0500 EC0501

(c) Reconnect the hose to the distributor sub-diaphragm.

(d) Check the ignition timing advances.

Ignition timing: About 13° BTDC @ Max. 950 rpm

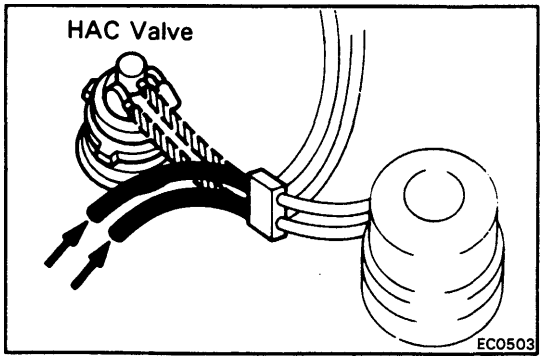


CHECK THE CHECK VALVE

(a) Disconnect the vacuum hose from the check valve at the black side and plug the hose end.

(b) Check that the ignition timing remains stationary for more than one minute.

(c) Stop the engine and reconnect the hose to the check valve.



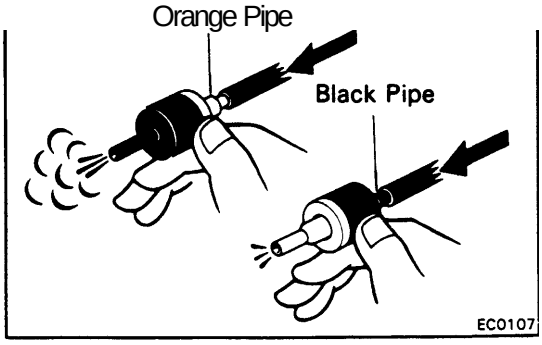
4. CHECK DISTRIBUTOR

(a) Disconnect the two hoses on top of the HAC valve.

(b) Blow air into each hose and check that air flows into the distributor.

(c) Reconnect the hoses to the proper locations.

IF NO PROBLEM IS FOUND WITH THIS INSPECTION, THE SYSTEM IS OKAY; OTHERWISE INSPECT EACH PART

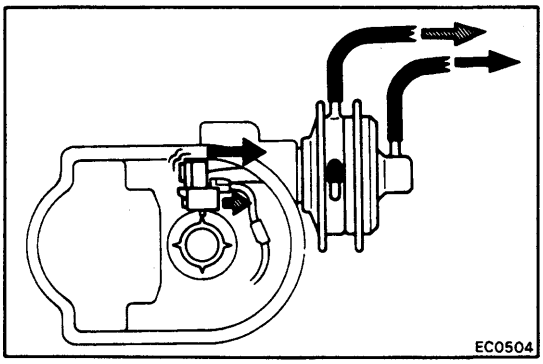


INSPECTION OF CHECK VALVE

CHECK VALVE BY BLOWING AIR INTO EACH PIPE

(a) Check that air flows from the orange pipe to the black pipe.

(b) Check that air does not flow from the black pipe to the orange pipe.



INSPECTION OF DISTRIBUTOR VACUUM ADVANCER

CHECK OPERATION OF VACUUM ADVANCER BY APPLYING VACUUM

(a) Remove the distributor cap and rotor.

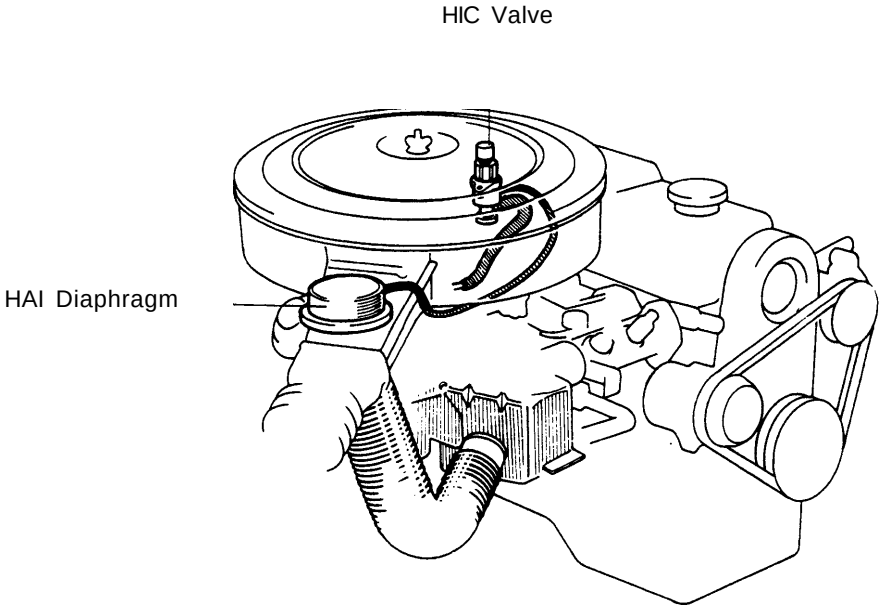
(b) Plug one port of the sub-diaphragm.

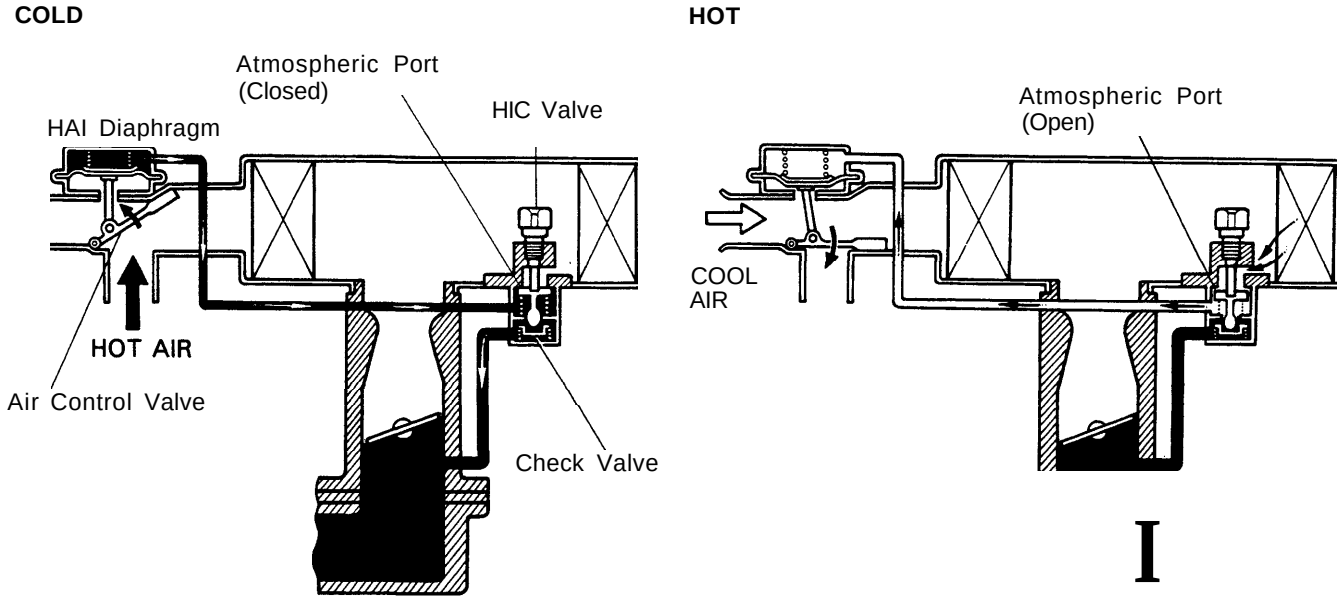
(c) Apply vacuum to the diaphragms, and check that the vacuum advancer moves in accordance with the vacuum.

(d) Reinstall the rotor and distributor cap, and remove the plug.

If a problem is found, repair or replace the distributor vacuum advancer.

AUXILIARY SYSTEMS
1. Automatic Hot Air Intake (HAI) System

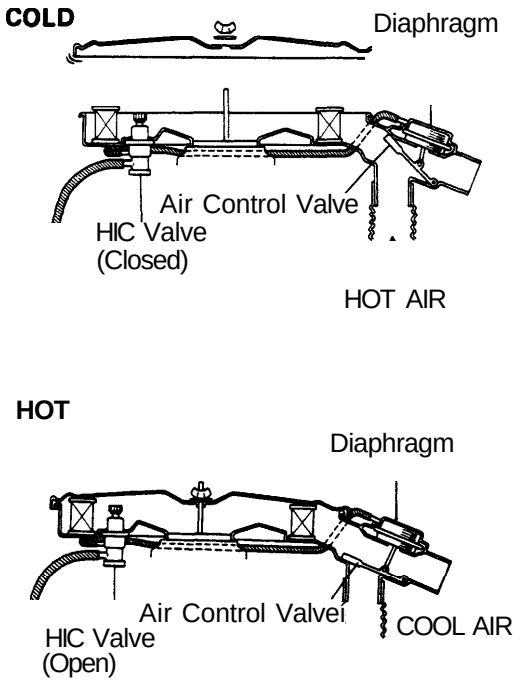




EC3201

I

This system leads a hot air supply to the carburetor in cold weather to improve driveability and to prevent the carburetor from icing in extremely cold weather.			
Temperature in Air Cleaner	**HIC Valve**	**Air Control Valve**	**Intake Air**
Cold Below 22°C (72°F)	Atmospheric port is CLOSED	Hot air passage OPEN	HOT
Hot Above 29°C (84°F)	Atmospheric port is OPEN	Cool air passage OPEN	COOL



INSPECTION OF HAI SYSTEM

1. CHECK AIR CONTROL VALVE OPERATION

(a) Remove the air cleaner cover.

(b) Cool the HIC valve by blowing compressed air on it.

(c) Check that the air control valve closes the cool air passage at idle.

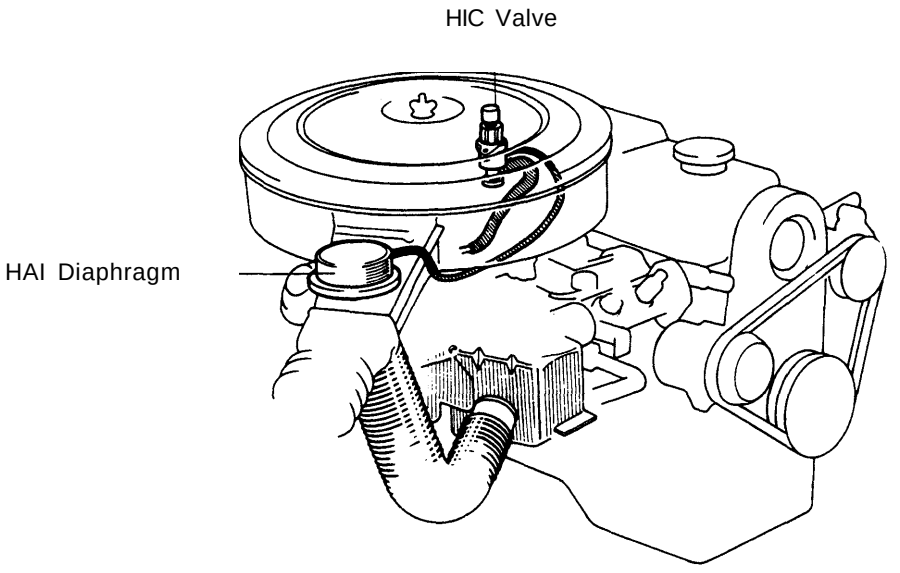
(d) Reinstall the air cleaner cover and warm up the engine.

(e) Check that the air control valve opens the cool air passage at idle.

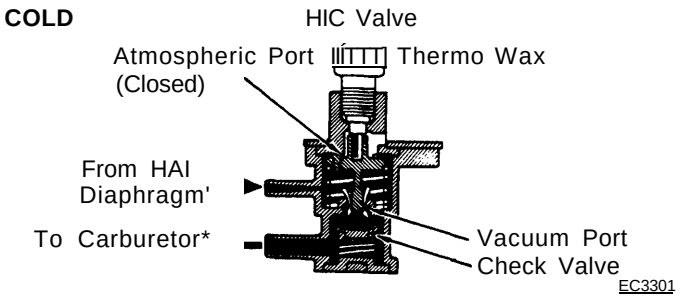
2. CHECK HOSES AND CONNECTIONS

Visually check the hoses and connections for cracks, leaks or damage.

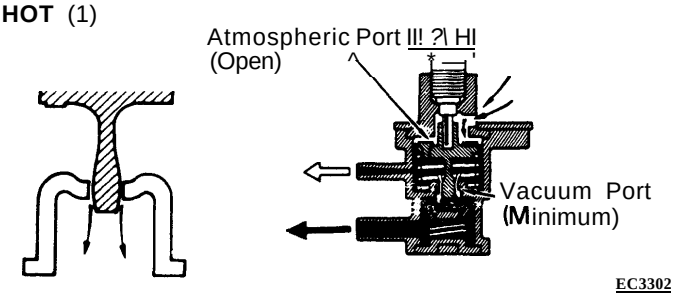
2. Hot Idle Compensation (HIC) System on Air Cleaner



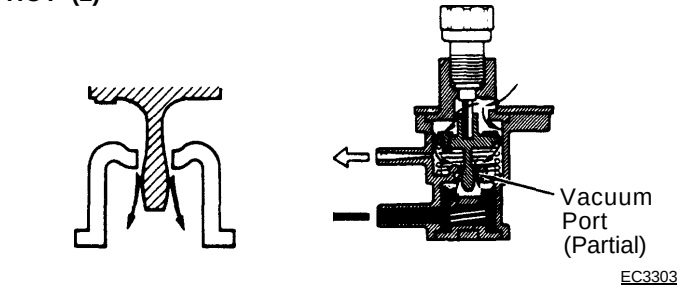
EC0505



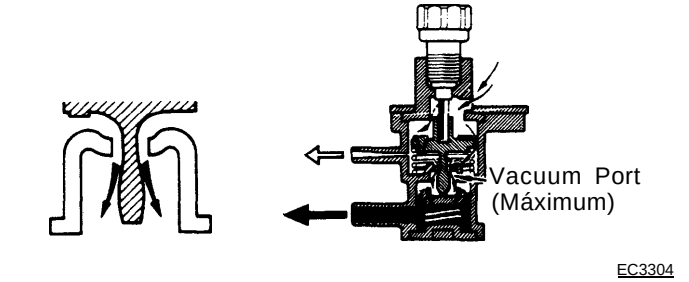
EC3301



EC3302



EC3303



EC3304

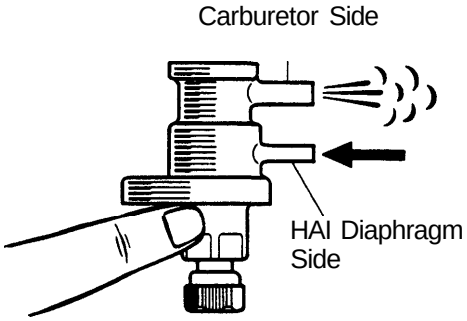
This system allows the air controlled by the HIC valve to enter the intake manifold to maintain proper air-f uel mixture during high temperatures at idle.

Temperature in Air Cleaner	HIC Valve Atmospheric Port	HIC Valve Vacuum Port Opening	HIC System
HOT (1) Between 29°C (84°F) and 52°C (126°F)	OPEN	MÍNIMUM	OFF
HOT (2) Between 59°C (138°F) and 82°C (180°F)	OPEN	PARTIAL	ON Air volume is controlled by HIC valve
HOT (3) Above 89°C (192°F)	OPEN	MÁXIMUM	ON

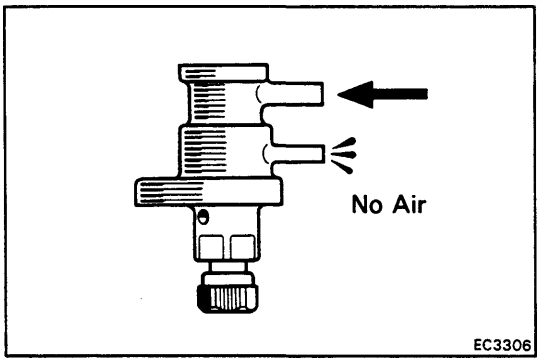
INSPECTION OF HIC SYSTEM

CHECK HIC VALVE BY BLOWING AIR

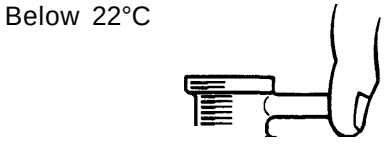
(a) Check that air flows from the HAI diaphragm side to the carburetor side while closing the atmospheric port.



(b) Check that air does not flow from the carburetor side to the HAI diaphragm side.



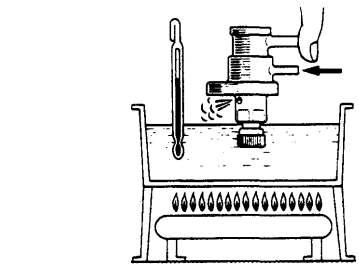
(c) Below 22°C (72°F), check that air does not flow from the HAI diaphragm side to the atmospheric port while closing the intake manifold side.



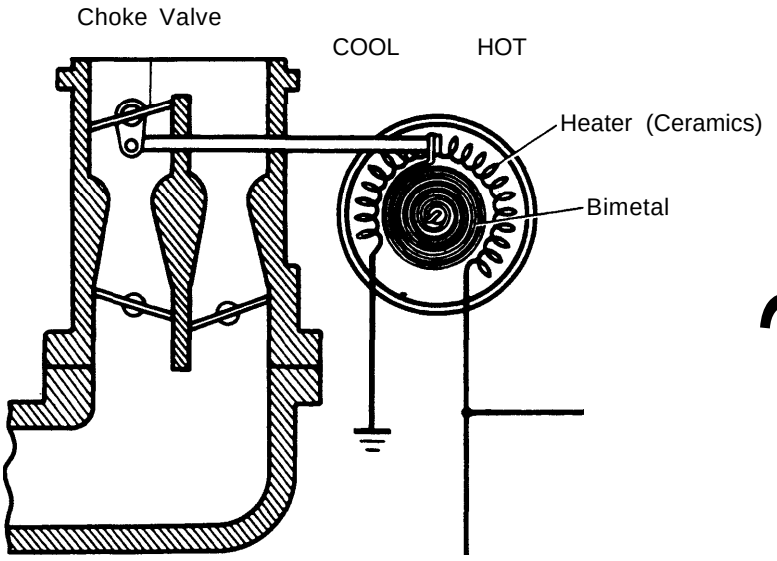
(d) Heat the HIC valve to above 29°C (84°F).

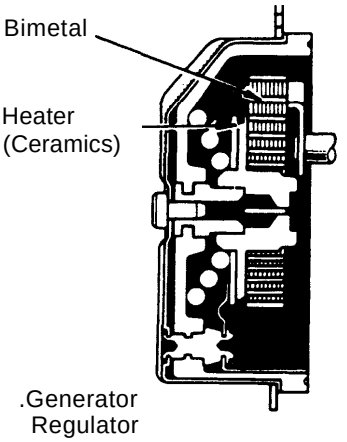
CAUTION: **Do** not let water get inside the **HIC** valve.

(e) Check that air flows from the HAI diaphragm side to the atmospheric port while closing the intake manifold side.



3. Automatic Choke System





.Generator
Regulator
(For Alternator w/o
IC Regulator)

?

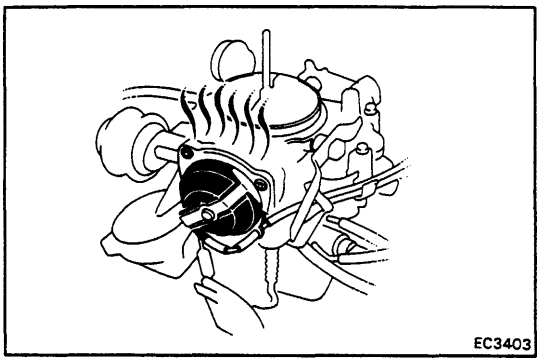
D

Alternator
(For Alternator w/IC
Regulator)

L Terminal [fl]

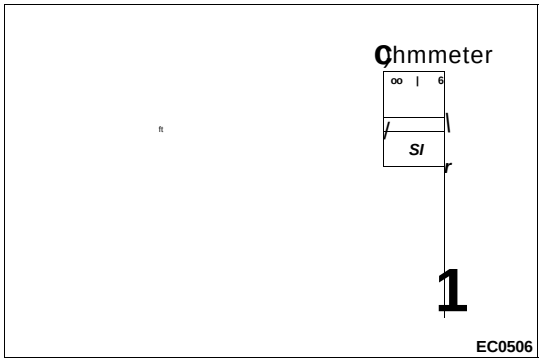
EC0387

This system temporarily supplies a rich mixture to the engine by closing the choke valve when the engine is cold.				
IGS/W	Engine	Current from L Terminal to Heater	Bimetal	**Choke Valve**
OFF	Not running	Not f lowing	Expanded	CLOSED
ON	Not running	* Not flowing	Expanded	CLOSED
	Running	Flowing	Heated up and contracted	OPEN
Remarks: * On altemators with IC regulator, slight voltage will occur when the ignition switch is turned ON, but not sufficient current to warm up the heater.				



INSPECTION OF AUTOMATIC CHOKE SYSTEM

1. START ENGINE
2. SHORTLY AFTER, CHECK THAT CHOKE VALVE BEGINS TO OPEN AND CHOKE HOUSING IS HEATED



INSPECTION OF HEATING COIL

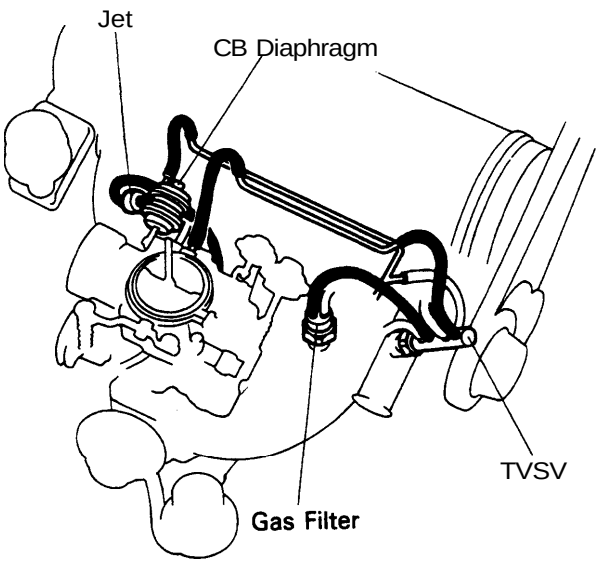
1. UNPLUG WIRING CONNECTOR
2. MEASURE RESISTANCE WITH OHMMETER

Resistance:

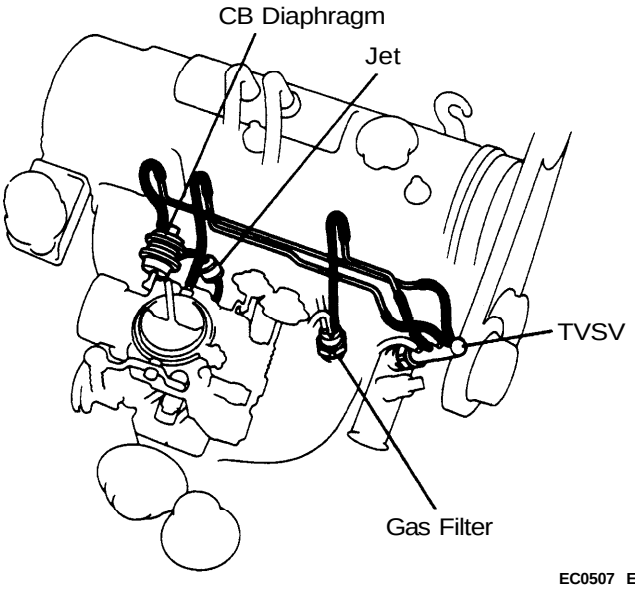
3A-C (ex. Canadá Wagón M/T)	17 - 19 n
Others	20 - 22 *ü*

4. Choke Breaker (CB) System

USA and Canadá 3A-C Engine 4-Speed & Wagón A/T

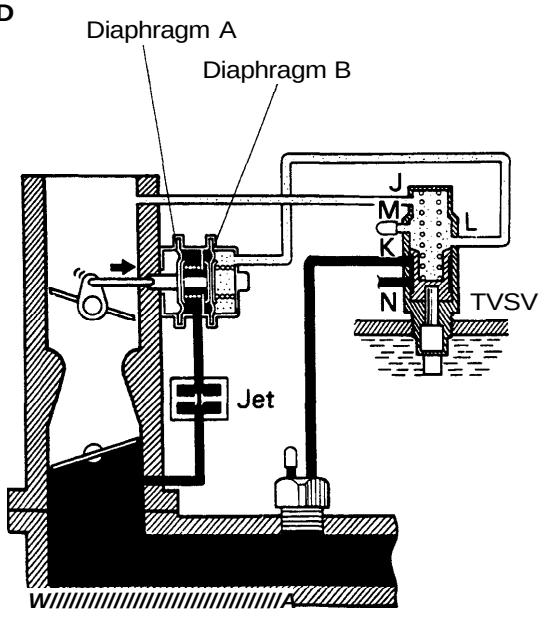


Canadá Wagón M/T & 3A Engine

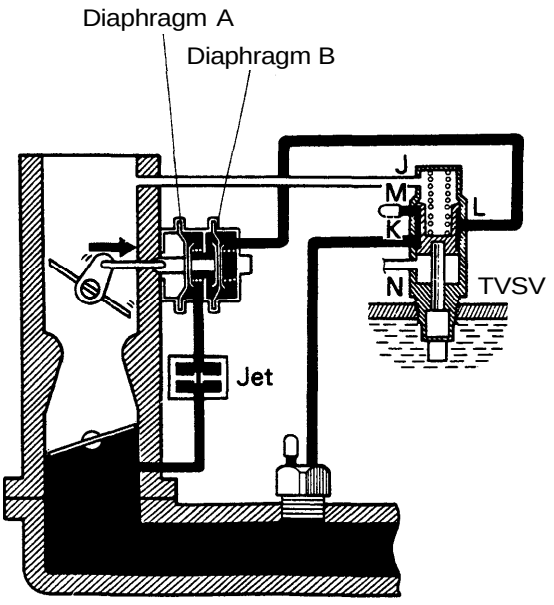


EC0507 EC0508

COLD



HOT

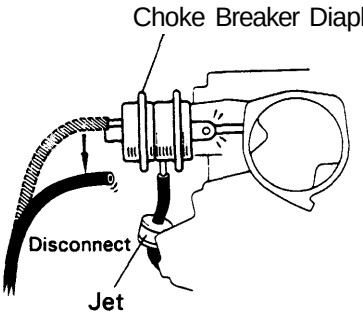


EC3506

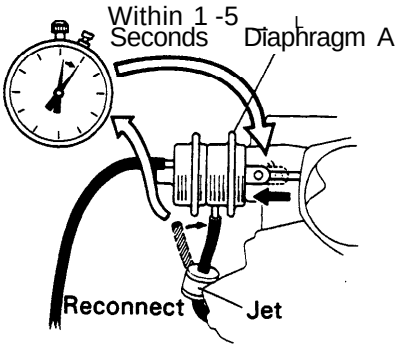
When the choke is closed, this system opens the choke valve slightly to prevent too rich a mixture. Then, when the engine is warmed up, the choke valve is forcibly opened further.

Coolant Temp.	**TVSV**	**Diaphragm A**	**Diaphragm** B	**Choke Link Pulí**
Below 7°C (45°F)	**OPEN (L-J)**	* PULLED	NOT PULLED	SLIGHT
Above 1 7°C (63°F)	**OPEN (K-L)**	* PULLED	PULLED	MUCH

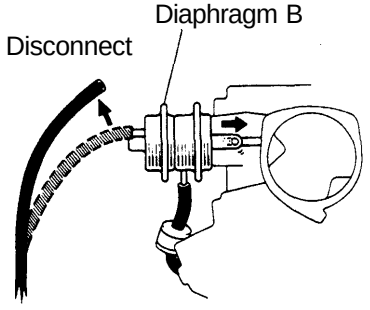
Remarks: * This action is delayed by the jet.



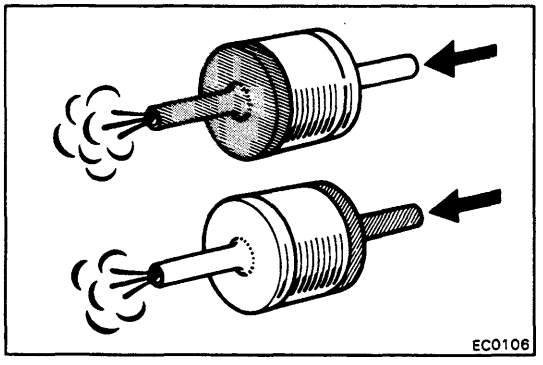
EC3501

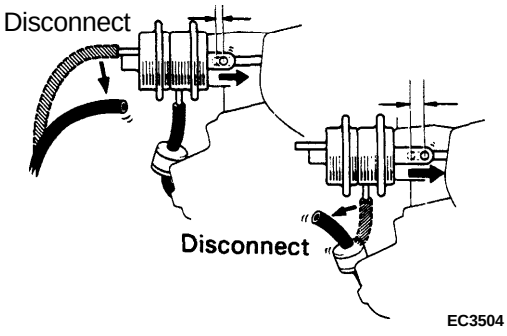


EC3502



EC3503


EC0106



EC3504

INSPECTION OF CB SYSTEM

1. CHECK TVSV WITH COLD ENGINE

(a) Start the engine.

(b) With the coolant temperature below 7°C (45°F), disconnect the vacuum hose from choke breaker diaphragm B and check that the choke linkage does not move.

(c) Reconnect the vacuum hose to diaphragm B.

CHECK JET AND DIAPHRAGM A

(a) Disconnect the vacuum hose from the choke breaker diaphragm A and check that the choke linkage moves.

(b) Reconnect the vacuum hose to diaphragm A and check that the choke linkage moves within the specified time after reconnecting the hose.

1—5 seconds

3. CHECK TVSV AND DIAPHRAGM B WITH WARM ENGINE

(a) After warming up the engine, disconnect the vacuum hose from diaphragm B and check that the choke linkage retums.

(b) Reconnect the vacuum hose to diaphragm B.

IF NO PROBLEM IS FOUND WITH THIS INSPECTION, THE SYSTEM IS OKAY; OTHERWISE INSPECT EACH PART

INSPECTION OF TVSV

(See page EC-22)

INSPECTION OF JET

CHECK JET BY BLOWING AIR FROM EACH SIDE

Check for stoppage.

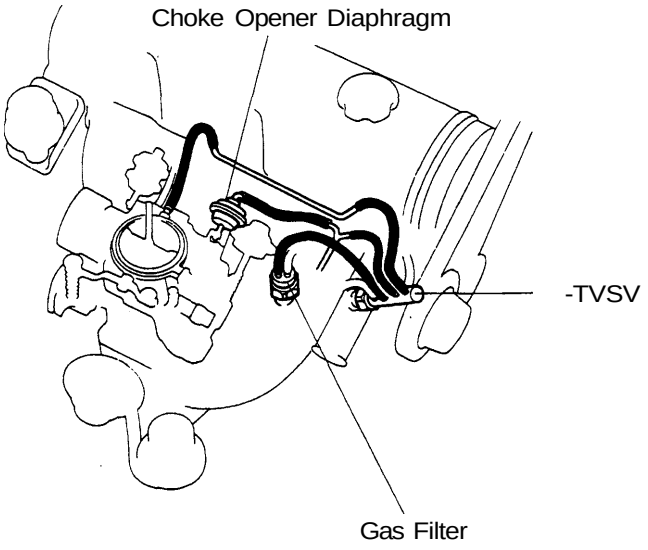
INSPECTION OF CB DIAPHRAGMS

CHECK THAT CHOKE LINKAGE MOVES IN ACCORDANCE WITH APPLIED VACUUM

If a problem is found, replace the diaphragm.

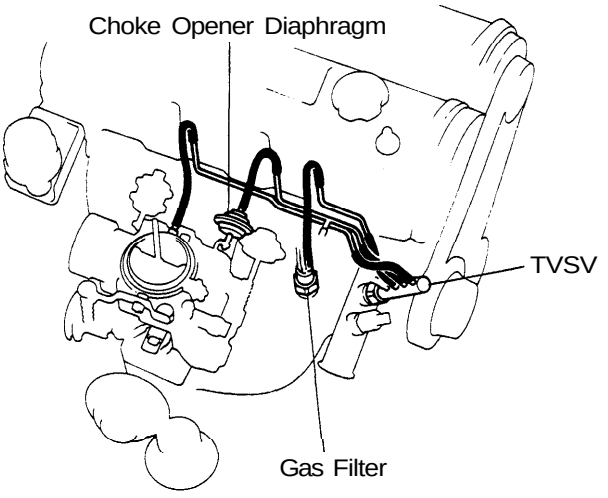
5. Choke Opener System

USA Vehicles and Canadá 3A-C Engine 4-Speed & Wagón A/T



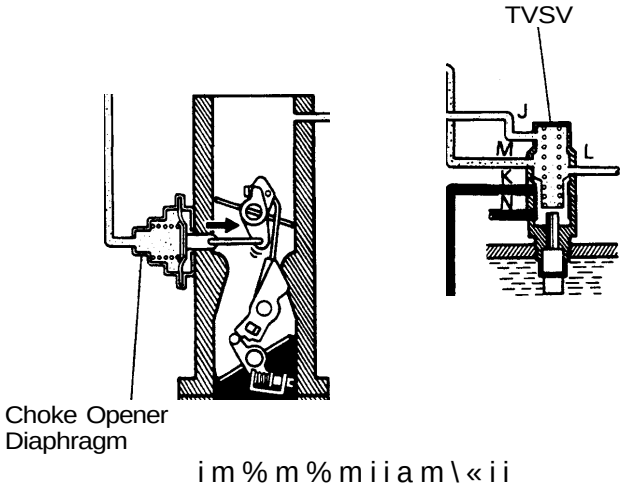
EC0509

Canadá Wagón M/T



EC0510

COLD



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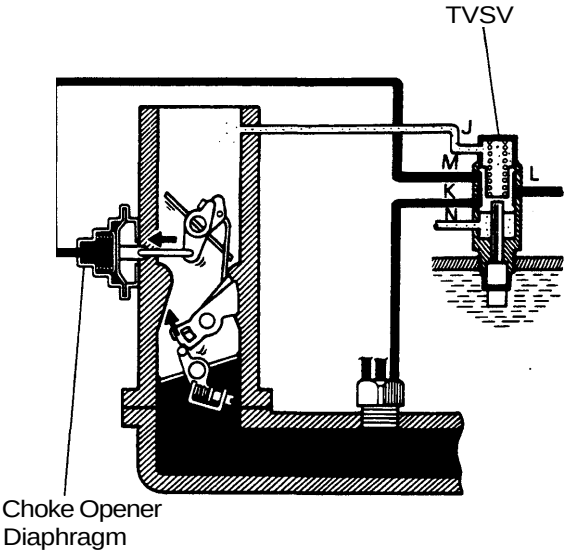
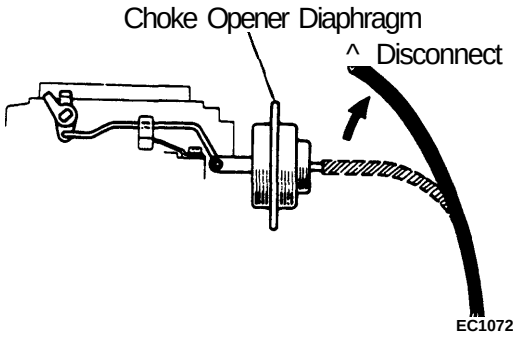
HOT

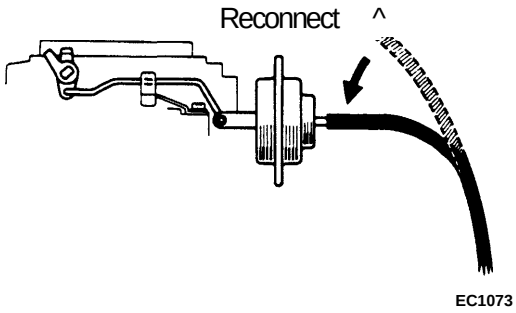


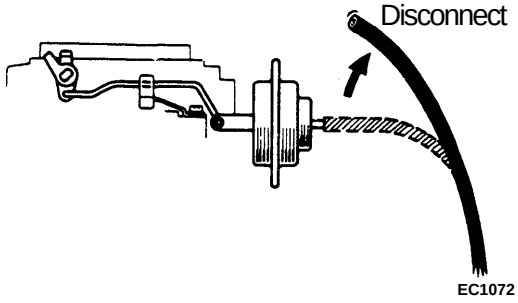
EC1071

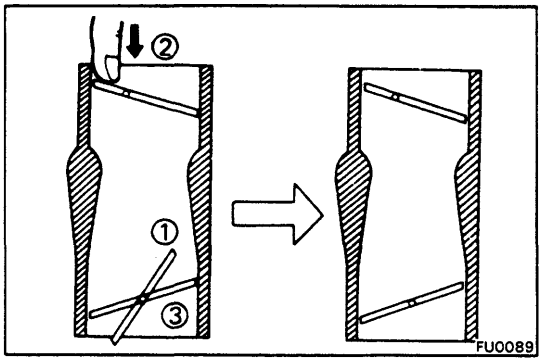
After warm up, this system forcibly holds the choke valve open to prevent an over-rich mixture and releases the fast idle to the 3rd step to lower the engine rpm.

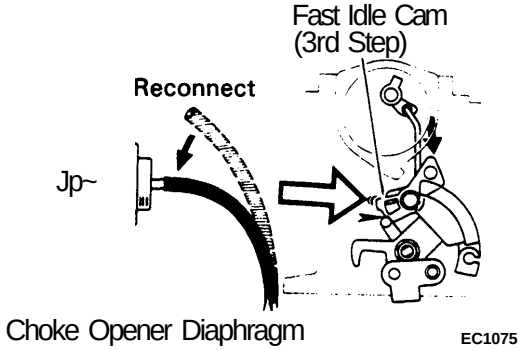
Coolant Temp.	TVSV	Diaphragm	Choke Valve	Fast Idle Cam	Engine RPM
Below 50°C (122°F)	OPEN (J-M)	Released by spring tensión	Closed by automatic choke	Set at 1 st or 2nd step	HIGH
Above 68°C (154°F)	OPEN (K-M)	Pulled by manifold vacuum	OPEN	Released to 3rd step	LOW











INSPECTION OF CHOKE OPENER SYSTEM

1. CHECK TVSV WITH COLD ENGINE

(a) Disconnect the vacuum hose from the choke opener diaphragm.

(b) With the coolant temperature below 50°C (122°F), step down on the accelerator pedal and reléase it.

(c) Start the engine.

(d) Reconnect the vacuum hose and check that the choke linkage does not move.

2. CHECK TVSV, DIAPHRAGM AND LINKAGE WITH WARM ENGINE

(a) Warm up the engine to normal operating temperature and stop the engine.

(b) Disconnect the vacuum hose from the choke opener diaphragm.

(c) Set the fast idle cam.
While holding the throttle slightly open, push the choke valve closed, and hold it closed as you reléase the throttle valve.

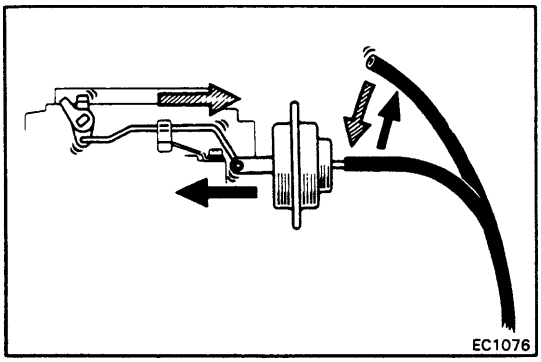
(d) Start the engine, but do not touch the accelerator pedal.

(e) Reconnect the vacuum hose, and check that the choke linkage moves, and that the fast idle cam is released to the 3rd step.

IF NO PROBLEM IS FOUND WITH THIS INSPECTION, THE SYSTEM IS OKAY; OTHERWISE INSPECT EACH PART

INSPECTION OF TVSV

(See page EC-22)



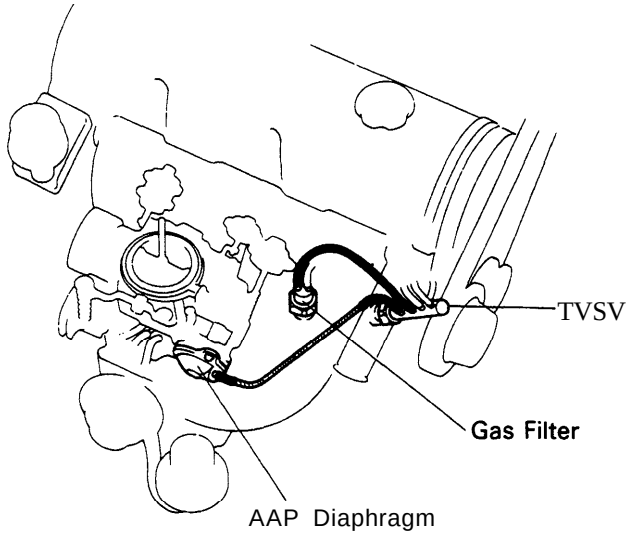
INSPECTION OF DIAPHRAGM

CHECK THAT CHOKE LINKAGE MOVES IN ACCORDANCE WITH APPLIED VACUUM

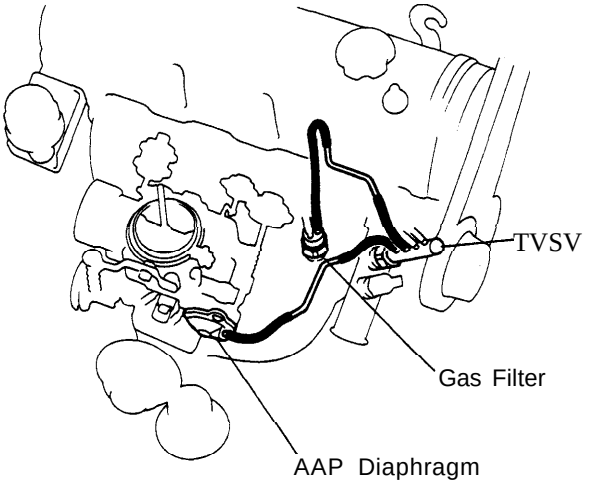
If a probiem is found, replace the diaphragm.

6. Auxiiiary Acceleration Pump (AAP) System

USA and Canadá 3A-C, 4-Speed & Wagón A/T

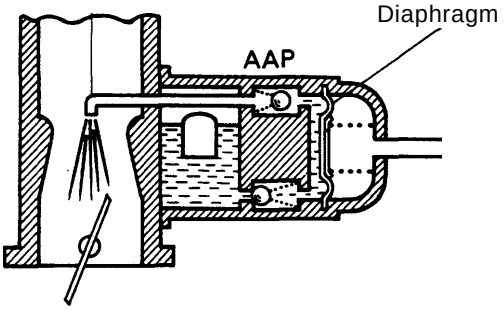


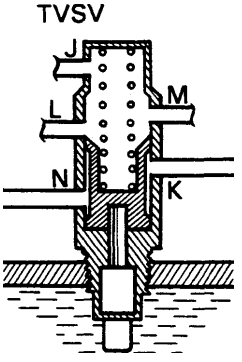
Canadá Wagón M/T & 3A Engine



EC0511 EC0512

Acceleration Nozzle



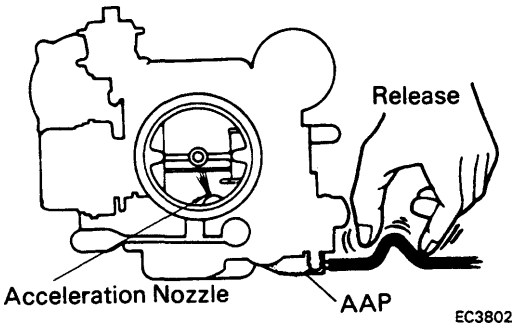


Intake Manifold

EC3801

When accelerating with a cold engine, the main acceleration pump capacity is insuff icient to provide good acceleration. The AAP system compensates for this by forcing more fuel into the acceleration nozzle to obtain better cold engine performance.

Coolant Temp.	TVSV	Engine	Intake Vacuum	Diaphragm in **AAP**	Fuel
Below 50°C (122°F)	OPEN (K-N)	Constant RPM	HIGH	Pulled by vacuum	Drawn into AAP chamber
		Acceleration	LOW	Retumed by spring tensión	Forced into acceleration nozzle
Above 68°C (154°F)	CLOSED (K-N)	—	—	No operation	—



INSPECTION OF AAP SYSTEM

1. CHECK SYSTEM WITH COLD ENGINE

(a) Check that the coolant temperature is below 50°C (122°F).

(b) Remove the air cleaner cover.

(c) Start the engine.

(d) Pinch the AAP hose, and stop the engine.

(e) Reléase the hose.

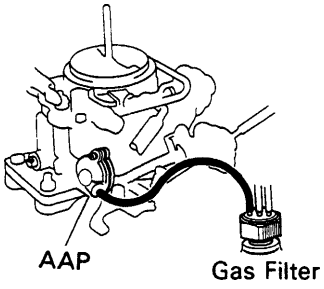
(f) Check that gasoline spurts out from the acceleration nozzle.

2. REPEAT (c), (d) AND (e) ABOVE AFTER WARM-UP

(a) Check that gasoline does not spurt out from the acceleration nozzle.

(b) Reinstall the air cleaner cover.

IF NO PROBLEM IS FOUND WITH THIS INSPECTION, THE SYSTEM IS OKAY; OTHERWISE INSPECT EACH PART



INSPECTION OF AAP DIAPHRAGM

CHECK DIAPHRAGM OPERATION AT IDLE

(a) Start the engine.

(b) Disconnect the hose from the AAP diaphragm.

(c) Apply and reléase the vacuum directly to the AAP diaphragm at idle.

(d) Check that the engine rpm changes by releasing vacuum.

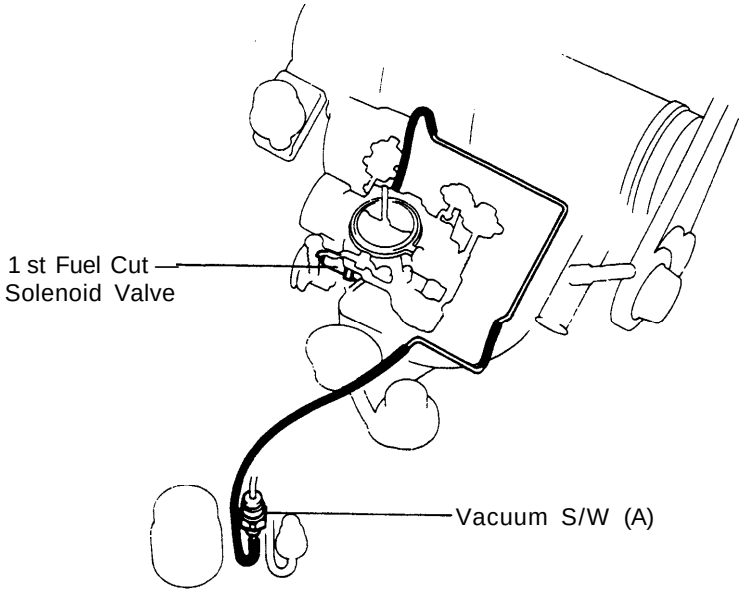
(e) Reconnect the AAP hose.

If a problem is found, replace the diaphragm.

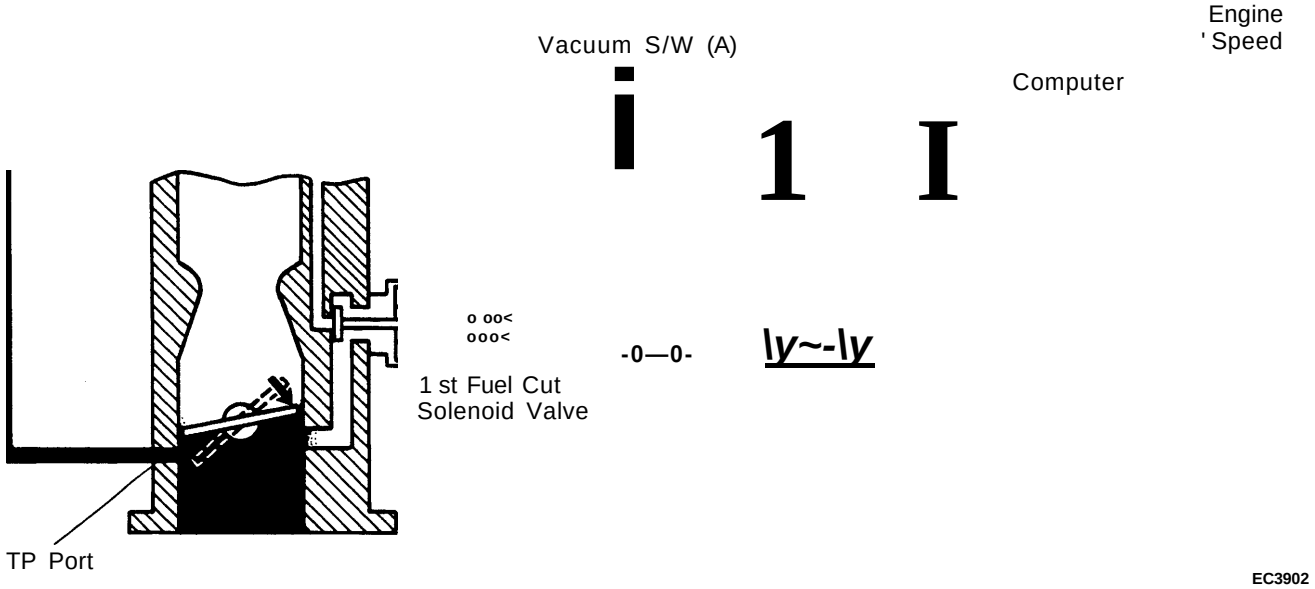
INSPECTION OF TVSV

(See page EC-22)

7. Deceleration Fuel Cut System (USA and Canadá 3A-C Engine 4-Speed & Wagón A/T)



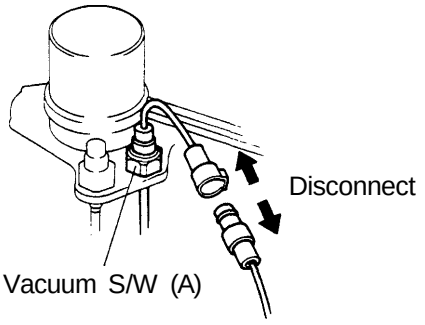
EC0513



EC3902

This system cuts off part of the fuel in the slow circuit of the carburetor to prevent overheating and afterburning in the exhaust system.

Engine RPM	Vacuum in the Vacuum S/W	Vacuum S/W (A)	Computer	1 st Fuel Cut Solenoid Valve	Slow Circuit in Carburetor
Below 1,900 rpm	—	—	**ON**	**ON**	OPEN
Above 2,290 rpm	Below 180 mm Hg /7.09 in. Hg\ \24.0 kPa /	ON	**ON**	**ON**	OPEN
	Above 215 mm Hg /8.46 in. Hg\ \28.7 kPa /	OFF	OFF	OFF	CLOSED



INSPECTION OF DECELERATION FUEL CUT SYSTEM

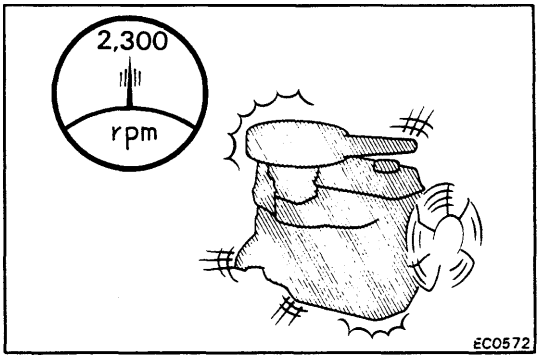
CHECK SYSTEM OPERATION

(a) Connect a tachometer to the engine.

(b) Start the engine.

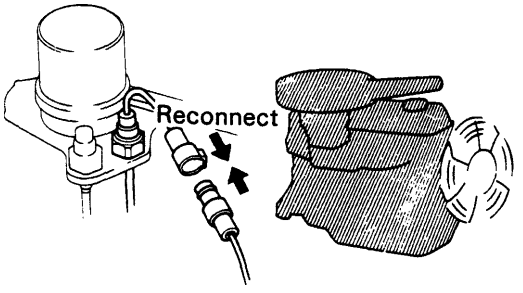
(c) Check that the engine runs normally.

(d) Disconnect the vacuum switch (A) connector.



(e) Gradually increase engine speed to 2,300 rpm, and check that the engine rpm is fluctuating.

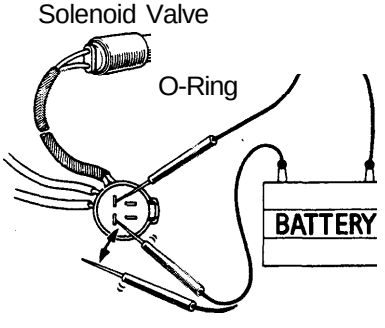
CAUTION: Perform this inspection quickly to avoid overheating the catalytic converter.



EC0514 EC0573

(f) Reconnect the vacuum switch connector. Again gradually increase the engine speed to 2,300 rpm and check that engine operation retums to normal.

IF NO PROBLEM IS FOUND WITH THIS INSPECTION, THE SYSTEM IS OKAY; OTHERWISE INSPECT EACH PART



EC0515

INSPECTION OF FIRST FUEL CUT SOLENOID VALVE

(a) Remove the solenoid valve.

(b) Connect the two terminàis and the battery terminàis as shown.

(c) Check that you can feel the "click" from the solenoid valve when the battery is connected and disconnected.

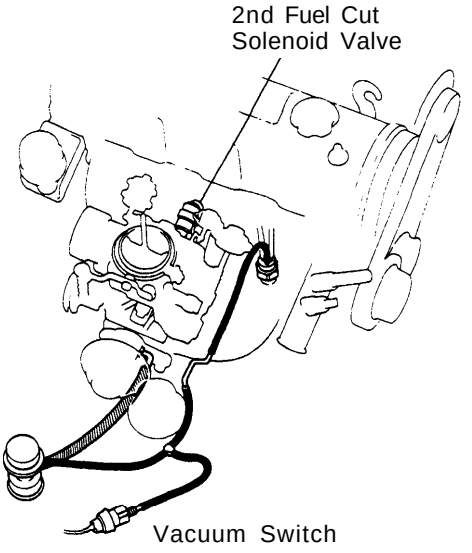
(d) Check the O-ring for damage.

(e) Reinstall the valve and reconnect the wiring connector.

INSPECTION OF VACUUM SWITCH (A)

(See page EC-34)

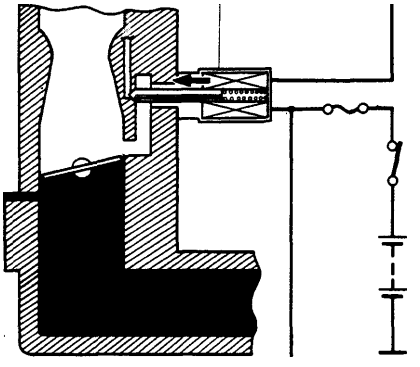
7. Deceleration Fuel Cut System (Canadá Wagón M/T)

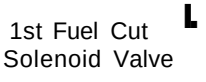


EC1078

Vacuum Switch (OFF)

2nd Fuel Cut Solenoid Valve (OFF)

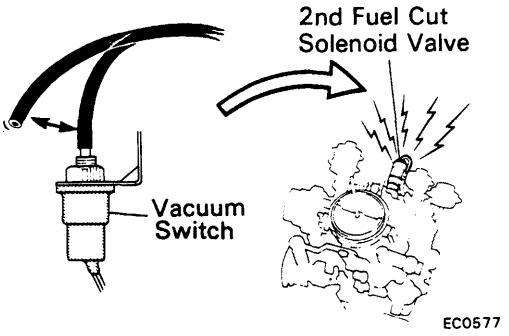




EC0516

This system cuts off part of the fuel in the 2nd slow circuit of the carburetor to prevent overheating and afterburning in the exhaust system.

Vacuum in the Vacuum S/W	Vacuum S/W	2nd Fuel Cut Solenoid Valve	2nd Slow Circuit in Carburetor
Below 160 mmHg /6.30 in.Hg\ \21.3 kPa /	ON	**ON**	OPEN
Above 225 mmHg /8.86 in.Hg\ \30.0 kPa J	OFF	OFF	CLOSED



INSPECTION OF SYSTEM

CHECK SYSTEM OPERATION

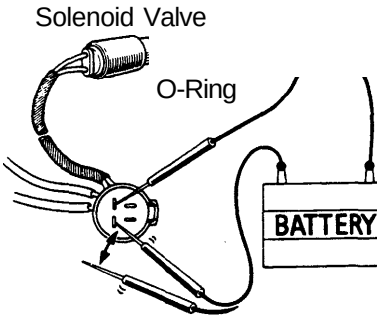
(a) Start the engine.

(b) Disconnect the vacuum hose from the vacuum switch and plug the hose end.

(c) Check that you can feel a "click" from the 2nd fuel cut solenoid valve when the vacuum hose is connected and disconnected at idle.

(d) Stop the engine and reconnect the hose.

IF NO PROBLEM IS FOUND WITH THIS INSPECTION, THE SYSTEM IS OKAY; OTHERWISE INSPECT EACH PART



INSPECTION OF SECOND FUEL CUT SOLENOID VALVE

(a) Remove the solenoid valve.

(b) Connect two terminái s and the battery terminái s as shown.

(c) Check that you can feel the "click" from the solenoid valve when the battery is connected and disconnected.

(d) Check the O-ring for damage.

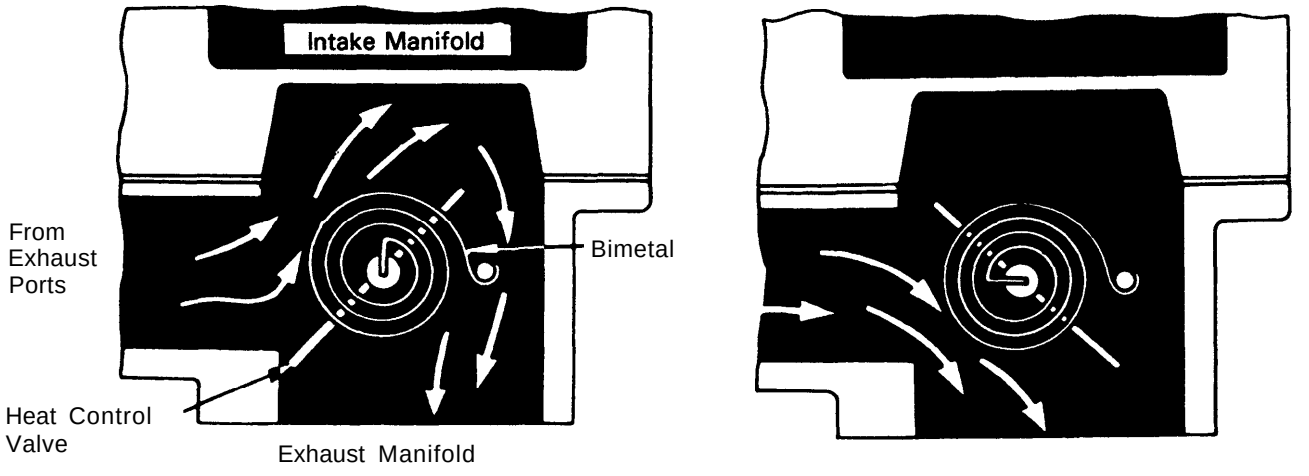
(e) Reinstall the valve and reconnect the wiring connector.

INSPECTION OF VACUUM SWITCH (A)

(See page EC-34)

8. Heat Control Valve

COLD ENGINE **HOT ENGINE**

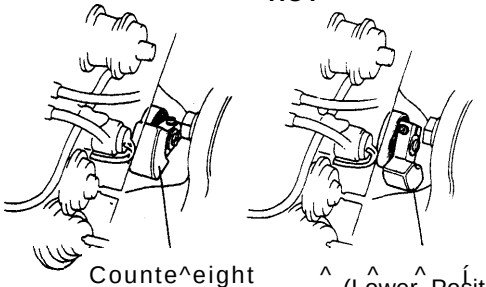


EC1079 EC1080

When cold, this device improves fuel vaporization for better driveabiiity by quickiy heating the intake manifold. After warm-up, it keeps the intake manifold at the proper temperature.

Engine	Bimetal	Exhaust Gas Passage	Intake Manifold
COLD	EXPANDED	Above the heat control valve	Heated quickiy.
HOT	CONTRACTED	Under the heat control valve	Heated to a suitable temperature.

COLD **HOT**



Counte^eight (Upper Position) ^ ^ ^ (Lower Position)

EC0518 EC0519

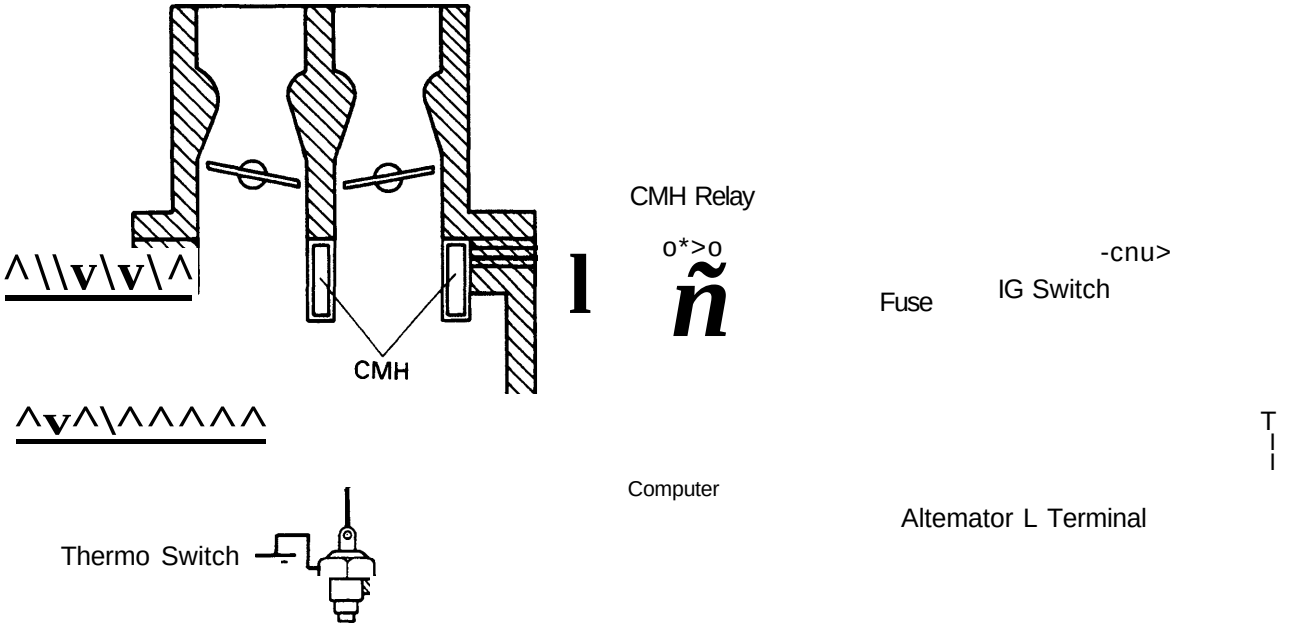
INSPECTION OF SYSTEM

CHECK OPERATION

(a) When the engine is cold, check that the counterweight of the heat control valve is at the upper position as shown.

(b) After warm-up, check that the counterweight of the heat control valve is at the lower position as shown.

9. Cold Mixture Heater (CMH) System (USA and Canadá 3A-C Engine 4-Speed & Wagón A/T)

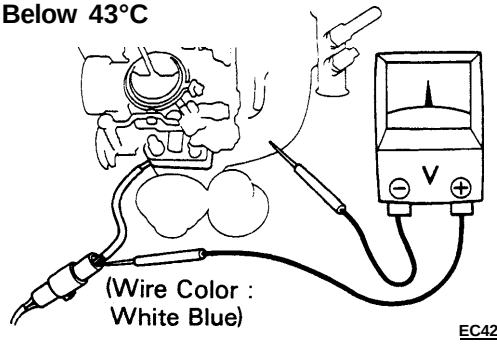


EC1081

To reduce cold engine emission and improve driveability, the intake manifold is heated during cold engine operation to accelerate vaporization of the liquid fuel.

IGS/W	Engine	Coolant Temp.	Thermo S/W	Computer	CMH Relay	CMH
OFF	Not running	—	—	—	OFF	OFF
ON	Not running	—	—	OFF	OFF	OFF
	Running	Below 43°C (109°F)	**ON**	**ON**	ON	ON (Heated)
		Above 55°C (131°F)	OFF	OFF	OFF	OFF

Below 43°C



EC4201

INSPECTION OF CMH SYSTEM

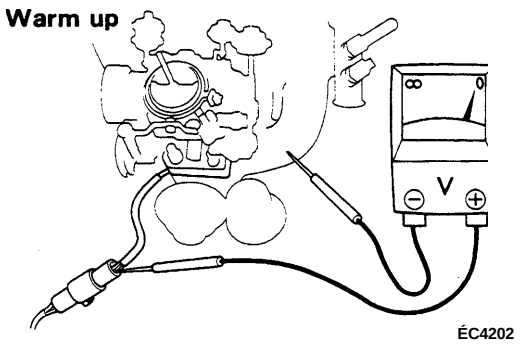
1. START ENGINE

2. CHECK CMH WITH COLD ENGINE

(a) The coolant temperature should be below 43°C (109°F).

(b) Using a voltmeter, check that there is voltage between the positive (+) terminal (wire color : White Blue) and the intake manifold.

CAUTION: The voltmeter probé should be inserted from the rear side of the connector.

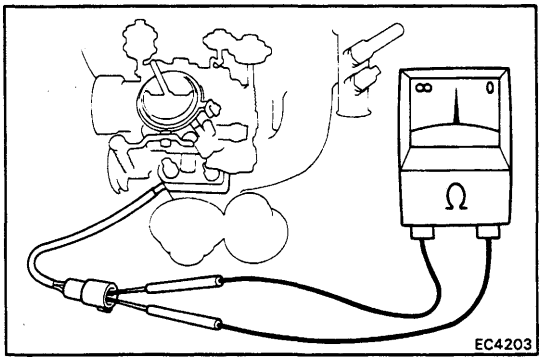


3. CHECK CMH WITH WARM ENGINE

(a) Warm up the engine to above 55°C (131°F).

(b) Check that there is no voltage.

IF NO PROBLEM IS FOUND WITH THIS INSPECTION, THE SYSTEM IS OKAY; OTHERWISE INSPECT EACH PART



INSPECTION OF CMH

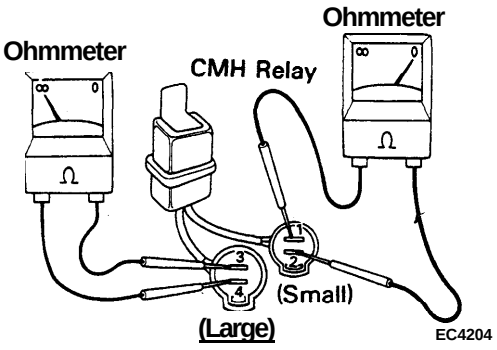
MEASURE RESISTANCE

(a) Unplug the wiring connector.

(b) Using an ohmmeter, measure the resistance between the terminái s.

Resistance: 0.5 - 2.0 fí (20°C, 68°F)

(c) Plug in the wiring connector.



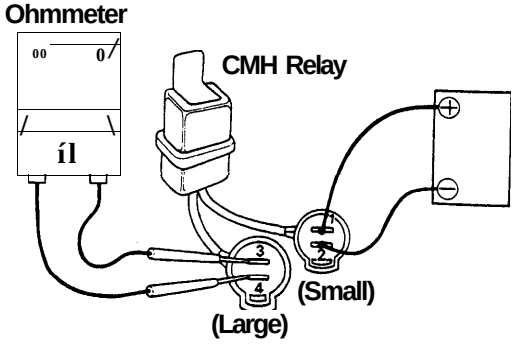
INSPECTION OF CMH RELAY

1. INSPECT RELAY CONTINUITY

Check that there is continuity between terminái s 1 and 2.

Check that there is no continuity between terminái s 3 and 4.

Relay location: Right fender apron



2. INSPECT RELAY OPERATION

Check the continuity between terminái s 3 and 4 with battery voltage applied between terminái s 1 and 2.

INSPECTION OF THERMO SWITCH

(See page EC-11)

FUEL SYSTEM

PRECAUTIONS

1. **Before working on the fuei system, disconnect the cable from the negative battery terminal.**
2. **When working on the fuel system, keep away from possible fire hazards and do not smoke.**
3. **Keep gasoline off rubber or leather parts.**
4. **Work on only one component group at a time to avoid confusión between similar looking parts.**
5. **Keep work área clean to avoid contamination of the carburetor and components.**
6. **Be careful not to mix up or lose clips or springs.**

TROUBLESHOOTING

Problem	Possible cause	Remedy	Page
Engine will not start/ Hard to start (cranks ok)	Carburetor problems • Choke operation • Needle valve sticking or clogged • Vacuum hose disconnected or damaged • Fuel cut solenoid valve not open	 Check choke system Check float and needle valve Check fuel cut solenoid valve	 **EC-47 to 53** FU-12 FU-12, 13
Rough idle or stalls	Carburetor problems • Idle speed incorrect • Slow jet clogged • Idle mixture incorrect • Fuel cut solenoid valve not open • Fast idle speed setting incorrect (cold engine) • Choke valve open (cold engine) EBCV hose disconnected or damaged Outer vent control valve not closed	 Adjust idle speed Adjust idle mixture Check fuel cut solenoid valve Adjust fast idle speed Check choke system Check hose Check outer vent control valve	 FU-25 FU-28 FÜ-12, 13 FU-26 **EC-47 to 53** EC-11
Engine hesitates/ Poor acceleration	Carburetor problems • Float level too low • Accelerator pump faulty • Power valve faulty • Choke valve closed (hot engine) • Choke valve stuck open (cold engine) Fuel line clogged	 Adjust float level Check power pistón and valve Check choke system Check choke system Check fuel line	 FU-15 FU-25, 26 **EC-47 to 53**
Engine dieseling (runs after ignition switch is turned off)	Carburetor problems • Linkage sticking • Idle speed or fast idle speed out of adjustment • Fuel cut solenoid faulty	 Adjust idle speed or fast idle speed Check fuel cut solenoid valve	 FU-24 FU-12, 13
Poor gasoline mileage	Carburetor problems • Choke faulty • Idle speed too high • Deceleraron fuel cut system faulty • Power valve always open Fuel leak	 Check choke system Adjust idle speed Check deceleration fuel cut system Repair as necessary	 **EC-47 to 53** FU-25
Insufficient fuel supply to carburetor	Fuel filter clogged Fuel pump faulty Fuel line clogged Fuel line bent or kinked	Replace fuel filter Replace fuel pump Check fuel line Replace fuel line	FU-31

ON-VEHICLE INSPECTION

1. REMOVE AIR CLEANER (See page FU-7)

2. CHECK CARBURETOR AND LINKAGE

(a) Check that the various set screws, plugs and unión bolts are tight and correctly installed.

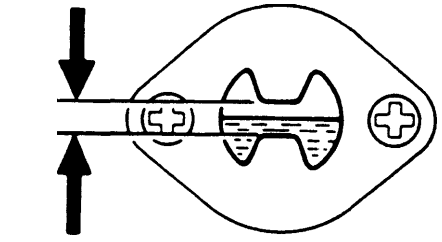
(b) Check the linkage for excessive wear and missing snap rings.

(c) Check that the throttle valves open fully when the accelerator pedal is fully depressed.

3. CHECK FLOAT LEVEL

Check that the float level is even with the correct level in the sight glass.

If not, check the carburetor needle valve and float level, and adjust or repair, as necessary.



Correct Level

COLD ENGINE

4. CHECK AUTOMATIC CHOKE SYSTEM (See page EC-47)

5. CHECK CHOKE BREAKER SYSTEM (See page EC-49)

6. CHECK CHOKE OPENER SYSTEM (See page EC-51)

7. CHECK THROTTLE POSITIONER SYSTEM (See page EC-15)

8. CHECK AUXILIARY ACCELERATION PUMP SYSTEM (See page EC-54)

HOT ENGINE

9. CHECK CHOKE BREAKER SYSTEM (See page EC-49)

10. CHECK CHOKE OPENER SYSTEM (See page EC-51)

11. CHECK THAT CHOKE VALVE OPENS FULLY

12. CHECK AUXILIARY ACCELERATION PUMP SYSTEM AND DIAPHRAGM (See page EC-54)

13. CHECK ACCELERATOR PUMP

Open the throttle valve, and check that gasoline spurts out from the acceleration nozzle.

14. CHECK AND ADJUST THROTTLE POSITIONER SETTING SPEED (See page FU-26)

15. CHECK AND ADJUST FAST IDLE SPEED (See page FU-25)

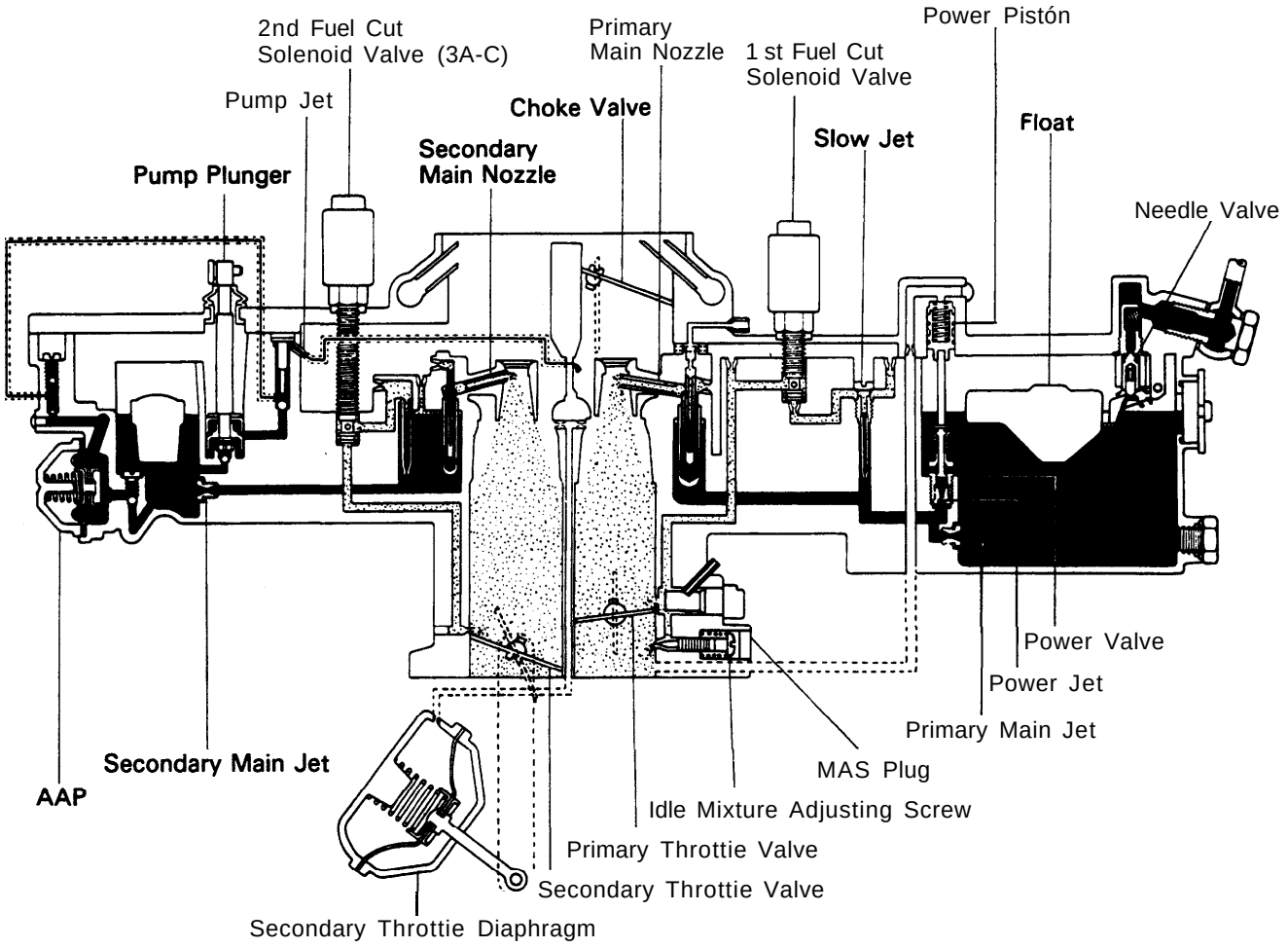
16. INSTALL AIR CLEANER ASSEMBLY (See page FU-24)

17. CHECK AND ADJUST IDLE SPEED (See page FU-25)

18. IF NECCESARY, ADJUST IDLE MIXTURE (See page **FU-28)**

CARBURETOR

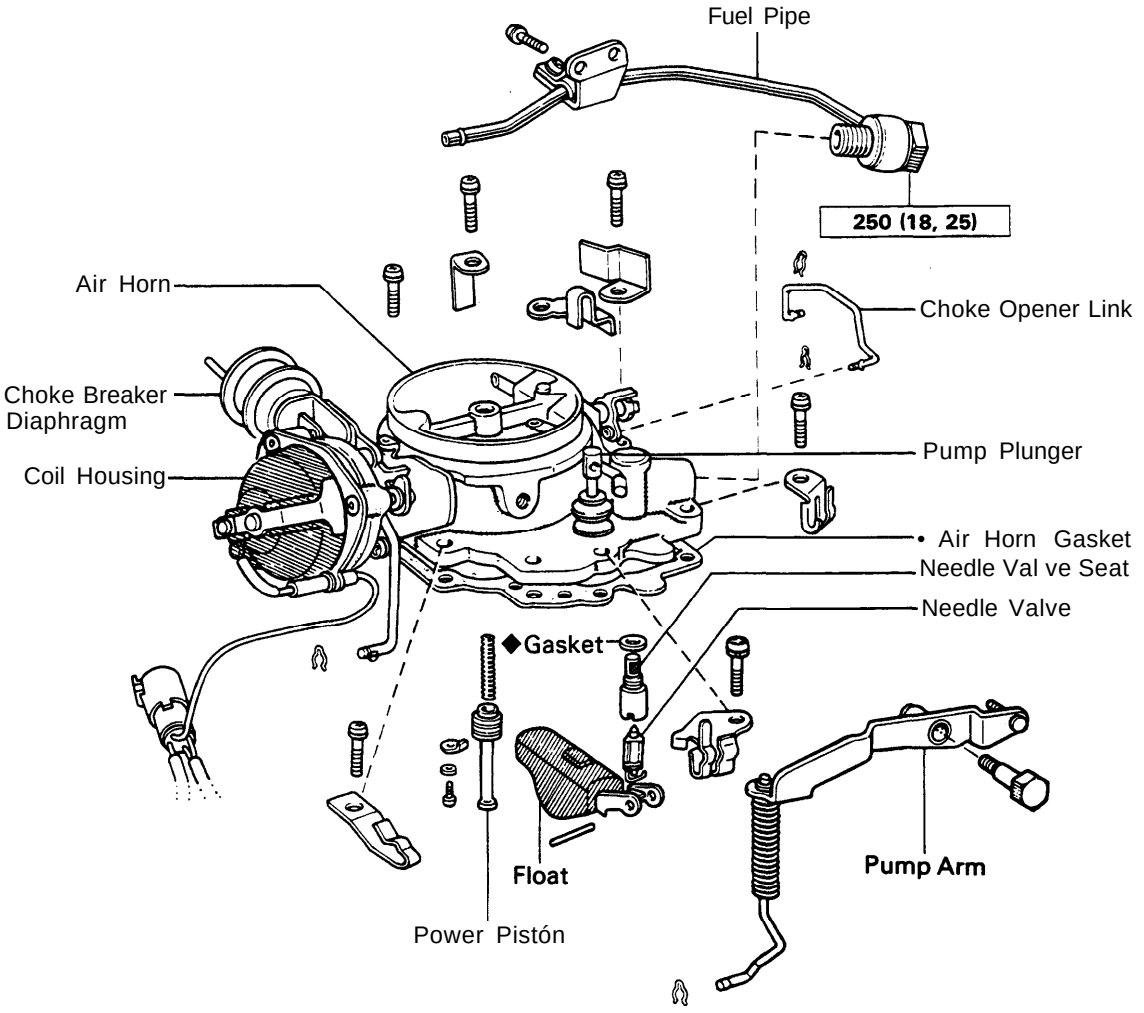
CARBURETOR CIRCUIT



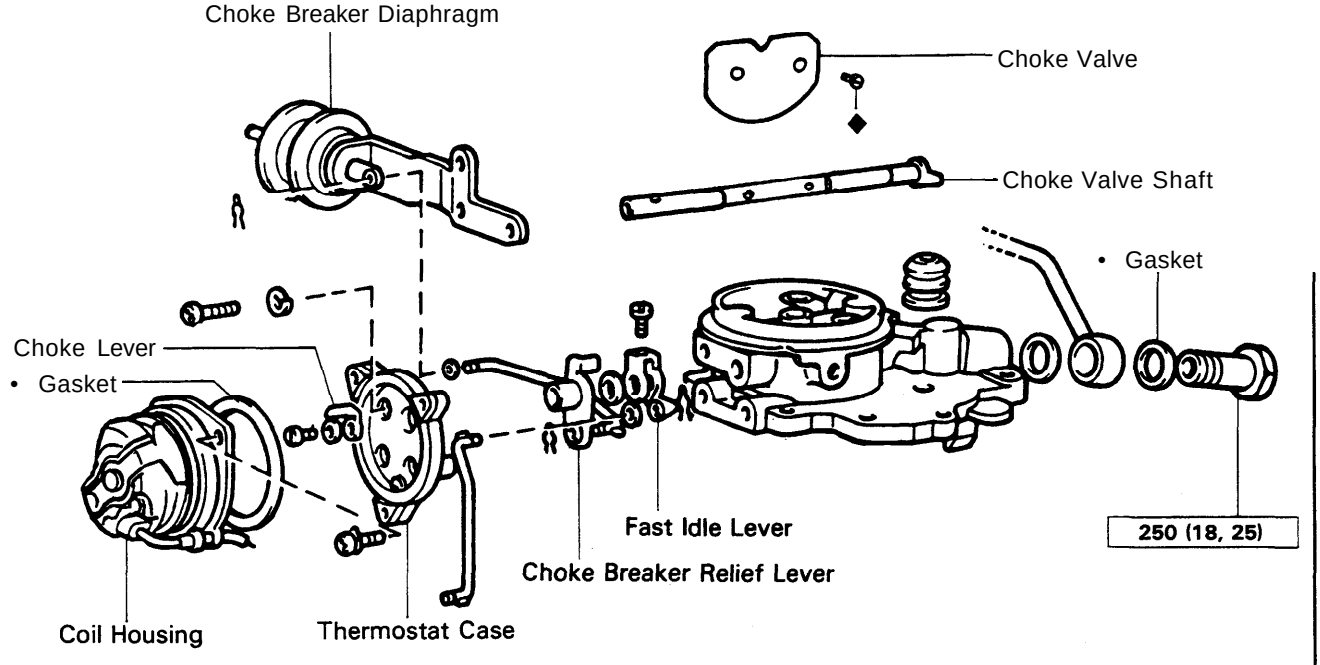
FU0002

COMPONENTS

3A-C



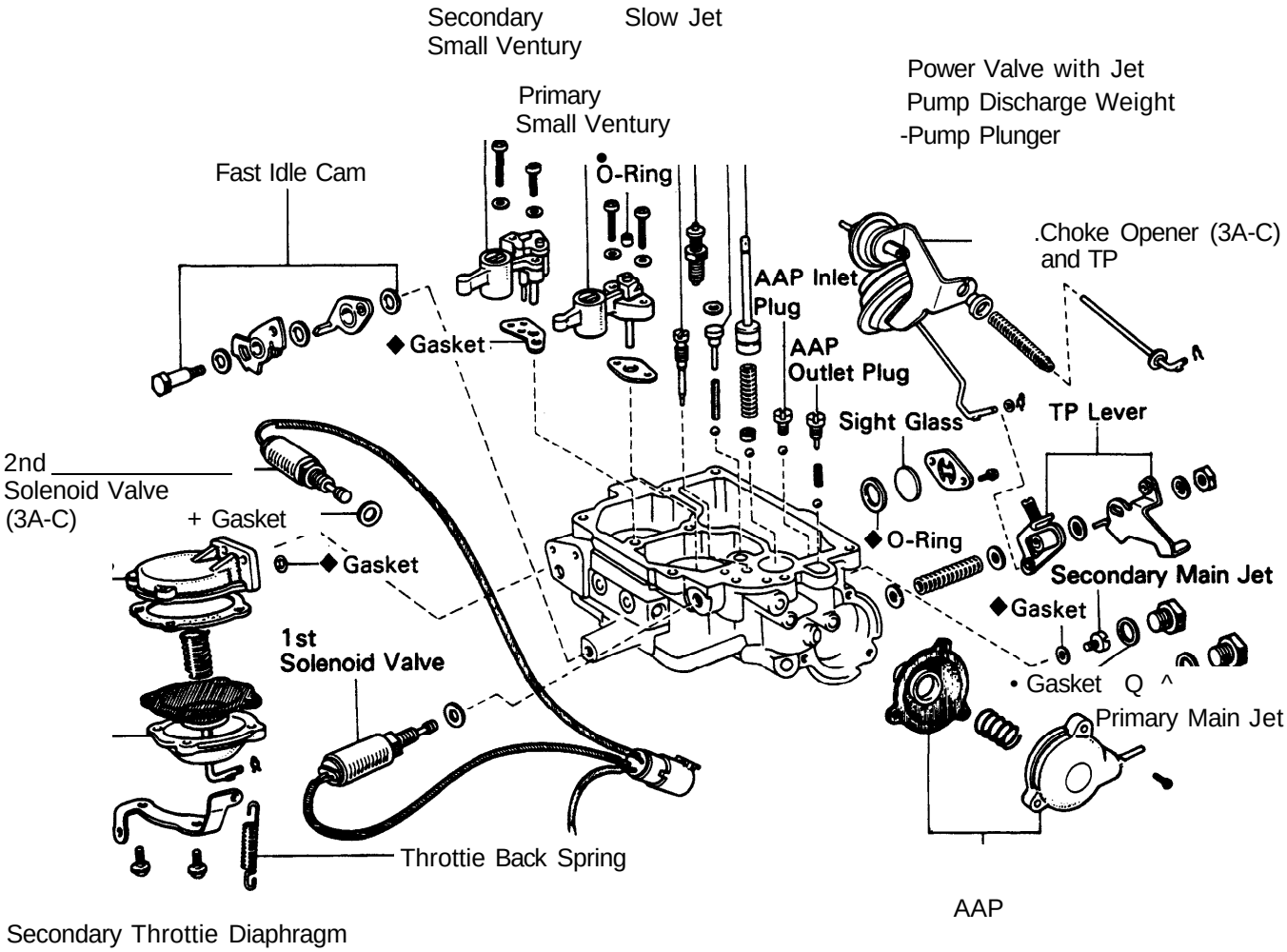
3A

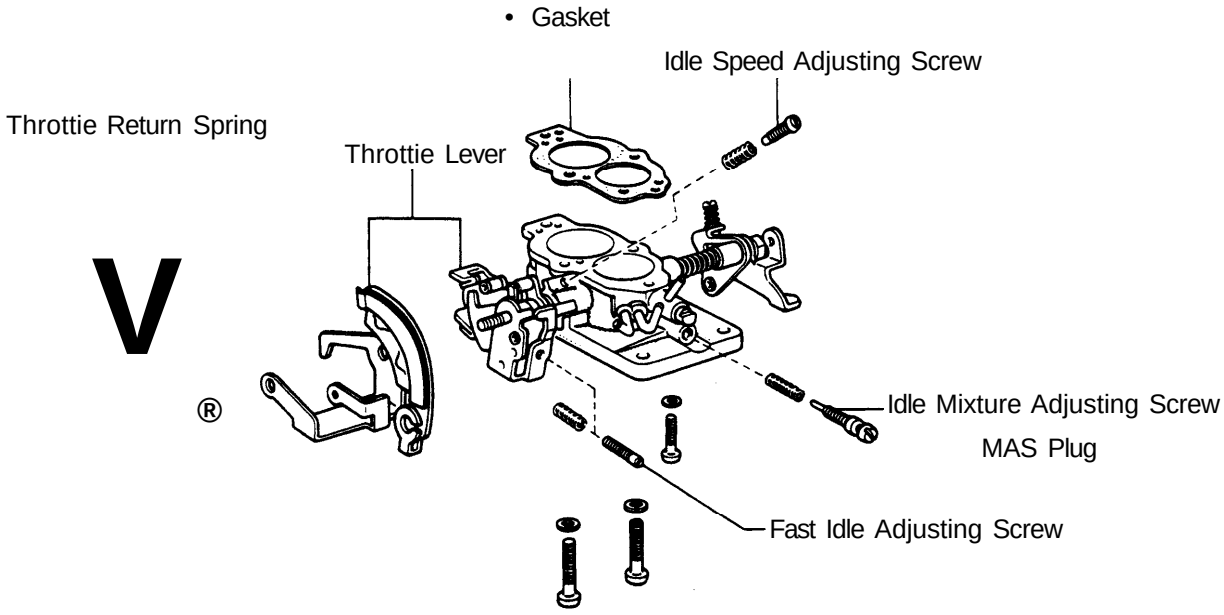


Kg-cm (ft-lb, Nm) : Tightening torque

+ : Non-reusable part

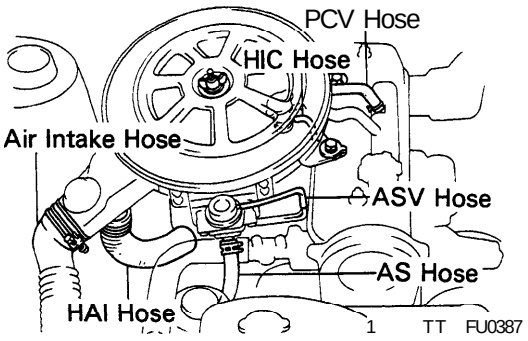
COMPONENTS (Cont'd)





• : Non-reusable part

FU0007 FU0008



REMOVAL OF CARBURETOR

1. REMOVE AIR CLEAÑER ASSEMBLY

(a) Disconnect the air intake hoses.

(b) Disconnect the emission control following hoses from the air cleaner:

(1) HAI hose

(2) (Calf. and Canadá 3A-C)
ASV hose

(3) (ex. Fed.)
AS hose

(4) PCV hose

(c) Remove the two mount bolts and batterfly nut.

(d) Lift the air cleaner assembly and disconnect the HIC hose. Remove the air cleaner assembly.

2. DISCONNECT ACCELERATOR CABLE FROM CARBURETOR

3. (w/ A/T)
DISCONNECT THROTTLE LINKAGE FROM CARBURETOR

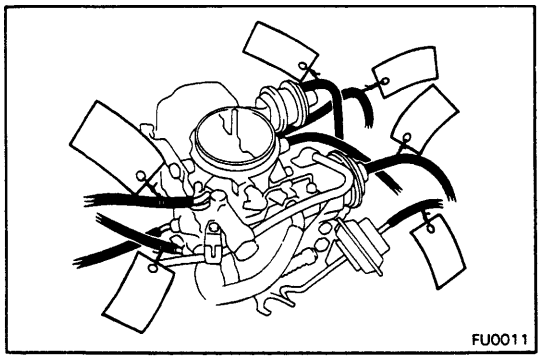
4. DISCONNECT CARBURETOR CONNECTOR

5. DISCONNECT FOLLOWING HOSES FROM CARBURETOR

(a) Emission control hoses

NOTE: Before disconnecting the vacuum hoses, use tags to indentify how they should be reconnected.

(b) Fuel inlet hose

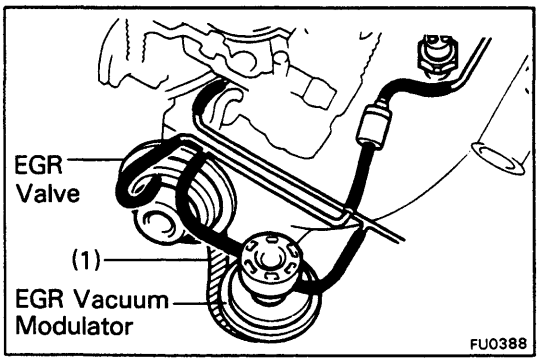


6. REMOVE CARBURETOR

(a) Remove the carburetor mount nuts.

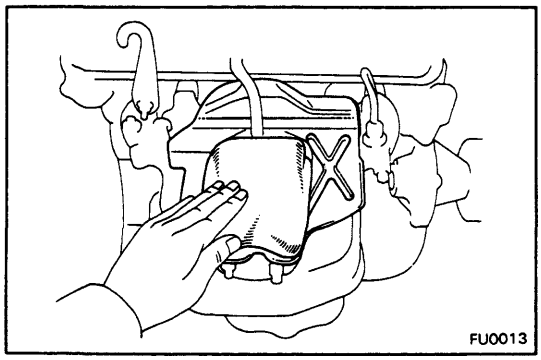
(b) Disconnect the EGR vacuum modulator hose (1).

(c) Remove the cold mixture heater wire clamp and lift off the EGR vacuum modulator bracket.



(d) Lift out the carburetor.

(e) Cover the inlet hole of the intake manifold with a shop cloth.



DISASSEMBLY OF CARBURETOR

(See pages FU-5 and 6)

NOTE: To conform with regulations, the idle mixture adjusting screw is adjusted and plugged with a steei plug by the manufacturer. Normally, this plug should not be removed.

The following instructions are organized so that you will work on only one component group at a time. This will help avoid confusión between similar-looking parts from different subassemblies being on your workbench at the same time.

(a) To facilítate reassembly, arrange parts in order.

(b) Be caref ul not to mix up or lose balls, clips or springs.

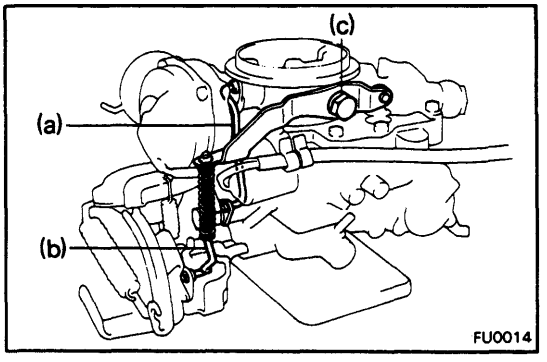
(c) Use SST (carburetor driver set).

SST 09860-11011

Disassembly of Air Horn

(See page FU-5)

1. DISCONNECT COIL HOUSING AND SECOND FUEL CUT SOLENOID VALVE (3A-C) WIRES FROM CONNECTOR

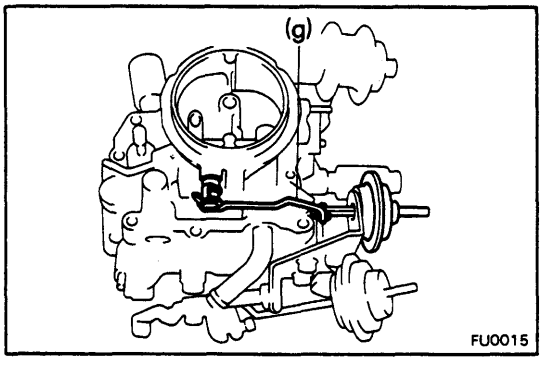


2. REMOVE AIR HORN ASSEMBLY

(a) Disconnect the choke link.

(b) Disconnect the pump connecting link.

(c) Remove the pump arm pivot screw and pump arm.



(d) Disconnect the choke breaker vacuum hose.

(e) Remove the unión bolt, gaskets and fuel pipe.

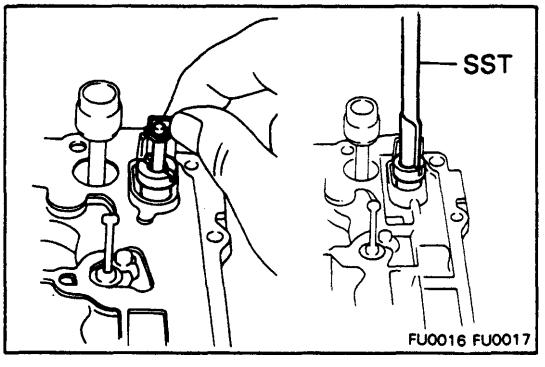
(f) Remove the eight air horn screws.

(g) Disconnect the choke opener link.

(h) Lift the air horn together with gasket from the body.

(i) Remove the primary and secondary solenoid valves from the body.

3. REMOVE FLOAT AND NEEDLE VALVE

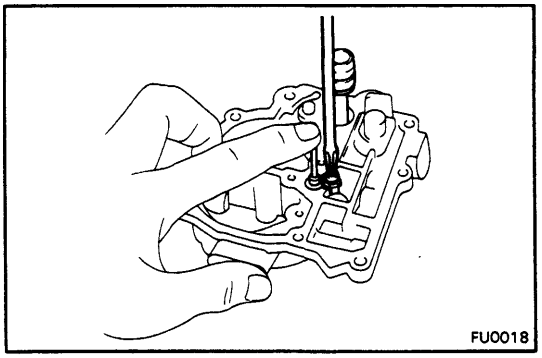


(a) Remove the float pivot pin and float.

(b) Remove the needle valve assembly.

(c) Remove air horn gasket.

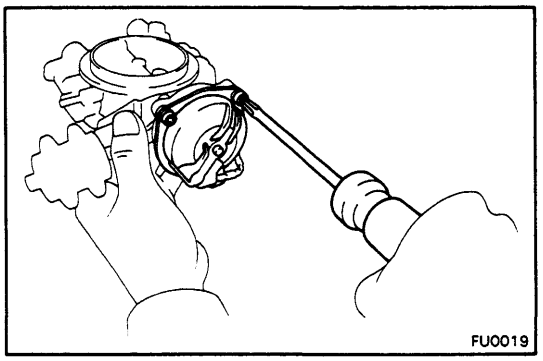
(d) Remove the needle valve seat and gasket.



4. REMOVE POWER PISTÓN AND PUMP PLUNGER

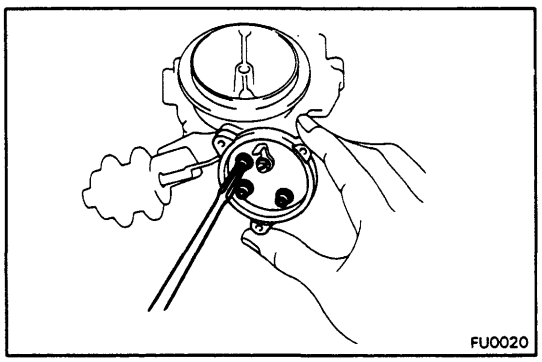
(a) Remove the power pistón retainer, power pistón and spring.

(b) Pulí out the pump plunger and remove the boot.



5. (3A)
DISASSEMBLE CHOKE VALVE

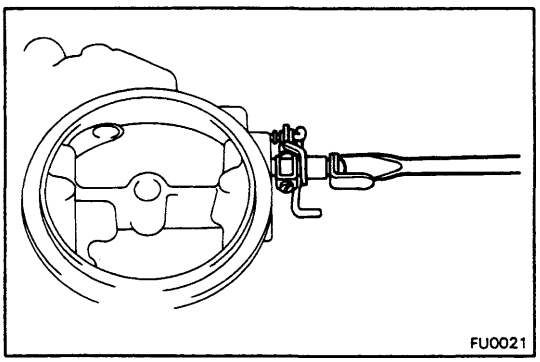
(a) Remove the three screws, coil housing and gasket.



NOTE: Remove the following parts only if it is necessary to replace the choke shaft or choke breaker.

(b) Remove the three screws and thermostat case.

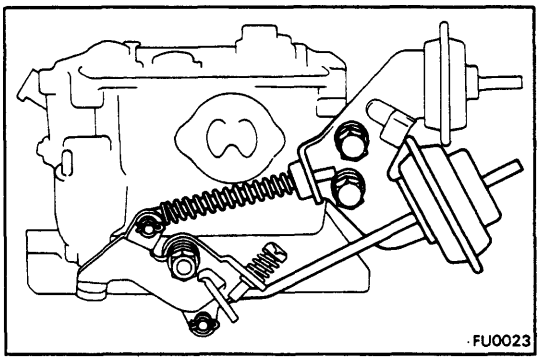
(c) Disconnect the choke breaker link and remove the choke breaker diaphragm.



(d) Remove the choke lever screw, choke lever, choke breaker relief lever and washers.

(e) Remove the fast idle lever screw and lever.

(f) File off the peened parts of the choke valve set screws and remove the choke valve.



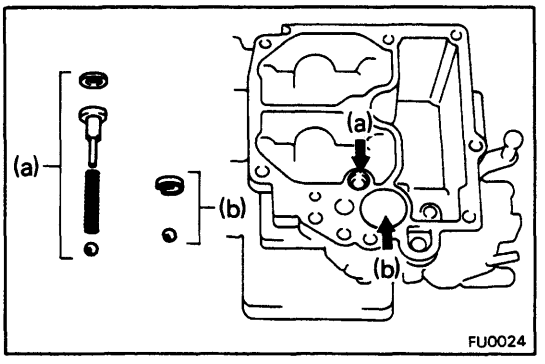
Disassembly of Carburetor Body

(See page FU-6)

1. REMOVE CHOKE OPENER (3A-C) AND THROTTLE POSITIONER (TP)

(a) Disconnect the opener and TP links.

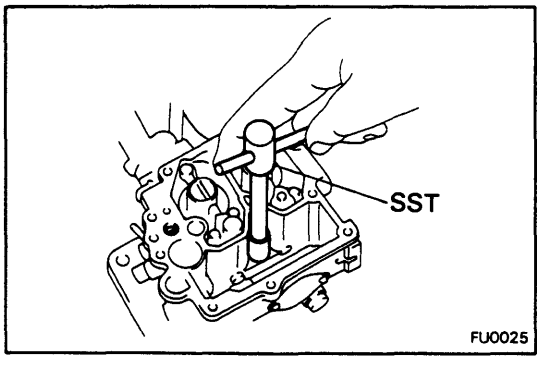
(b) Remove the two bolts.



2. REMOVE CHECK BALL FOR ACCELERATION

(a) Remove the stopper gasket, pump discharge weight, long spring and discharge large ball.

(b) Using a tweezer, remove the plunger retainer and small ball.

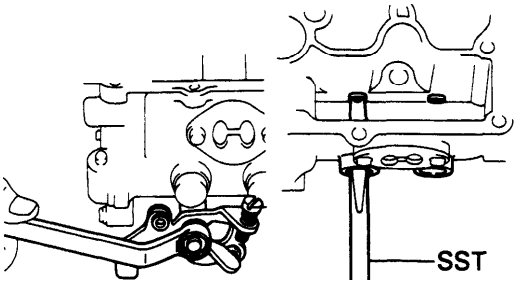


3. REMOVE JETS AND POWER VALVE

(a) Remove the slow jet.

(b) Remove the power valve and jet assembly.

(c) Disassemble the power valve and jet.

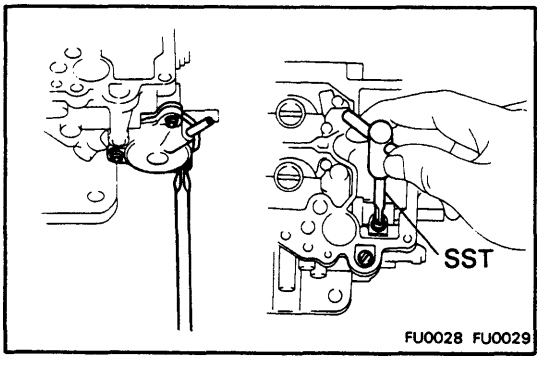


FU0026 FU0027

(d) Remove the TP levers.

Remove the primary passage plug and gasket. Remove the primary main jet and gasket.

(f) Remove the secondary passage plug and gasket. Remove the secondary main jet and gasket.

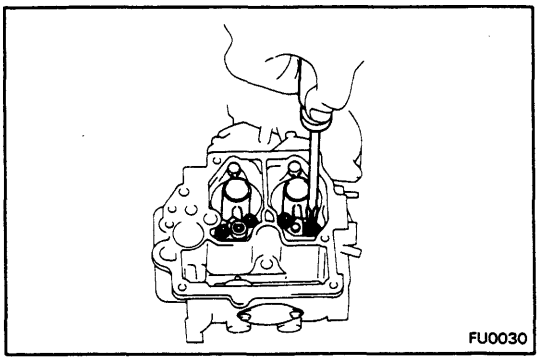


4. DISASSEMBLE AUXÍLIARY ACCELERATION PUMP (AAP)

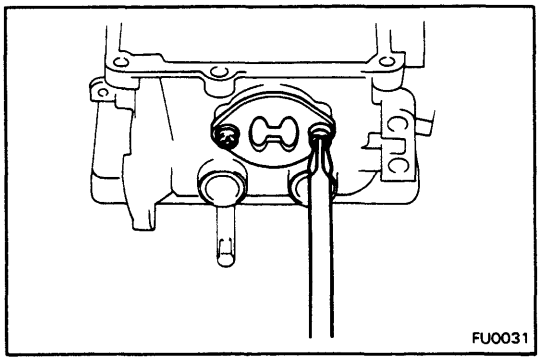
(a) Remove the AAP housing, spring and diaphragm.

(b) Remove the AAP inlet plug and small ball.

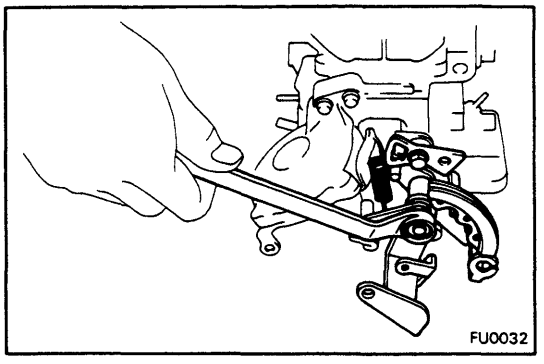
(c) Remove the outlet plug, short spring and small ball.



5. REMOVE SMALL VENTURIES

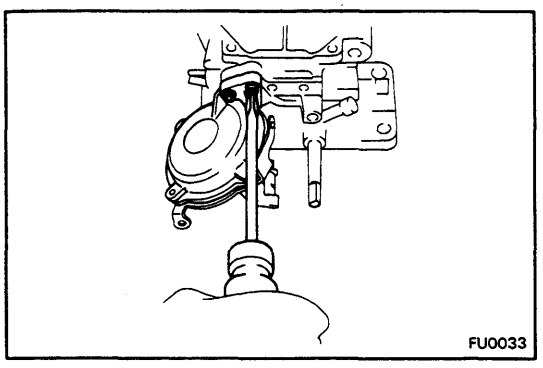


6. IF NECESSARY, REMOVE SIGHT GLASS



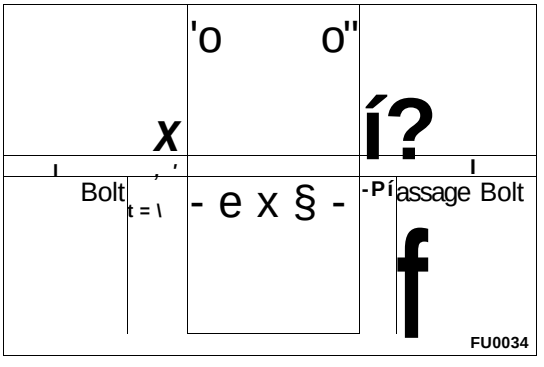
7. REMOVE THROTTLE LEVER AND FAST IDLE CAM ASSEMBLY

(a) Remove the throttle return spring.
(b) Remove the throttle back spring.
(c) Remove the nut and throttle lever.
(d) Remove the bolt and fast idle cam.



8. REMOVE SECONDARY THROTTLE VALVE DIAPHRAGM

(a) Disconnect the link.
(b) Remove the diaphragm assembly and gasket.



9. SEPÁRATE BODY AND FLANGE

Remove the three bolts and vacuum passage bolt. Sepá-rate the body and flange.

GENERAL CLEANING PROCEDURE

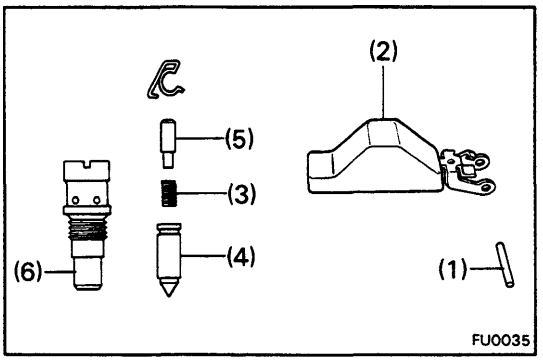
CLEAN DISASSEMBLED PARTS BEFORE INSPECTION

(a) Wash and clean the cast parts with a soft brush ¡n carburetor cleaner.

(b) Clean off any carbón around the throttle valve.

(c) Wash the other parts thoroughly in carburetor cleaner.

(d) Blow all dirt and other foreign matter from the jets, fuel passages and restrictions in the body.



INSPECTION OF CARBURETOR

1. INSPECT FLOAT AND NEEDLE VALVE

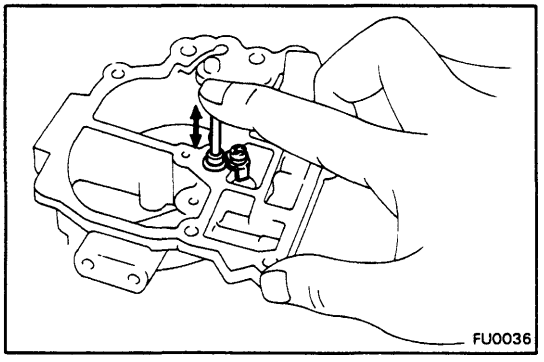
(a) Inspect the pivot pin (1) for scratches and excessive wear.

(b) Inspect the float (2) for broken lips and wear in the pivot pin holes.

(c) Inspect the spring (3) for breaks and deformation.

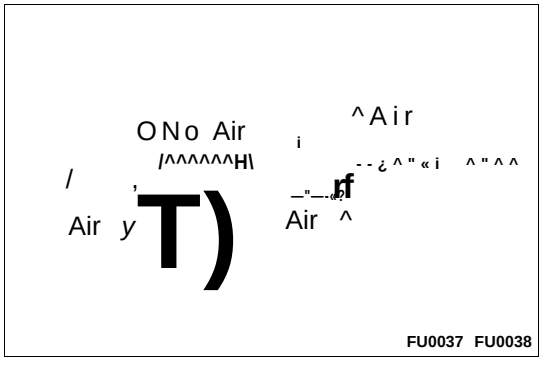
(d) Inspect the needle valve (4) and plunger (5) for wear or damage.

(e) Inspect the strainer (6) for rust and breaks.



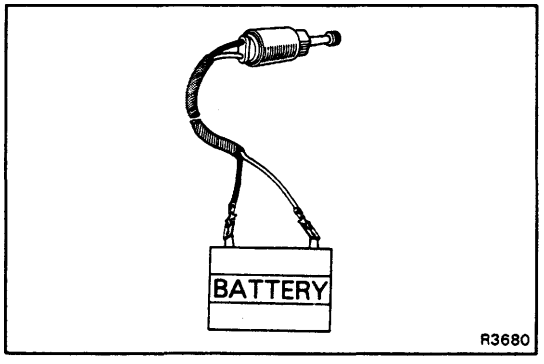
2. INSPECT POWER PISTÓN

Make sure that power pistón moves smoothly.



3. INSPECT POWER VALVE

Check for faulty opening and closing action.



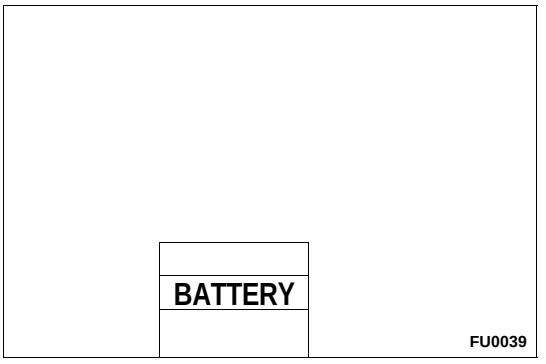
4. INSPECT FIRST FUEL CUT SOLENOID VALVE

(a) Connect the solenoid valve terminái s to the battery terminái s.

(b) You should feel the click from the solenoid valve when the battery power is connected and disconnected.

If the solenoid valve is not operating properly, replace ¡t.

(c) Replace the O-ring.



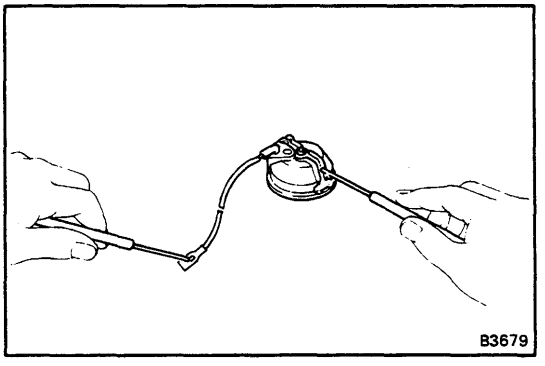
5. (3A-C)
INSPECT SECOND FUEL CUT SOLENOID VALVE

(a) Connect the solenoid valve body and terminal to the battery terminái s.

(b) You should feel a click from the solenoid valve when the battery power is connected and disconnected.

If the solenoid valve is not operating properly, replace it.

(c) Replace the O-ring.



6. **INSPECT CHOKE HEATER (COIL HOUSING)**

Using an ohmmeter, measure the resistance between the terminái s.

Resistance (Cold):
3A-C (ex. Canadá Wagón M/T)
17 - 19 O
Others 20 - 22 ü

If problem is found, replace the choke heater.

However for a 3A-C engine, replace the air hom assembly.

ASSEMBLY OF CARBURETOR

(See pages FU-5 and 6)

NOTE: Use new gaskets and O-rings throughout.

Assembly of Carburetor Body

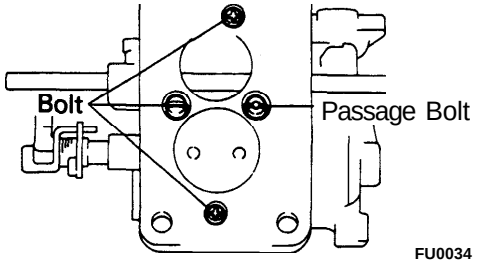
(See page FU-6)

1. **ASSEMBLE CARBURETOR BODY AND FLANGE**

(a) Place the gasket and body onto the flange.

(b) Install the vacuum passage bolt.

(c) Install the three bolts.

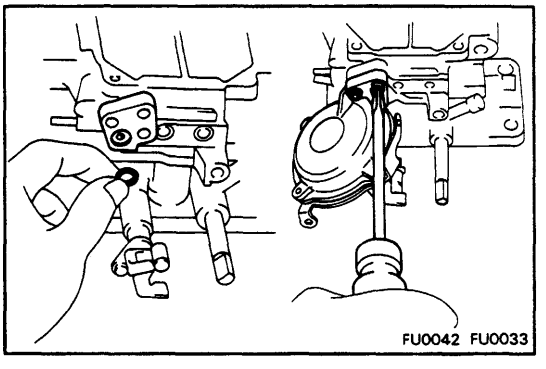


2. **INSTALL SECONDARY THROTTLE VALVE DIAPHRAGM**

(a) Assemble the secondary throttle valve diaphragm.

(b) Position a new gasket in the carburetor body, and install the diaphragm assembly.

(c) Connect the link.



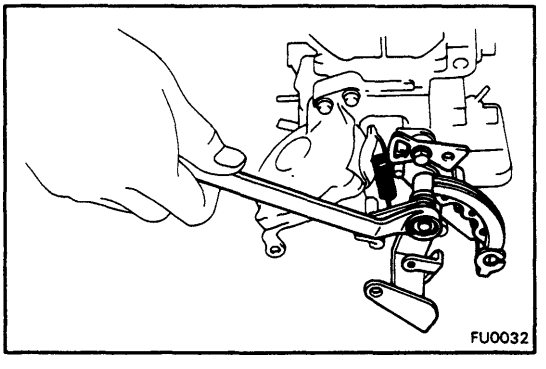
3. **INSTALL FAST IDLE CAM AND THROTTLE LEVER**

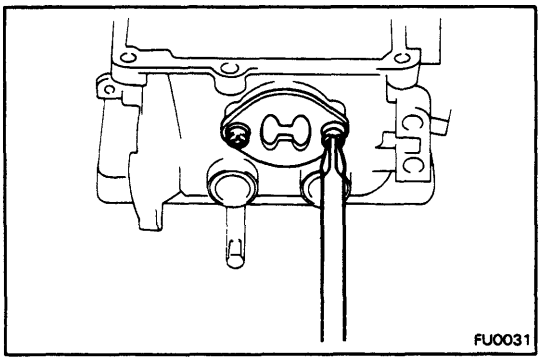
(a) Install the fast idle cam with the bolt.

(b) Install the throttle lever with the nut.

(c) Install the throttle back spring.

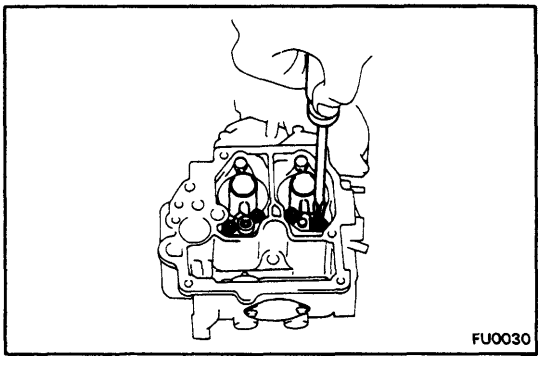
(d) Install the throttle return spring.





4. **INSTALL** SIGHT GLASS

Install a new O-ring, the sight glass and retainer with the two screws.

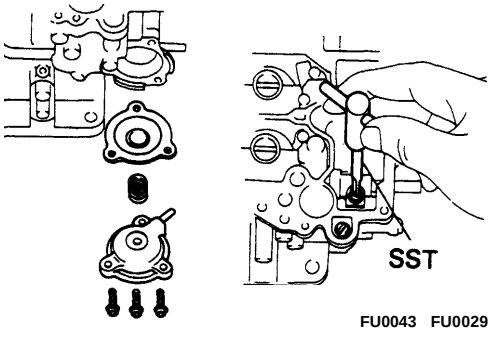


5. INSTALL SMALL VENTURIES

(a) Install a new gasket and the primary small ventury with the two screws.

(b) Install a new gasket and the secondary small ventury with the two screws.

(c) Install a new O-ring onto the primary small ventury.

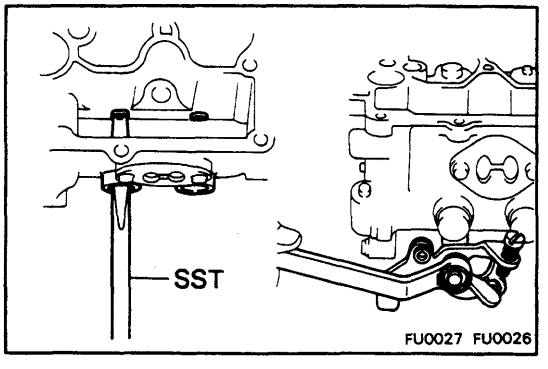


6. INSTALL AUXILIARY ACCELERATION PUMP (AAP)

(a) Install the small ball and short spring with the outlet plug.

(b) Install the small ball with the inlet plug.

(c) Install the diaphragm, spring and AAP housing with the three screws.

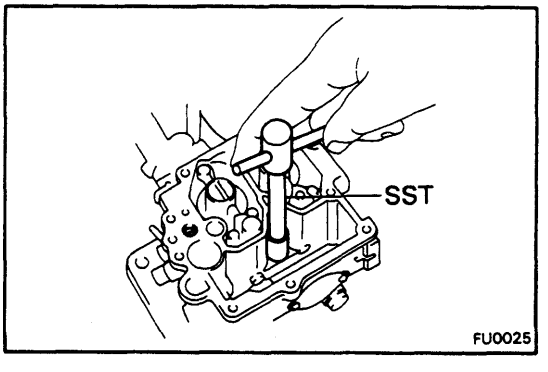


INSTALL JETS AND POWER VALVE

(a) Install a new gasket and the primary main jet. Install a new gasket and the passage plug.

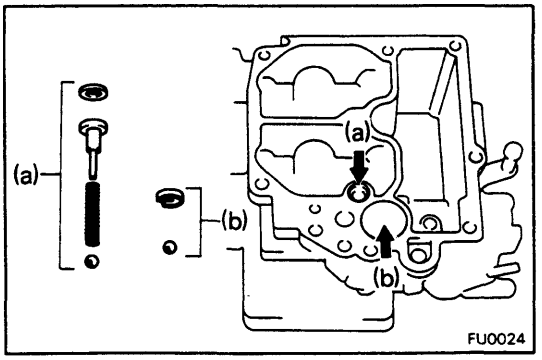
(b) Install a new gasket and the secondary main jet. Install a new gasket and the passage plug.

(c) Install the TP levers.



(d) Install the slow jet.

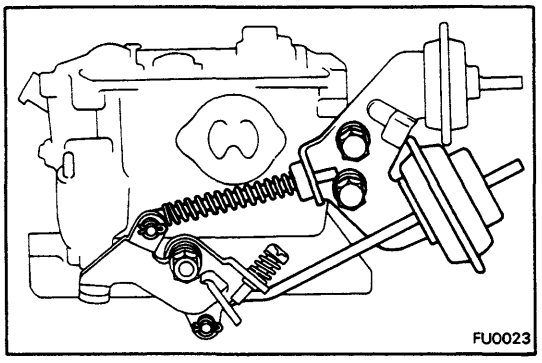
(e) Assemble the power valve and jet, and install them.



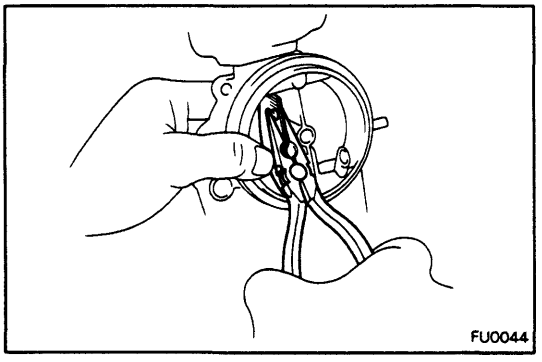
8. INSTALL CHECK BALLS FOR ACCELERATION

(a) Instad the discharge large ball, long spring, pump discharge weight and stopper gasket.

(b) Using tweezers, insert the plunger small ball and retainer.



9. INSTALL CHOKE OPENER (3A-C) AND THROTTLE POSITIONER



Assembly of Air Horn

(See page FU-5)

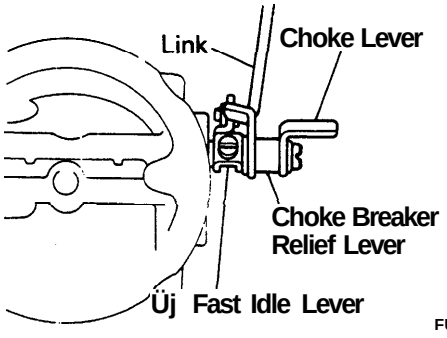
1. (3A)

INSTALL CHOKE SHAFT

(a) Instad the choke shaft.

(b) Instad the choke valve with new screws.

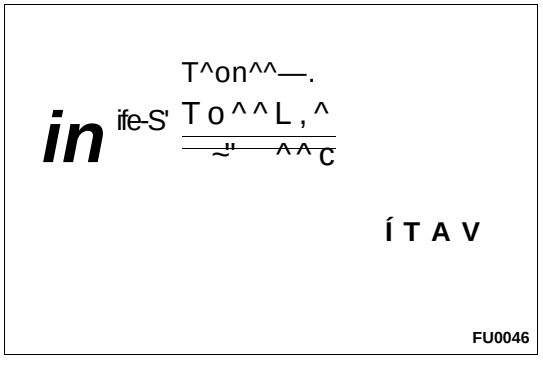
NOTE: Peen the screw.



(c) Instad the fast idle lever with the screw.

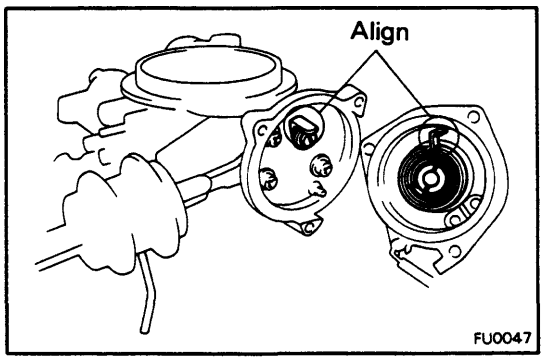
(d) Instad the washer and choke breaker relief lever.

(e) Instad the choke lever and washer with the screw.



(f) Connect the choke breaker link to the choke breaker relief lever.

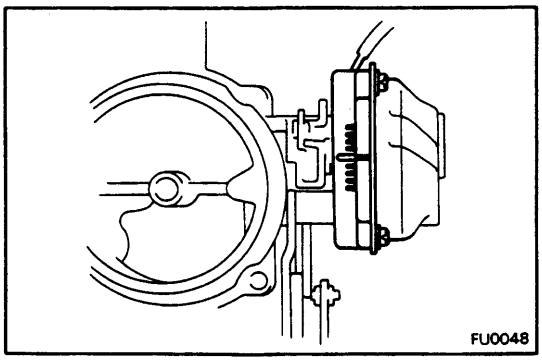
(g) Instad the thermostat case over the choke breaker diaphragm bracket with the three screws.



2. (3A)
INSTALL COIL HOUSING

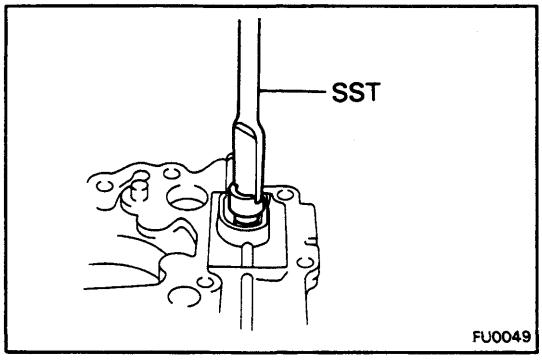
(a) Install a new gasket.

(b) Align the bi-metal spring and the choke lever, and install the coil housing.



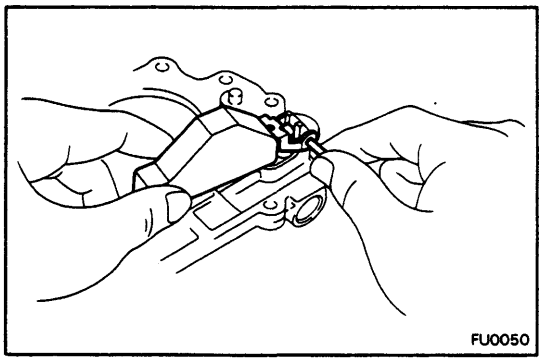
(c) Align the scale center of the thermostat case with the coil housing line, and install the three screws.

(d) Check the choke valve action.



3. INSTALL VALVE SEAT

Install a new gasket and the valve seat into the fuel inlet.

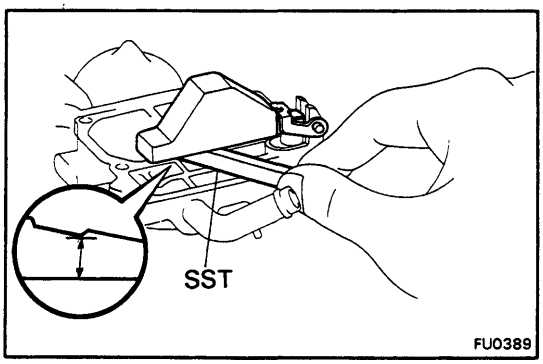


4. ADJUST FLOAT LEVEL

(a) Install the needle valve, spring and plunger into the seat.

NOTE: After adjusting the float level, install the clip onto the needle valve.

(b) Install the float with the pivot pin.

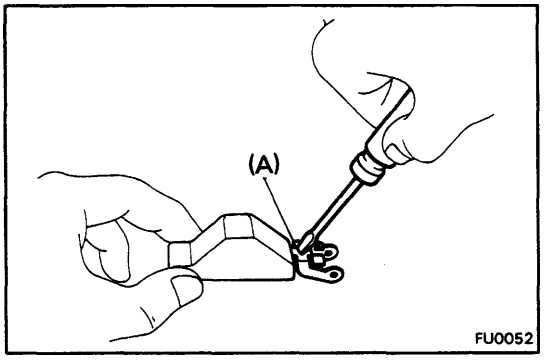


(c) Allow the float to hang down by its own weight. Using SST, check the clearance between the float tip and air horn.

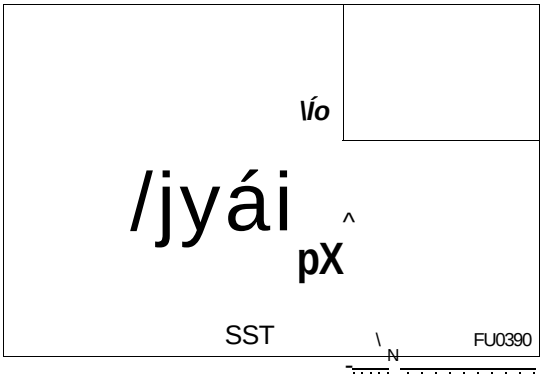
SST 09240-00014

NOTE: This measurement should be made without a gasket on the air horn.

Float level (raised position): 7.2 mm (0.283 in.)



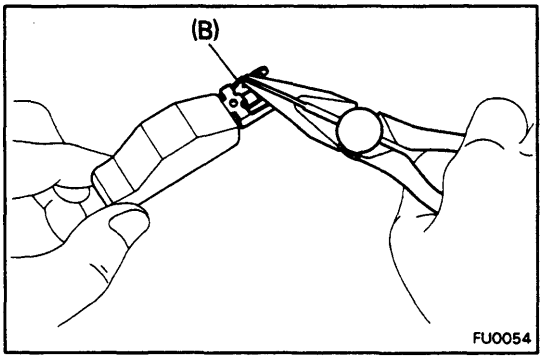
(d) Adjust by bending the portion of the float lip marked (A).



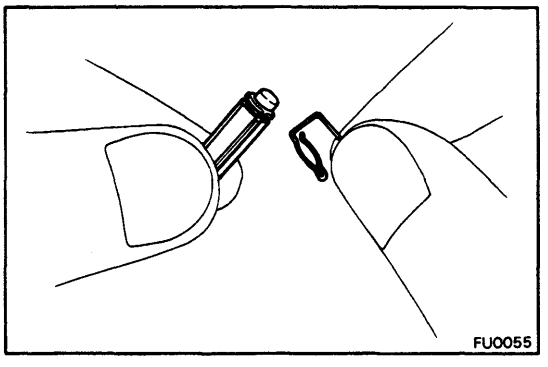
(e) Lift up the float and, using SST, check the clearance between the needle valve plunger and float lip.

SST 09240-00014

Float level (lowered position): 1.67 — 1.99 mm (0.0657 - 0.0783 in.)

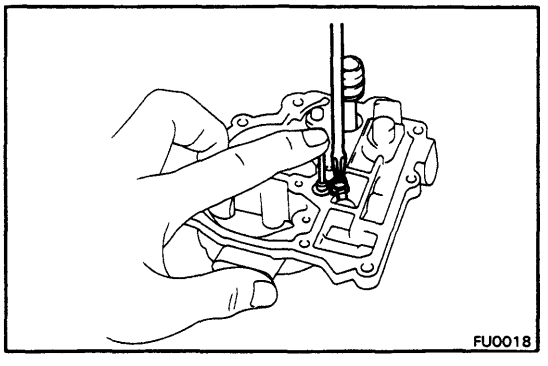


(f) Adjust by bending the portion of the float lip marked (B).



(g) After adjusting the float level, remove the float plunger, spring and needle valve.

(h) Assemble the needle valve, spring and plunger with the clip.



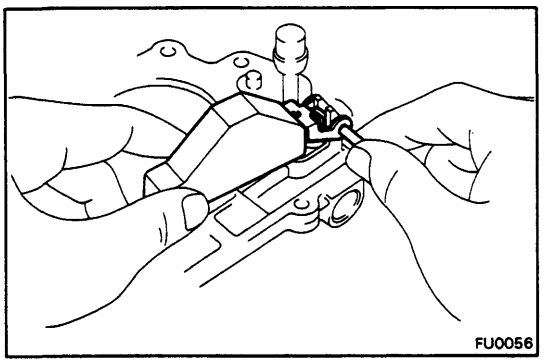
5. INSTALL POWER PISTÓN

(a) Insta)) the power pistón spring and pistón into the bore.

(b) Insta» the retainer with the screw.

6. INSTALL ACCELERATION PUMP PLUNGER AND BOOT

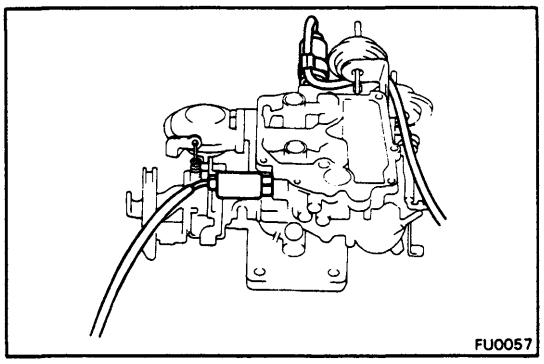
7. INSTALL AIR HORN GASKET ONTO AIR HORN



8. INSTALL NEEDLE VALVE AND FLOAT

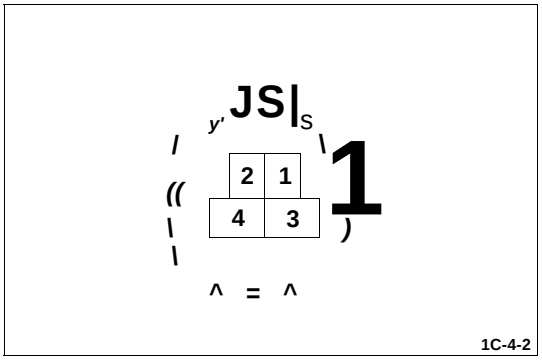
(a) Install the needle valve into the seat.

(b) Insert the float lip between the plunger and clip, and install the float with the pivot pin.



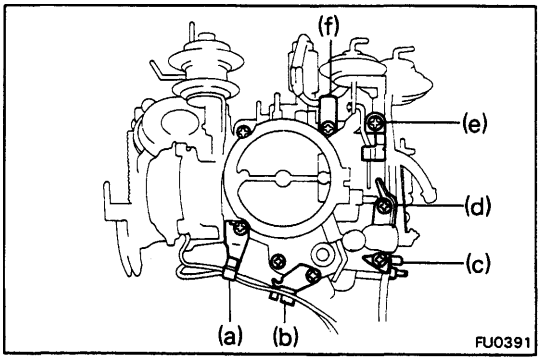
ASSEMBLE AIR HORN AND BODY

Install the solenoid valves with new gaskets into the carburetor body. Clamp the wire for the secondary solenoid valve (3A-C) to the throttle positioner bracket.



10. INSTALL COIL HOUSING AND SECOND FUEL CUT SOLENOID VALVE (3A-C) WIRES TO CONNECTOR

USA	(1)	1st fuel cut solenoid valve (Black and white)
	(2)	Coil housing (Red)
	(3)	1 st fuel cut solenoid valve(Black)
	(4)	2nd fuel cut solenoid valve (Black)
Canadá	(1)	2nd fuel cut solenoid valve (White and black)
	(2)	Coil housing (Red)
	(3)	2nd fuel cut solenoid valve (Black)
	(4)	1 st fuel cut solenoid valve (Black)



11. CONNECT CHOKE OPENER LINK

12. INSTALL EIGHT SCREWS TOGETHER WITH OTHER PARTS AS FOLLOWS:

(a) Choke and solenoid wire clamp

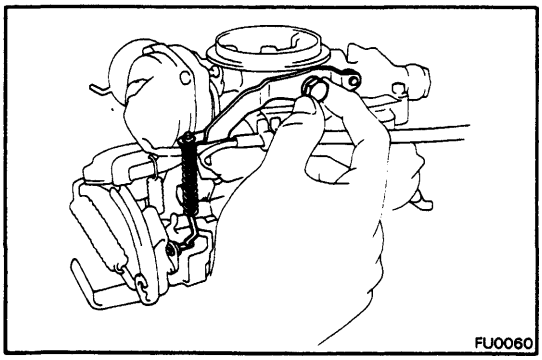
(b) Choke and solenoid wire clamp

(c) Solenoid wire clamp (3A-C)

(d) Choke opener link guide

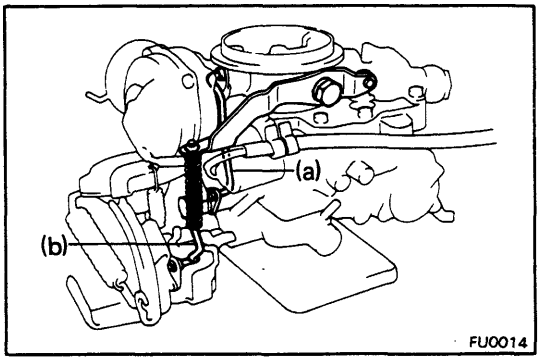
(e) • Choke opener link cover (3A-C)
• Number píate (3A)

(f) Number píate (3A-C)



13. INSTALL ACCERELATOR PUMP ARM

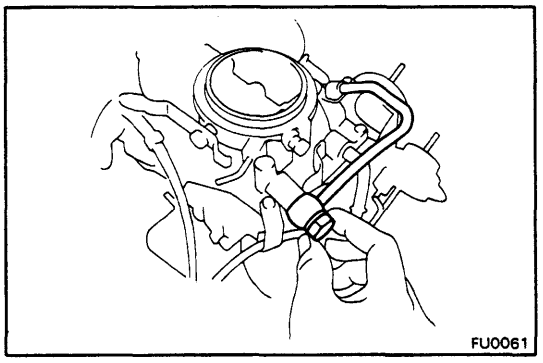
Install the pump arm to the air hom with the pump plunger hole and lever end aligned.



14. CONNECT FOLLOWING LINKS:

(a) Choke link

(b) Pump connecting link



15. (3A)
INSTALL VACUUM HOSE

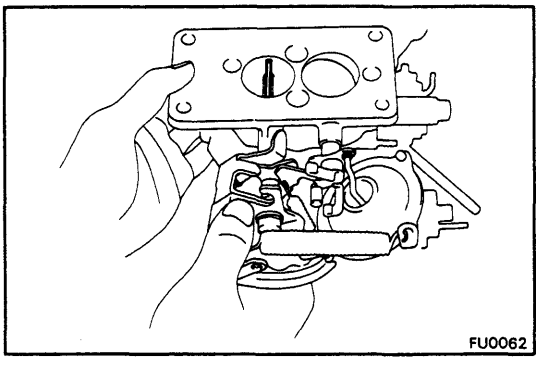
Insta 11 the vacuum hoses and the jet.

16. INSTALL FUEL PIPE

Instad the fuel pipe with new gaskets and the unión bolt. Torque the unión bolt.

Torque: 250 kg-cm (18 ft-lb, 25 Nm)

17. CHECK FOR SMOOTH OPERATION OF EACH PART



ADJUSTMEIMT OF CARBURETOR

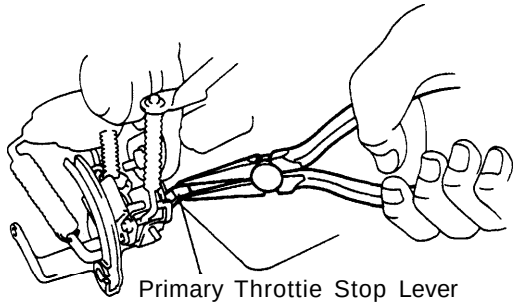
NOTE: Use SST 09240-00014 and 09240-00020 to make adjustment

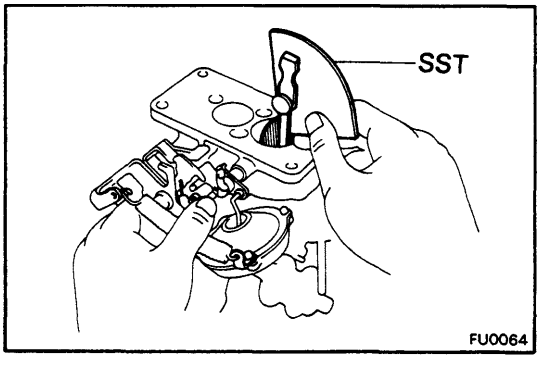
1. CHECK AND ADJUST THROTTLE VALVE OPENING

(a) Check the full opening angle of the primary throttie valve.

Standard angle: 90° from horizontal

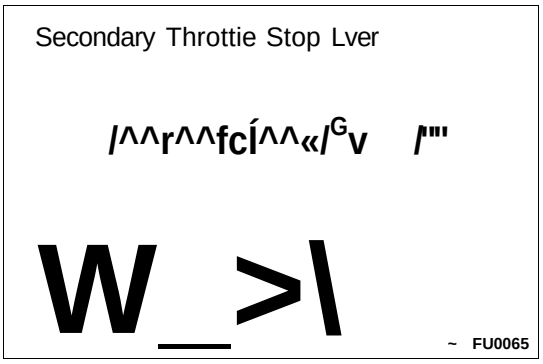
(b) Adjust by bending the primary throttie stop lever.



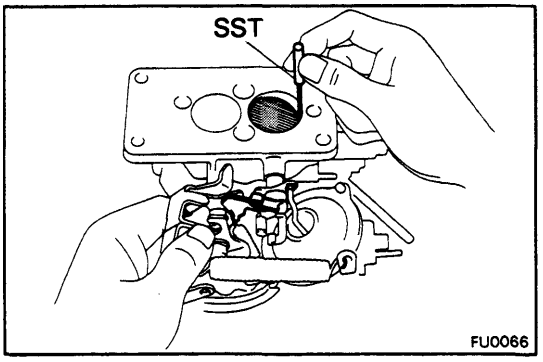


(c) Check the full opening angle of the secondary throttie valve.

Standard angle: 75° from horizontal



(d) Adjust by bending the secondary throttie stop lever.

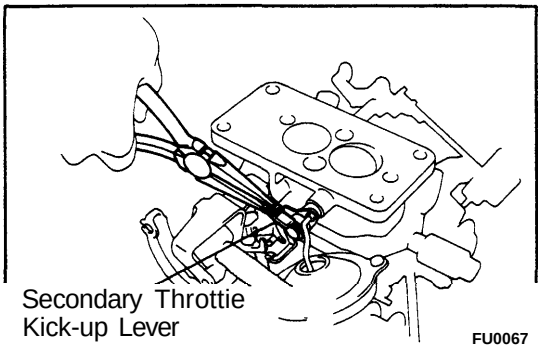


2. CHECK AND ADJUST KICK-UP SETTING

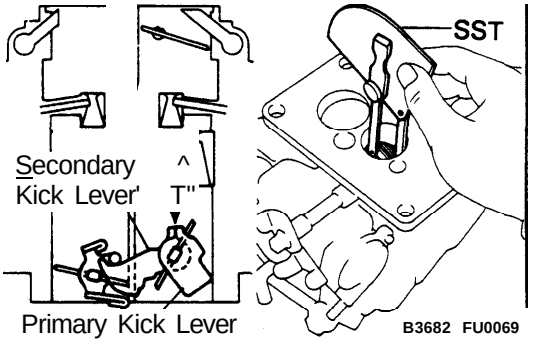
(a) With the primary throttie valve fully opened, check the clearance between the secondary throttie valve and body.

Kick-up clearance:

3A-C (ex. Canadá Wagón M/T)
0.16 mm (0.0063 in.)
Others **0.23 mm (0.0091** in.)



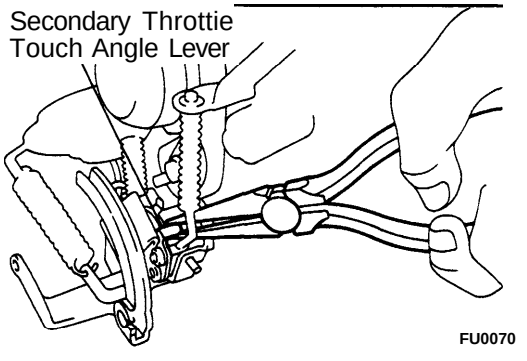
(b) Adjust by bending the secondary throttie kick-up lever.



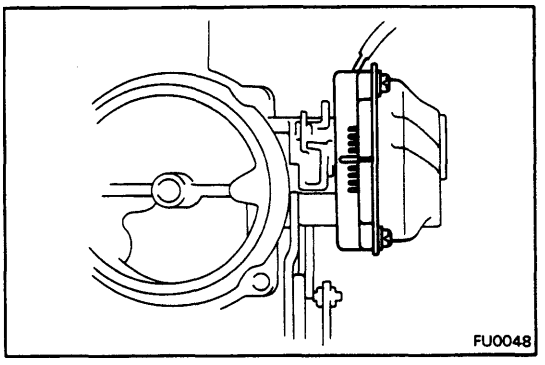
3. CHECK AND ADJUST SECONDARY TOUCH ANGLE

(a) Check the primary throttie valve opening angle at the same time the primary kick lever just touches the secondary kick lever.

Standard angle: 45° from horizontal



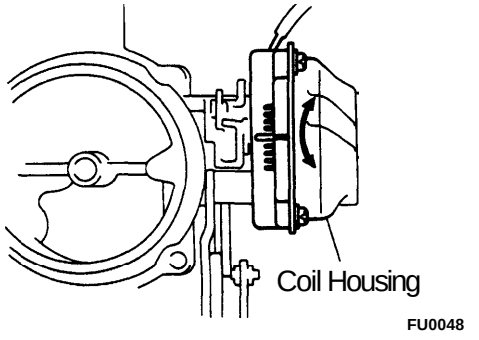
(b) Adjust by bending the secondary throttie touch angle lever.



4. (3A)
SET AUTOMATIC CHOKE

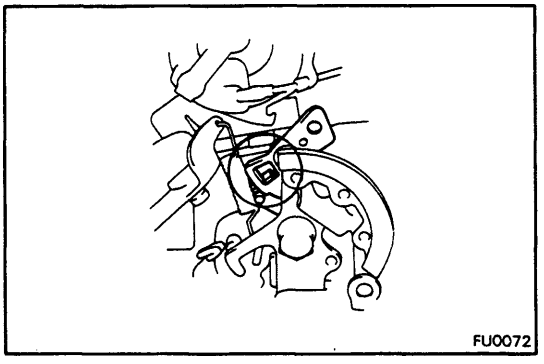
(a) Set the coil housing line so that ¡t is aligned with the scale center line of the thermostat case.

NOTE: The choke valve becomes fully closed when the atmospherlc temperature reaches 30°C (86°F).



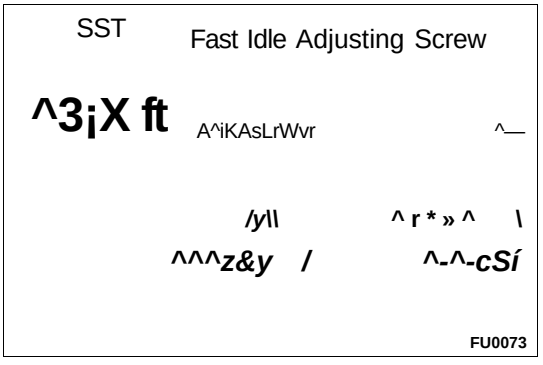
(b) Depending on vehicle operating conditions, turn the coil housing and adjust the engine starting mixture.

If too rich. . . . . .Turn clockwise
If too lean. . . . . .Turn counterclockwise



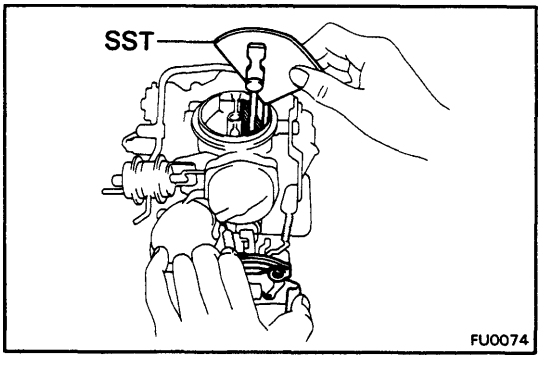
5. CHECK AND ADJUST FAST IDLE SETTING

(a) Set the throttie shaft lever to the 1 st step of the fast idle cam as shown.



(b) With the choke valve fully closed, check the primary throttie valve angle.
Adjust by turning the fast idle adjusting screw.

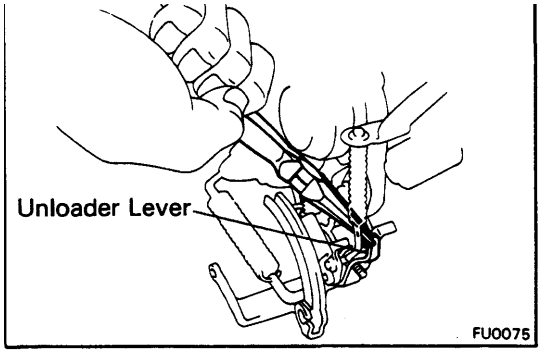
Standard angle:
3A-C (ex. Canadá Wagón M/T)
20° from horizontal
Others 21° from horizontal



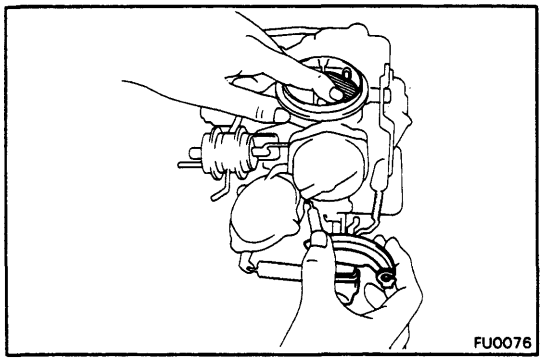
6. CHECK AND ADJUST UNLOADER

(a) With the primary throttie valve fully opened, check the choke valve angle.

Standard angle:
3A-C (ex. Canadá Wagón M/T)
41° from horizontal
Others 47° from horizontal

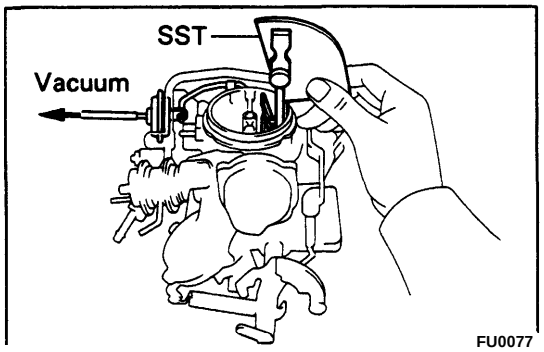


(b) Adjust by bending the unloader lever.



7. (3A-C)
CHECK AND ADJUST CHOKE OPENER

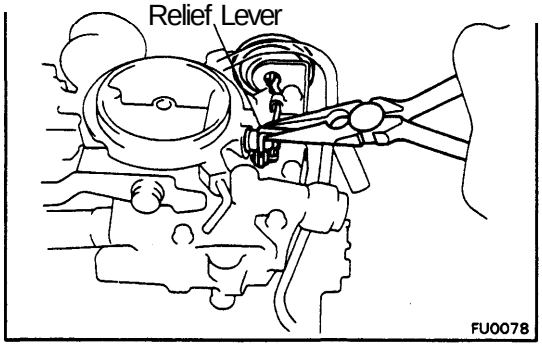
(a) Set the fast idle cam.
While holding the throttie slightiy open, push the choke valve closed, and hold it closed as you reléase the throttie valve.



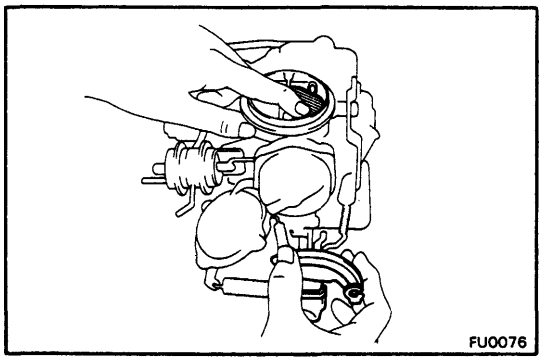
(b) Apply vacuum to choke breaker diaphragm.

(c) Check the choke valve angle.

Standard angle: 77° from horizontal

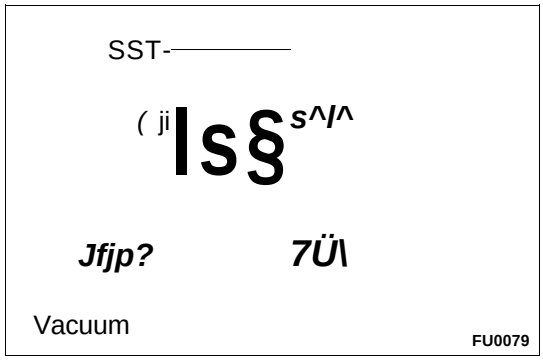


(d) Adjust by bending the relief lever.



8. CHECK CHOKE BREAKER

NOTE: Fully cióse the choke valve and check the opening angle.

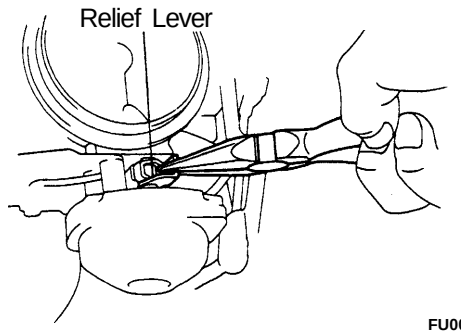


(a) Apply vacuum to choke breaker diaphragm A.

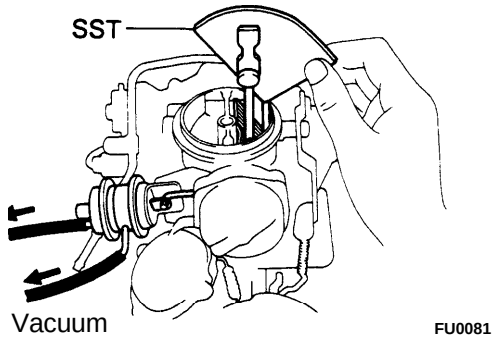
(b) Check the choke valve angle.

Standard angle:

3A-C (ex. Canadá Wagón M/T)
38° from horizontal
Others 39° from horizontal



(c) Adjust by bending the relief lever.

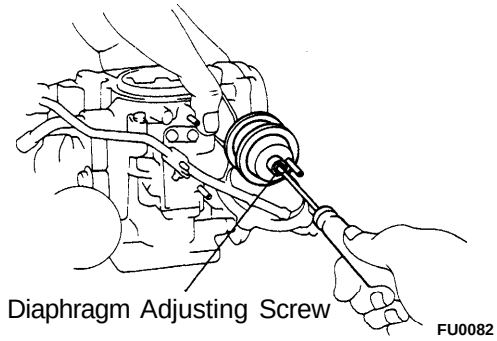


(d) Apply vacuum to choke breaker diaphragms A and B.

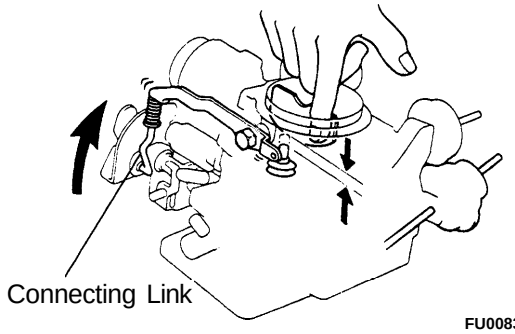
(e) Check the choke valve angle.

Standard angle:

3A-C (ex. Canadá Wagón M/T)
55° from horizontal
Others 50° from horizontal



(f) Adjust by turning the diaphragm adjusting screw.



9. CHECK AND ADJUST PUMP STROKE

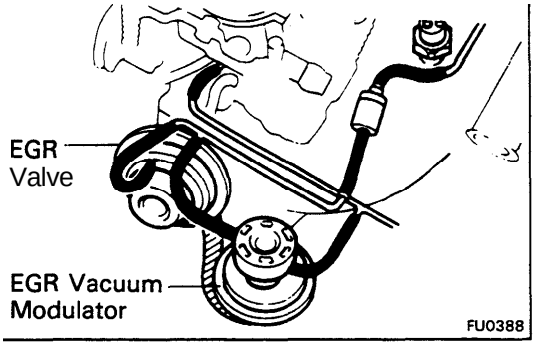
(a) With the choke valve fully opened, check the length of the stroke.

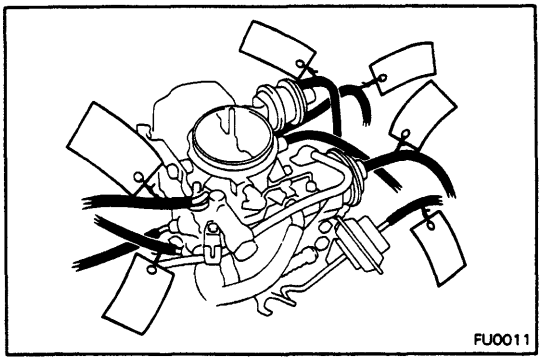
Standard stroke:

3A-C (ex. Canadá Wagón M/T)
4.0 mm (0.157 in.)
Others 3.0 mm (0.118 in.)

(b) Adjust the pump stroke by bending the connecting link (A).

10. CHECK FOR SMOOTH OPERATION OF EACH PART





INSTALLATION OF CARBURETOR

(See page FU-5)

1. INSTALL CARBURETOR

(a) Place the insulator in the intake manifold.

(b) Place the carburetor in position.

(c) Install the EGR vacuum modulator bracket.

(d) Connect the EGR vacuum modulator hose (1).

(e) Clamp the cold mixture heater wire.

(f) Install the carburetor mount nuts.

2. CONNECT FOLLOWING HOSES TO CARBURETOR:

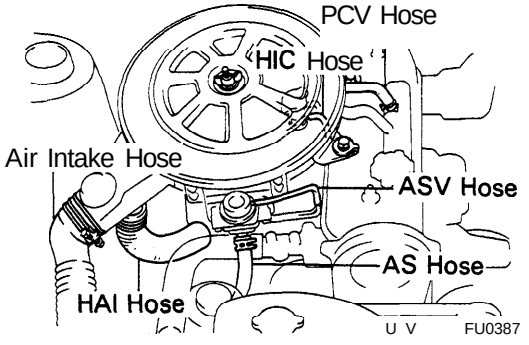
(a) Fuel inlet hose

(b) Emission control hoses (see system layout in the emission control section or the layout printed under the hood)

3. CONNECT CARBURETOR CONNECTOR

4. CONNECT ACCELERATOR CABLE

5. (w/ A/T)
CONNECT THROTTLE LINKAGE



6. INSTALL AIR CLEANER ASSEMBLY

(a) Connect the HIC hose, and place the air cleamer assembly in the carburetor.

(b) Install the two mount bolt and batterfly nut.

(c) Connect the emission control following hoses:

(1) HAI hose

(2) (Calf. and Canadá 3A-C)
ASV hose

(3) (ex. Fed.)
AS hose

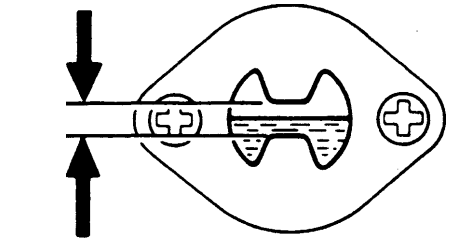
(4) PCV hose

(d) Connect the air intake hose.

ADJUSTMENT OF CARBURETOR (ON-VEHICLE)

1. INITIAL CONDITIONS

(a) Air cleaner installed
(b) Normal operating coolant temperature
(c) Choke fully open
(d) All accessories switched off
(e) All vacuum lines connected
(f) Ignition timing set correctly
(g) Transmission in N range
(h) Front wheels straight ahead position for PS
(i) Fuel level should be about even with the correct level in the sight glass.



EC0174

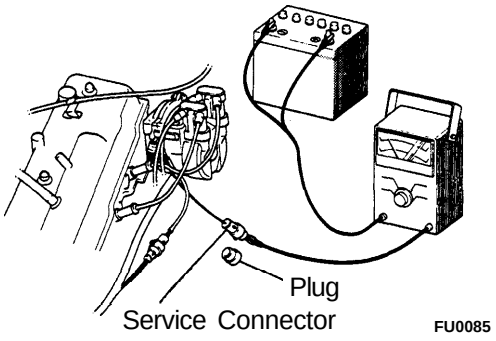
2. CONNECT TACHOMETER

Remove the rubber cap and connect the tachometer positive (+) terminal to the service connector at the HA.

CAUTION:

(a) NEVER allow the ignition coil terminàis to touch ground as it could result in damage to the igniter and/or ignition coil.

(b) As some tachometers are not compatible with this ignition system, it is recommended that you consult with the manufacturer.



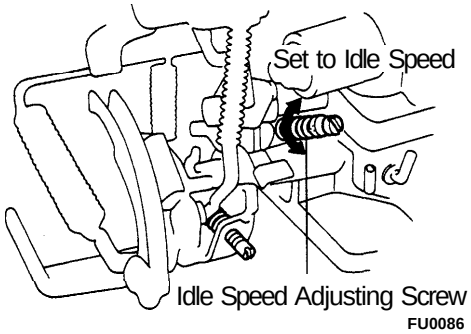
FU0085

3. ADJUST IDLE SPEED

Adjust the idle speed by turning the IDLE SPEED ADJUSTING SCREW.

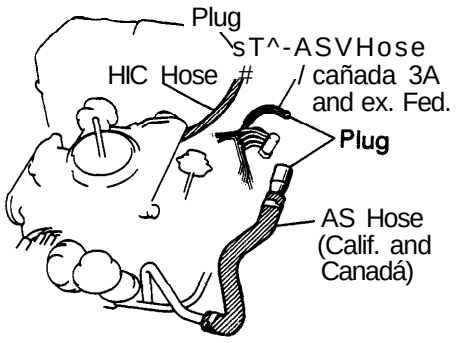
Idle speed:

3A-C	**550 rpm 4-speed M/T**
	650 rpm 5 or 6 speed M/T w/o PS
	800 rpm 5 or 6 speed M/T w/ PS & A/T w/o PS
	900 rpm A/T w/ PS
3A	**650 rpm M/T w/o PS**
	800 rpm M/T w/ PS & A/T w/o PS
	900 rpm A/T w/ PS



FU0086

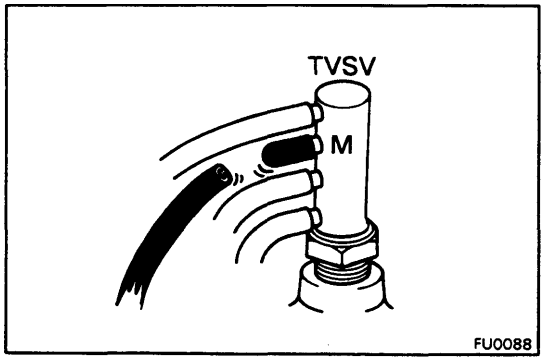
NOTE:
- Make adjustments with the engine cooling fan OFF.
- Leave tachometer connected for further adjustments.



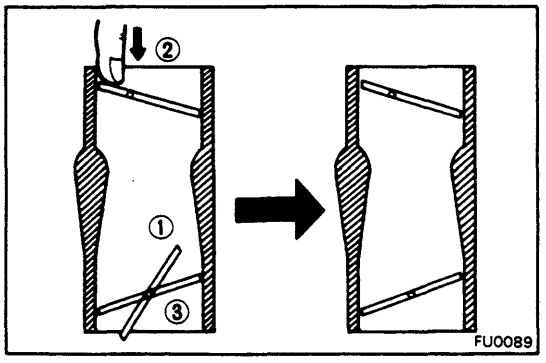
ADJUST FAST IDLE SPEED

(a) Stop the engine and remove the air cleaner.

(b) Plug the AS hose (for California and Canadá) to prevent leakage of exhaust gas and plug the HIC hose to prevent rough idling.

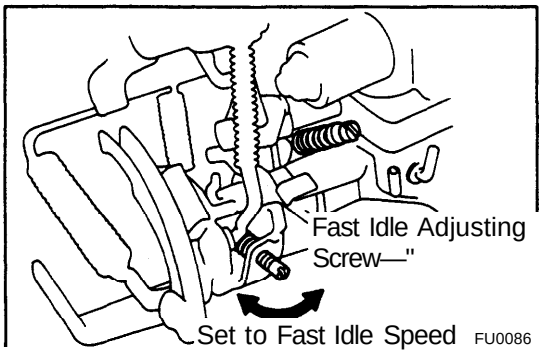


(c) Disconnect the hose from the TVSV M port and plug the M port.
This will shut off the choke opener and EGR systems.



(d) Set the fast idle cam.
While holding the throttle siightly open, push the choke valve closed, and hold it closed as you reléase the throttle valve.

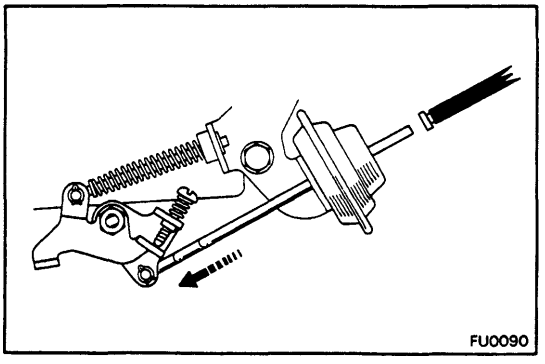
(e) Start the engine, but do NOT depress the accelerator pedal.



(f) Set the fast idle speed by turning the FAST IDLE ADJUSTING SCREW.

Fast idle speed: 3,000 rpm

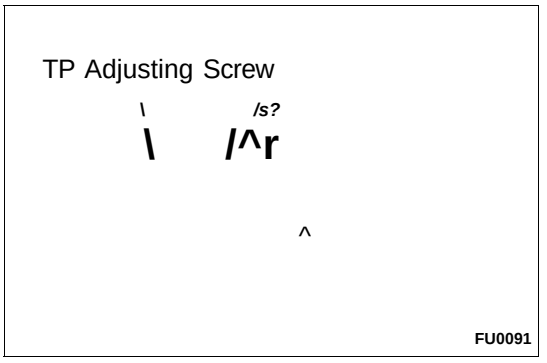
NOTE: Leave the tachometer connected for further adjustments.



ADJUST THROTTLE POSITIONER (TP) SETTING SPEED

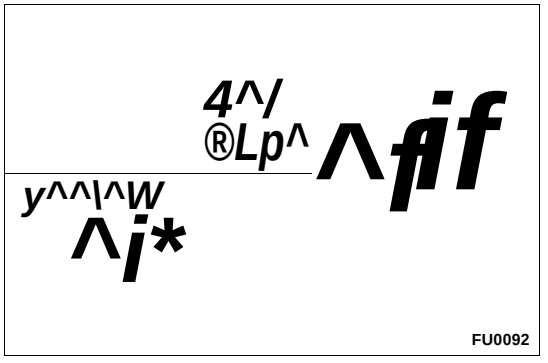
(a) Preparation
- Choke opener and EGR system OFF
- Air cleaner removed

(b) Disconnect the vacuum hose from the TP diaphragm and plug the hose end.
Check that the TP is set.



(c) Start the engine and adjust the TP setting speed by turning the TP ADJUSTING SCREW.

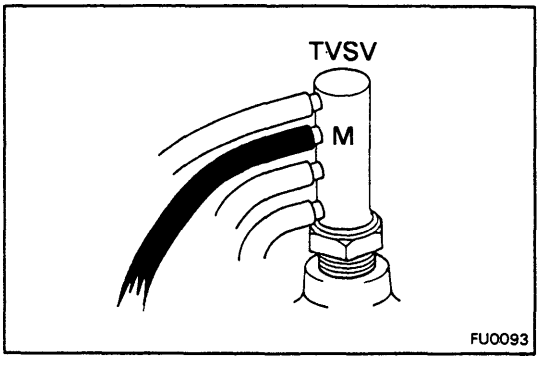
TP setting speed: 3A-C 1,400 rpm
3A 1,400 rpm A/T
1,700 rpm M/T



(d) Reconnect the vacuum hose to the TP diaphragm. Check that the engine speed returns to idle.

(e) Reconnect the vacuum hose to the choke opener diaphragm.

(f) Reconnect the vacuum hose to the EGR valve.



(g) Reconnect the vacuum hose to the TVSV M port

6. STOP ENGINE

7. REINSTALL AIR CLEANER ASSEMBLY
(See page FU-24)

8. IF NECESSARY, ADJUST IDLE MIXTURE
(See pages FU-28)

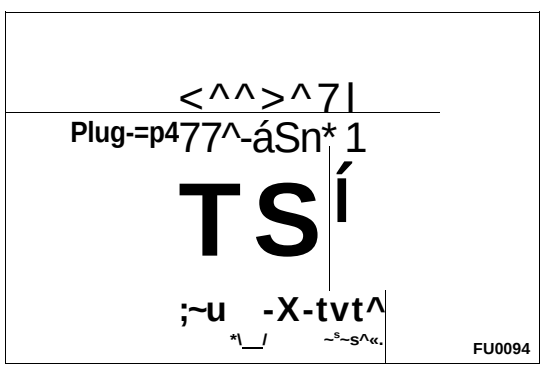
9. REMOVE TACHOMETER

IDLE MIXTURE

ADJUSTMENT OF IDLE MIXTURE

NOTE:

- To conform with regulations, the idle mixture adjusting screw is adjusted and plugged with a steel plug by manufacturer. Normally, this plug should not be removed.
- When troubleshooting rough idle, check all other possible causes before attempting to adjust the idle mixture (see TROUBLESHOOTING on page FU-2). Only if no other factors are found to be at fault, should the idle mixture be adjusted and, when doing so, remove the plug and follow the procedure described below.

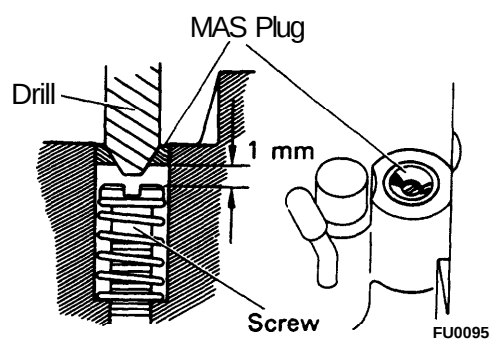


1. REMOVE CARBURETOR (See page FU-7)

2. REMOVE MIXTURE ADJUSTING SCREW PLUG (MAS PLUG)

(a) Plug each carburetor vacuum port to prevent entry of steel particles when drilling.

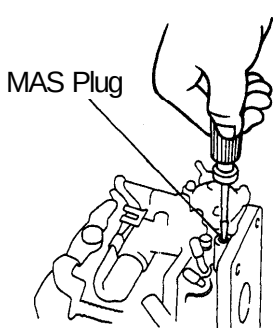
(b) Mark the center of the plug with a punch.



(c) Drill a 6.5 mm <f> (0.256 in. <f>) hole in the center of the plug.

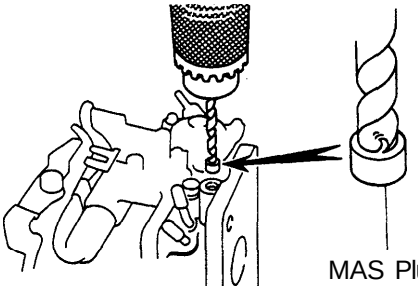
NOTE:

- As there is only 1 mm (0.04 in.) ciearance between the plug and screw, drill carefully and slowly to avoid drilling onto the screw.
- The drill may forcé the plug off at this time.



(d) Through the hole in the plug, fully screw in the mixture adjusting screw with a screwdriver.

NOTE: Be careful not to damage the screw tip by tightening the screw too tight.



FU0097

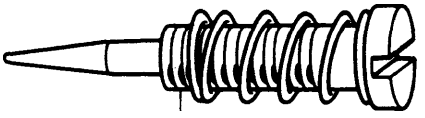
(e) Use a 7.5 mm <f> (0.295 in. <f>) drill to forcé the plug off.

3. INSPECT MIXTURE ADJUSTING SCREW

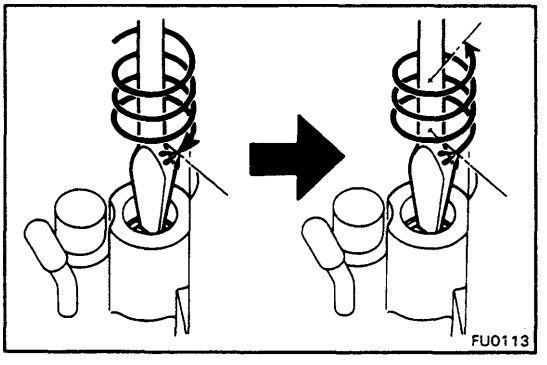
(a) Blow off any steel partióles with compressed air.

(b) Remove the screw and inspect it.

If the drill has gnawed into the screw top or if the tapered portion is damaged, replace the screw.



Idle Mixture Adjusting Screw



4. REINSTALL MIXTURE ADJUSTING SCREW

Fully screw in the idle mixture adjusting screw and then unscrew it the specified amount.

Screw revolutions (counterclockwise):
3A-C (ex. Canadá Wagón M/T)
3 1/4 A revolutions
Others 2 1/4 A revolutions

NOTE: Be careful not to damage the screw tip by tightening the screw too tight.

5. REINSTALL CARBURETOR (See page FU-24)

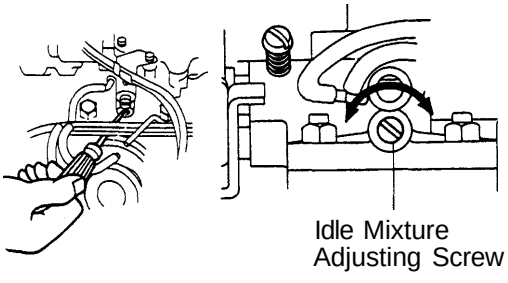
6. ADJUST IDLE SPEED AND IDLE MIXTURE

(a) Initial conditions (See page FU-25)

(b) Start the engine.

(c) Set to the máximum speed by turning the IDLE MIXTURE ADJUSTING SCREW.

NOTE: Insert a small screwdriver between EGR valve and EGR vacuum modulator bracket.



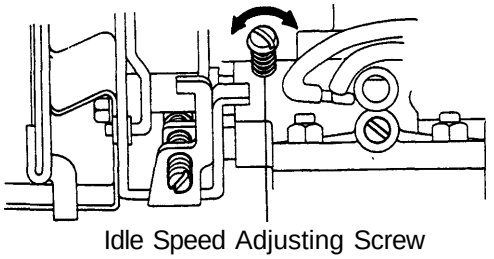
FU0100 FU0101

(d) Set to the idle mixture speed by turning the IDLE SPEED ADJUSTING SCREW.

Idle mixture speed: 700 rpm

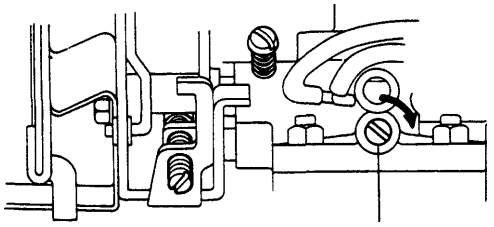
NOTE: Make adjustment with the cooling fan OFF.

(e) Before moving to the next step, continué adjustments (c) and (d) until the máximum speed will not rise any further no matter how much the IDLE MIXTURE ADJUSTING SCREW ¡s adjusted.



Idle Speed Adjusting Screw

FU0102

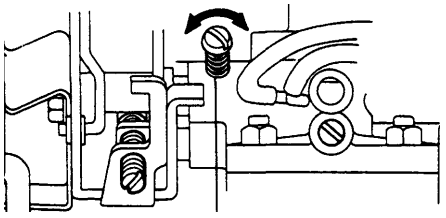


Idle Mixture Adjusting Screw

FU0102

(f) Set to 650 rpm by screwing in the IDLE MIXTURE ADJUSTING SCREW.

NOTE: Make adjustment with the cooling fan OFF.
This is the Lean Drop Method for setting idle speed and mixture.



Idle Speed Adjusting Screw

FU0102

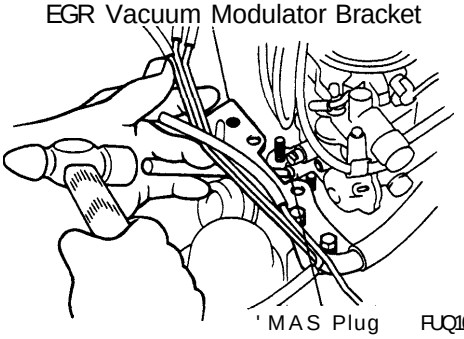
(g) Set to the idle speed by screwing in the IDLE SPEED ADJUSTING SCREW.

speed:

3A-C	**550 rpm**	**4-speed M/T**
	650 rpm	**5 or 6 speed M/T w/o PS**
	800 rpm	**5 or 6 speed M/T** w7 **PS**
		6 A/T w/o PS
	900 rpm	**A/T w/ PS**
3A	**650 rpm**	**M/T w/o PS**
	800 rpm	**M/T w/ PS** & **A/T w/o PS**
	900 rpm	**A/T w/ PS**

NOTE: Make adjusting with the cooling fan OFF.

EGR Vacuum Modulator Bracket



'MAS Plug FUQ103

7. PLUG IDLE MIXTURE ADJUSTING SCREW

(a) Remove the air cleaner and EGR vacuum modulator bracket.

(b) With tapered end inward, tap in plug until it is even with carburetor surface.

(c) Reinstaii the EGR vacuum modulator bracket and air cleaner.

8. CHECK AND ADJUST TP SETTING SPEED
(See step 8 on page FU-26)

9. CHECK AND ADJUST FAST IDLE SPEED
(See step 7 on page FU-26)

FUEL PUMP

REMOVAL OF FUEL PUMP

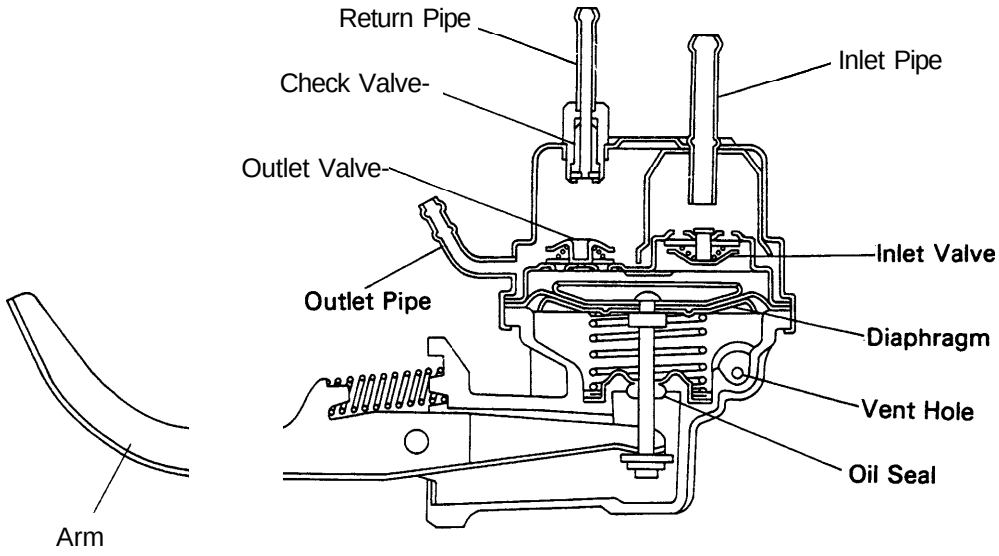
1. DISCONNECT FUEL HOSES FROM FUEL PUMP

2. REMOVE FUEL PUMP

Remove two bolts, fuel pump and gasket.

INSPECTION OF FUEL PUMP (Airtight Test)

Cutaway View

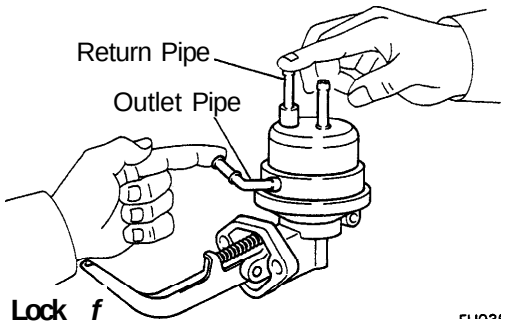


Prechecks

Before performing the following checks on the fuel pump.

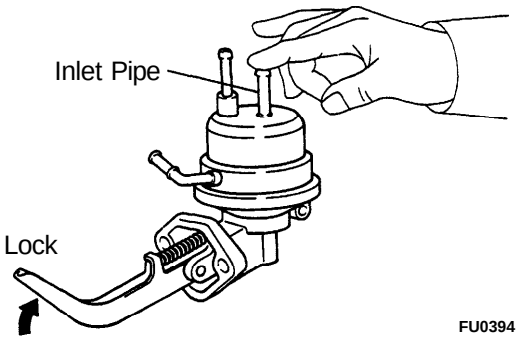
(a) Run some fuel through the pump to insure that the check valves seal tightly (a dry check valve may not seal properly).

(b) Without blocking off any pipes, opérate the pump lever and check the amount of forcé necessary for operation and the amount of arm play. This same amount of forcé should be used in the checks.



1. CHECK INLET VALVE

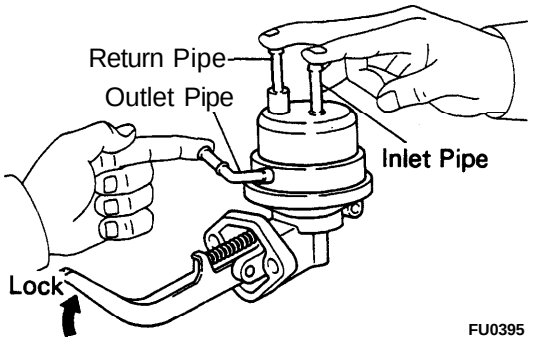
Block off the outlet and return pipes with your finger and check that there is an increase in lever arm play and that the lever arm moves freely (no reaction forcé).



2. CHECK OUTLET VALVE

Block off the inlet pipe with your finger and check that the arm locks (does not opérate with same amount of forcé used in the precheck above).

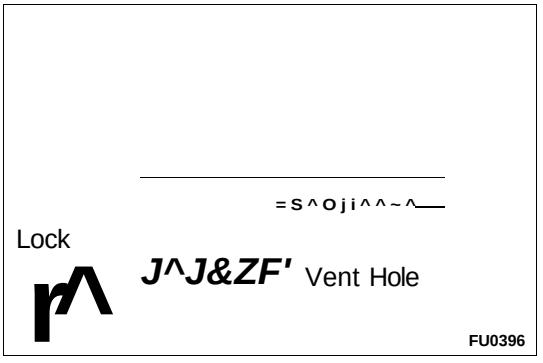
NOTE: Never use more forcé than that used in the precheck. This applies to checks 3 and 4 also.



3. CHECK DIAPHRAGM

Block off the inlet, outlet and return pipes and check that the pump arm locks.

NOTE: If all three of these checks are not as specified, the caulking (sealing) of the body and upper casing is defective.



4. CHECK OIL SEAL

Block off the vent hole with your finger and check that the pump arm locks.

INSTALLATION OF FUEL PUMP

1. INSTALL FUEL PUMP

Install a new insulator and the fuel pump with the two bolts. Torque the bolts.

Torque: 185 kg-cm (13 ft-lb, 18 Nm)

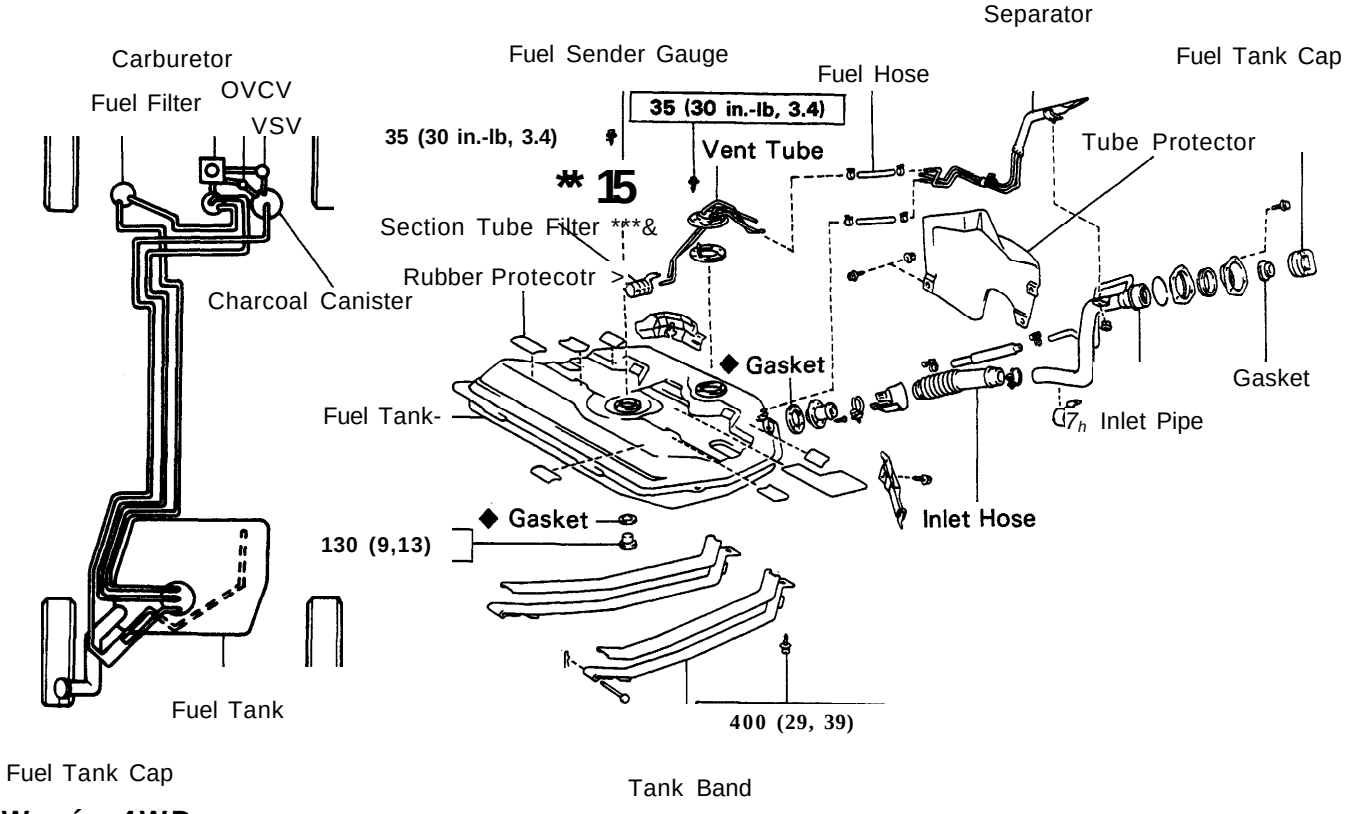
2. CONNECT FUEL HOSES TO FUEL PUMP

3. START ENGINE AND CHECK FOR LEAKS

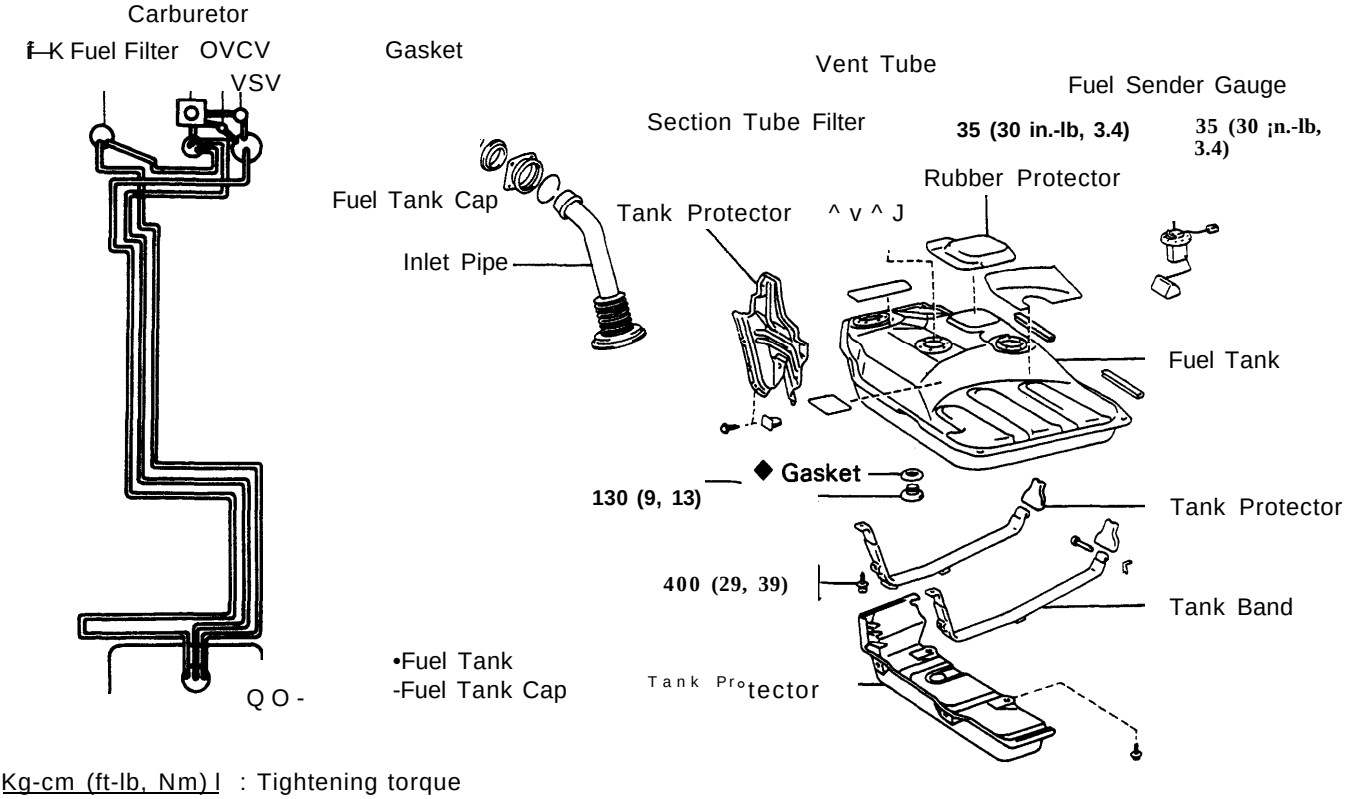
FUEL TANK AND LINES

COMPONENTS

Sedan and Wagón FWD



Wagón 4WD



Kg-cm (ft-lb, Nm) l : Tightening torque

• : Non-reusable part

FU0313 FU0314
FU0315 FU0557

PRECAUTIONS

1. **Always use new gaskets when replacing the fuel tank or component parts.**
2. **When re-installing, be sure to include the rubber protectors on the upper surfaces of the fuel tank and tank band.**
3. **Apply the proper torque to all tightening parts.**

INSPECT FUEL LINES AND CONNECTIONS

(a) Inspect the fuel lines and connections for cracks, leakage or deformation.

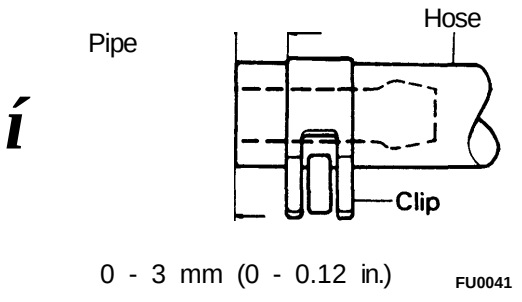
(b) Inspect the fuel tank vapor vent system hoses and connections for looseness, sharp bends or damage.

(c) Inspect the fuel tank for deformation, cracks, fuel leakage or tank band looseness.

(d) Inspect the filler neck for damage or fuel leakage.

(e) Hose and tube connections are as shown in the illustration.

If problem is found, repair or replace parts as necessary.



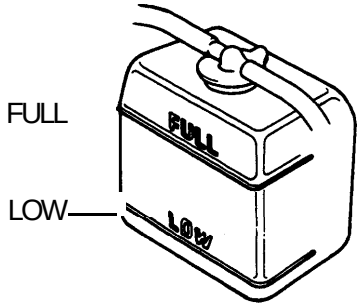
COOLING SYSTEM

TROUBLESHOOTING

Problem	Possible cause	Remedy	Page
Engine overheats	Water pump drive belt loóse or missing	Adjust or replace belt	EM-13
	Dirt, leaves or insects on radiator	Clean radiator	
	Hoses, water pump, thermostat housing, radiator, heater, core plugs or head gasket leakage	Repair as necessary	
	Thermostat faulty	Check thermostat	CO-11
	Ignition timing retarded	Set timing	
	Electric cooling system faulty	Inspect electric cooling system	CO-18
	Radiator hose plugged or rotted	Replace hose	
	Water pump faulty	Replace water pump	CO-4
	Radiator plugged or cap faulty	Check radiator	CO-12
	Cylinder head or block cracked or plugged	Repair as necessary	

NOTE: The thermostat on the 3A and 3A-C engines is equipped with a by-pass valve. Therefore, if the engine tends to overheat, removal of the thermostat would have an adverse effect, causing a lowering of cooling efficiency.

CHECK AND REPLACEMENT OF ENGINE COOLANT

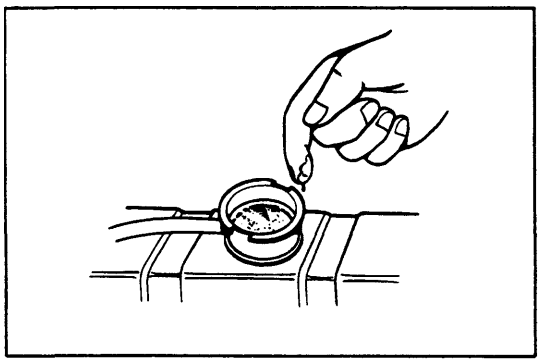


C00060

1. CHECK ENGINE COOLANT LEVEL AT RESERVE TANK

The coolant level should be between the "LOW" and "FULL" lines.

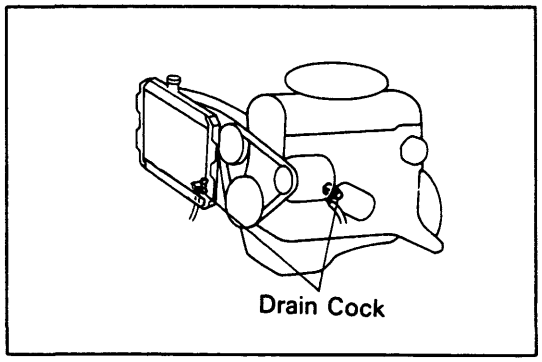
If low, check for leaks and add coolant up to the "FULL" line.



2. CHECK ENGINE COOLANT QUALITY

There should not be any excessive deposit of rust or scales around the radiator cap or radiator filler hole, and the coolant should be free from oil.

If excessively dirty, replace the coolant.



3. REPLACE ENGINE COOLANT

(a) Remove the radiator cap.

(b) Drain the coolant from radiator and engine drain cocks. (Engine drain is at left rear of engine block.)

(c) Cióse the drain cocks.

(d) Fill the system with coolant.
Use a good brand of ethylene-glycol base coolant, mixed according to the manufactureras directions.

Capacity **(w/ Heater or air conditioner)**:
5.3 liters (5.6 US qts, 4.7 Imp.qts)

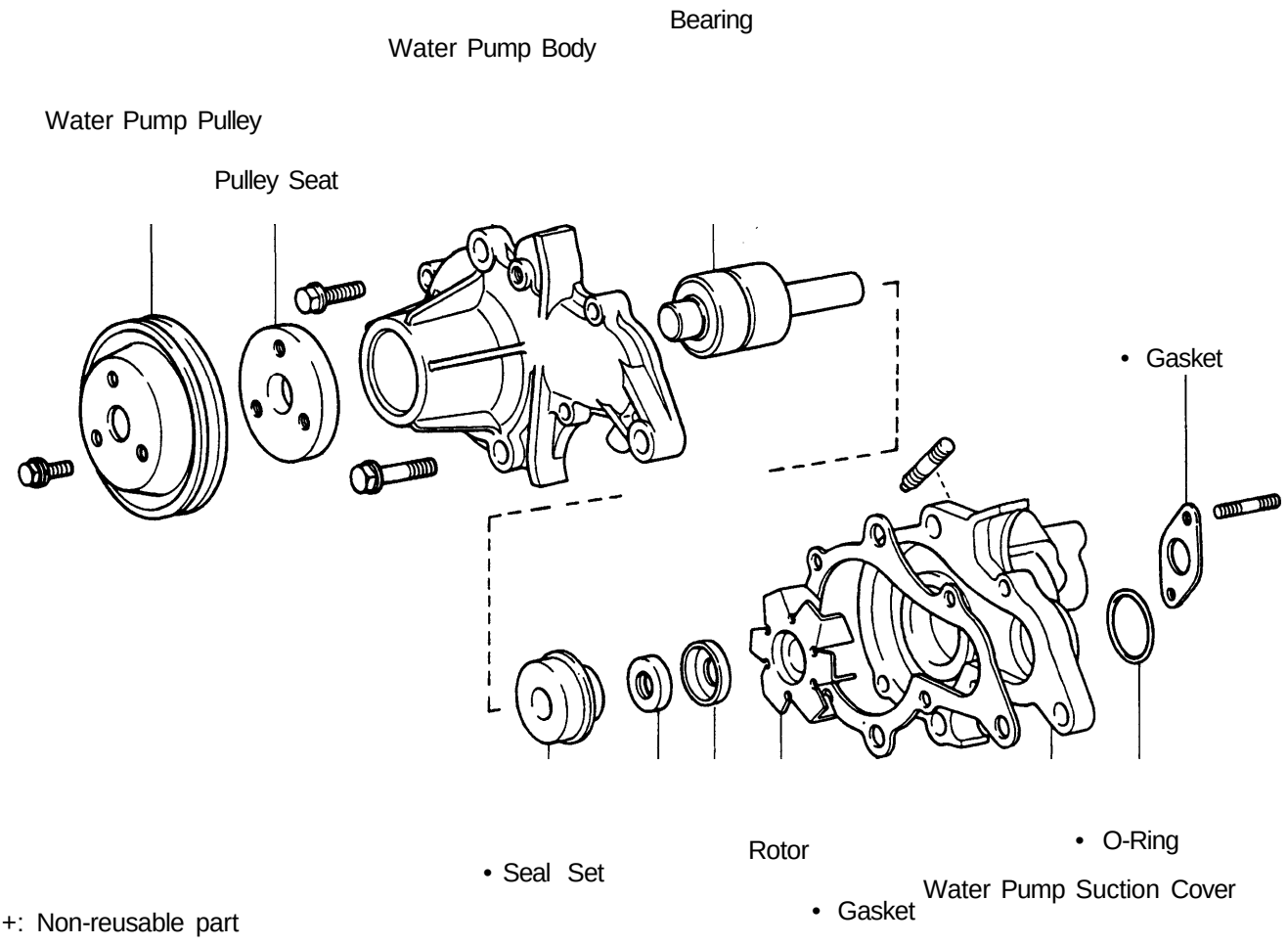
(e) Install the radiator cap.

(f) Start the engine and check for leaks.

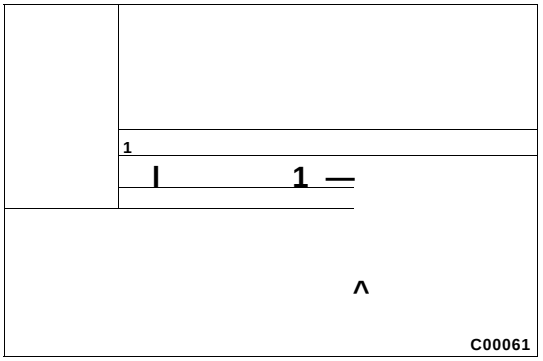
(g) Recheck the coolant level and refill as necessary.

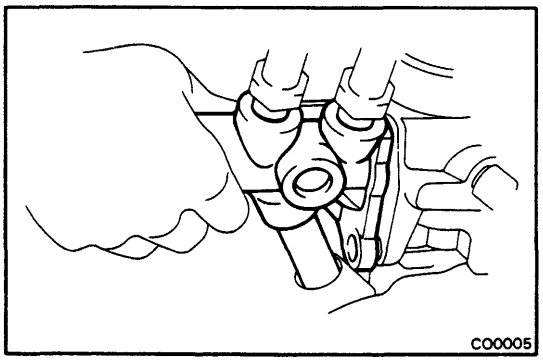
WATER PUMP

COMPONENTS



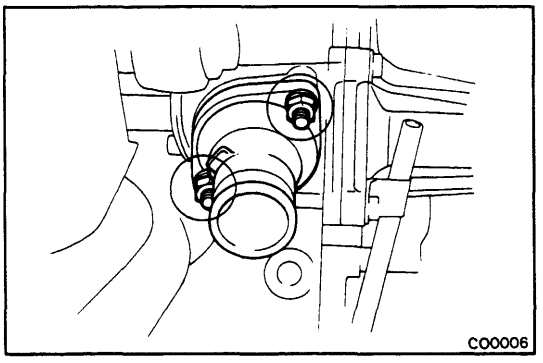
+: Non-reusable part





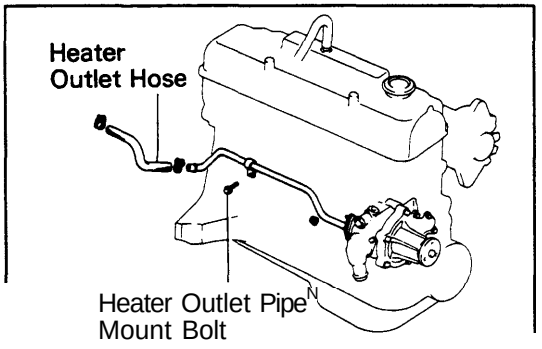
REMOVAL OF WATER PUMP

1. **DRAIN ENGINE COOLANT (See page CO-3)**
2. **REMOVE RADIATOR (See page CO-12)**
3. **REMOVE WATER PUMP PULLEY**
   (a) Loosen the drive belt.
   (b) Remove the pulley mount bolts and pulley together with the drive belt.
4. **REMOVE WATER OUTLET HOUSING AND BY-PASS PIPE**
   (a) Remove the mount bolts of the water outlet housing
   (b) Remove the outlet housing and by-pass pipe.



5. REMOVE WATER INLET HOUSING AND THERMOSTAT

6. REMOVE TIMING BELT UPPER COVER



7. DISCONNECT HEATER OUTLET HOSE FROM OUTLET PIPE

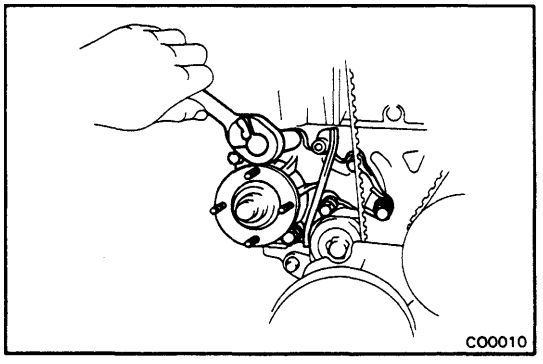
8. REMOVE HEATER OUTLET PIPE MOUNT BOLT

9. REMOVE OIL LEVEL GAUGE AND GUIDE

(a) Remove the oil level gauge.

(b) Remove the mount bolt, and pulí out the oil level gauge guide.

NOTE: After pulling out the oil level gauge guide, be sure to plug the oil pump body hole.

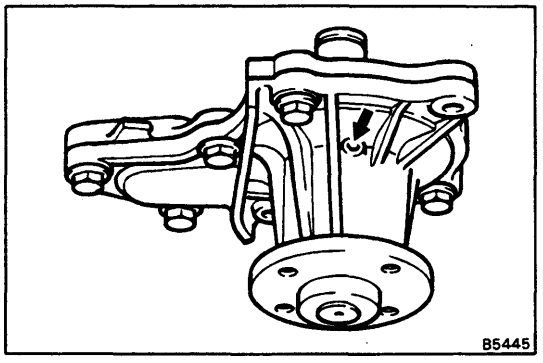


10. REMOVE WATER PUMP

(a) Remove the three bolts and water pump.

(b) Remove the two nuts and heater outlet pipe from the pump body.

CAUTION: Be caref ul not to get coolant on the timing belt.



INSPECTION OF WATER PUMP

1. INSPECT WATER PUMP SEAL

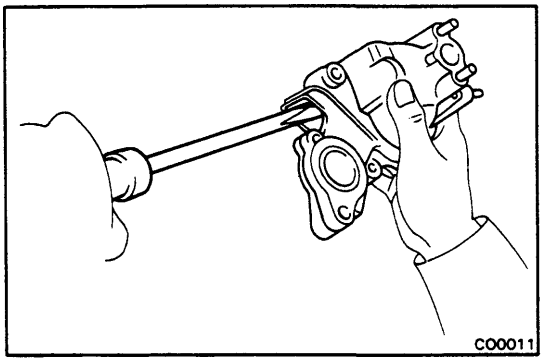
Make sure that there are no traces of coolant leakage from the drain hole.

If necessary, replace the water pump.

2. INSPECT WATER PUMP BEARING

Check that the water pump bearing operation is not rough or noisy.

If necessary, replace the water pump.

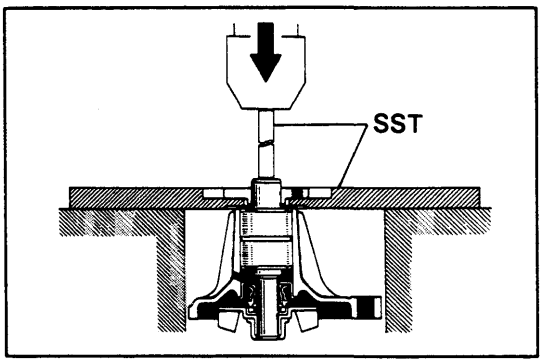


DISASSEMBLY OF WATER PUMP

(See page CO-4)

1. REMOVE WATER PUMP SUCTION COVER

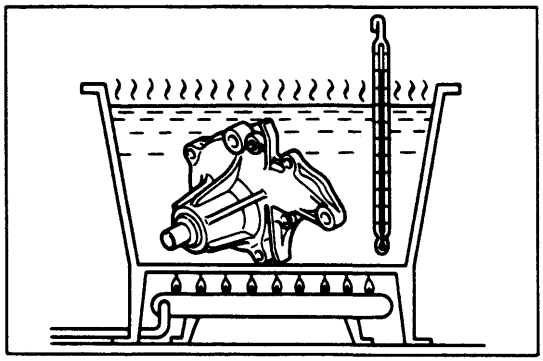
Using a screwdriver, pry off the water pump suction cover.



2. REMOVE PULLEY SEAT

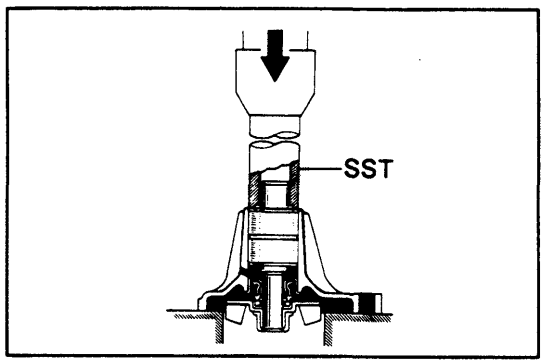
Usíng a press and SST, remove the pulley seat from the water pump bearing shaft.

SST 09236-00101



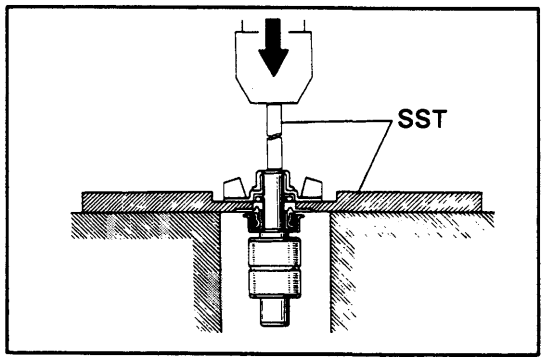
3. REMOVE WATER PUMP BEARING

(a) Gradually heat the water pump body to about 85°C (185°F).



(b) Using a press and SST, remove the water pump bearing with the rotor from the water pump body.

SST 09236-00101

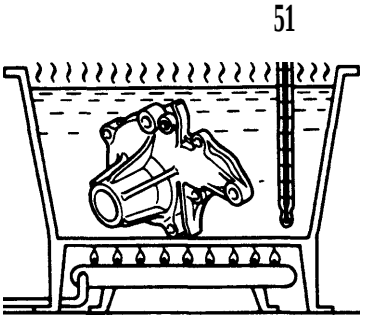


4. REMOVE ROTOR

(a) Using a press and SST, remove the rotor from the water pump bearing.

SST 09236-00101

(b) Remove the seal set from the water pump bearing.



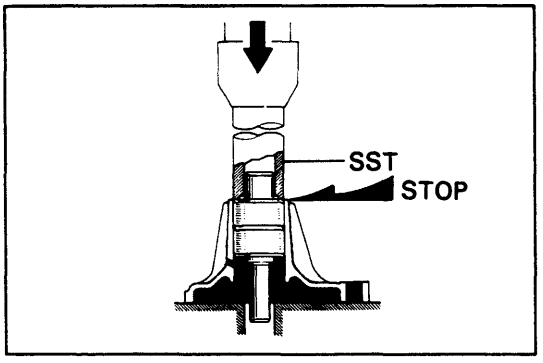
ASSEMBLY OF WATER PUMP

(See page CO-4)

NOTE: Always assemble the water pump with a new seal set.

1. INSTALL WATER PUMP BEARING

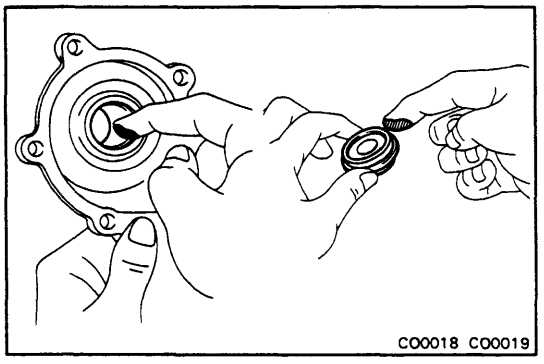
(a) Gradually heat the water pump body to about 85°C (185°F).



(b) Using a press and SST, install the water pump bearing into the water pump body.

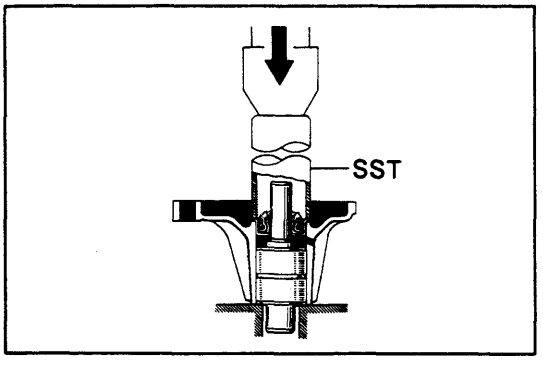
SST 09236-00101

NOTE: The bearing and face should be flush with the body top surface.



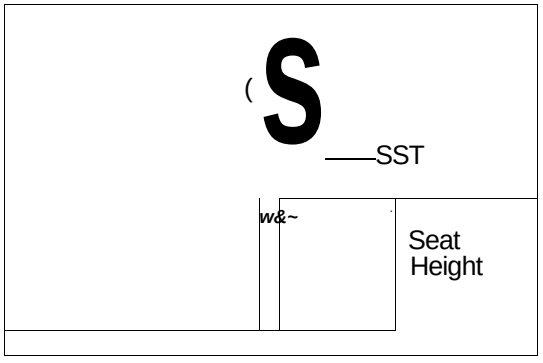
2. INSTALL SEAL

(a) Apply a little sealer to a new seal and pump body.



(b) Using a press and SST, install the seal on the water pump bearing.

SST 09236-00101



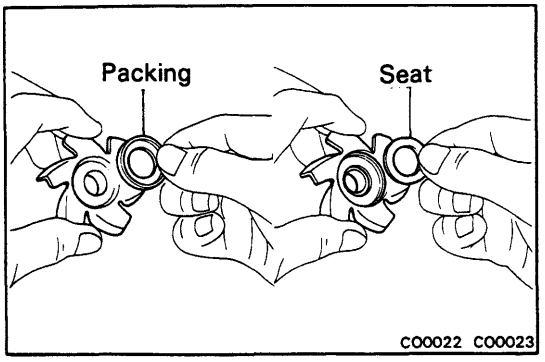
3. INSTALL PULLEY SEAT

Using a press and SST, install the pulley seat on the water pump bearing shaft.

SST 09236-00101

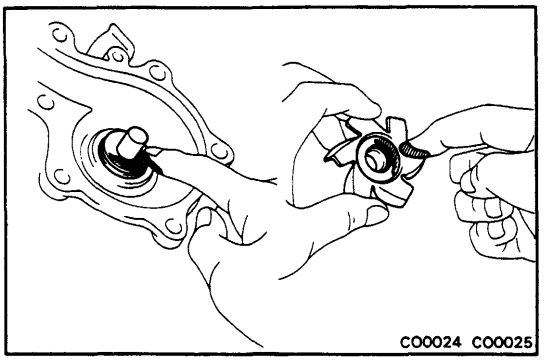
NOTE: As shown in the figure, the distance from the pulley seat to the installation surface of the pump body should be as follows.

Seat height: 76 mm (2.99 in.)

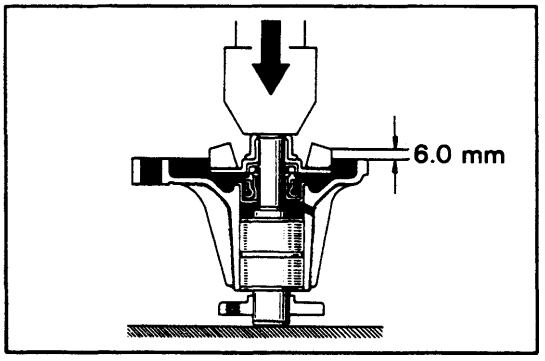


4. INSTALL ROTOR

(a) Install a new packing and seat into the rotor.



(b) Apply a líttle engine oil to the seal and rotor contact surface.

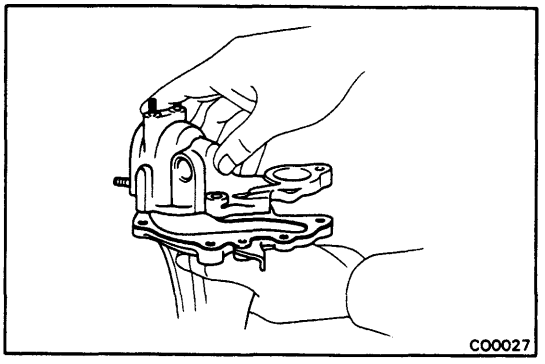


(c) Using a press, install the rotor on the water pump bearing shaft.

NOTE: As shown in the figure, the distance from the rotor edge to the installation surface of the pump body should be 6.0 mm (0.236 in.).

5. CHECK WATER PUMP

After assembly, make sure that the rotor rotates smoothly.

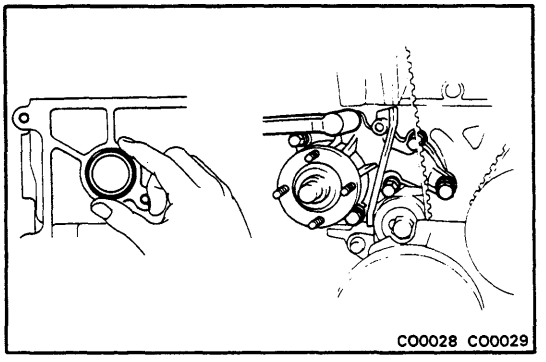


6. INSTALL WATER PUMP SUCTION COVER

Instad a new gasket and water pump suction cover with three bolts. Torque the bolts.

Torque: 95 **kg-cm** (82 **in.-lb,** 9.3 Nm)

NOTE: After installing, make sure that the rotor is not in contact with the water pump suction cover.



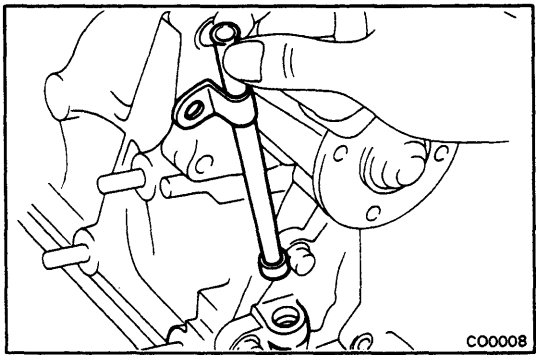
INSTALLATION OF WATER PUMP

1. INSTALL WATER PUMP

(a) Instali the heater outlet pipe together with a new gasket to the water pump with the two nuts.

(b) Instali a new O-ring to the block and instali the pump with the three bolts.
Torque the bolts.

Torque: **150** kg-cm **(11** ft-lb, 15 Nm)

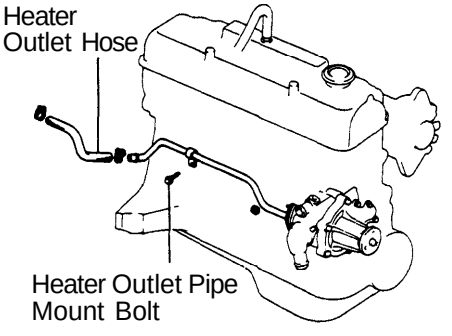


2. INSTALL OIL LEVEL GAUGE GUIDE AND GAUGE

(a) Instali a new 0-ring on the oil level gauge guide.

(b) Push in the oil level gauge guide with the O-ring coated with a small amount of engine oil.

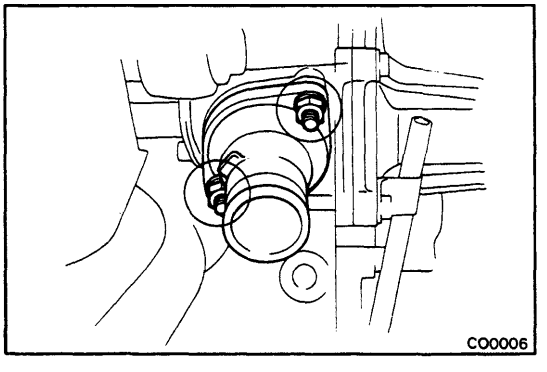
(c) Instad mount bolt.



3. INSTALL HEATER OUTLET PIPE MOUNT BOLT

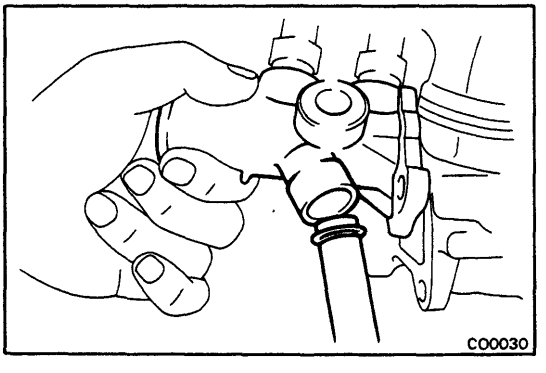
4. CONNECT HEATER OUTLET HOSE TO OUTLET PIPE

5. INSTALL T1MING BELT UPPER COVER



6. INSTALL THERMOSTAT AND WATER INLET HOUSING

Instali the thermostat, a new gasket and the water inlet housing with the two nuts.

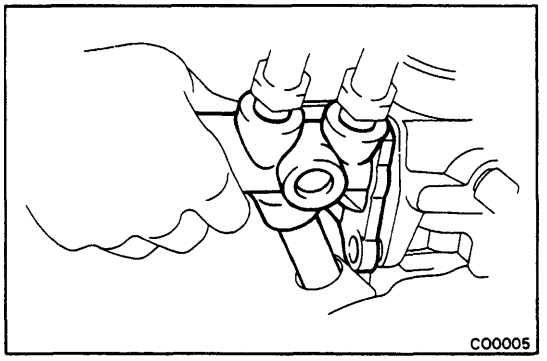


7. INSTALL WATER OUTLET HOUSING AND BY-PASS PIPE

(a) Instali two new O-rings on the by-pass pipe.

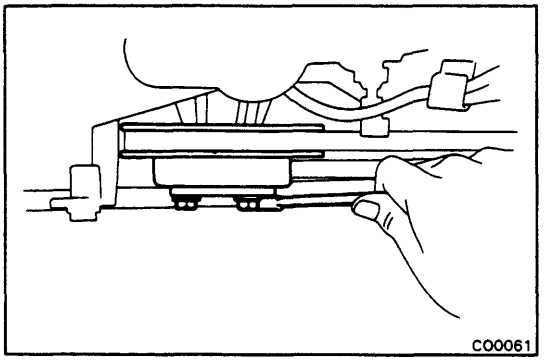
(b) Apply a little engine oil to the O-rings.

(c) Instali the by-pass pipe to the water outlet housing.



(d) Install the water outlet together with the water by-pass pipe.

(e) Install the two mount bolts.



8. INSTALL WATER PUMP PULLEY

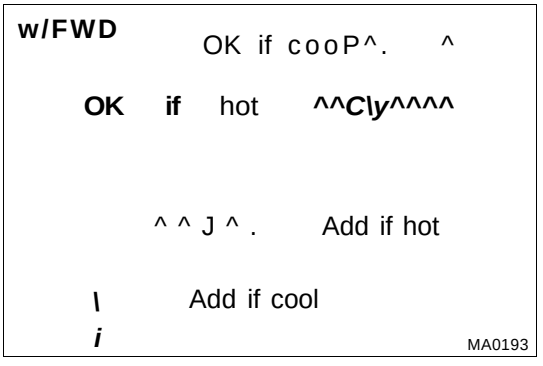
Place drive belts on the water pump pulley and install the water pump pulley with the bolts.

9. INSTALL RADIATOR (See page CO-17)

10. FILL WITH ENGINE COOLANT (See page CO-3)

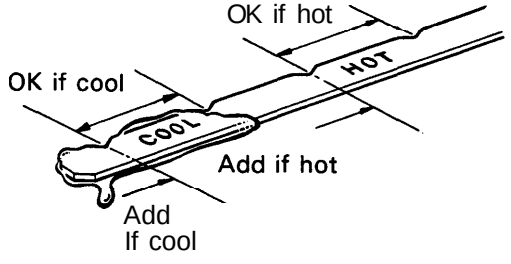
11. START ENGINE AND CHECK FOR LEAKS

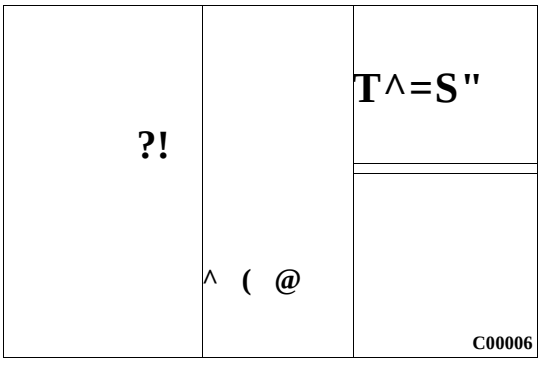
w/FWD



12. (w/A/T)
CHECK A/T FLUID LEVEL (See page MA-20)

w/4WD



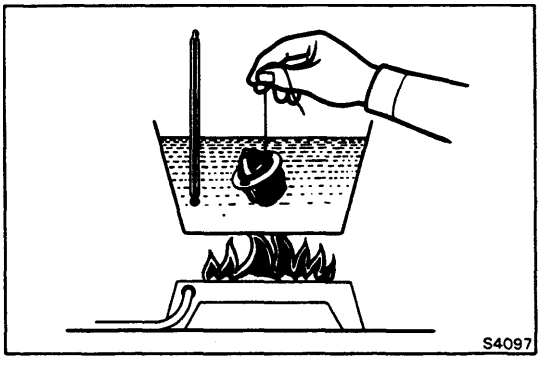


THERMOSTAT

REMOVAL OF THERMOSTAT

1. **DRAIN ENGINE COOLANT (See page CO-3)**
2. **DISCONNECT RADIATOR OUTLET HOSE**
3. **REMOVE WATER INLET HOUSING AND THERMOSTAT**

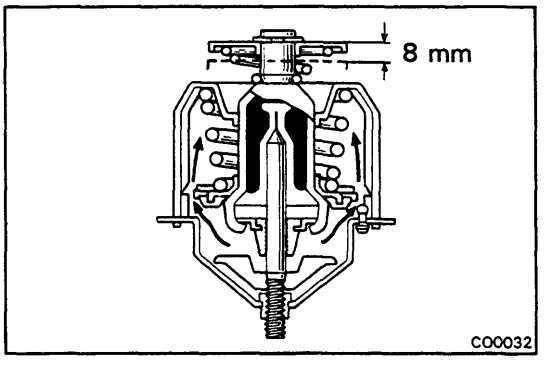
   Remove the two nuts, water inlet housing, thermostat and gasket.



INSPECTION OF THERMOSTAT

NOTE: The thermostat ¡s numbered according to the valve opening temperature.

(a) Immerse the thermostat in water and heat the water gradually.



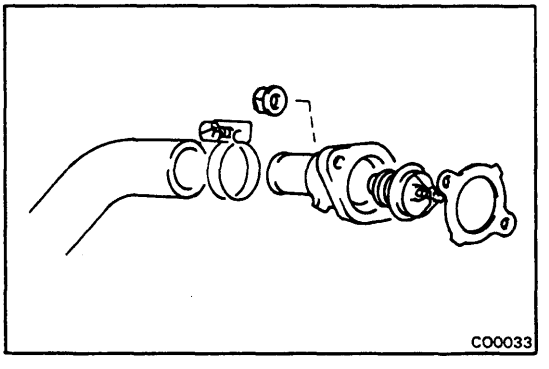
(b) Check the valve opening temperature and valve lift.

If the valve opening temperature and valve lift are not within the following specifications, replace the thermostat.

Valve opening temperature 80 — 84°C (176- 183°F)

Valve lift: 8 mm (0.31 in.) or more at 95°C (203°F)

(c) Check that valve spring is tight when the thermostat is fully closed. Replace as necessary.



INSTALLATION OF THERMOSTAT

1. **INSTALL THERMOSTAT AND WATER INLET HOUSING**

   Install a new gasket the thermostat and water inlet housing with the two nuts.

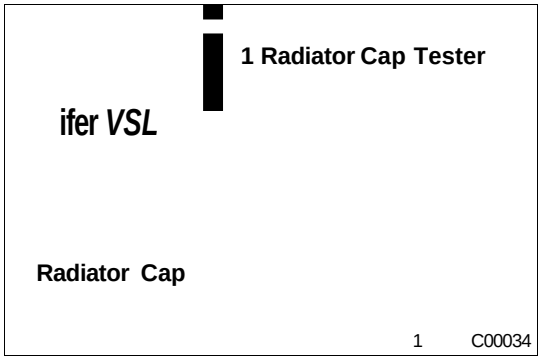
2. **CONNECT RADIATOR OUTLET HOSE**
3. **FILL WITH ENGINE COOLANT (See page CO-3)**

RADIATOR

CLEANING OF RADIATOR

Using water or steam cleaner, remove mud and dust from radiator core.

CAUTION: If using high pressure type cleaner, be careful not deform fin of the radiator core. For example, keep distance more than 40 - 50 cm (15.75 — 19.59 in.) between the radiator core and cleaner nozzle when cleaner nozzle pressure is 30 - 35 kg/cm^2 (427 - 498 psi, 2,942 - 3,432 kPa).



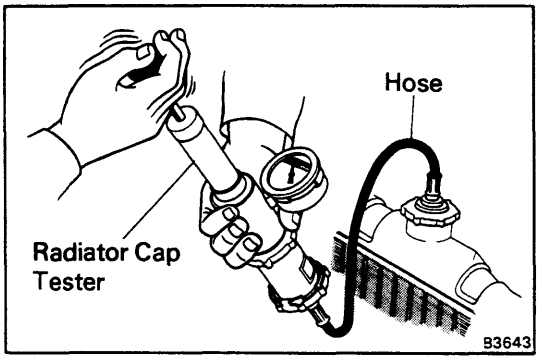
ON-VEHICLE INSPECTION

1. CHECK RADIATOR CAP

Using a radiator cap tester, pump the tester until the relief valve opens. Check that the valve opens between 0.75 kg/cm^2 (10.7 psi, 74 kPa) and 1.05 kg/cm^2 (14.9 psi, 103 kPa).

Check that the pressure gauge does not drop rapidly when the pressure on the cap is below 0.6 kg/cm^2 (8.5 psi, 59 kPa).

If either check is not within limits, replace the cap.



2. CHECK COOLING SYSTEM FOR LEAKS

Attach a radiator cap tester to the radiator, and pump tester to 1.8 kg/cm^2 (26 psi, 177 kPa). Check that pressure does not drop.

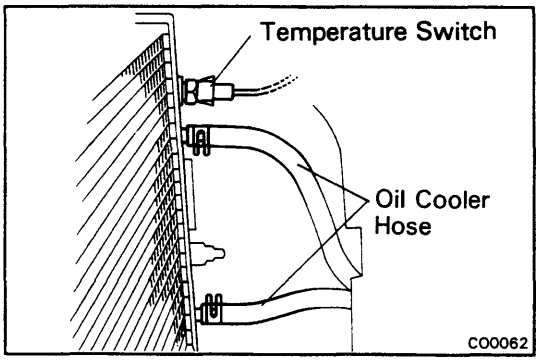
If the pressure drops, check for leaks from the hoses, radiator or water pump. If no external leaks are found, check the heater core, block and intake manifold.

REMOVAL OF RADIATOR

1. DRAIN ENGINE COOLANT (See page **CO-3)**

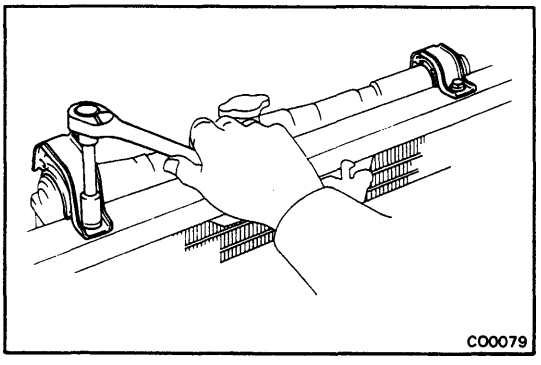
2. DISCONNECT CONNECTOR FROM WATER TEMPERATURE SWITCH

Disconnect the connector by pushing both lock levers in while pulling apart the connector.



3. (w/ A/T)
DISCONNECT TWO OIL COOLER HOSES

NOTE:
- Be careful as some oil will leak out. Catch it in a suitable container.
- Plug the hose to prevent oil from escaping.



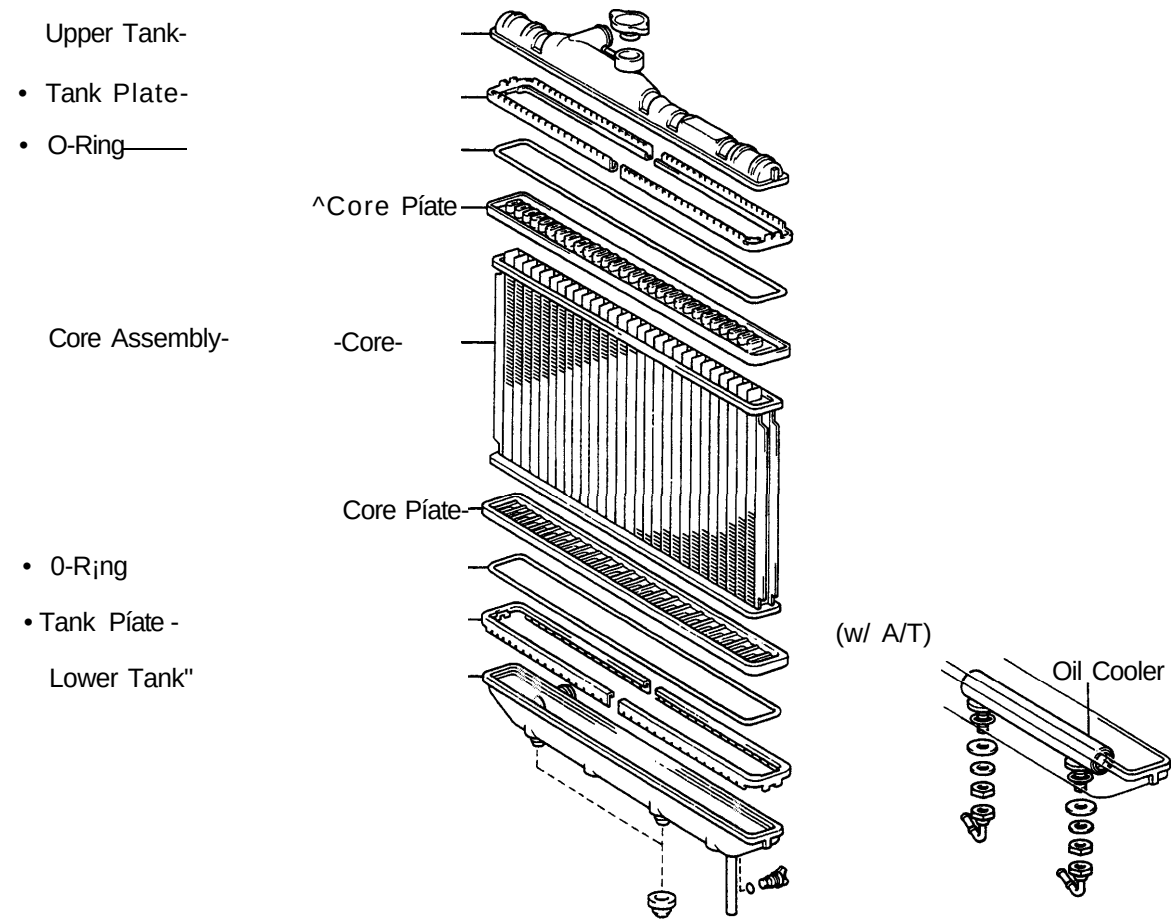
4. REMOVE BOND CABLE

DISCONNECT COOLANT RESERVOIR TUBE

DISCONNECT TWO RADIATOR HOSES

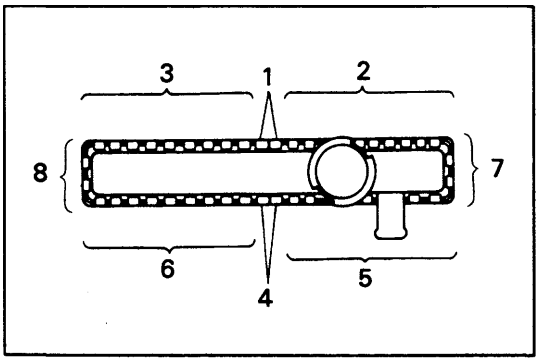
REMOVE TWO RADIATOR MOUNT BOLTS AND RADIATOR

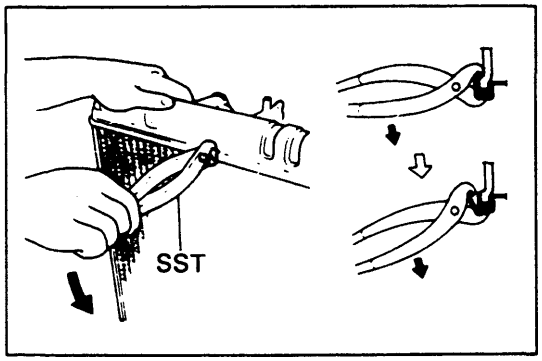
COMPONENTS



•: Non-reusable parts

CO0099





DISASSEMBLY OF RADIATOR

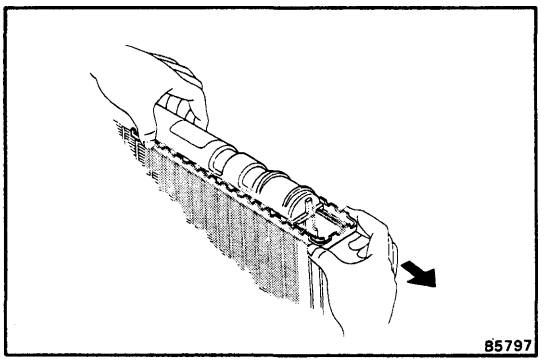
1. IF NECESSARY, REMOVE TEMPERATURE SWITCH FROM LOWER TANK

2. REMOVE TANK PLATE

(a) Raise the claws of the tank plates with SST in the numerical order shown in the figure.

SST 09230-00010

NOTE: Be careful not to damage the core píate.

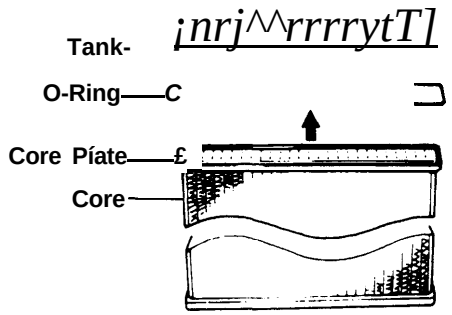


(b) Pulí the tank plates outward.

3. REMOVE TANK AND O-RING

(a) Pulí the tank upward.

(b) Remove the O-ring.



ASSEMBLY OF RADIATOR

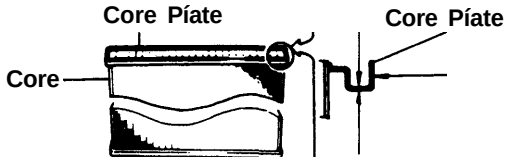
(See page CO-13)

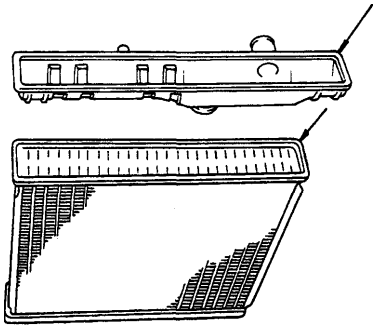
1. INSPECT CORE PLATE

Inspect the core píate for damage.

NOTE:

- If the sides of the core píate groove are deformed, reassembly of the tank will be impossible. Therefore, first correct any deformation with pliers or such.
- Water leakage will result if the bottom of the core píate groove is damaged or dented. Therefore, repair or replace if necessary.



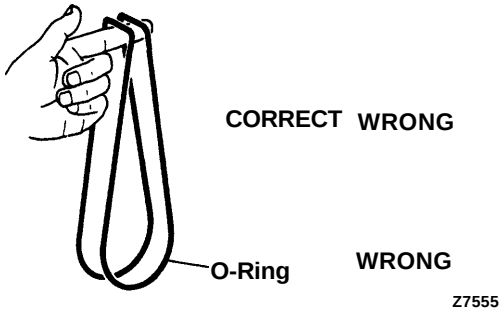


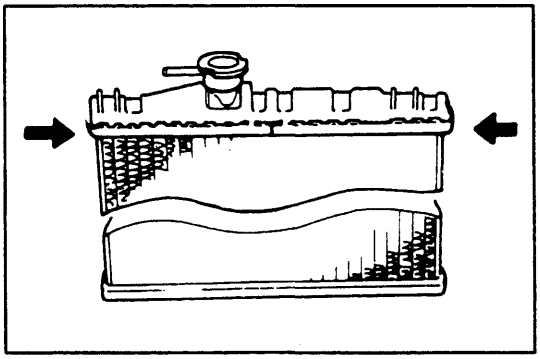
2. INSTALL NEW O-RING AND TANK

NOTE:

- Clean the tank and core píate.

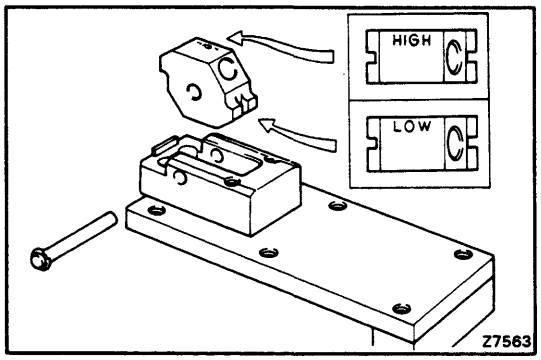
Take out any twists.





3. INSTALL TANK PLATES

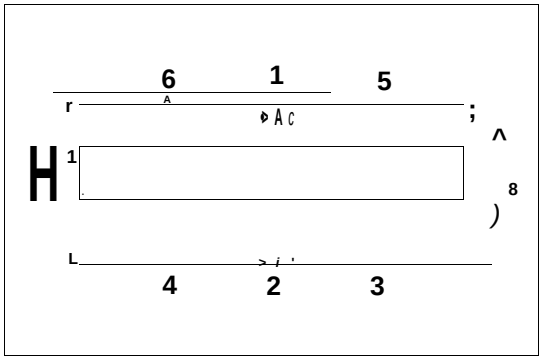
Inserí new tank plates from both ends in the direction of the arrows. Inserí to where the portions shown with an asterisk make conract with the tank.



4. STAKE CLAWS OF TANK PLATES

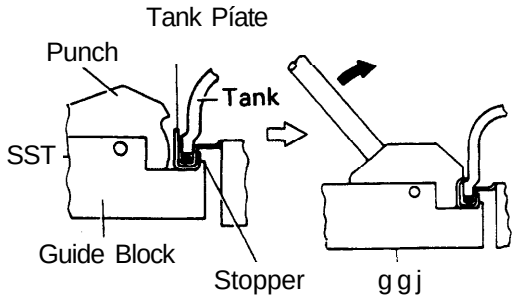
(a) Set the punch of SST to "LOW".

SST 09230-00010

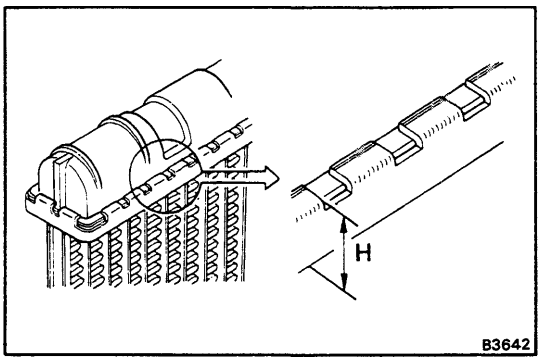


(b) Stake the claws of the tank plates with **SST** in the numerical order shown in the figure.

SST 09230-00010



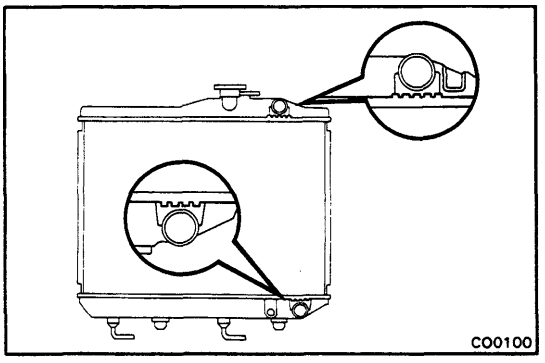
CAUTION: If the bottom of the core píate is staked with the SST on the guide block stopper, it may result in water leakage.



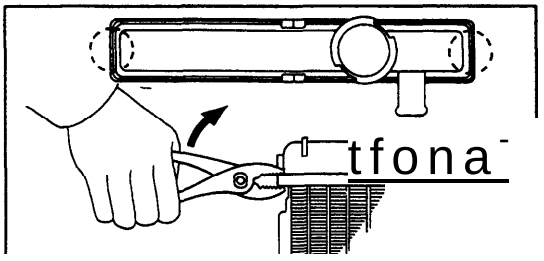
NOTE:

- Stake with just enough pressure to leave a mark on the claw. The staked píate height (H) should be as follows:

Píate height (H): 9.0 - 9.4 mm (0.354 - 0.370 in.)



Do not stake the áreas protruding around the pipes.



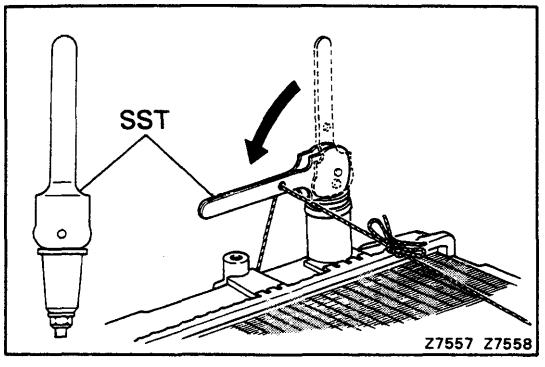
The points shown in the illustration cahnot be staked with the SST. Use a pliers or such and be careful not to damage the core píate.

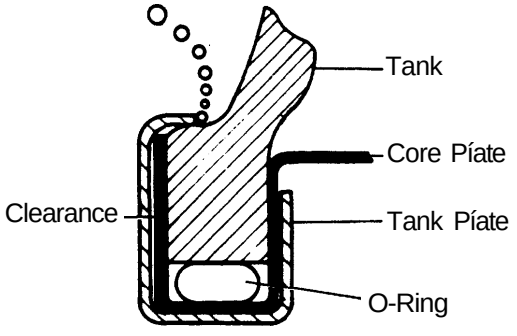
CO0O45
B3640

5. INSTALL TEMPERATURE SWITCH TO LOWER TANK

Clean the contact surfaces of the O-ring and install the temperature switch over the O-ring to the lower tank.

Torque: 75 kg-cm (65 in.-lb, 7.4 IM-m)





6. INSPECT FOR WATER LEAKS

(a) Tighten the drain plug.

(b) Plug the inlet and outlet pipes of the radiator with SST.

SST 09230-00010

(c) Using a radiator cap tester, apply pressure to the radiator.

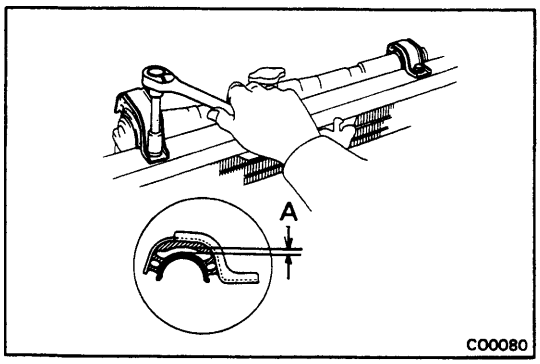
Test pressure: 1.8 kg/cm^2 (26 psi, 177 kPa)

(d) Inspect for water leaks.

NOTE: On radiators with resin tanks, there is a clearance between the core píate and tank píate where a minute amount of air will remain, causing an appearance of an air leak when the radiator is submerged in water. Therefore, before performing the water leak test, first swish the radiator around in the water until all air bubbles disappear.

7. PAINT TANK PLATE

NOTE: If the water leak test checks out okay, allow the radiator to completely dry and then paint the tank píate.



INSTALLATION OF RADIATOR

1. INSTALL RADIATOR

Place the radiator in installed position and install the two supports with two bolts.

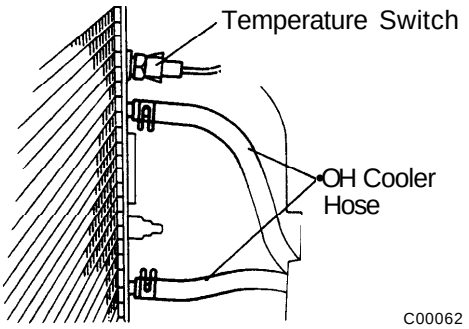
NOTE: After installation, confirm that the rubber cushion (A) of the support is not depressed.

2. CONNECT TWO RADIATOR HOSES

3. CONNECT COOLANT RESERVOIR TUBE

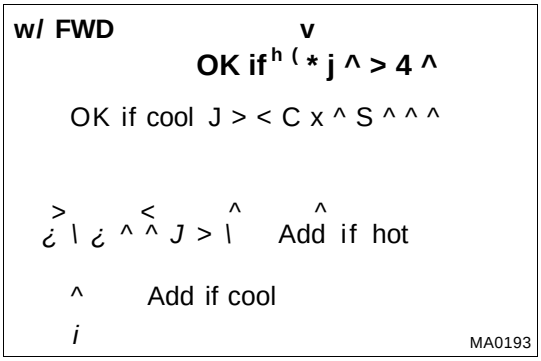
4. INSTALL BOND CABLE

5. (w/ A/T)
CONNECT TWO OIL COOLER HOSES



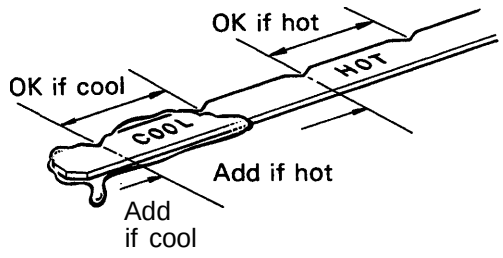
6. CONNECT CONNECTOR TO WATER TEMPERATURE SWITCH

7. FILL WITH ENGINE COOLANT (See page CO-3)



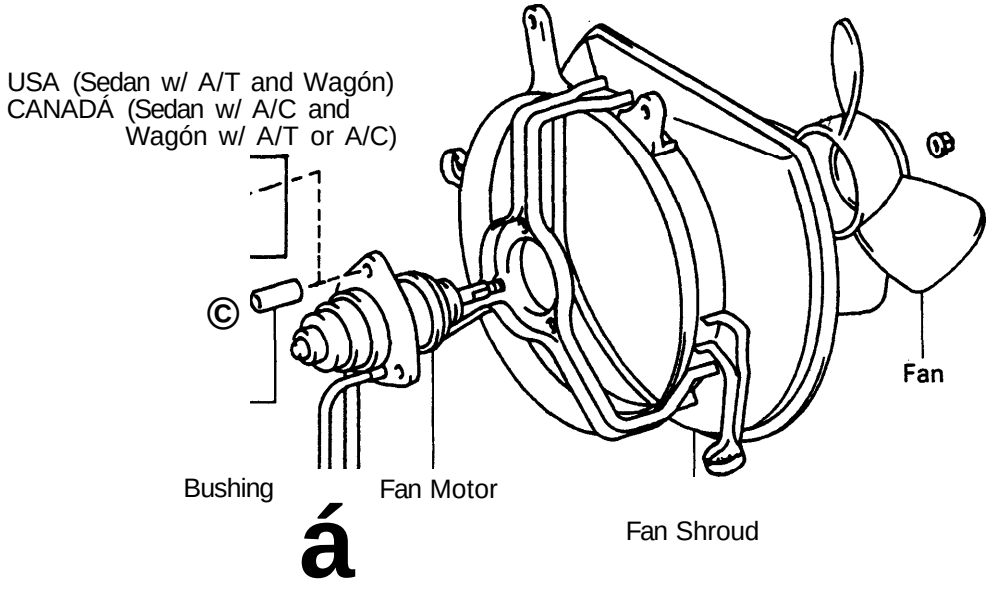
8. (w7 **A/T)**
CHECK A/T FLUID LEVEL (See page MA-20)

w/4WD

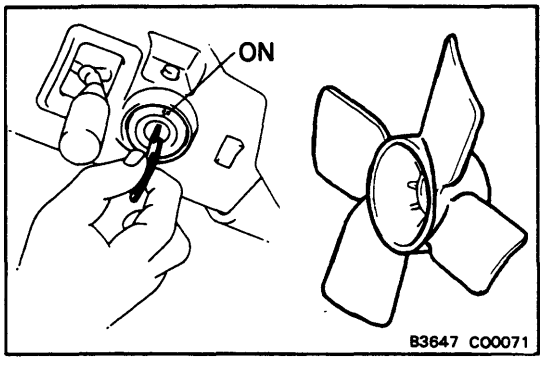


ELECTRIC COOLING FAN

COMPONENTS



C00092

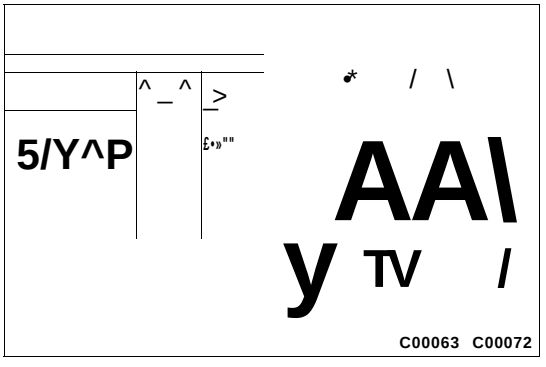


ON-VEHICLE INSPECTION
Low Temperature [below 83°C (181°F)]

1. TURN IGNITION SWITCH "ON"

Check that the fan stops.

If it does not, check the fan relay and temperature switch, and check for a separated connector or severed wire between the relay and temperature switch.



2. DISCONNECT TEMPERATURE SWITCH CONNECTOR

Check that the fan rotates.

If not, check the fan relay, fan motor, ignition relay and fuse, and check for a short circuit between the fan relay and temperature switch.

3. CONNECT TEMPERATURE SWITCH WIRE

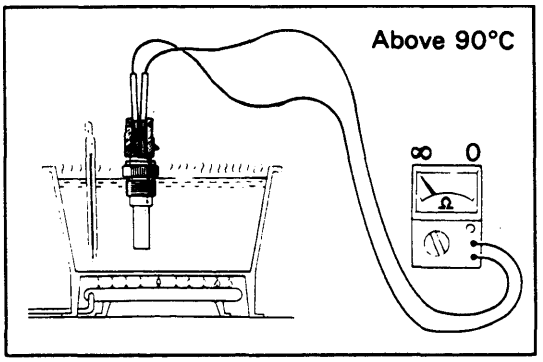
High Temperature [above 90°C (194°F)]

4. START ENGINE

(a) Raise the engine temperature to above 90°C (194°F).

(b) Check that the fan rotates.

If not, replace the temperature switch.

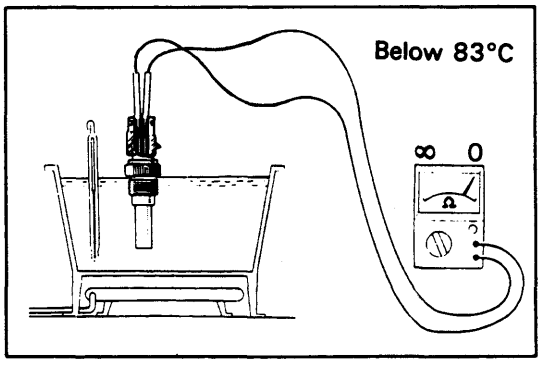


INSPECTION OF ELECTRIC COOLING FAN

1. INSPECT TEMPERATURE SWITCH

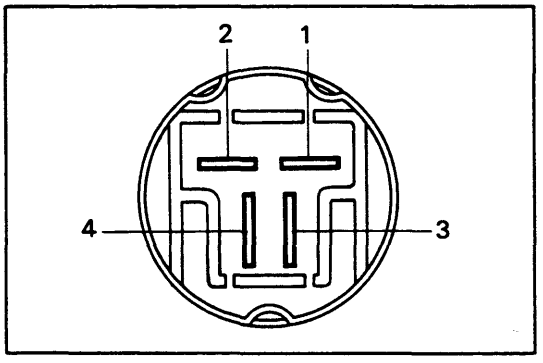
LOCATION: In the radiator lower tank

(a) Using an ohmmeter, check that there is no continuity when the coolant is above 90°C (194°F).



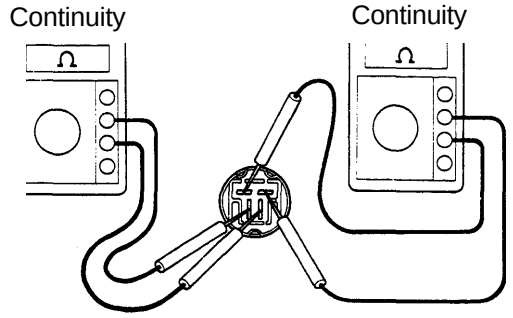
(b) Check that there is continuity when the coolant temperature ¡s below 83°C (181°F).

If continuity is not as specified, replace the switch.



2. INSPECT COOLING FAN MOTOR RELAY

LOCATION: In the engine compartment relay box.

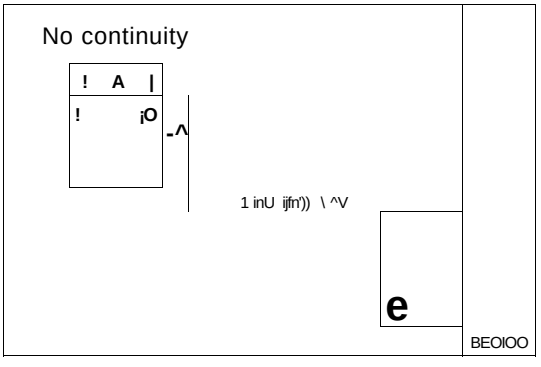


Inspect Relay Continuity

(a) Using an ohmmeter, check that there is continuity between terminái‌s 1 and 2.

(b) Check that there is continuity between terminái‌s 3 and 4.

If there is no continuity, replace the relay.

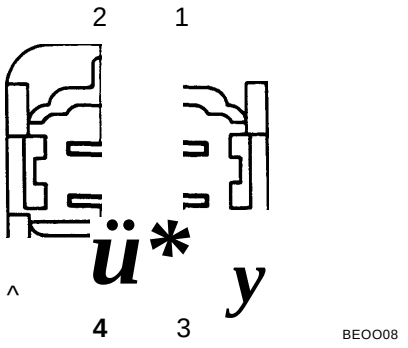


Inspect Relay Operation

(a) Apply battery voltage across terminái‌s 1 and 2.

(b) Check that there is no continuity between terminái‌s 3 and 4.

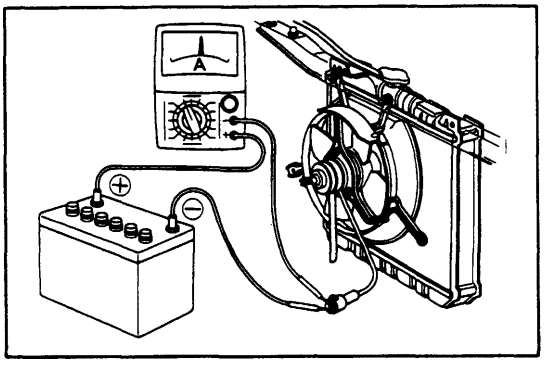
If there is continuity, replace the relay.



3. INSPECT IGNITION MAIN RELAY

LOCATION: In the engine compartment relay box.

Inspect Relay Continuity and Operation
(See Taillight Control Relay on page BE-12)



4. INSPECT FAN MOTOR

(a) Connect the battery and ammeter to the fan motor connector.

(b) Check to see that the motor rotates smoothly, and current is as follows:

ítem	Current (A)	
	USA	CANADÁ
Sedan	4.2 - 5.4 (w/ M/T) 5.8 - 7.4 (w/ A/T)	4.2 - 5.4 5.8 - 7.4 (w/ A/C)
Wagón	5.8 - 7.4 (w/ M/T) 8.8 - 10.8 (w/A/T)	4.2 - 5.4 (w/ M/T) 5.8 - 7.4 (w/ A/T or A/C)

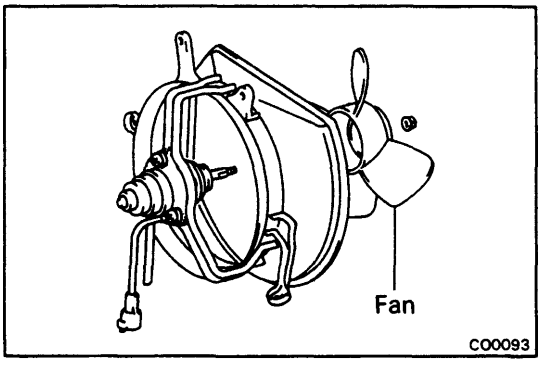
REMOVAL OF ELECTRIC COOLING FAN

1. DISCONNECT CONNECTOR OF FAN MOTOR

2. REMOVE FRONT GRILL

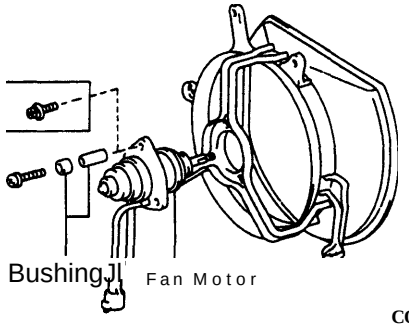
3. REMOVE ELECTRIC COOLING FAN ASSEMBLY

DISASSEMBLY OF ELECTRIC COOLING FAN



1. REMOVE FAN

Remove the nut and fan.



2. REMOVE FAN MOTOR

Remove the screws, bushings and fan motor.

ASSEMBLY OF ELECTRIC COOLING FAN

(See page CO-18)

1. **INSTALL FAN MOTOR**
   Install the fan motor with the bushings and screws.
2. **INSTALL FAN**
   Install the fan with the nut.

INSTALLATION OF ELECTRIC COOLING FAN

1. **INSTALL ELECTRIC COOLING FAN ASSEMBLY**
2. **INSTALL FRONT GRILL**
3. **CONNECT CONNECTOR OF FAN MOTOR**

LUBRICATION SYSTEM

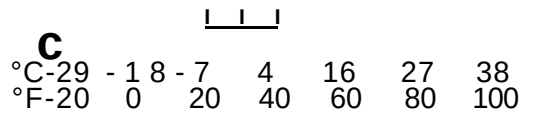
•ü

TROUBLESHOOTING

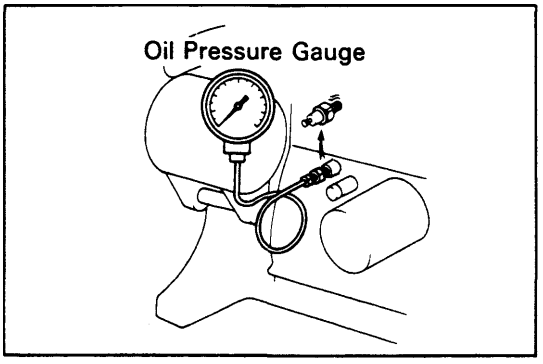
Problem	Possible cause	Remedy	Page
Oil leakage	Cylinder head, cylinder block or oil pump body damaged or cracked	Repair as necessary	
	Oil seal faulty	Replace oil seal	LU-4, EM-52
	Gasket faulty	Replace gasket	
Low oil pressure	Oil leakage	Repair as necessary	
	Relief valve faulty	Repair relief valve	LU-4
	Oil pump faulty	Repair oil pump	LU-4
	Engine oil poor quality	Replace engine oil	
	Crankshaft bearing faulty	Replace bearing	EM-36
	Connecting rod bearing faulty	Replace bearing	EM-36
High oil pressure	Oil filter clogged	Replace oil filter	
	Relief valve faulty	Repair relief valve	LU-4

OIL PRESSURE CHECK

Recommended viscosity (SAE):



LU0043



1. CHECK OIL QUALITY

Check the oil for deterioraron, entry of water, discoloring or thinning.

If oil quality is poor, replace.

Use API grade SF, or SF/CC multigrade, fuel-efficient and recommended viscosity oil.

2. CHECK OIL LEVEL

The oil level should be between the "L" and "F" marks on the level gauge.

If low, check for leakage and add oil up to the "F" mark.

3. REMOVE OIL PRESSURE SWITCH

4. INSTALL OIL PRESSURE GAUGE

5. START ENGINE

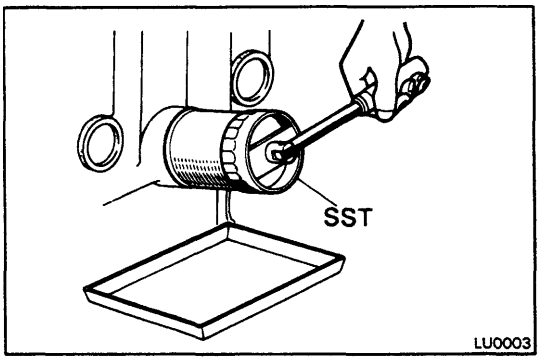
Start the engine and warm it up to normal operating temperature.

6. MEASURE OIL PRESSURE

Oil pressure:

At idle	**More than 0.3 kg/cm^2 (4.3** psi, **29 kPa)**
At 3,000 rpm	**2.5 - 5.0 kg/cm^2 (36 - 71** psi, **245 - 490 kPa)**

NOTE: Check for oil leakage after reinstalling the pressure switch.



REPLACEMENT OF ENGINE OIL AND OIL FILTER

1. DRAIN ENGINE OIL

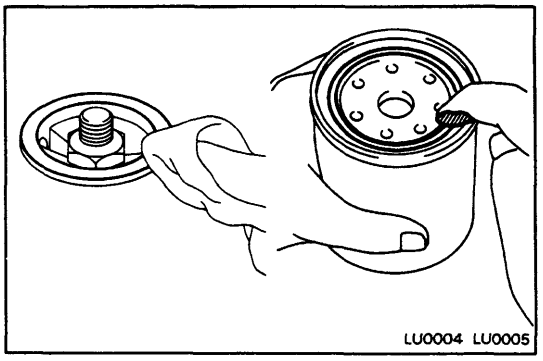
(a) Remove the oil filler cap.

(b) Remove the oil drain plug and drain the oil into a container.

2. REPLACE OIL FILTER

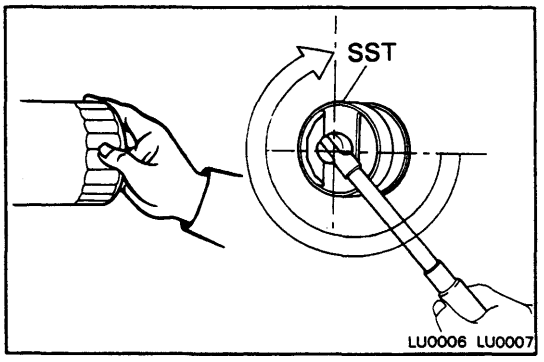
(a) Using SST, remove the oil filter.

SST 09228-22020



(b) Inspect and clean the oil filter ¡nstallation surface.

(c) Apply clean engine oil to the gasket of a new oil filter.



(d) Lightly screw in the oil filter to where you feel resistance.

(e) Then, using SST, tighten the oil filter an extra 3/4 turn.

SST 09228-22020

3. FILL WITH ENGINE OIL

(a) Clean and instali the oil drain plug with a new gasket. Torque the drain plug.

Torque: 350 kg-cm (25 ft-lb, 34 Nm)

(b) Fill the engine with new oil, API grade SF or SF/CC, multigrade, fuel-efficient and recommened viscosity oil.

Capacity:

Drain and refill-

w/o Oil filter change

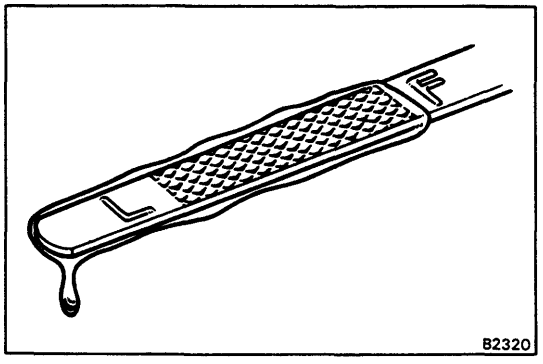
3.0 liters (3.2 US qts, 2.6 Imp.qts)

w/ Oil filter change

3.3 liters (3.5 US qts, 2.9 Imp.qts)

Dry fill- 3.7 liters (3.9 US qts, 3.3 Imp.qts)

(c) Instali the oil filler cap.



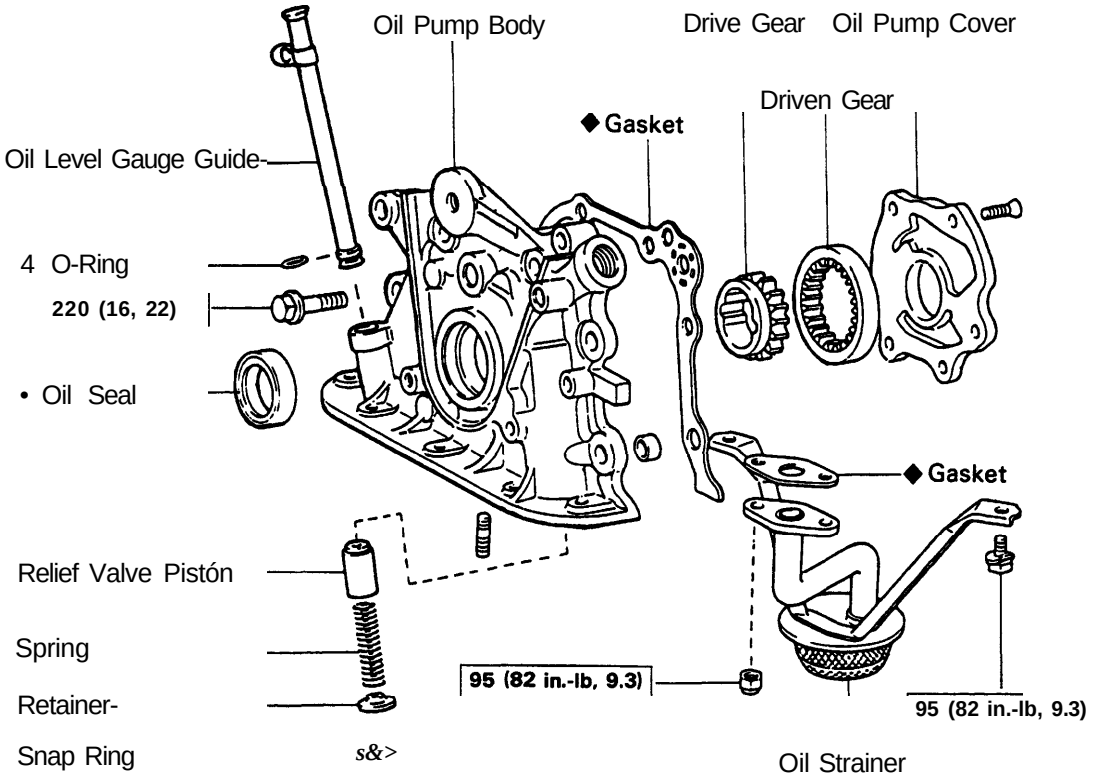
4. START ENGINE AND CHECK FOR LEAKS

5. RECHECK OIL LEVEL

Recheck the engine oil level and refill as necessary.

OIL PUMP

COMPONENTS



lkg-cm (ft-lb, Nm)|: Tightening torque
• : Non-reusable part

REMOVAL OF OIL PUMP

NOTE: When repairing the oil pump, the oil pan and strainer should be removed and cleaned.

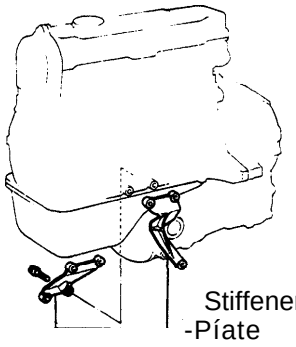
1. **RAISE VEHICLE**

   CAUTION: Be sure the vehicle is securely supported.

2. **DRAIN ENGINE OIL**

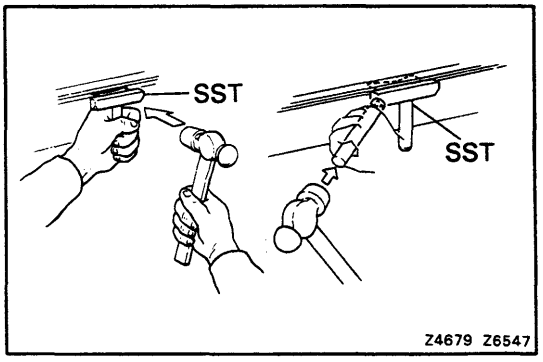
3. **DRAIN ENGINE COOLANT (See page CO-3)**

4. **REMOVE RADIATOR (See page CO-12)**



LU0078

5. **REMOVE OIL PAN**
   (a) Remove the engine under cover.
   (b) Remove the four bracket bolts, and lower the stabilizer.
   (c) Remove the right and left stiffener plates.



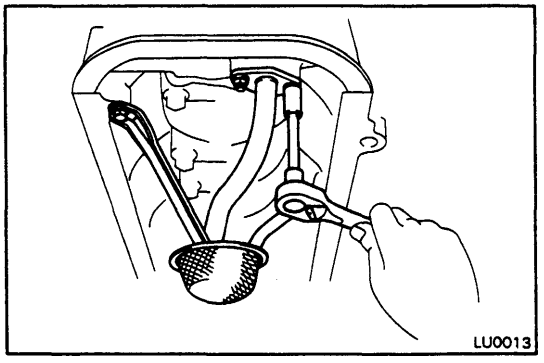
(d) Remove the four nuts and seventeen bolts.

(e) Inserí the blade of SST between the cylinder block and oil pan, cut off applied sealer and then remove the oil pan.

SST 09032-00100

NOTE:

- **Do not use SST for the oil pump body side. If necessary, use a screwdriver.**
- **When removing the oil pan, be careful not to damage the oil pan flange.**

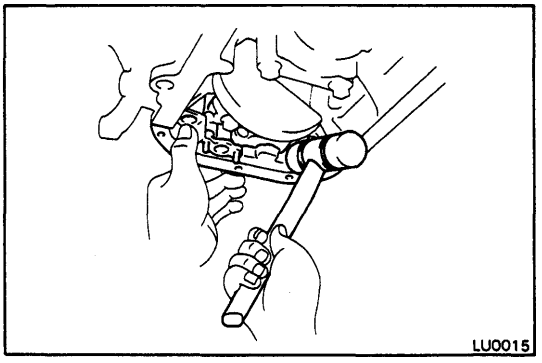


6. REMOVE OIL STRAINER

Remove the two bolts, nuts, oil strainer and gasket.

7. REMOVE TIMING BELT AND CRANKSHAFT TIMING PULLEY (See pages EM-7 and 8)

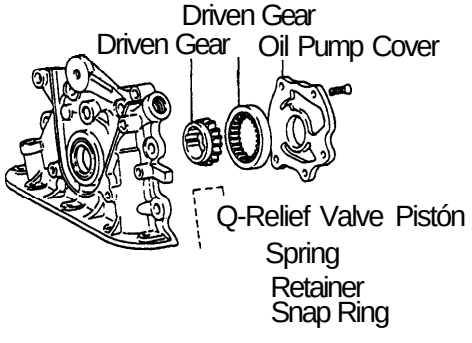
8. REMOVE OIL LEVEL GAUGE AND GUIDE



9. REMOVE OIL PUMP

(a) Remove the seven bolts.

(b) Using a plastic-faced hammer, carefully tap off the oil pump body.



DISASSEMBLY OF OIL PUMP

(See page LU-4)

1. REMOVE RELIEF VALVE

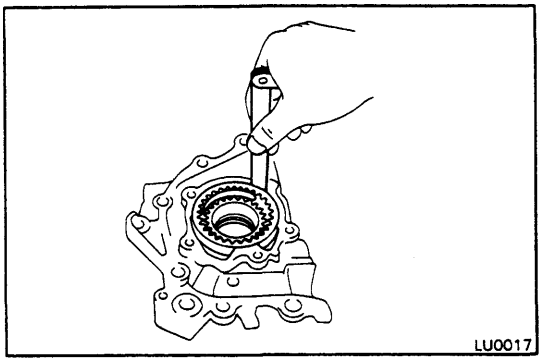
(a) Using snap ring pliers, remove the snap ring.

(b) Remove the retainer, spring and relief valve pistón.

2. REMOVE DRIVE AND DRIVEN GEARS

(a) Remove the five bolts and oil pump cover.

(b) Remove the drive and driven gears.



INSPECTION OF OIL PUMP

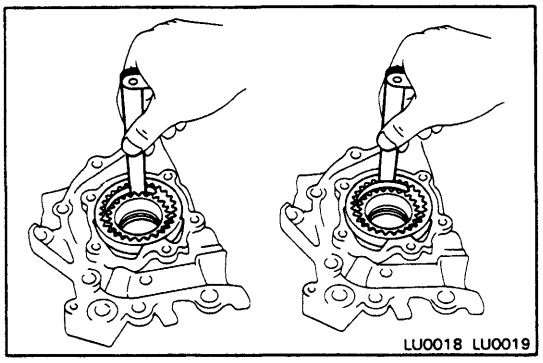
1. INSPECT BODY CLEARANCE

Using a feeler gauge, measure the clearance between the driven gear and body.

Standard clearance: 0.100 - 0.191 mm (0.0039 - 0.0075 in.)

Máximum clearance: 0.20 mm (0.0079 in.)

If the clearance is exceeds máximum, replace the gear and/or body.



2. INSPECT TIP CLEARANCE

Using a feeler gauge, measure the clearance between both gear tips and crescent.

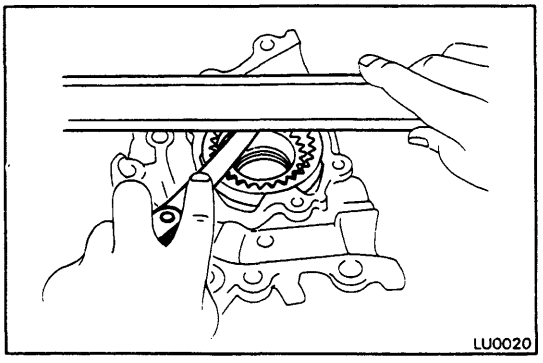
Standard clearance:

Drive gear to cresent 0.058 - 0.310 mm (0.0023-0.0122 in.)

Drive gear to cresent 0.107 - 0.248 mm (0.0042 - 0.0098 in)

Máximum clearance: 0.35 mm (0.0138 in.)

If the clearance is exceeds máximum, replace the gear and/or body.



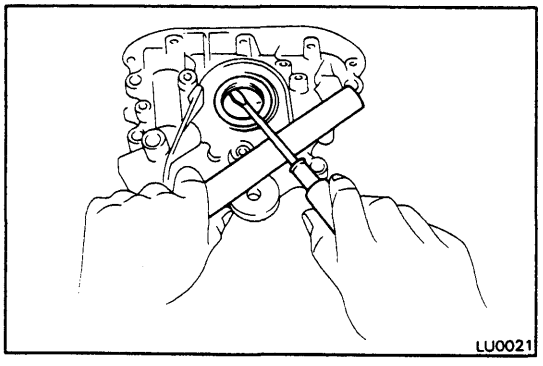
3. INSPECT SIDE CLEARANCE

Using a feeler gauge and fíat block, measure the side clearance as shown.

Standard clearance: 0.025 - 0.075 mm (0.0010 - 0.0030 in.)

Máximum clearance: 0.10 mm (0.0039 in.)

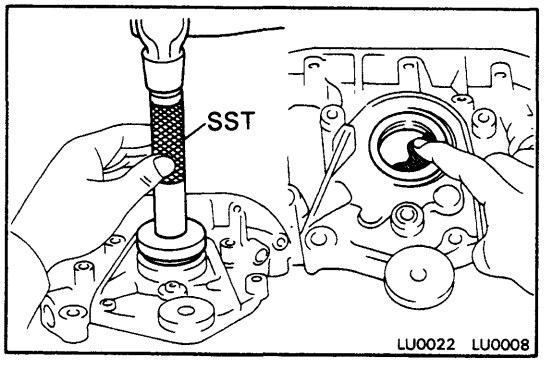
If the clearance is exceeds máximum, replace the gears and/or body.



REPLACEMENT OF OIL SEAL

1. REMOVE OIL SEAL

Using a screwdriver, pry out the oil seal.

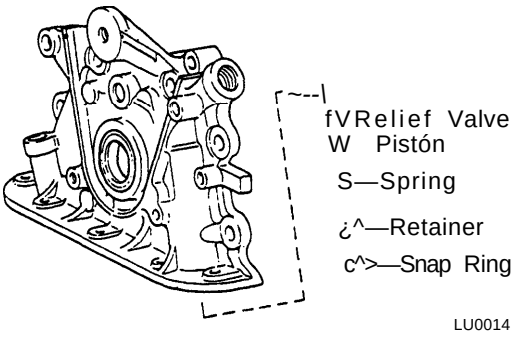


2. INSTALL OIL SEAL

(a) Using SST, drive in a new oil seal.

SST 09517-30010

(b) Apply MP grease to the oil seal.



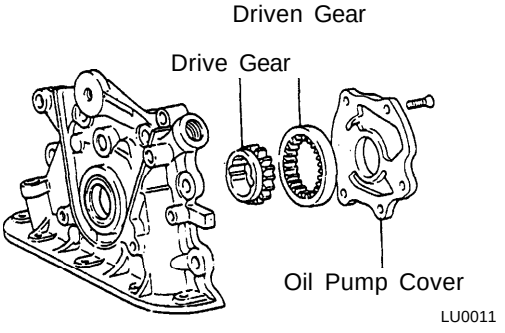
ASSEMBLY OF OIL PUMP

(See page LU-4)

1. INSTALL RELIEF VALVE

(a) Insert the relief valve pistón, spring and retainer into the pump body.

(b) Using snap ring pliers, install the snap ring.

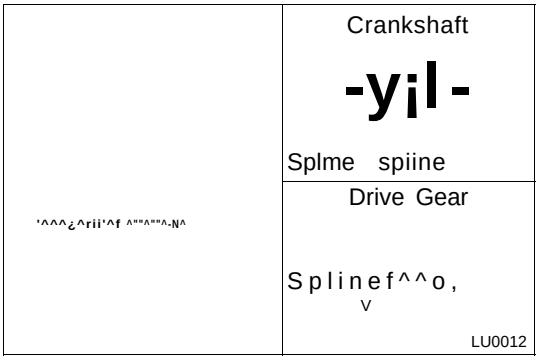


2. INSTALL DRIVE AND DRIVEN GEARS

(a) Insert the drive and driven gears into the pump body.

(b) Install the oil pump cover with the five screws. Torque the screws.

Torque: 105 kg-cm (8 ft-lb, 10.3 Nm)



INSTALLATION OF OIL PUMP

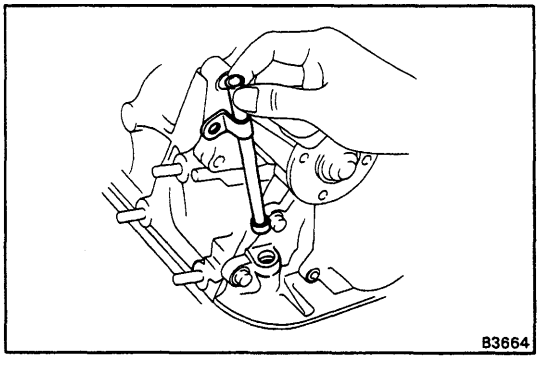
1. INSTALL OIL PUMP

(a) Install a new gasket to the block.

(b) Install the oil pump to the crankshaft with the spiine teeth of the drive gear engaged with the large teeth of the crankshaft.

(c) Install and torque seven bolts.

Torque: 220 kg-cm (16 ft-lb, 22 Nm)



2. INSTALL OIL LEVEL GAUGE GUIDE AND GAUGE

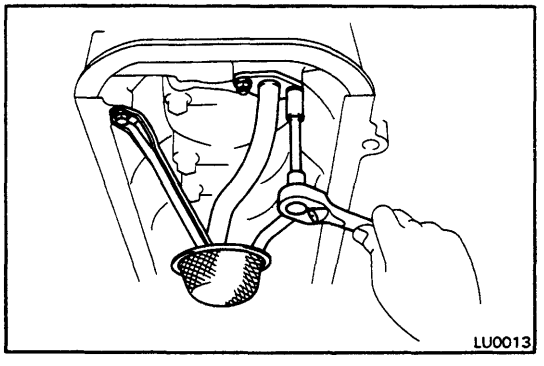
(a) Push in the oil level gauge guide with a new O-ring coated with a small amount of engine oil.

(b) Install the O-ring to the oil level gauge guide.

(c) Insert the oil level gauge guide.

(d) Install the mount bolt.

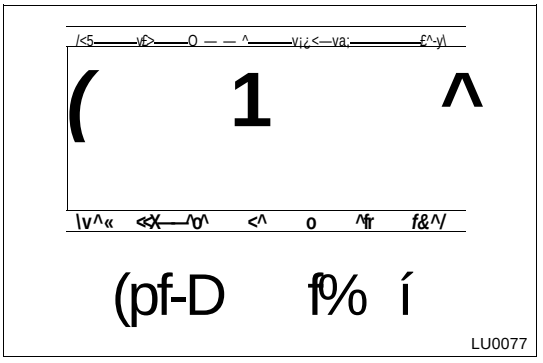
(e) Insert the oil level gauge.



3. INSTALL OIL STRAINER

Place a new oil strainer gasket in position and install the oil strainer with the two bolts and nuts. Torque the bolts and nuts.

Torque: 95 kg-cm (82 in.-lb, 9.3 Nm)



4. INSTALL OIL PAN

(a) Remove any oíd packing material and be careful not to drop any oil on the contacting surfaces of the oil pan and cylinder block.

- Using a razor blade and gasket scraper, remove all the packing (FIPG) material from the gasket surfaces.
- Thoroughly clean all components to remove all the loóse material.
- Clean both sealing surfaces with a non-residue solvent.

CAUTION: Do not use a solvent which will affect the painted surfaces.

(b) Apply No. 102 seal packing (Part No. 08826-00080) or equivalent to the oil pan as shown in the figure.

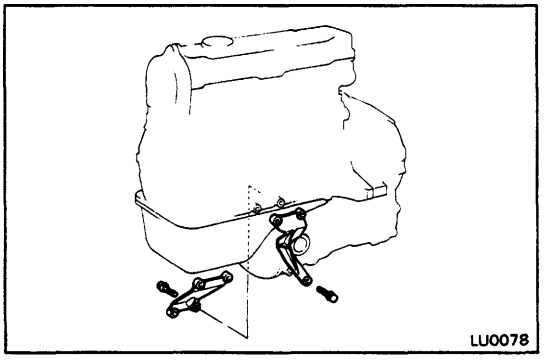
- Instad a nozzle that has been cut to a 5mm (0.20 in.) opening.

NOTE: Avoid applying an excess amount to the surface. Be especially careful near oil passages.

- Parts must be assembled within 15 minutes of application. Otherwise, the material must be removed and re-applied.
- Immediately remove nozzle from tube and reinstall cap.

(c) Instad the oil pan with the nineteen bolts and two nuts.

Torque: 55 kg-cm (48 in.-lb, 5.4 N-m)



(d) Instad the right and left stiffener plates with the seven bolts. Torque the bolts.

Torque: 350 kg-cm (25 ft-lb, 34 N-m)

(e) Install the two stabilizer brackets with the four bolts. Torque the bolts.

Torque: 590 kg-cm (43 ft-lb, 58 N-m)

(f) Install the engine under cover with the four bolts.

5. LOWER VEHICLE

6. INSTALL TIMING BELT (See page EM-11)

7. INSTALL AIR CLEANER
(See step 10 on page FU-27)

8. INSTALL AND FILL RADIATOR (See page CO-17)

9. FILL ENGINE OIL (See page LU-3)

IGNITION SYSTEM

ME

PRECAUTIONS

1. **Do not keep the ignition switch "ON" for more than 10 minutes if the engine will not start.**
2. **When using a tachometer, connect the tachometer test probé to the service connector of the HA.**
3. **It is recommended that you consult with the manufacturer before using a tachometer as some are not compatible with this system.**
4. **NEVER allow the ignition coil terminái s to touch ground as it could result in damage to the igniter and/or ignition coil.**
5. **Do not disconnect the battery while the engine is running.**
6. **Make sure that the igniter is properly grounded to the body.**

TROUBLESHOOTING

Problem	Possibie cause	Remedy	Page
Engine will not start/ Hard to start (cranks OK)	Incorrect ignition timing	Reset timing	IG-13
	Ignition coil faulty	Inspect coil	IG-4
	Igniter faulty	Inspect igniter	IG-5
	Distributor faulty	Inspect distributor	IG-6
	High-tension cord faulty	Inspect high-tension cord	IG-4
	Spark plugs faulty	Inspect plugs	IG-4
	Ignition wiring disconnected or broken	Inspect wiring	
Rough idle or stalls	Spark plugs faulty	Inspect plugs	IG-4
	ignition wiring faulty	Inspect wiring	
	Incorrect ignition timing	Reset timing	IG-13
	Ignition coil faulty	Inspect coil	IG-4
	Igniter faulty	Inspect igniter	IG-5
	Distributor faulty	Inspect distributor	IG-6
	High-tension cord faulty	Inspect high-tension cord	IG-4
Engine hesitates/ Poor acceleration	Spark plugs faulty	Inspect plugs	IG-4
	Ignition wiring faulty	Inspect wiring	
	Incorrect ignition timing	Reset timing	IG-13
Engine dieseling (runs after ignition switch is turned off)	Incorrect ignition timing	Reset timing	IG-13
Muffler explosión (after fire) all the time	Incorrect ignition timing	Reset timing	IG-13
Engine backfires	Incorrect ignition timing	Reset timing	IG-13
Poor gasoline mileage	Spark plugs faulty	Inspect plugs	IG-4
	Incorrect ignition timing	Reset timing	IG-13
Engine overheats	Incorrect ignition timing	Reset timing	IG-13

ON-VEHICLE INSPECTION

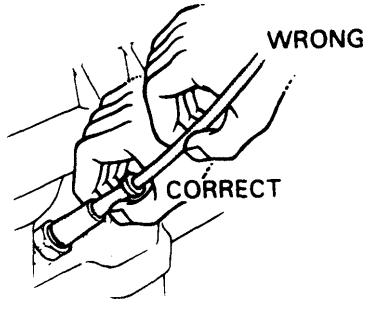
SPARK TEST

NOTE: Perform this test to check that there is voltage from the HA to each spark plug.

CRANK ENGINE AND CHECK THAT LIGHT FLASHES

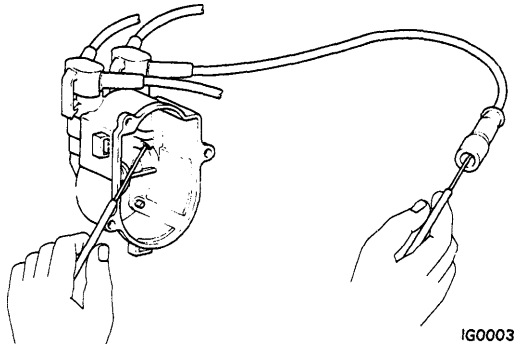
Connect a timing light to the spark plug. If the timing light does not flash, check the wiring connections, ignition coil, igniter and distributor.

INSPECTION OF HIGH-TENSION CORDS



1. CAREFULLY REMOVE HIGH-TENSION CORDS BY RUBBER BOOT FROM SPARK PLUGS

CAUTION: Pulling on or bending the cords may damage the conductor inside.



2. INSPECT HIGH-TENSION CORD RESISTANCE

Using an ohmmeter, measure the resistance without disconnecting the cap.

Máximum resistance: 25 kíl/per cord

If resistance is more than máximum, check the terminái. Replace the high-tension cord and/or distributor cap if necessary.

INSPECTION OF SPARK PLUGS

1. REMOVE SPARK PLUGS

2. CLEAN AND INSPECT SPARK PLUGS

(a) Clean the spark plugs with a spark plug cleaner or wire brush.

(b) Inspect the spark plugs for electrode wear, thread damage and insulator damage.

If there is a problem, replace the plugs.

Recommended spark plugs:

Fed.

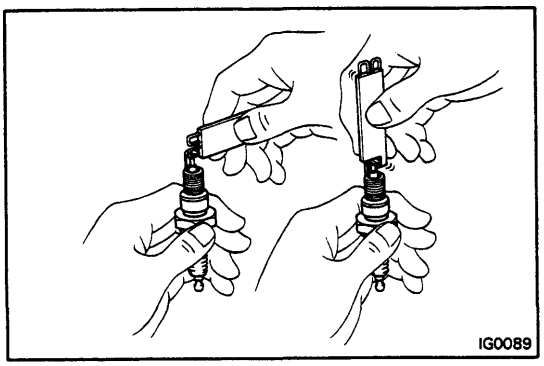
ND W14EXR-U11 orW16EXR-U11
NGK BPR4EY11 or BPR5EY11

Calif. & Canadá 3A-C (ex. Wagón M/T)

ND W16EXR-U11
NGK BPR5EY11

Canadá 3A-C (Wagón M/T) & 3A

ND W14EXR-U or W16EXR-U
NGK BPR4EY or BPR5EY



3. ADJUST ELECTRODE CAP

Carefully bend the outer electrode to obtain the correct electrode gap.

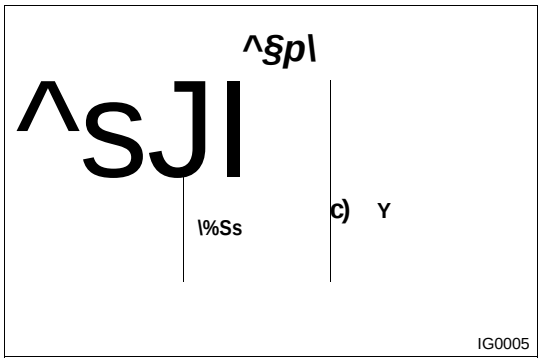
Correct electrode gap:

3A-C (ex. Canadá Wagón M/T)
1.1 mm (0.043 in.)
Others 0.8 mm (0.031 in.)

4. INSTALL SPARK PLUGS

Torque: 180 kg-cm (13 ft-lb, 18 Nm)

INSPECTION OF IGNITION COIL

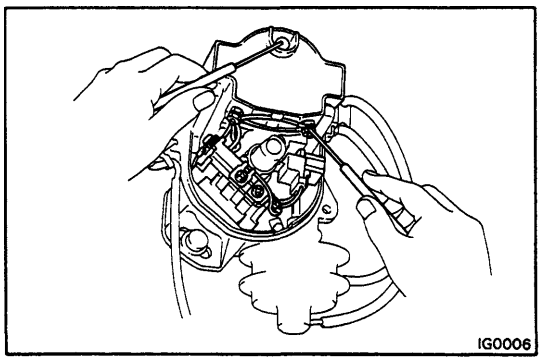


1. INSPECT PRIMARY COIL RESISTANCE

Using an ohmmeter, measure the resistance between the positive (+) and negative (-) terminais.

Primary coil resistance (cold):

3A-C (ex. Canadá Wagón M/T)
0.3 - 0.5 H
Others 1.2- 1.5 O

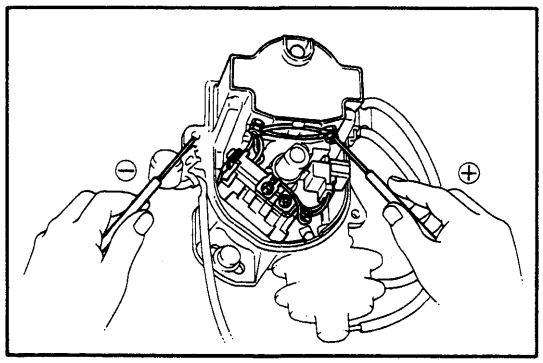


2. INSPECT SECONDARY COIL RESISTANCE

Using an ohmmeter, measure the resistance between the positive (+) terminal and high-tension terminal.

Secondary coil resistance (cold): 7.5 — 10.5 kfí

INSPECTION OF IGNITER

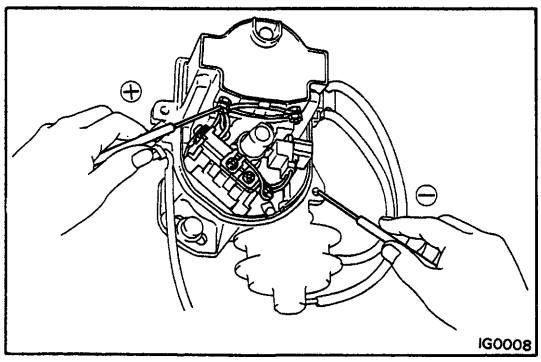


1. TURN IGNITION SWITCH "ON"

2. INSPECT POWER SOURCE LINE VOLTAGE

Using a voltmeter, connect the positive (+) probé to the ignition coil positive (+) terminal and the negative (-) probé to the body ground.

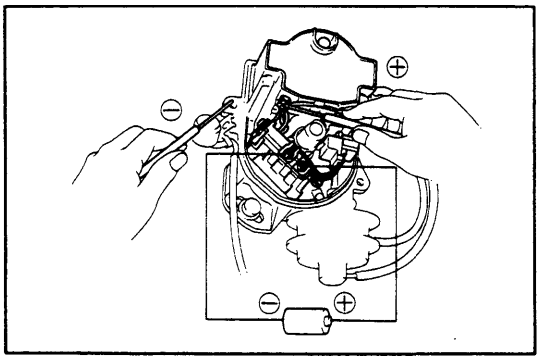
Voltage: Approx. 12 V



3. INSPECT POWER TRANSISTOR IN IGNITER

(a) Using a voltmeter, connect the positive (+) probé to the negative (-) terminal of the ignition coil, and the negative (-) probé to the body ground.

Voltage: Approx. 12 V



(b) Using a dry cell battery (1.5 V), connect the positive (+) pole of the battery to the pink wire terminal and the negative (-) pole to the white wire terminal.

CAUTION: Do not apply voltage more than 5 seconds to avoid destroying the power transistor in the igniter.

(c) Using a voltmeter, connect the positive (+) probé to the negative (-) terminal of the ignition coil, and the negative (-) probé to the body ground.

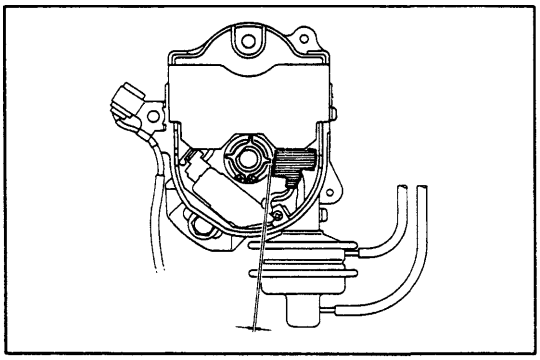
(d) Check the voltage reading.

Voltage:

3A-C (ex. Canadá 4WD Wagón M/T)
5 V - Less than battery voltage
Others 0 - 3 V

If there is a problem, replace the igniter.

TURN IGNITION SWITCH "OFF"

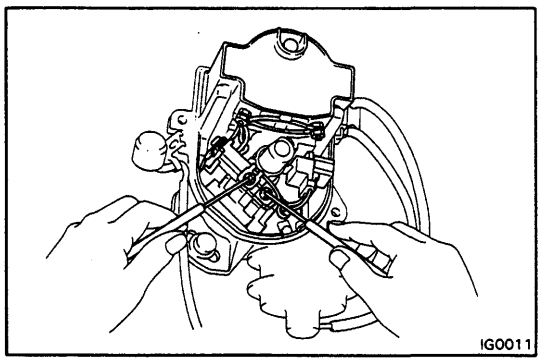


INSPECTION OF HA

1. INSPECT AIR GAP

Using a feeler gauge, measure the gap between the signal rotor and the pick-up coil projection.

Air gap: 0.2 - 0.4 mm (0.008 - 0.016 in.)

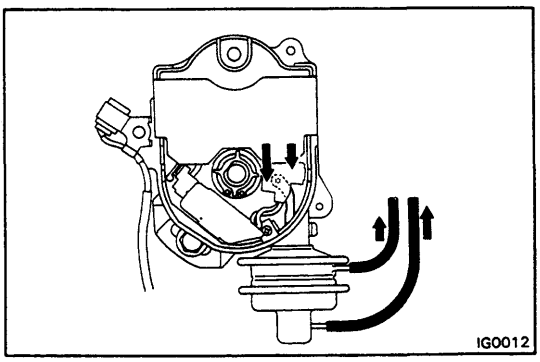


2. INSPECT PICK-UP COIL

Using an ohmmeter, measure the resistance of the pick-up coil.

Pickup coil resistance: 130 — 190 Í2

If the resistance is not correct, replace the pick-up coil and the breaker assembly.

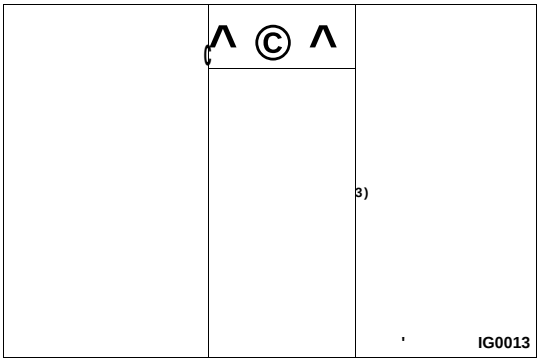


3. INSPECT VACUUM ADVANCE

(a) Disconnect the vacuum hose and connect a vacuum pump to the diaphragms.

(b) Apply vacuum and check that the vacuum advance moves.

If the vacuum advance does not work, repair or replace as necessary.



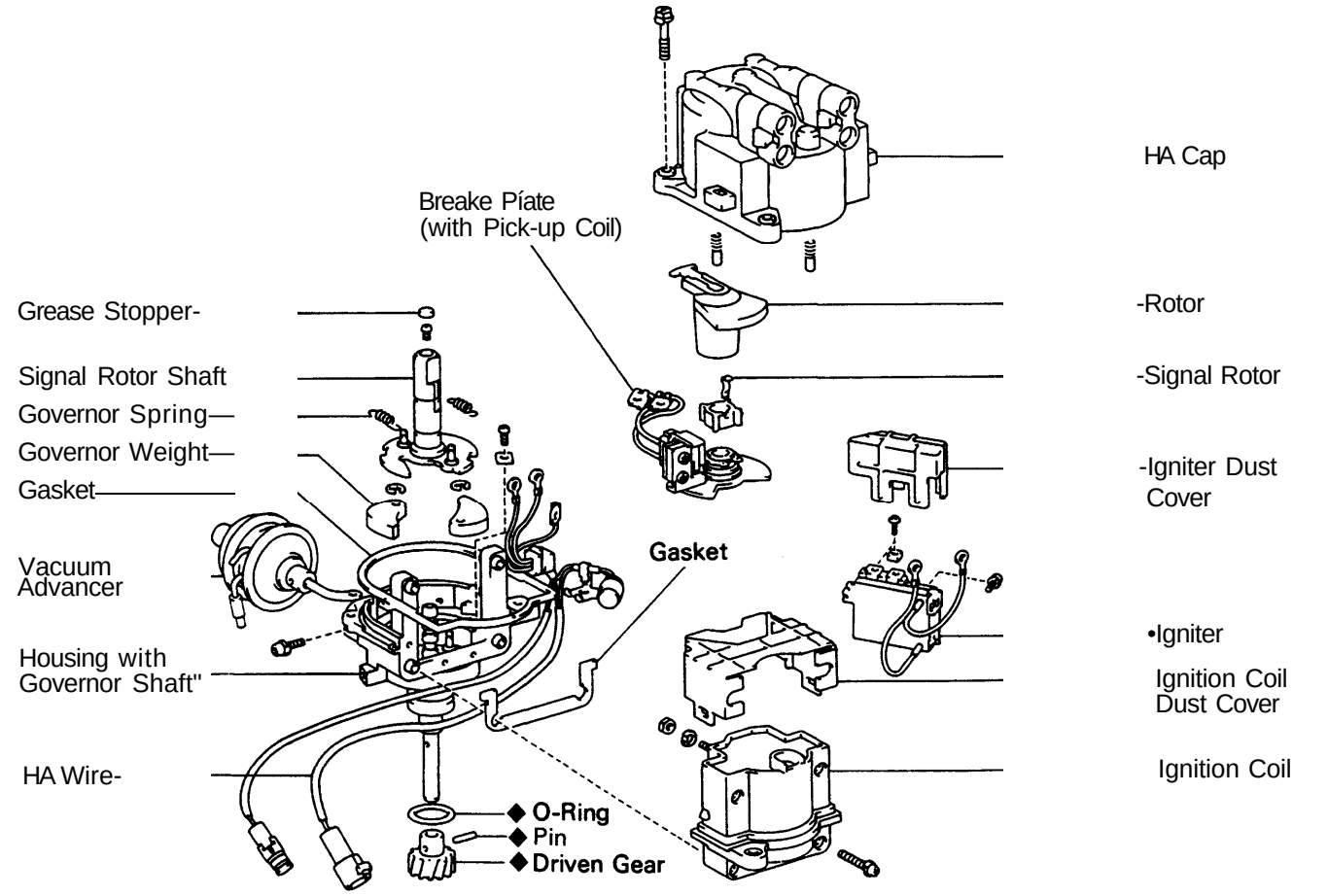
4. INSPECT GOVERNOR ADVANCE

(a) Turn the rotor shaft counterclockwise, reléase it and check that the rotor returns slightly clockwise.

(b) Check that the rotor shaft is not excessively loóse.

INTEGRATED IGNITION ASSEMBLY (HA)

COMPONENTS



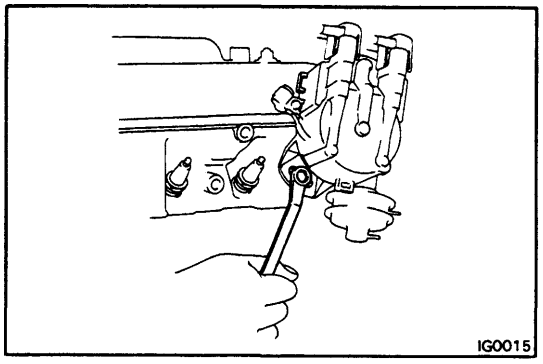
• : Non-reusable part

IG0014

REMOVAL OF HA

1. **DISCONNECT CABLE FROM NEGATIVE TERMINAL OF BATTERY**
2. **DISCONNECT HA WIRE CONNECTOR**
3. **DISCONNECT HOSES FROM VACUUM ADVANCER**
4. **DISCONNECT HIGH-TENSION CORDS FROM SPARK PLUGS.**

   NOTE: Do not remove the cords from the HA cap.



IG0015

5. **REMOVE HA**

   Remove the mount bolt and pulí out the HA.

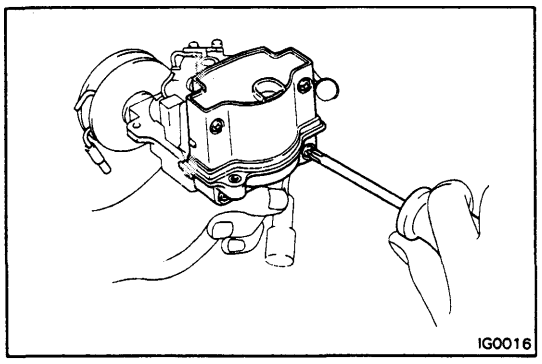
DISASSEMBLY OF HA

(See page IG-7)

1. REMOVE HA CAP AND ROTOR

2. REMOVE IGNITER DUST COVER

3. REMOVE IGNITION COIL DUST COVER

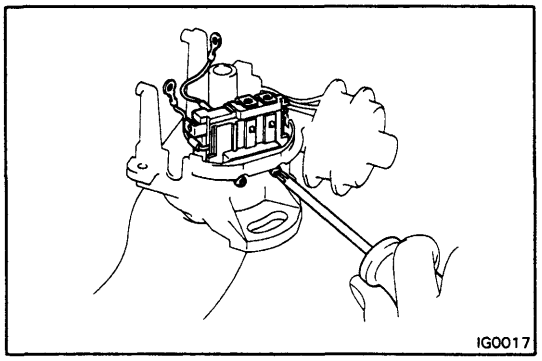


4. REMOVE IGNITION COIL

(a) Remove the nuts and disconnect the wires from the terminái s of the ignition coil.

(b) Remove the four screws and ignition coil.

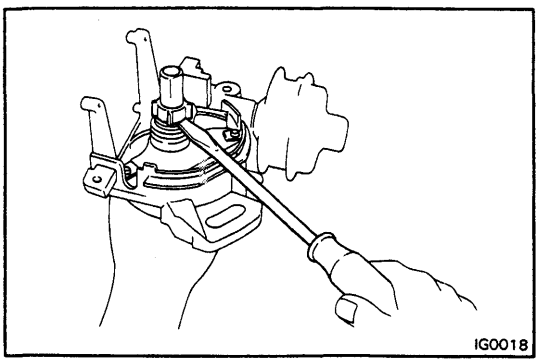
5. REMOVE HA WIRE AND CONDENSER



REMOVE IGNITER

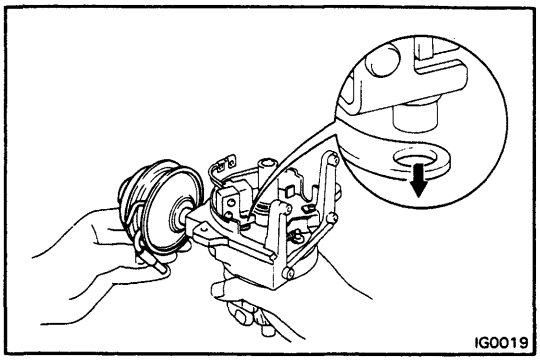
(a) Remove the screws and nuts, and disconnect the wires from the terminái s of the igniter.

(b) Remove the two screws and igniter.



7. REMOVE SIGNAL ROTOR

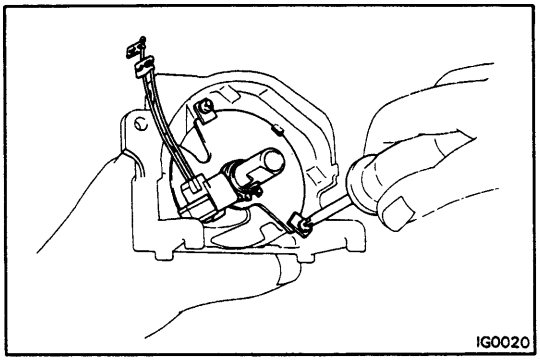
Using a screwdriver, pry out the rotor and set spring.



8. REMOVE VACUUM ADVANCER

(a) Remove the screw.

(b) Disconnect the advancer link hole from the breaker píate pin and remove the advancer.

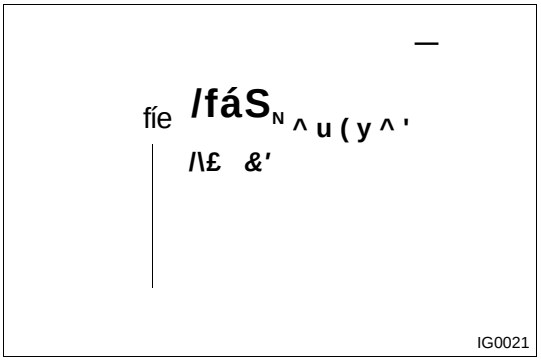


9. REMOVE BREAKER PLATE

(a) Remove the two screws and píate washers.

(b) Remove the breaker píate.

10. REMOVE GOVERNOR SPRINGS

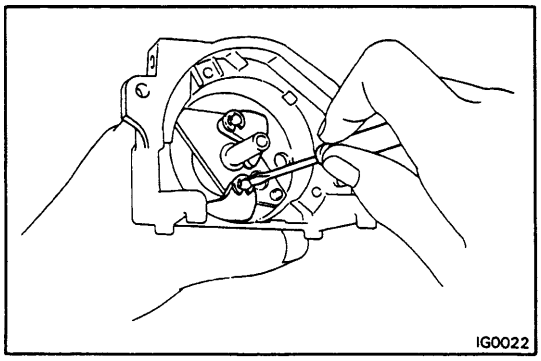


11. REMOVE SIGNAL ROTOR SHAFT

(a) Remove the grease stopper.

(b) Remove the screw at the end of the governor shaft.

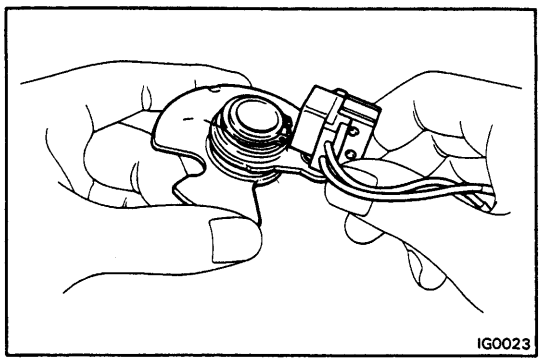
(c) Pulí out the signal rotor shaft.



12. REMOVE GOVERNOR WEIGHTS

Using a small screwdriver, remove the E-rings and pulí out the weights.

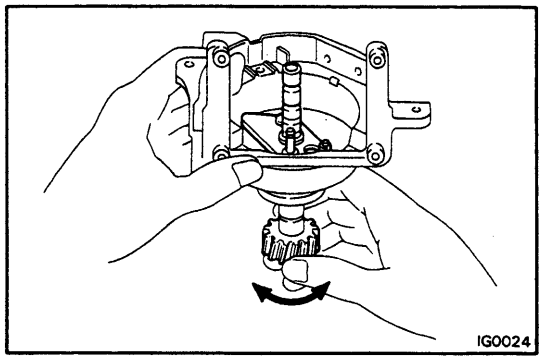
INSPECTION OF HA



1. INSPECT BREAKER PLATE

Turn the breaker píate and check that it has a slight drag.

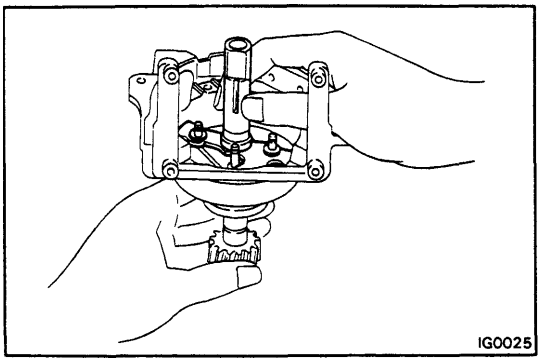
If it sticks or has a strong resistance replace the breaker píate and the pick-up coil assembly.



2. INSPECT GOVERNOR SHAFT BEARING

Turn the governor shaft and check that the bearing is not rough or worn.

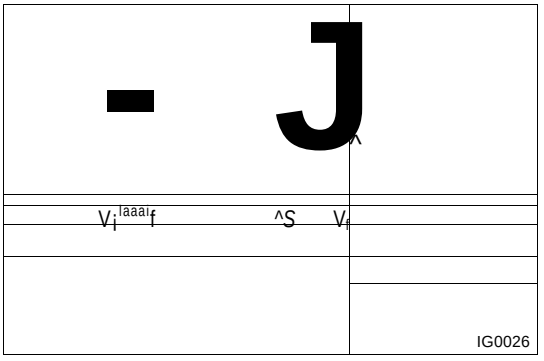
If it feels rough or worn, replace the HA.



3. INSPECT SIGNAL ROTOR SHAFT

Temporarily install the signal rotor shaft to the governor shaft and check that they fit correctly.

If they don't fit, replace the signal rotor shaft or HA.



REPLACEMENT OF DRIVEN GEAR

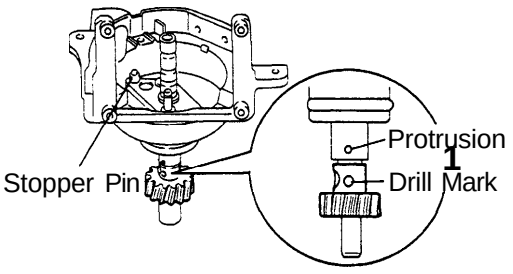
REPLACE DRIVEN GEAR

(a) Using a grinder, grind the driven gear and pin.

CAUTION: Be careful not to damage the governor shaft and housing.

(b) Using a pin punch and hammer, tap out the pin.

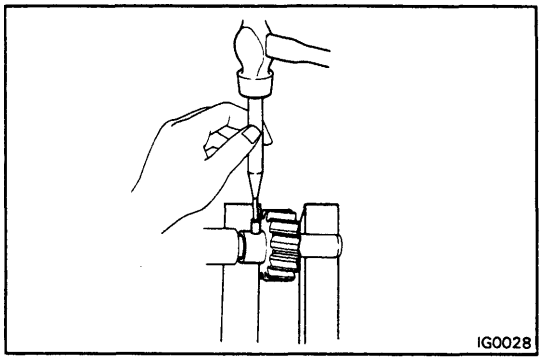
(c) Remove the driven gear.



(d) Align the drill mark on the new driven gear (not the straight pin hole) with the protrusion on the housing.

CAUTION: Be sure to check the stopper pin is positioned as shown.

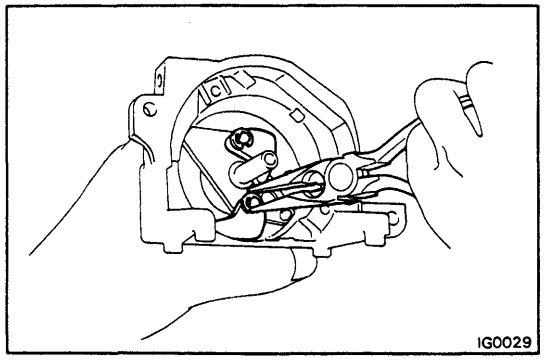
(e) Align the pin holes of the driven gear and governor shaft.



(f) Using a pin punch and hammer, tap in the pin.

(g) Using a hammer, secure both ends of the pin by peening.

CAUTION: Be careful not to damage the driven gear and housing.



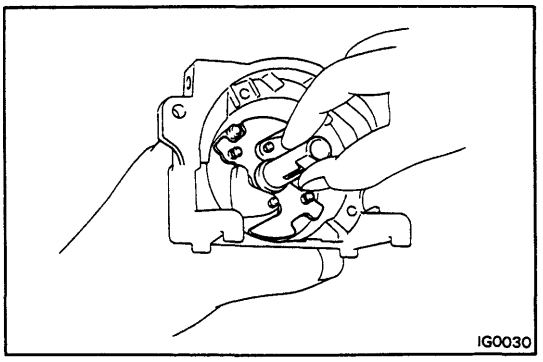
ASSEMBLY OF HA

(See page IG-7)

1. INSTALL GOVERNOR WEIGHTS

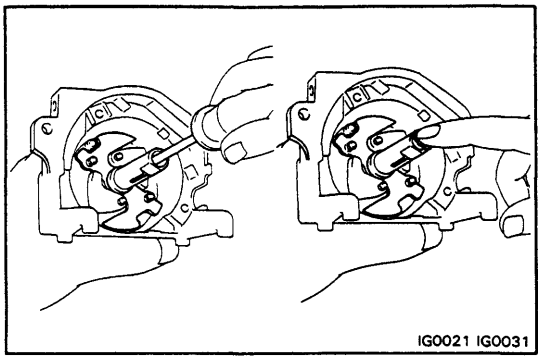
Using needle-nose pliers, install the weights with the E-rings.

2. LIGHTLY COAT GOVERNOR SHAFT WITH HIGH-TEMPERATURE GREASE



3. INSTALL SIGNAL ROTOR SHAFT

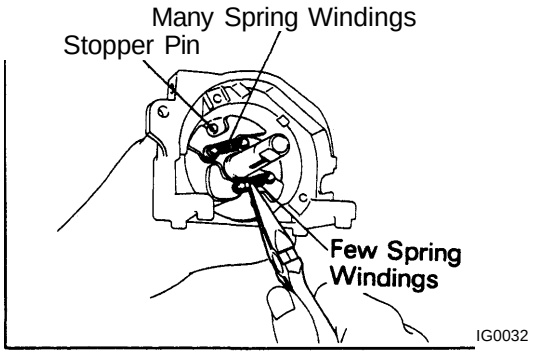
(a) Install the signal rotor shaft on the governor shaft as shown.



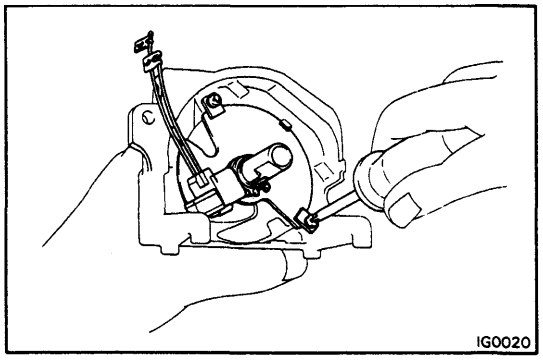
(b) Instad the screw.

(c) Pack high-temparature grease into the shaft.

(d) Push on the grease stopper with your finger.



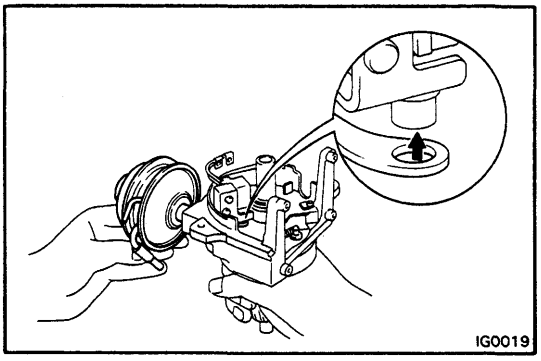
4. INSTALL GOVERNOR SPRINGS



5. INSTALL BREAKER PLATE

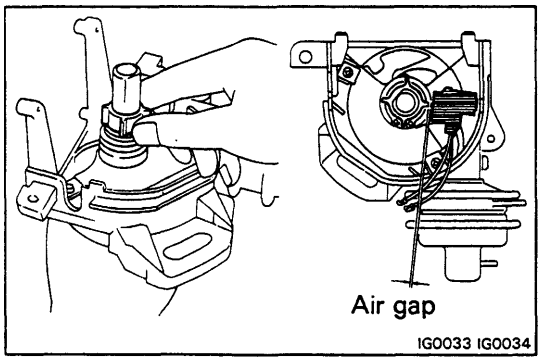
(a) Align the cutout parts of the breaker píate and hous-¡ng, and install the breaker píate.

(b) Secure the breaker píate with the two píate washers and screws.



6. INSTALL VACUUM ADVANCER

Connect the advancer link hole to the breaker píate pin and install the advancer with the screw.



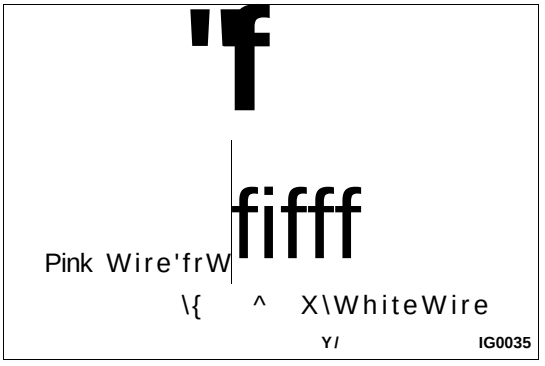
7. INSTALL SIGNAL ROTOR

Install on the rotor with a new spring.

8. INSPECT AIR GAP

Using a feeler gauge, measure the gap between the signal rotor and pick-up coil.

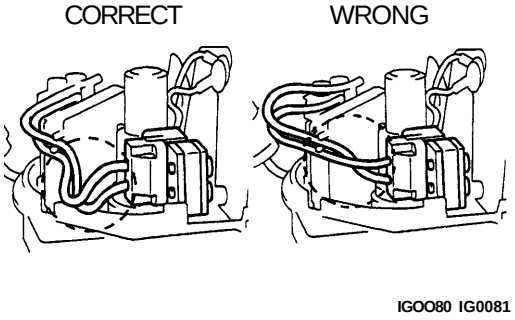
Air gap: 0.2 - 0.4 mm (0.008 - 0.016 in.)



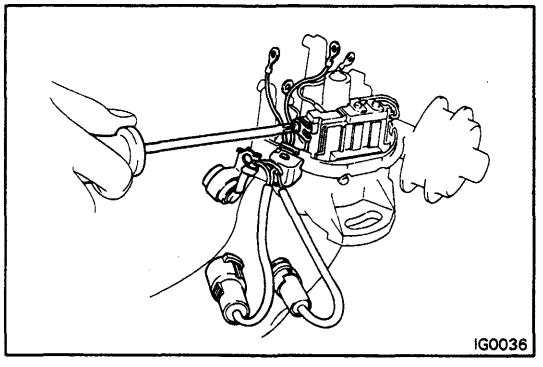
INSTALL IGNITER

(a) Install the igniter with the two screws.

(b) Connect the two wires to the terminals of the igniter with the two screws and nuts as shown.



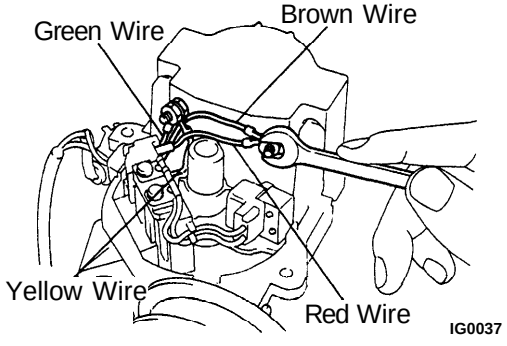
(c) As shown in the figure, secure the pick-up coil wires in the clips, allowing sufficient slack.



10. INSTALL HA WIRE

(a) Install the grommet of the wire to the housing.

(b) Connect the wire to the terminal of the igniter with the screw and nut.



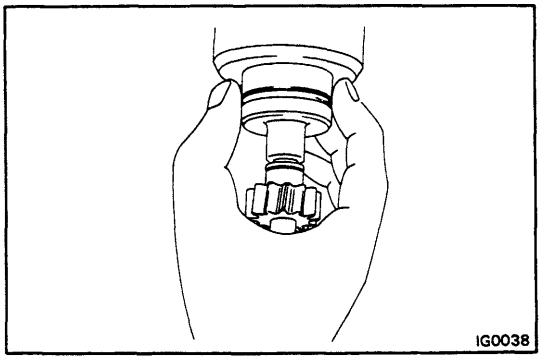
11. INSTALL IGNITION COIL

(a) Install a new gasket and the ignition coil with the four screws.

(b) Connect the three wires to the terminals of the ignition coil with the two spring washers and nuts as shown.

12. INSTALL IGNITION COIL DUST COVER

13. INSTALL IGNITER DUST COVER



14. INSTALL ROTOR AND CAP

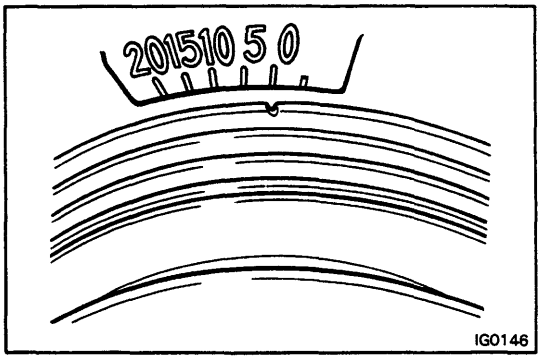
(a) Install the rotor.

(b) Place a new gasket and the cap in position.

(c) Install the condenser and three screws.

15. INSTALL NEW O-RING TO HA HOUSING

NOTE: Lightly coat the O-ring with engine oil.



INSTALLATION OF HA

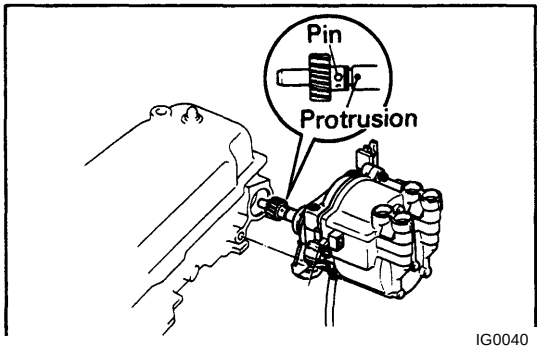
1. SET NO. 1 CYLINDER TO TDC/COMPRESSION

Set to TDC/compression in the following manner.

(a) Remove the No. 1 spark plug.

(b) Place your finger over the hole of the No. 1 spark plug and roíate the crankshaft clockwise to TDC. If you feel pressure on your finger, this is TDC/compression of the No. 1 cylinder. If not, repeat the process.

(c) Instad the No. 1 spark plug.



2. INSTALL HA

(a) Coat the spirai gear and governor shaft tip with engine oil.

(b) Align the protrusion on the housing with the pin of the spirai gear drill mark side.

(c) Insert the HA, aligning the center of the flange with that of the bolt hole on the cylinder head.

(d) Lightly tighten the hold-down bolt.

3. INSTALL HIGH-TENSION CORDS

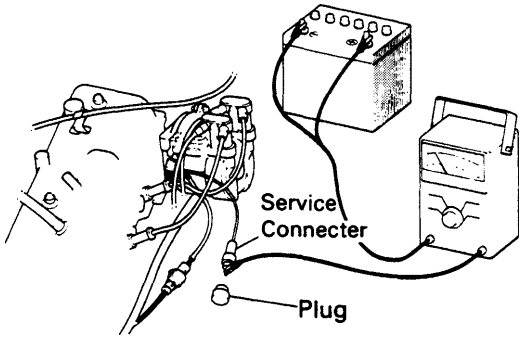
Firing order: 1 - 3 - 4 — 2

4. CONNECT HOSES TO VACUUM ADVANCER

5. CONNECT HA WIRE CONNECTOR

6. CONNECT CABLE TO NEGATIVE TERMINAL OF BATTERY

7. START ENGINE



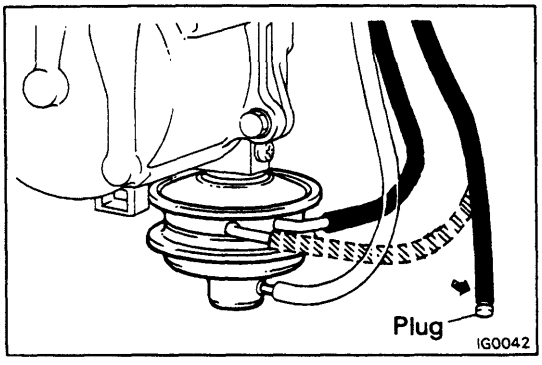
8. CONNECT ENGINE TACHOMETER

Remove the rubber cap and connect the test probé of a tester to the service connecter of the HA.

CAUTION:

(1) NEVER allow the ignition coil terminái s to touch ground as it could result in damage to the igniter and/or ignition coil.

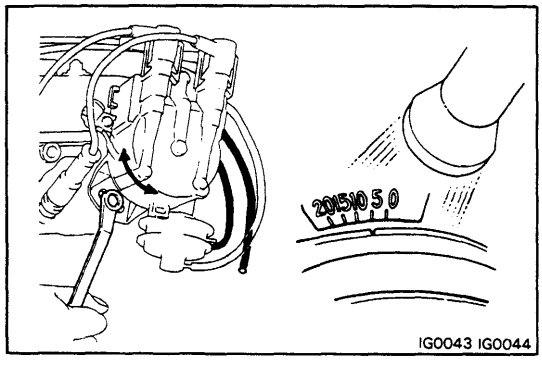
(2) It is recommended that you consult with the manufacturer before using a tachometer as some are not compatible with this system.



9. ADJUST IGNITION TIMING

(a) (3A-C)

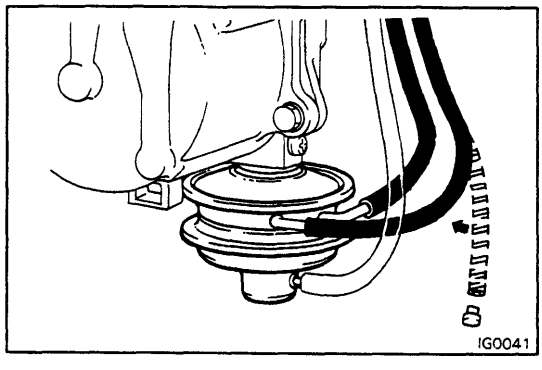
Disconnect the hose from the vacuum advancer sub-diaphragm and plug the hose ends.



(b) Using a timing light, slowly turn the HA until the timing mark on the crankshaft pulley is aligned with the 5° mark. Tighten the HA mount bolt and recheck the ignition timing.

Ignition timing: 5°BTDC @ Max. 950 rpm

Torque: 130 kg-cm (9 ft-lb, 13 N-m)



(c) (3A-C)

Reconnect the hose to the vacuum advancer sub-diaphragm.

(d) (3A-C)

Check that the ignition timing advances.

Ignition timing: Approx. 13°BTDC @ Max. 950 rpm

10. ADJUST IDLE SPEED (See page FU-25)

STARTING SYSTEM

ES

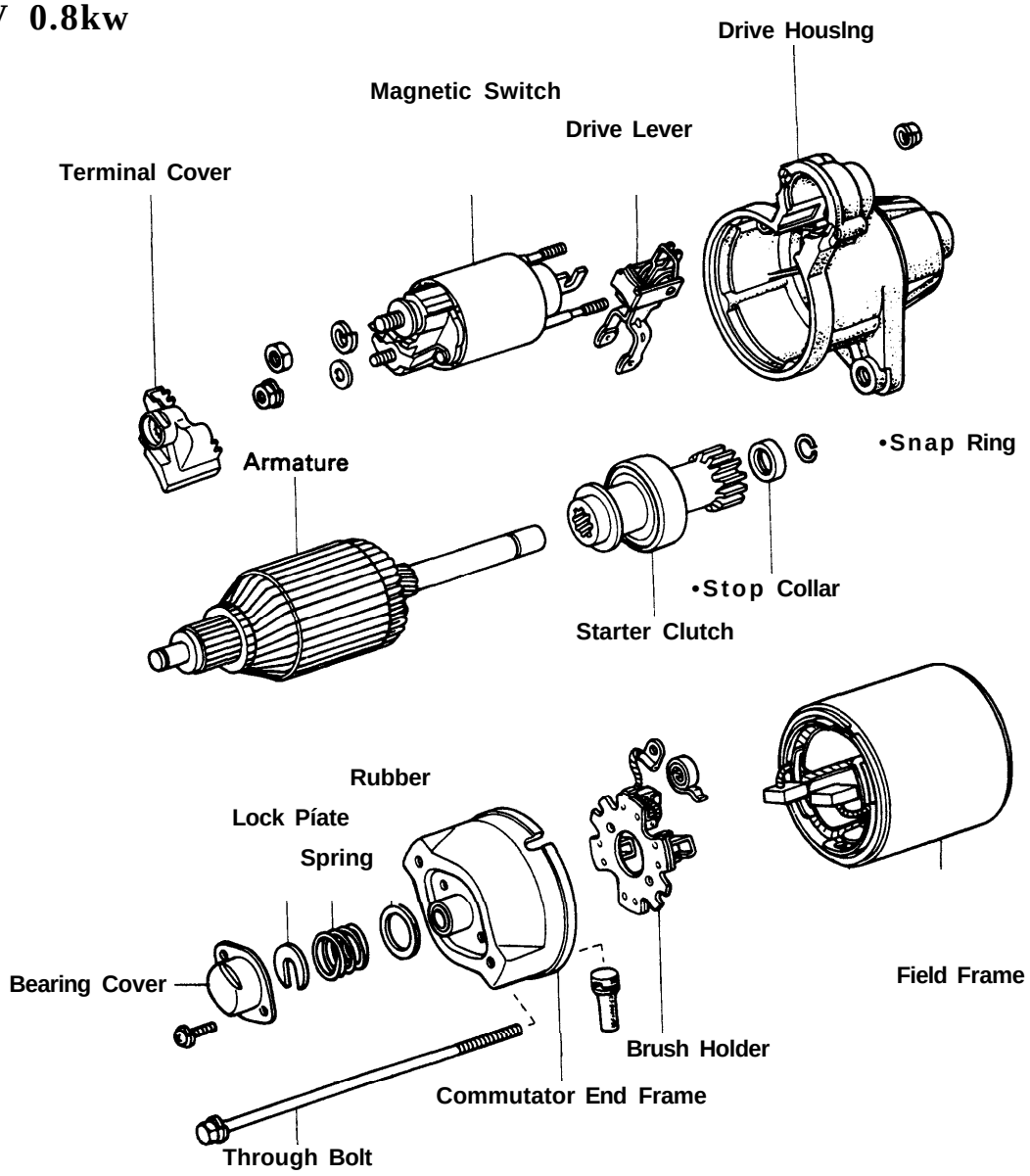
TROUBLESHOOTING

Problem	Possible cause	Remedy	Page
Engine will not crank	Battery charge low	Check battery specific gravity Charge or replace battery	CH-4
	Battery cables loóse, corroded or worn	Repair or replace cables	
	Neutral start switch faulty (auto, trans.)	Replace switch	
	Fusible link blown	Replace fusible link	
	Starter faulty	Repair starter	ST-3
	Ignition switch faulty	Replace ignition switch	
Engine cranks slowly	Battery charge low	Check battery specific gravity Charge or replace battery	CH-4
	Battery cables loóse, corroded or worn	Repair or replace cables	
	Starter faulty	Repair starter	ST-3
Starter keeps running	Starter faulty	Repair starter	ST-3
	Ignition switch faulty	Replace ignition switch	
	Short in wiring	Repair wiring	
Starter spins - engine will not crank	Pinion gear teeth broken or faulty starter Flywheel teeth broken	Repair starter Replace flywheel	ST-3

CONVENTIONAL STARTER

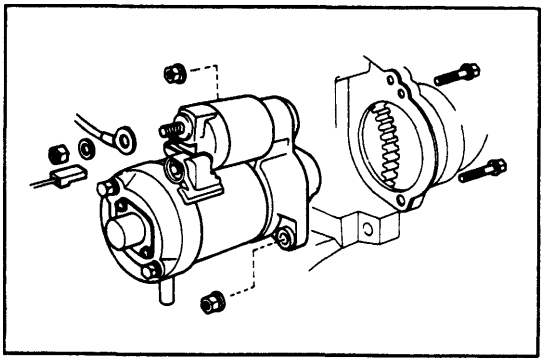
COMPONENTS

12V 0.8kw



•: Non-reusable part

REMOVAL OF CONVENTIONAL STARTER



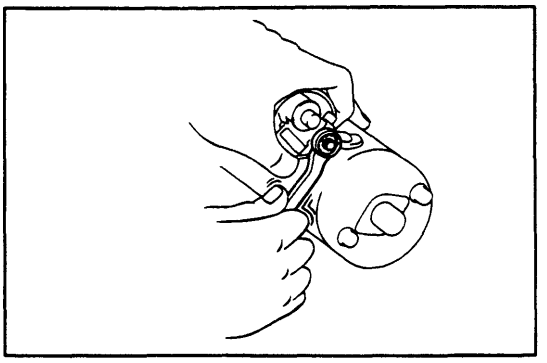
1. DISCONNECT CABLE FROM NEGATIVE TERMINAL OF BATTERY

2. DISCONNECT TWO WIRES FROM STARTER

   Remove the nut and disconnect the battery cable from the magnetic switch on the starter motor. Disconnect the other wire from the terminal.

3. REMOVE STARTER MOTOR

   Remove the two bolts, and them remove the starter motor from the flywheel bell-housing.



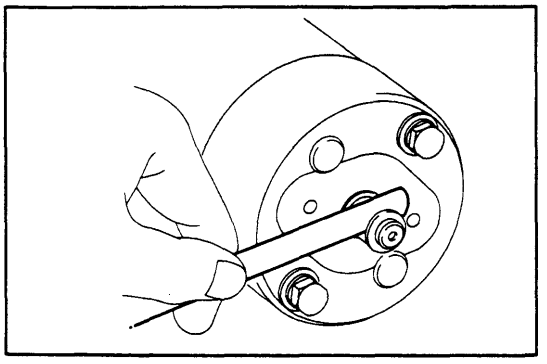
DISASSEMBLY OF CONVENTIONAL STARTER

(See page ST-3)

1. REMOVE MAGNETIC SWITCH

(a) Remove the nut, and disconnect the lead wire from the magnetic switch terminal.

(b) Loosen the two nuts holding the magnetic switch to the switch housing. Lift the magnetic switch up and out to unhook the plunger from the drive lever.

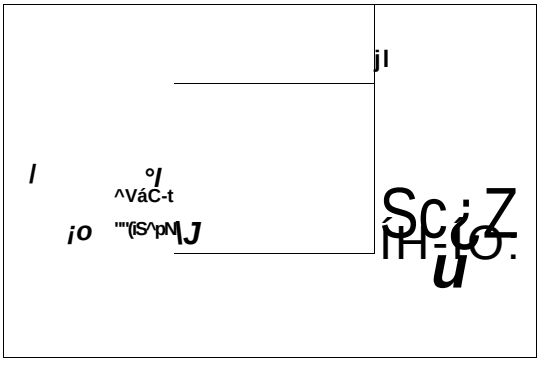


2. REMOVE END FRAME

(a) Remove the bearing cover.

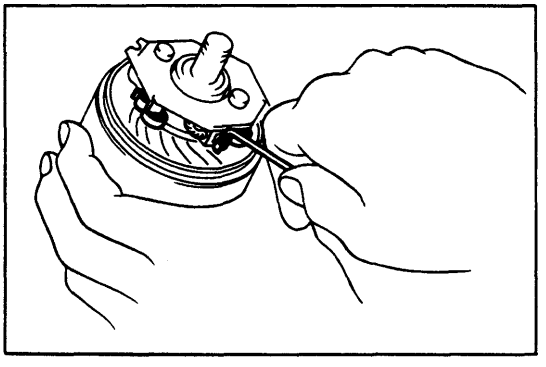
(b) Using a feeler gauge, check the armature shaft thrust clearance between the lock píate and end frame.

Thrust clearance: 0.05 - 0.60 mm (0.0020 - 0.0236 in.)



(c) Remove the lock píate, spring and rubber.

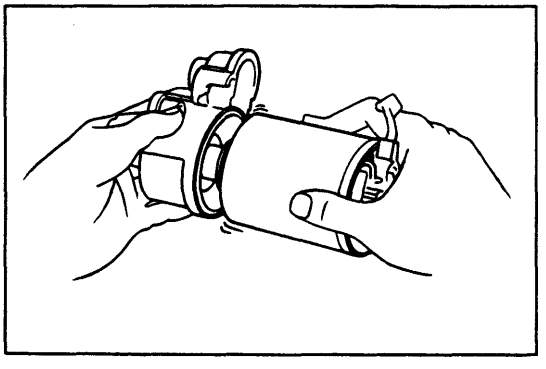
(d) Remove the two through bolts and pulí out the commutator end frame.



3. REMOVE BRUSH HOLDER

(a) Using a piece of steel wire, hold the brush spring back, and remove the brush from the brush holder. Remove the four brushes.

(b) Pulí the brush holder off the armature.



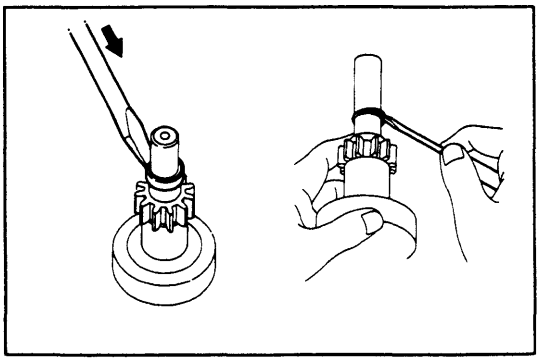
4. REMOVE FIELD FRAME FROM DRIVE HOUSING

Pulí apart by hand.

5. REMOVE ARMATURE

(a) Remove the drive lever from the drive housing.

(b) Pulí the armature from the drive housing.

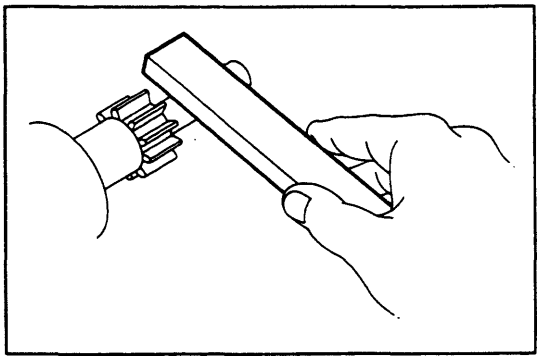


6. REMOVE STARTER CLUTCH

(a) Using a screwdriver, tap in the stop collar.

(b) Using a screwdriver, pry off the snap ring.

(c) Remove the collar from the shaft.



(d) If the pinion was difficult to pulí out smooth out the shaft with an oil stone.

(e) Remove the starter clutch.

	ñ p2[i]

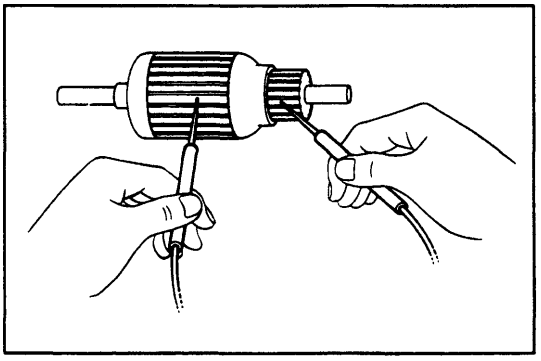
INSPECTION OF CONVENTIONAL STARTER

Armature Coi I

1. INSPECT COMMUTATOR FOR OPEN CIRCUIT

Using an ohmmeter, check that there is continuity between the segments of the commutator.

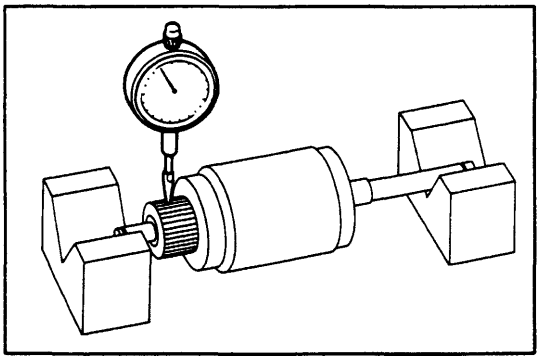
If there is no continuity, replace the armature.



2. INSPECT COMMUTATOR FOR GROUND

Using an ohmmeter, check that there is no continuity between the commutator and armature coil core.

If there is continuity, replace the armature.



Commutator

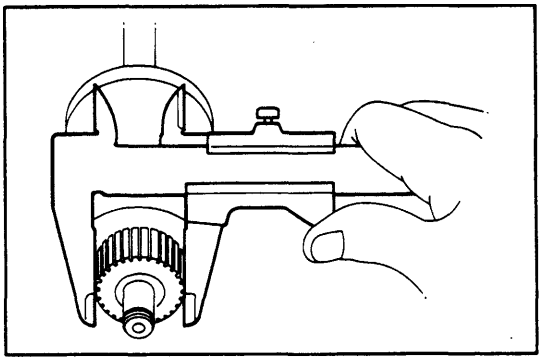
1. INSPECT COMMUTATOR FOR DIRTY AND BURNT SURFACES

If surface is dirty or burnt, correct with sandpaper (No. 400) or a lathe.

2. INSPECT COMMUTATOR RUNOUT

Máximum runout: 0.4 mm (0.016 in.)

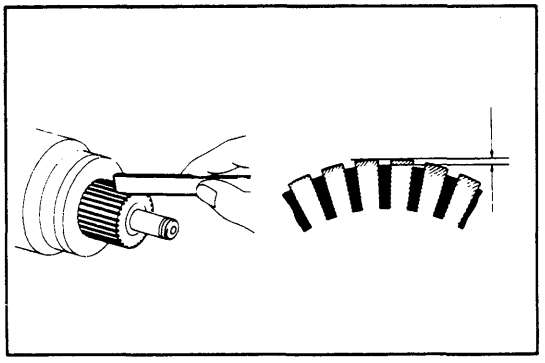
If runout is exceeds máximum, correct with a lathe.



3. INSPECT DIAMETER OF COMMUTATOR

Standard diameter: 28 mm (1.10 in.)
Minimum diameter: 27 mm (1.06 in.)

If the diameter of the commutator is less than minimum, replace the armature.



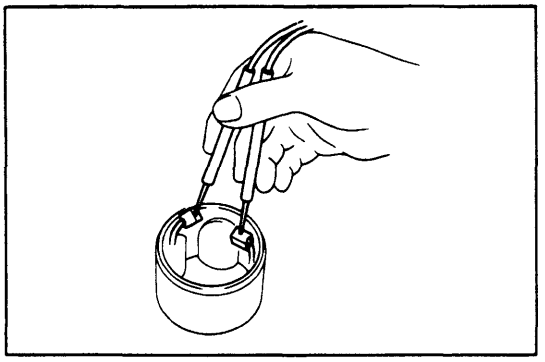
4. INSPECT SEGMENT

Check that the segment is clean and free of foreign material.

Standard undercut depth: 0.5 - 0.8 mm (0.020 - 0.031 in.)
Minimum undercut depth: 0.2 mm (0.008 in.)

If the undercut depth is less than minimum, correct with a hacksaw blade and smooth out the edge.

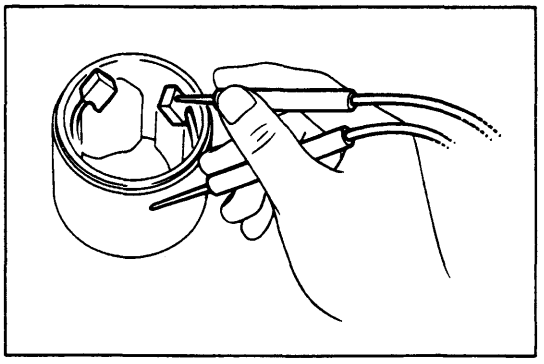
Field Coil (Field Frame)



1. INSPECT FIELD COIL FOR OPEN CIRCUIT

Using an ohmmeter, check that there is continuity between the lead wire and field coil brush lead.

If there is no continuity, replace the field coil.

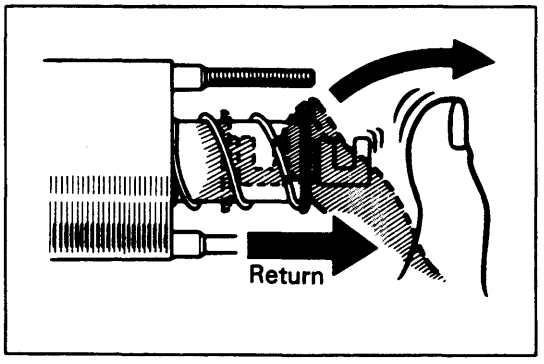


2. INSPECT FIELD COIL FOR GROUND

Using an ohmmeter, check that there is continuity between the field coil end and field frame.

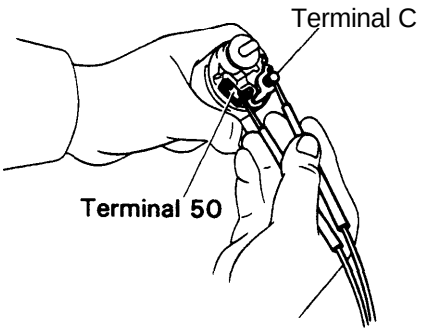
If there is continuity, replace the field coil.

Magnetic Switch



1. CHECK PLUNGER

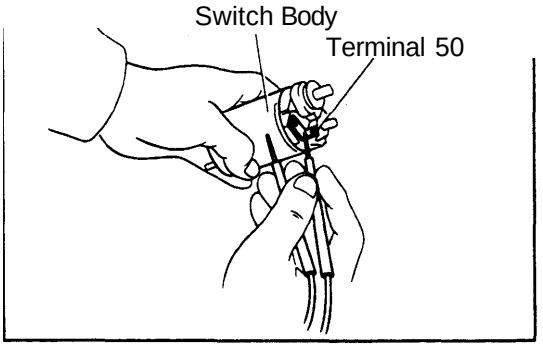
Push in the plunger and reléase it. Check that it returns quickly to its original position.



2. PERFORM PULL-IN COIL OPEN CIRCUIT TEST

Using an ohmmeter, check that there is continuity between terminais 50 and C.

If there is no continuity, replace the magnetic switch.

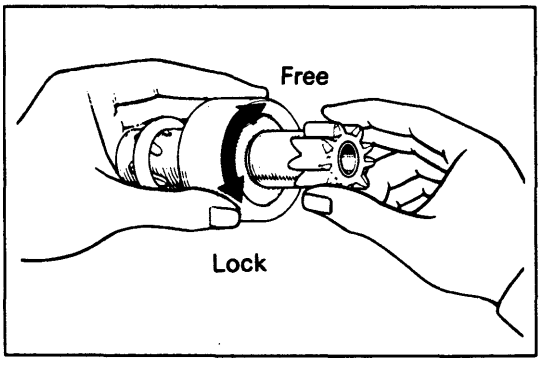


3. PERFORM HOLD-IN COIL OPEN CIRCUIT TEST

Using an ohmmeter, check that there is continuity between terminal 50 and the switch body.

If there is no continuity, replace the magnetic switch.

Starter Clutch



1. INSPECT PINION GEAR AND SPLINE TEETH

Inspect the pinion gear and spline teeth for wear or damage.

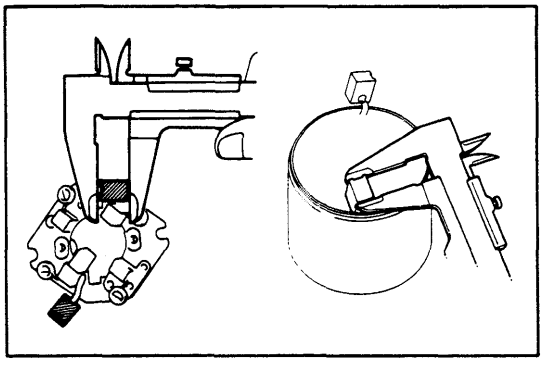
If damaged, replace and also inspect the f lywheel ring gear for wear or damage.

2. INSPECT PINION GEAR

Rotate the pinion gear clockwise and check that it tums freely.

Try to rotate the pinion gear counterclockwise and check that it locks.

Brushes

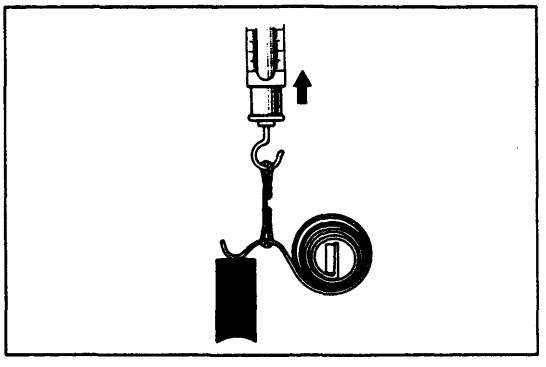


INSPECT BRUSH LENGTH

Standard length: 16 mm (0.63 in.)
Minimum length: 10.5 mm (0.413 in.)

If the length is less than minimum, replace the brush holder and field frame.

Brush Springs

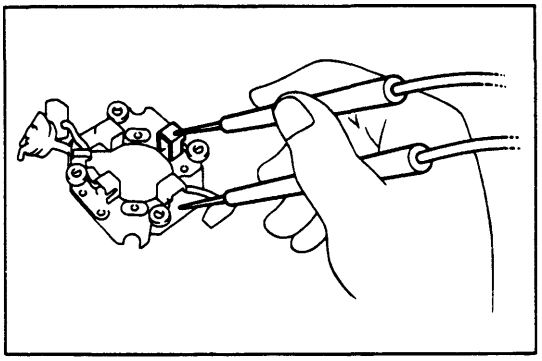


INSPECT BRUSH SPRING LOAD WITH PULL SCALE

Spring installed load: 1.02- 1.38 kg (2.2-3.0 lb, 10 - 14 N)

NOTE: Take the pulí scale reading at the very instant the brush spring separates from the brush.

If the reading is below standard, replace the brush springs.

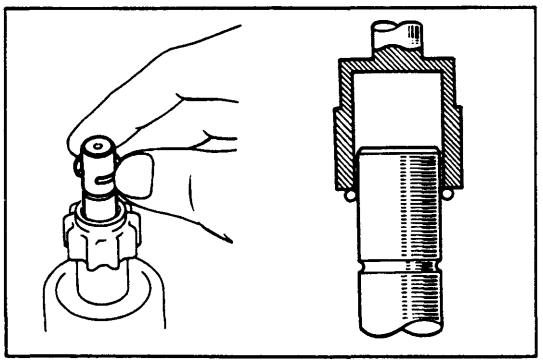


Brush Holder

INSPECT INSULATION OF BRUSH HOLDER

Using an ohmmeter, check that there is no continuity between the positive (+) and negative (-) brush holders.

If there is continuity, repair or replace the brush holder.



ASSEMBLY OF CONVENTIONAL STARTER

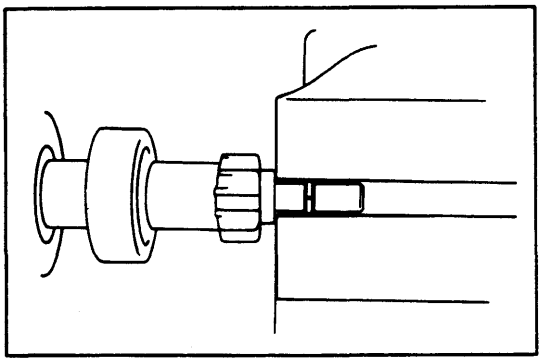
(See page ST-3)

NOTE: Use high-temperature grease to lubrícate the bearings and sliding parts when assemblying the starter.

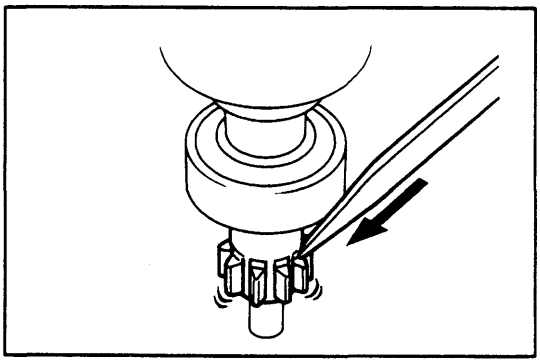
1. ASSEMBLE STARTER CLUTCH TO ARMATURE

(a) Place a new stop collar on the armature.

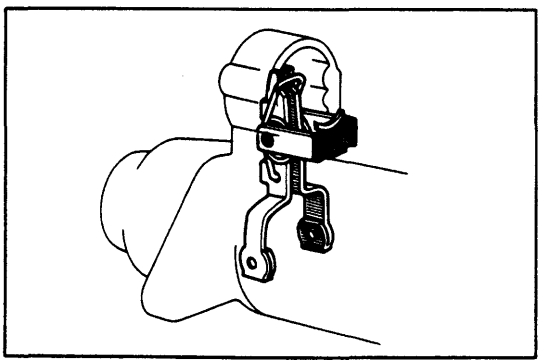
(b) Drive in new snap ring with a 14 mm (0.55 in.) socket wrench, and then fit it into the shaft groove.



(c) Using a vise, compress the snap ring.
Make sure that the snap ring fits correctly.



(d) Using a screwdriver, tap the pinion to slide the stop collar onto the snap ring.

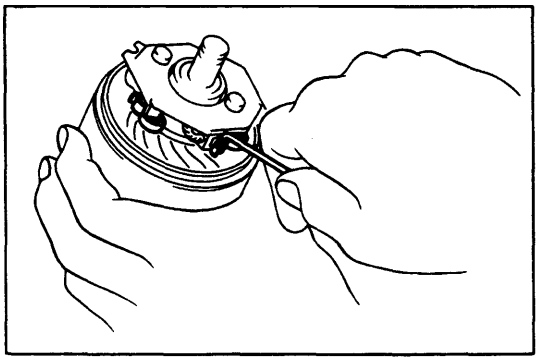


2. ASSEMBLE DRIVE HOUSING, DRIVE LEVER AND FIELD FRAME TO ARMATURE

(a) Apply grease to the drive lever and drive housing bushing.

(b) Install the drive lever to the drive housing.

(c) Install the field frame on the armature.



3. INSTALL BRUSH HOLDER

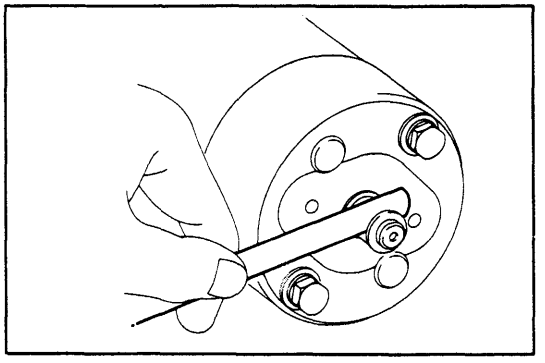
(a) Place the brush holder over the armaute shaft.

(b) Using a piece of steel wire, hold the brush spring back and install the brush in the brush holder. Insta 11 the four brushes.

4. INSTALL END FRAME

(a) Apply grease to the end frame bushing.

(b) Install the end frame on the armature shaft and secure ¡t with the two through bolts.



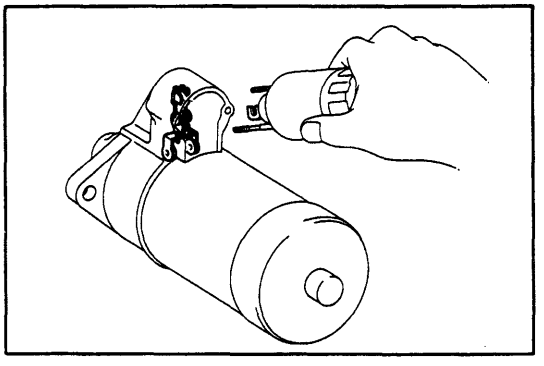
5. INSTALL BEARING COVER

(a) Install the rubber, spring and lock píate.

(b) Using a feeler gauge, measure the armature thrust clearance between the lock píate and end frame.

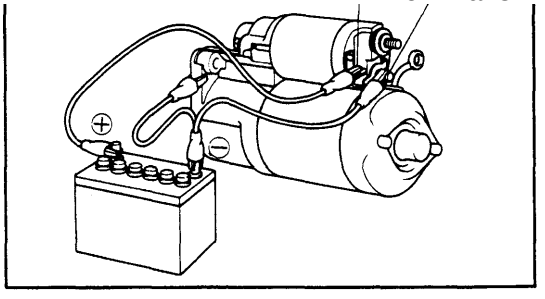
Thrust clearance: 0.05 — 0.60 mm (0.0020 - 0.0236 in.)

(c) Install the bearing cover with the two screws.



6. INSTALL MAGNETIC SWITCH

Hook the magnetic switch stud underneath the drive lever spring. Install the two nuts.



PERFORMANCE TEST OF CONVENTIONAL STARTER

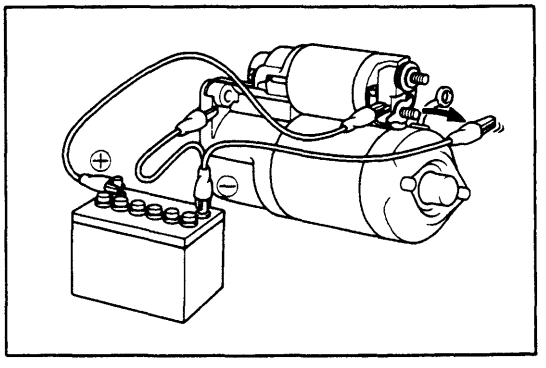
CAUTION: These tests must be performed within 3 to 5 seconds to avoid burning out the coil.

1. PERFORM PULL-IN TEST

(a) Disconnect the field coil lead from terminal C.

(b) Connect the battery to the magnetic switch as shown. Check that the pinion gear moves outward.

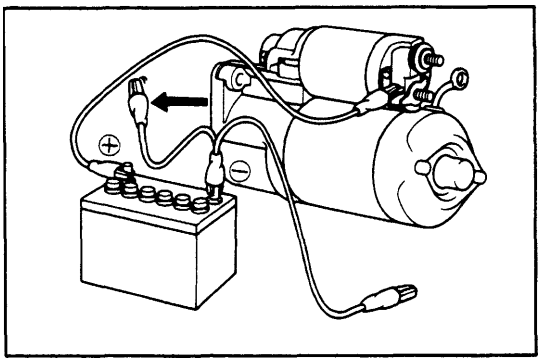
If the pinion gear does not move, replace the magnetic switch.



2. PERFORM HOLD-IN TEST

While still connected as above and with the pinion out, disconnect the negative (-) lead from terminal C. Check that the pinion gear remains out.

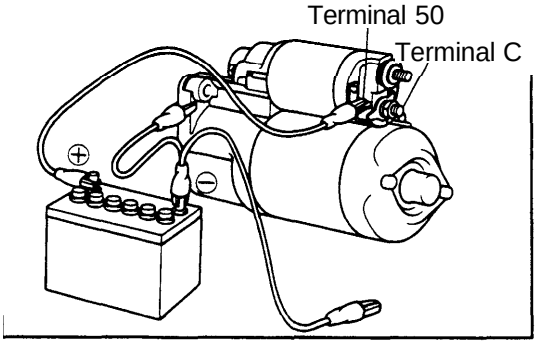
If the pinion gear retums inward, replace the magnetic switch.



3. CHECK PINION GEAR RETURN

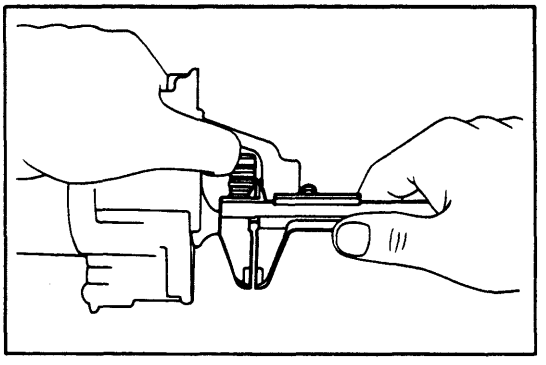
Disconnect the negative (-) lead from the switch body. Check that the pinion retums inward.

If the pinion does not return, replace the magnetic switch.



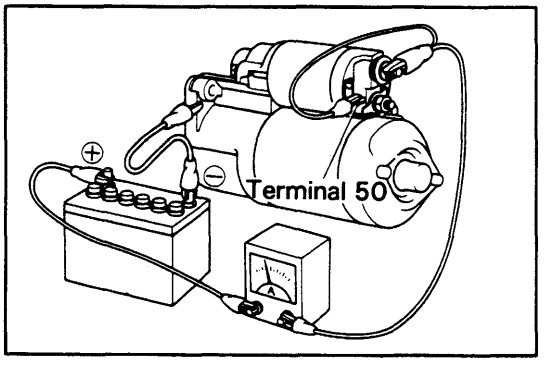
4. CHECK PINION GEAR CLEARANCE

(a) Connect the battery to the magnetic switch as shown.



(b) Move the pinion gear toward the armature to remove slack and measure the clearance between the pinion gear end and stop collar.

Standard clearance: 0.1 - 4.0 mm (0.004 - 0.157 in.)



5. PERFORM NO-LOAD PERFORMANCE TEST

(a) Connect the field coil lead to terminal C. Make sure the lead is not grounded.

(b) Connect the battery and ammeter to the starter as shown.

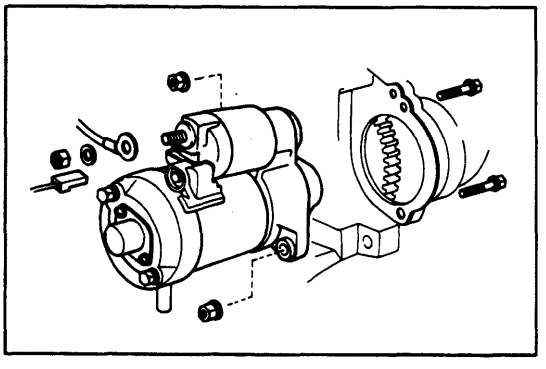
(c) Check that the starter rotates smoothly and steadily with the pinion gear moving out.

(d) Check that the ammeter reads the specified curren!

Specified current: Less than 50 A at 11V

INSTALLATION OF CONVENTIONAL STARTER

(See page ST-3)



1. INSTALL STARTER MOTOR IN FLYWHEEL HOUSING

2. CONNECT TWO WIRES TO STARTER

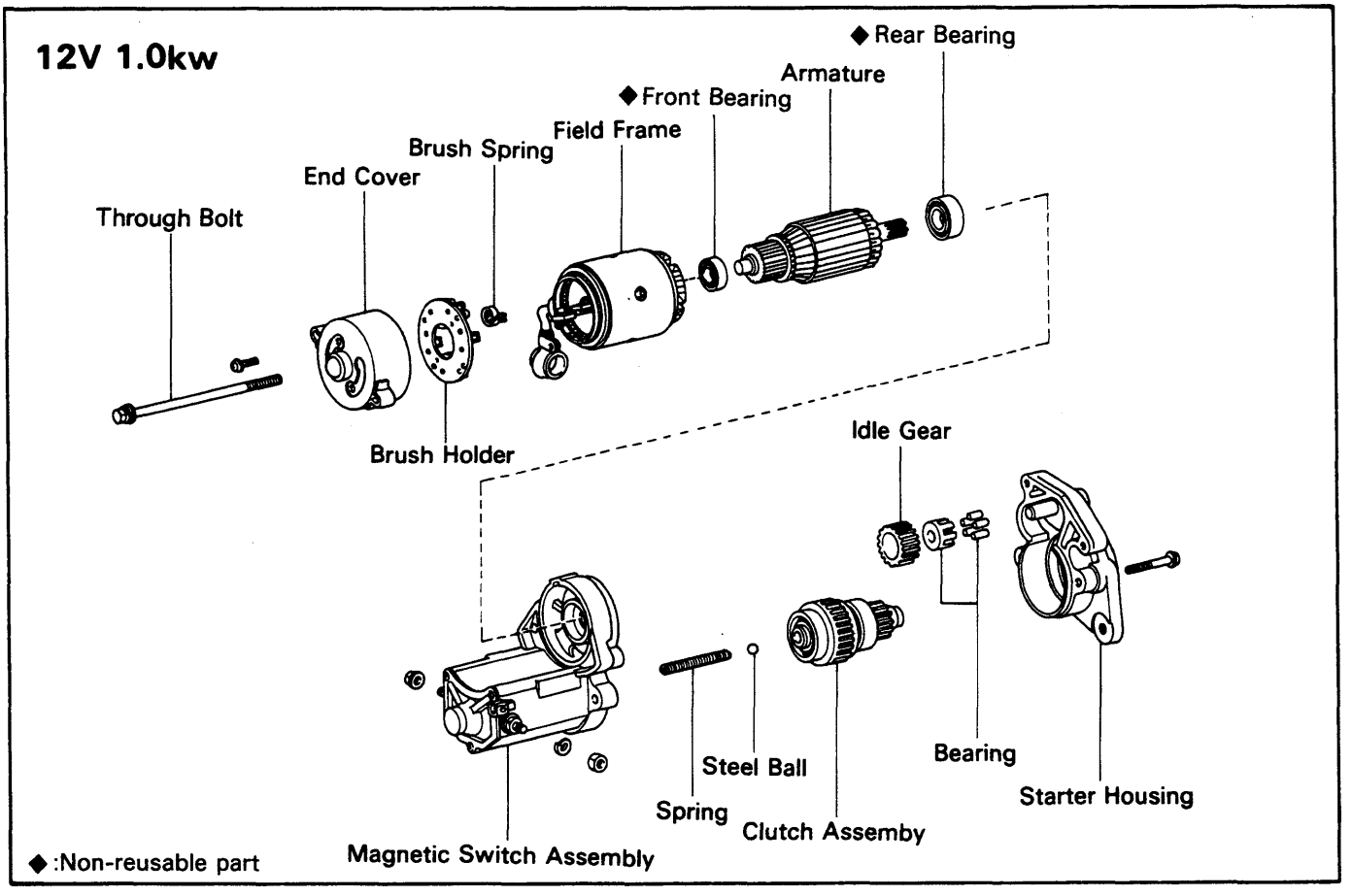
Connect the connector to the terminal on the magnetic switch. Connect the cable from the bettery to the terminal on the switch, and install the nut.

3. CONNECT CABLE TO NEGATIVE TERMINAL OF BATTERY

Check that the car starts.

REDUCTION TYPE STARTER

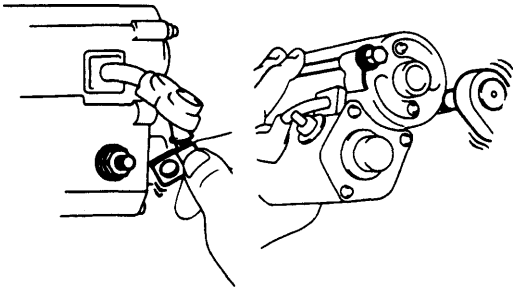
COMPONENTS



REMOVAL OF REDUCTION TYPE STARTER

(See procedure on page ST-3)

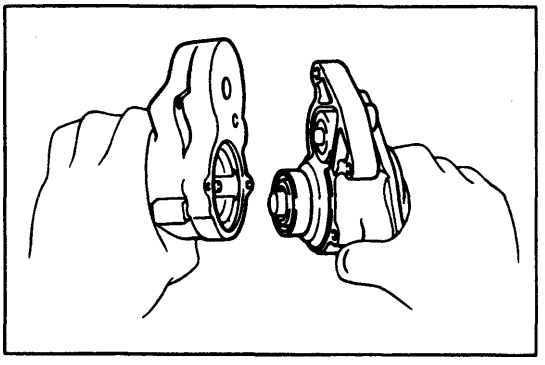
DISASSEMBLY OF REDUCTION TYPE STARTER



1. REMOVE FIELD FRAME AND ARMATURE ASSEMBLY FROM MAGNETIC SWITCH

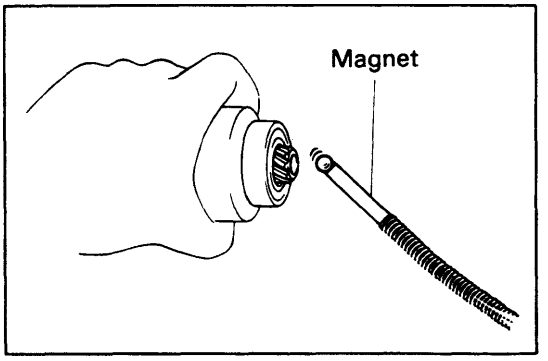
(a) Disconnect the lead wire from the magnetic switch terminal.

(b) Remove the two through bolts. Pulí out the field frame together with the armature from the magnetic switch.



2. REMOVE STARTER HOUSING FROM MAGNETIC SWITCH ASSEMBLY

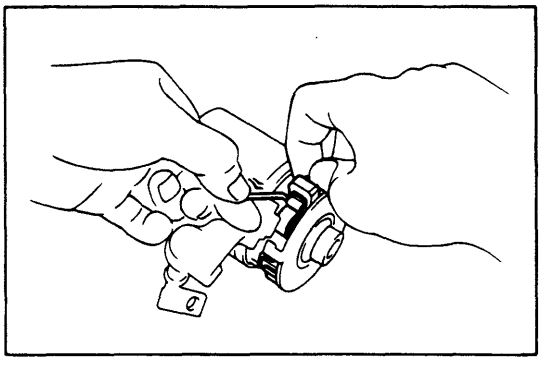
Remove the two screws and starter housing together with the idler gear and clutch assembly.



3. REMOVE CLUTCH ASSEMBLY AND IDLER GEAR FROM STARTER HOUSING

4. REMOVE STEEL BALL AND SPRING

Using a magnetic finger, remove the spring and steel ball from the clutch shaft hole.



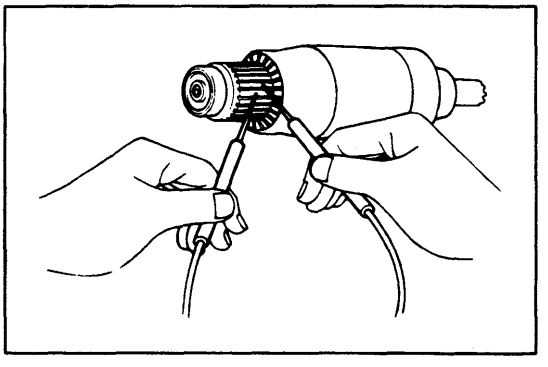
REMOVE BRUSH HOLDER

(a) Remove the end cover from the field frame.

(b) Using a screwdriver or steel wire, hold the brush spring back, and remove the brush from the brush holder. Remove the four brushes.

(c) Pulí the brush holder off the armature.

REMOVE ARMATURE FROM FIELD FRAME



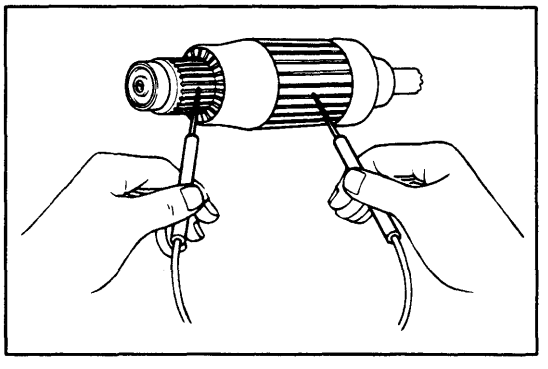
INSPECTION OF REDUCTION TYPE STARTER

Armature Coil

1. INSPECT COMMUTATOR FOR OPEN CIRCUIT

Using an ohmmeter, check that there is continuity between the segments of the commutator.

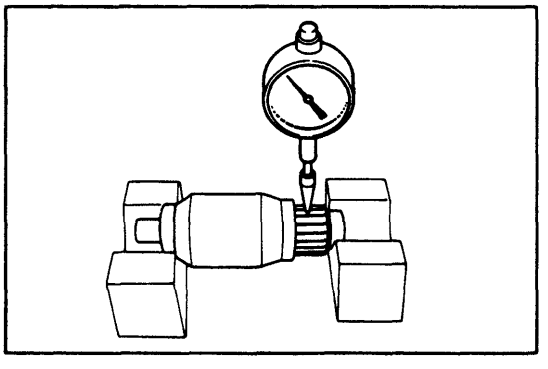
If there is no continuity between any segment, replace the armature.



2. INSPECT COMMUTATOR FOR GROUND

Using an ohmmeter, check that there is no continuity between the commutator and armature coil core.

If there is continuity, replace the armature.



Commutator

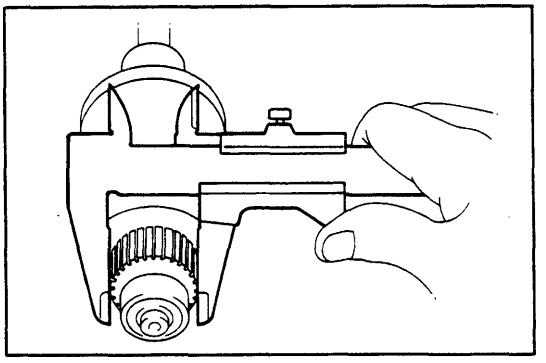
1. INSPECT COMMUTATOR FOR DIRTY AND BURNT SURFACES

If the surface is dirty or burnt, correct with sandpaper (No. 400) or a lathe.

2. INSPECT COMMUTATOR RUNOUT

Máximum cride runout: 0.05 mm (0.0020 in.)

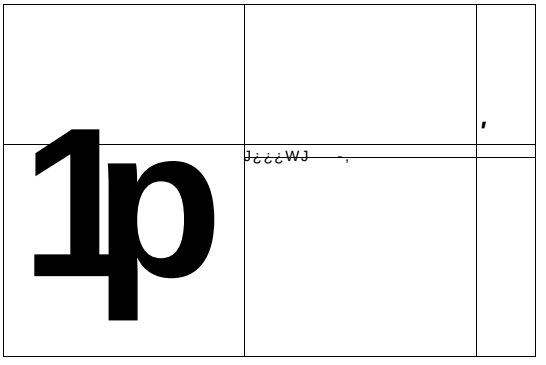
If the circle runout is exceeds máximum, correct with a lathe.



3. INSPECT DIAMETER OF COMMUTATOR

Standard diameter: 30 mm (1.18 in.)
Minimum diameter: 29 mm (1.14 in.)

If the diameter is less than minimum, replace the armature.

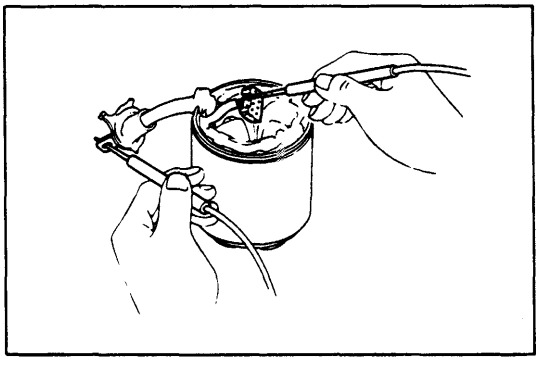


4. INSPECT SEGMENT

Check that the segment is clean and free of foreign material and smooth out the edge.

Standard undercut depth: 0.5 - 0.8 mm (0.020 - 0.031 in.)
Minimum undercut depth: 0.2 mm (0.008 in.)

If the undercut depth is less than minimum, correct with a hacksaw blade.



Field Coil (Field Frame)

1. INSPECT FIELD COIL FOR OPEN CIRCUIT

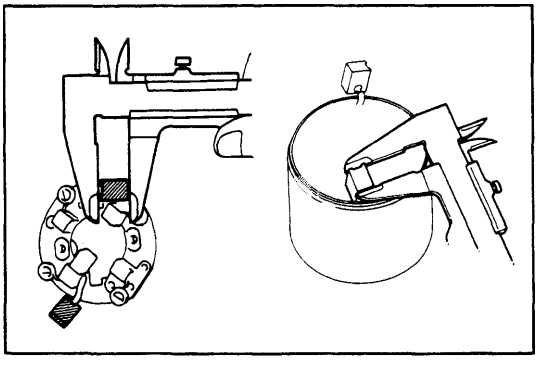
Using an ohmmeter, check that there is continuity between the lead wire and field coil brush lead.

If there is no continuity, replace the field coil.

2. INSPECT FIELD COIL FOR GROUND

Using an ohmmeter, check that there is no continuity between the field coil end and field frame.

If there is continuity, repair or replace the field coil.

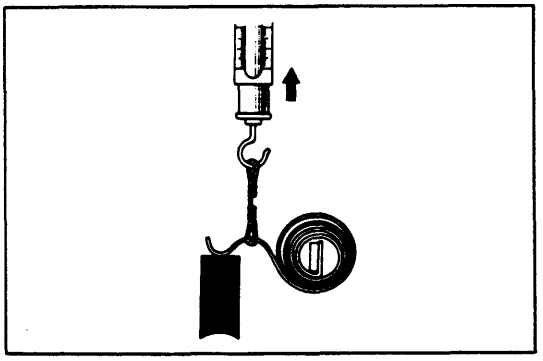


Brushes

INSPECT BRUSH LENGTH

Standard length: 13.0 mm (0.512 in.)
Minimum length: 8.5 mm (0.335 in.)

If the length is less than minimum, replace the brush holder and field frame.



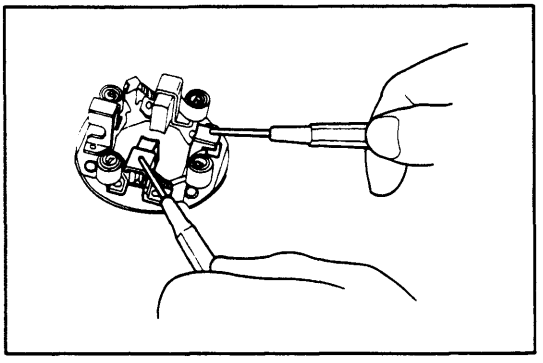
Brush Springs

INSPECT BRUSH SPRING LOAD WITH PULL SCALE

Spring installed load: 1.79 - **2.41** kg
(3.9 - 5.3 **lb, 1 8 - 24 N)**

NOTE: Take the pulí scale reading at the very instant the brush spring separates from the brush.

If the reading is below standard, replace the brush springs.

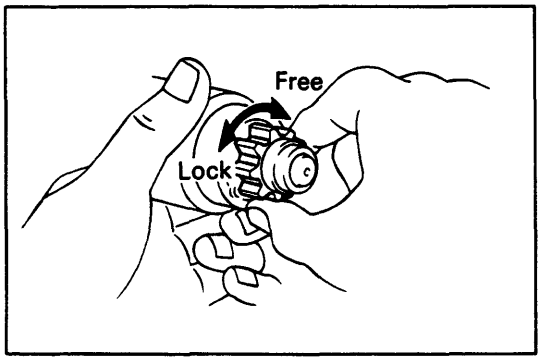


Brush Holder

INSPECT INSULATION OF BRUSH HOLDER

Using an ohmmeter, check that there is no continuity between the positive (+) and negative (-) brush holders.

If there is continuity, repair or replace the brush holder.



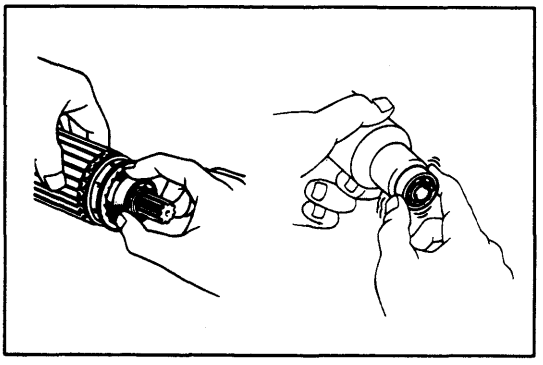
Clutch and Gears

1. INSPECT GEAR TEETH

Check the gear teeth on the pinion gear, idler gear and the clutch assembly for wear or damage.
If damged, replace and also check the fiywheei ring gear for wear or damage.

2. INSPECT PINION GEAR

Rotate the pinion gear clockwise and check that it turns freely. Try to rotate the pinion gear counterclockwise and check that it locks.

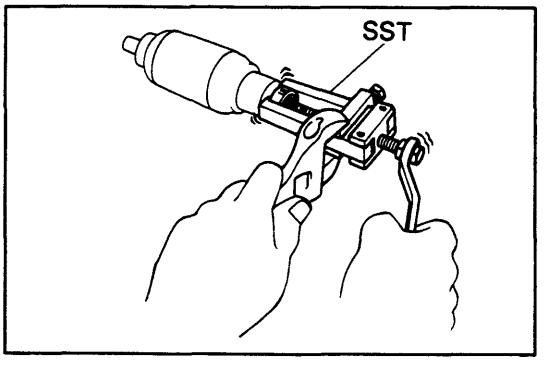


Bearings

1. INSPECT BEARINGS

Tum each bearing by hand while applying inward forcé.

If the bearing resists or sticks, replace it

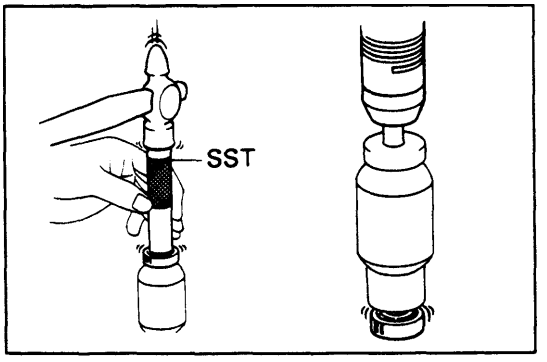


2. IF NECESSARY, REPLACE BEARINGS

(a) Using SST, remove the bearing from the armature shaft.

(b) Using SST, remove the other bearing from the opposite side.

SST 09286-46011

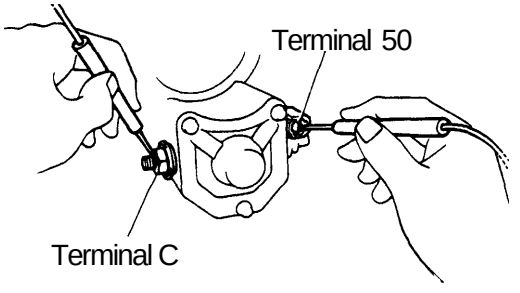


(c) Using SST and a hammer, tap a new front bearing onto the shaft.

SST 09285-76010

(d) Using a press, instad a new rear bearing onto the shaft.

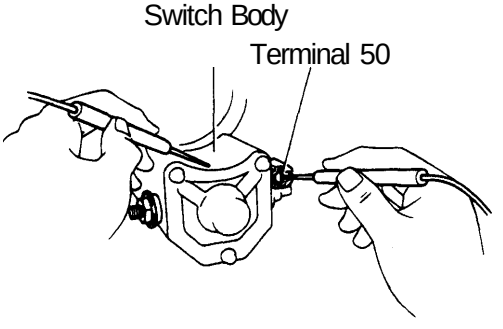
Magnetic Switch



1. PERFORM PULL-IN COIL OPEN CIRCUIT TEST

Using an ohmmeter, check that there is continuity between terminái 50 and O

If there is no continuity, replace the magnetic switch.



2. PERFORM HOLD-IN COIL OPEN CIRCUIT TEST

Using an ohmmeter, check that there is continuity between terminal 50 and the switch body.

If there is no continuity, replace the magnetic switch.

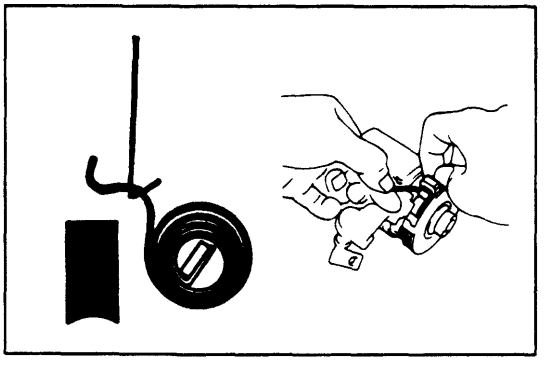
ASSEMBLY OF REDECTION TYPE STARTER

(See page ST-11)

NOTE: Use high temperature grease to lubrícate the bearings and gears when assembling the starter.

1. PLACE ARMATURE INTO FIELD FRAME

Apply grease to the armature bearing and insert the armature into the field frame.

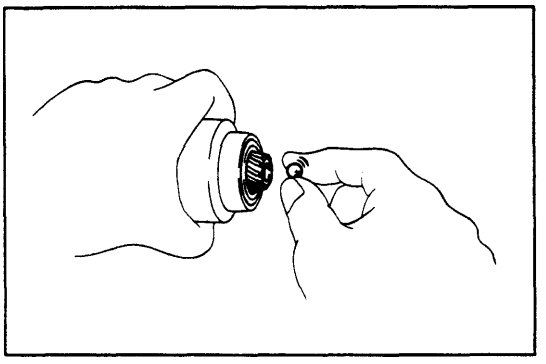


2. INSTALL BRUSH HOLDER

(a) Using a screwdriver, hold the brush spring back, and install the brush into the brush holder. Install the four brushes.

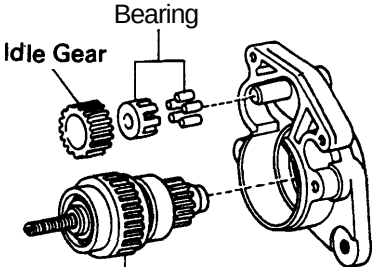
NOTE: Check that the positive (+) lead wires are not grounded.

(b) Install the end cover to the field frame.



3. INSERT STEEL BALL INTO CLUTCH SHAFT HOLE

Apply grease to the ball and spring and insert them into the clutch shaft hole.

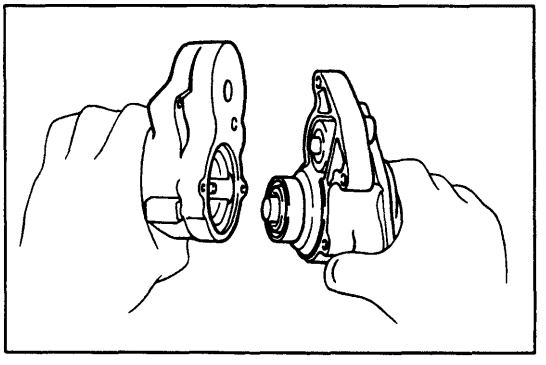


Clutch Assembly

4. INSTALL GEAR AND CLUTCH ASSEMBLY

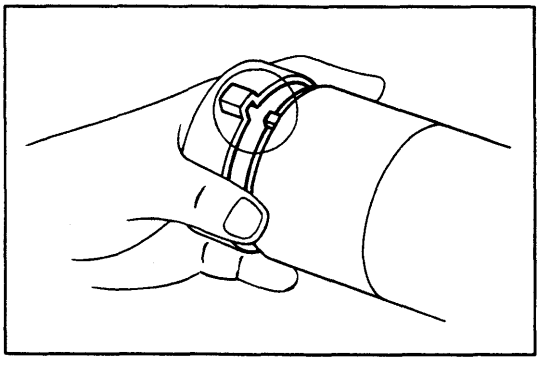
(a) Apply grease to gear and the clutch assembly.

(b) Place the clutch assembly, idler gear and bearing in the starter housing.



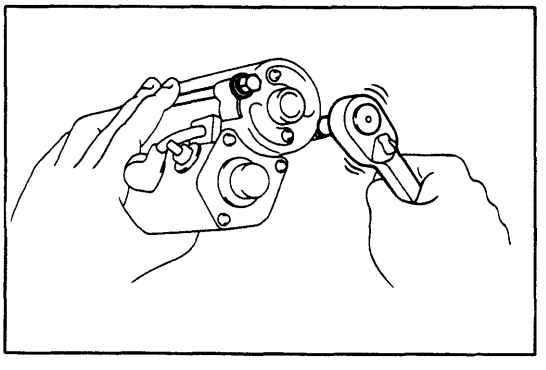
5. INSTALL STARTER HOUSING

Place the starter housing on the magnetic switch and install the two screws.



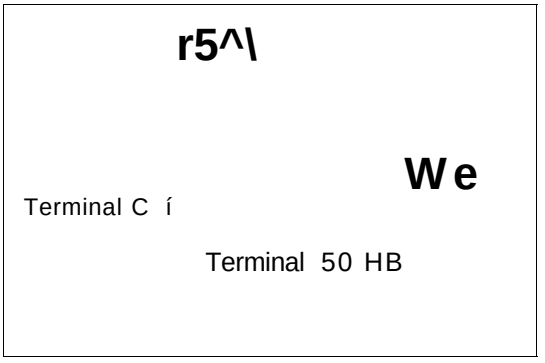
6. INSTALL FIELD FRAME AND ARMATURE ASSEMBLY IN MAGNETIC SWITCH

(a) Match the protrusion of the f ield f rame with the magnetic switch.



(b) Install the two through bolts.

(c) Connect the coil lead to the terminal on the magnetic switch.



PERFORMANCE TEST OF REDECTION TYPE STARTER

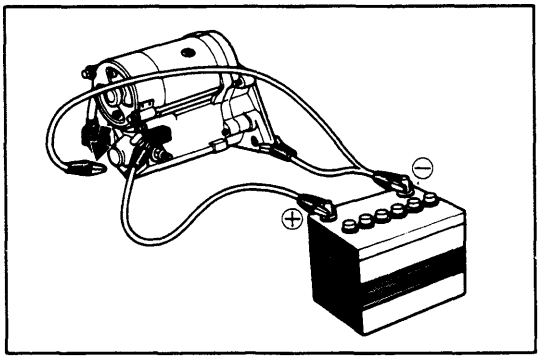
CAUTION: These tests must be performed within 3 to 5 seconds to avoid burning out the coil.

1. PERFORM PULL-IN TEST

(a) Disconnect the field coil lead from terminal C.

(b) Connect the battery to the magnetic switch as shown. Check that the pinion gear moves outward.

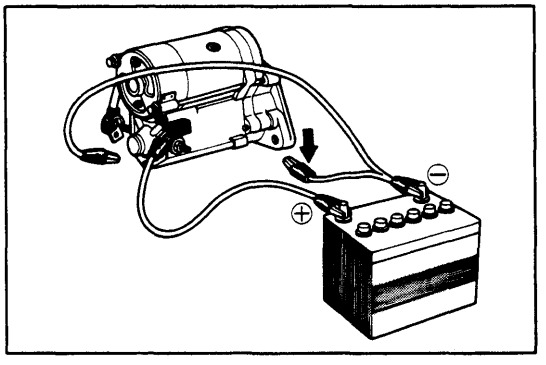
If the pinion gear does not move, replace the magnetic switch.



2. PERFORM HOLD-IN TEST

While connected as above with the plunger out, disconnect the negative (-) lead from terminal C. Check that the pinion gear remains out.

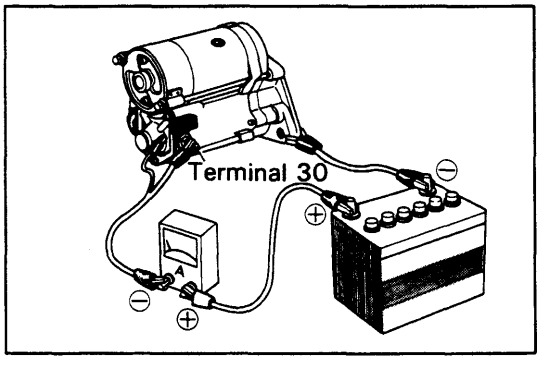
If the pinion gear retums inward, replace the magnetic switch.



3. INSPECT PINION GEAR RETURN

Disconnect the negative (-) lead from the switch body. Check that the pinion gear returns inward.

If the pinion gear does not return, replace the magnetic switch.



4. PERFORM NO-LOAD PERFORMANCE TEST

(a) Connect the battery and ammeter to the starter as shown.

(b) Check that the starter rotates smoothly and steadily with the pinion gear moving out. Check that the ammeter reads the specified current.

Specified current: Less than 90 A at 11.5 V

INSTALLATION OF REDUCTION TYPE STARTER

(See procedure on page ST-10)

CHARGING SYSTEM

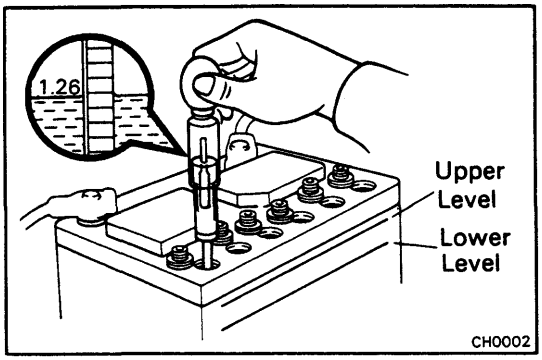
PRECAUTIONS

1. **Check that the battery cables are connected to the correct terminái s.**
2. **Dísonnect the battery cables when the battery is given a quick charge.**
3. **Do not perform tests with a high voltage insulation resistance tester.**
4. **Never disconnect the battery when the engine is running.**

TROUBLESHOOTING

Problem	Possible cause	Remedy	Page
Charge light does not light with ignition "ON" and engine off	Fuse blown	Check "IGN", "CHARGE" and "ENGINE" fuses	CH-3
	Light burned out	Replace light	
	Wiring connection loóse	Tighten loóse connections	
	Alternator voltage regulator faulty	Check regulator	CH-22
	IC regulator faulty	Replace IC regulator	
Charge light does not go out with engine running (battery requires frequent recharging)	Drive belt loóse or wom	Adjust or replace drive belt	CH-3
	Battery cables loóse, corroded or worn	Repair or replace cables	
	Fuse blown	Check "ENGINE" fuse and ignition main relay	CH-4,17
	Fusible link blown	Replace fusible link	CH-3
	Alternator voltage regulator, IC regulator or alternator faulty	Check charging system	CH-3
	Wiring faulty	Repair wiring	

*** Built in IC Regulator Alternator Type**



ON-VEHICLE INSPECTION

1. INSPECT BATTERY SPECIFIC GRAVITY

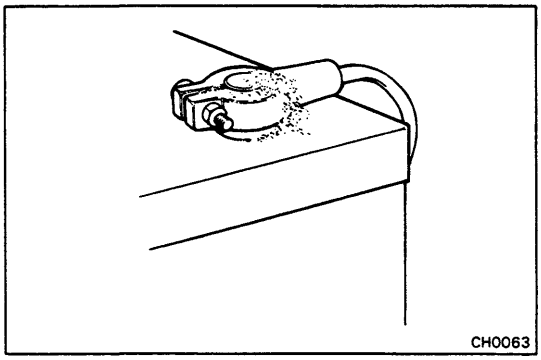
(a) Check the specific gravity of each cell.

Standard specific gravity:

When fully charged at 20°C (68°F) 1.25 - 1.27

(b) Check the electrolyte quantity of each cell.

If insufficient, refill with distilled (or purified) water.



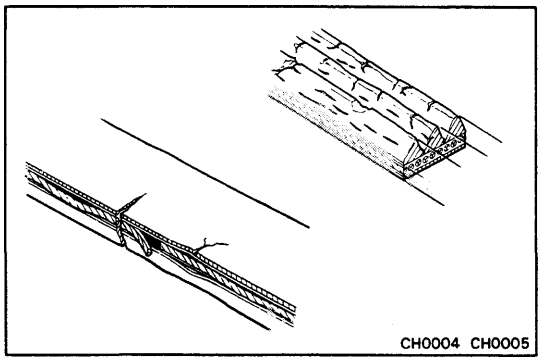
2. CHECK BATTERY TERMINALS, FUSIBLE LINKS AND FUSES

(a) Check that the battery terminái s are not loóse or corroded.

(b) Check the fusible link and fuses for continuity.

Fusible link:
1.25 B (w/o IC Regulator)
2, L (w/ IC Regulator)
AM1 60A
ALT 80A (w/ IC Regulator)

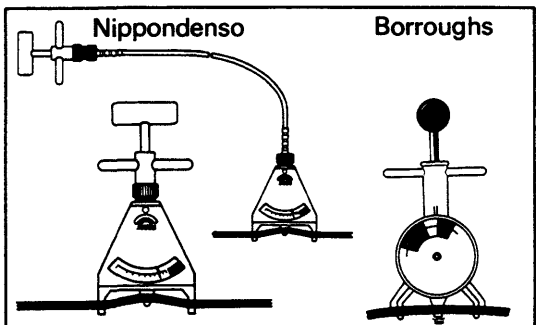
Fuse: CHARGE 7.5A
ENGINE 15A
IGN 7.5A



3. INSPECT DRIVE BELT

(a) Visually check the belt for separation of the adhesive rubber above and below the core, separating from the belt side, severed core, separation of the rib from the adhesive rubber, cracking or separation of the ribs, torn or worn ribs or cracks in the inner ridges of the ribs.

If the belt has any of the above defects, replace it



(b) Using a belt tensión gauge, check the drive belt tensión.

Belt tensión gauge:
Nippondenso BTG-20 (95506-00020) or
Borroughs No. BT-33-73F

Drive belt tensión: Used belt 80 ± 20 lb
New belt 125+25 lb

If the belt tensión is not within specification, adjust it.

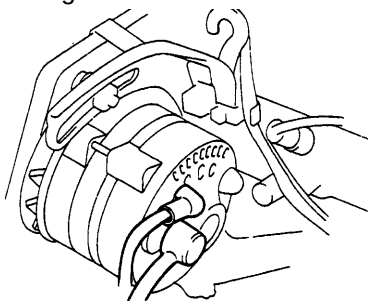
NOTE:
- "New beit" refers to a brand new beit which has never been used.
- "Used beit" refers to a beit which has been used on a running engine for 5 minutes or more.
- After ¡nstalling the drive beit, check that it fits properly in the ribbed grooves.

LÉÉÉJ *ÚMf^ \<Nkfok*

CORRECT WRONG

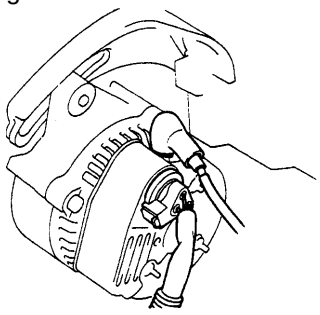
CH0084

w/o **IC** Regulator



CH0204

w/ IC Regulator



CH0210

4. VISUALLY CHECK ALTERNATOR WIRING AND LISTEN FOR ABNORMAL NOISES

(a) Check that the wiring is in good condition.

(b) Check that there are no abnormal noise from the altemator while the engine is running.

5. CHECK CHARGE LIGHT CIRCUIT

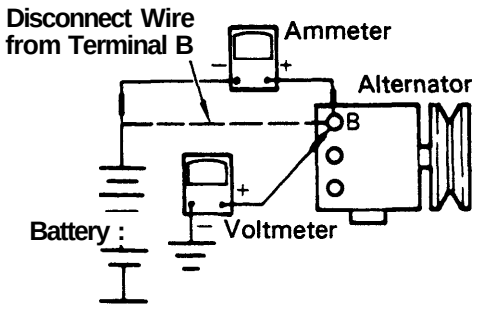
(a) Warm up the engine and then turn it off.

(b) Turn off all accessories.

(c) Turn the ignition switch to "ON". Check that the charge light is lit.

(d) Start the engine. Check that the light goes out.

If the light does not come on and go off as specified, troubleshoot the charge light circuit.

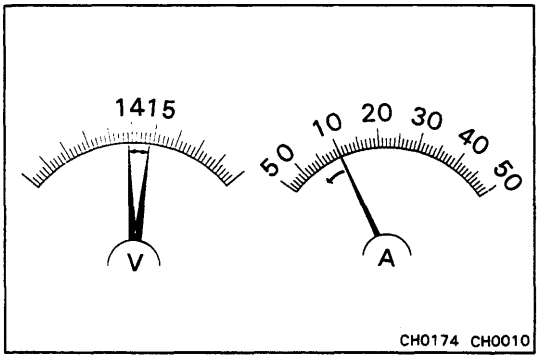


6. CHECK CHARGING CIRCUIT WITHOUT LOAD

NOTE: If a battery/alternator tester is available, connect the tester to the charging circuit as per manufacturéis instructions.

(a) If a tester is not available, connect a voltmeter and ammeter to the charging circuit as follows:

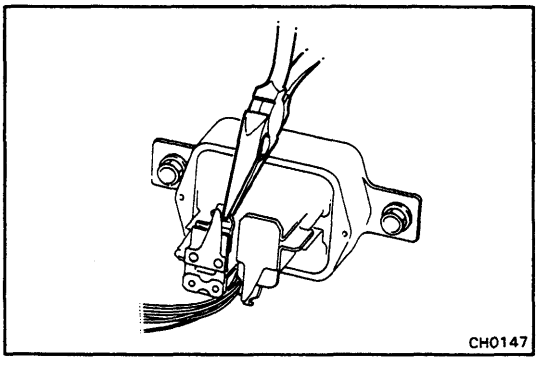
- Disconnect the wire from terminal B of the alternator and connect ¡t to the negative probé of the ammeter.
- Connect the test probé from the positve (-) terminal of the ammeter to terminal B of the alternator.
- Connect the positive probé of the voltmeter to terminal B of the altemator.
- Ground the negative probé of the voltmeter.



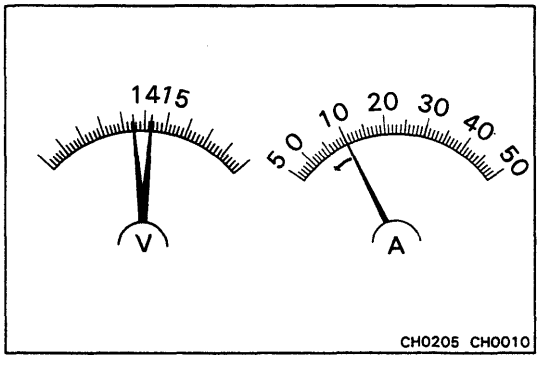
(b) Check the charging circuit as follows:

With the engine running from idling to 2,000 rpm, check the reading on the ammeter and voltmeter.

(w/o IC Regulator)
Standard amperage: Less than 10A
Standard voltage: 13.8 - 14.8V at 25°C (77°F)

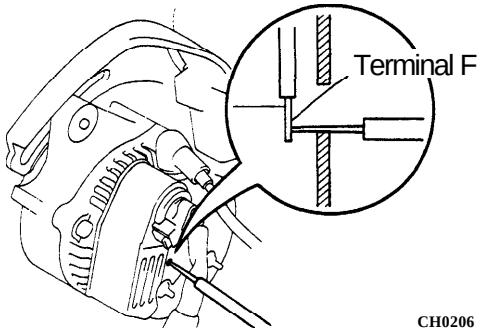


If the reading is not within standard voltage, adjust the regulator or replace it.



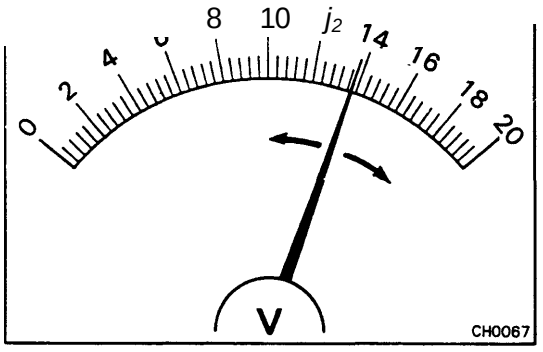
(w/ IC Regulator)
Standard amperage: Less than 10A
Standard voltage: 13.5- 15.1Vat25°C(77°F)

If the voltage reading is not within standard voltage, replace the IC regulator.

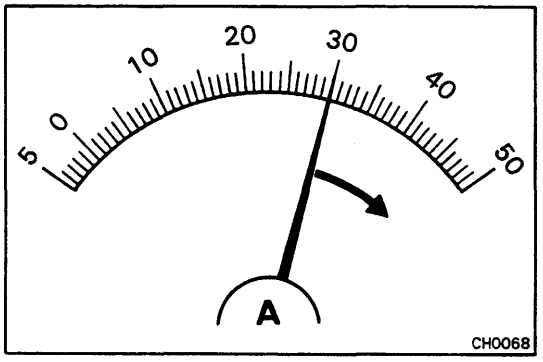


If the voltage reading is less than standard voltage, check the IC regulator and alternator as follows:

- With terminal F grounded, start the engine and check the voltage reading of terminal B.



- If the voltage reading is more than standard voltage, replace the IC regulator.
- If the voltage reading is less than standard voltage, check the alternator.

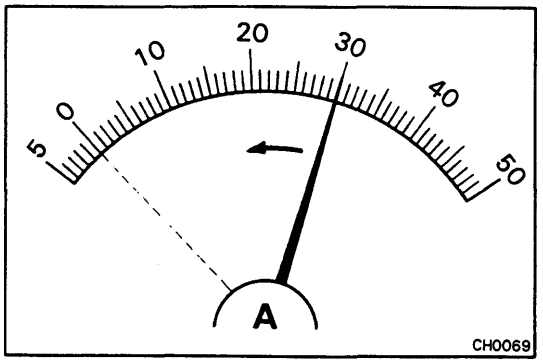


7. CHECK CHARGING CIRCUIT WITH LOAD

(a) With the engine running at 2,000 rpm, turn on the high beam headlights and place the heater fan control switch on "HI".

(b) Check the reading on the ammeter.

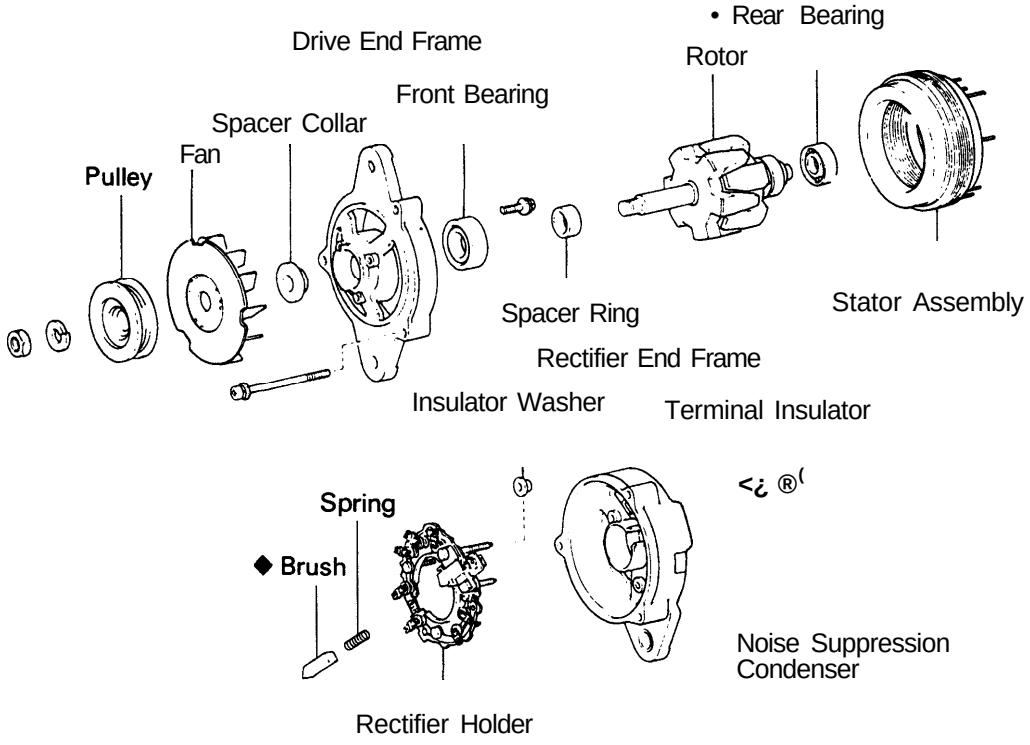
Standard amperage: More than 30A



If the ammeter reading is less than 30A, repair the alternator. (See page CH-7)

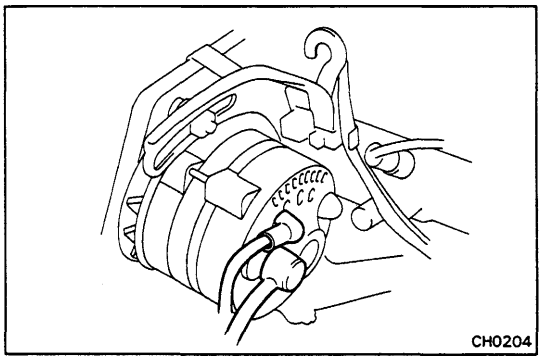
NOTE: With the battery fully charged, the indication will sometimes be less than 30A.

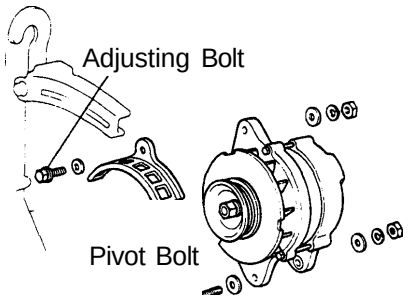
ALTERNATOR
w/o IC Regulator
COMPONENTS



•: Non-reusable part

CH0184

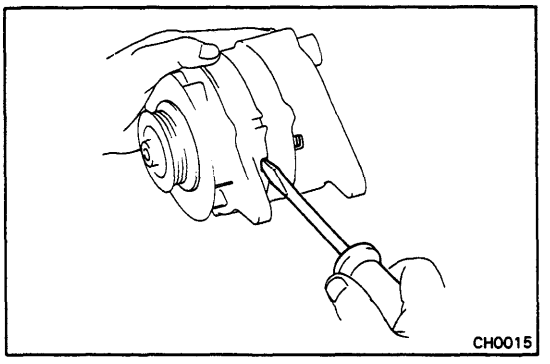




CH0207

REMOVAL OF ALTERNATOR

1. **DISCONNECT CABLE FROM NEGATIVE TERMINAL OF BATTERY**
2. **DISCONNECT CONNECTOR AND WIRE FROM ALTERNATOR**
3. **DISCONNECT DRIVE BELT FROM ALTERNATOR**
   (a) Loosen the adjusting and pivot nuts.
   (b) Disconnect the drive belt.
4. **REMOVE ALTERNATOR**
   (a) Remove the adjusting bolt, nut and fan cover.
   (b) Remove the pivot bolt and nut.
   (c) Remove the alternator.



DISASSEMBLY OF ALTERNATOR

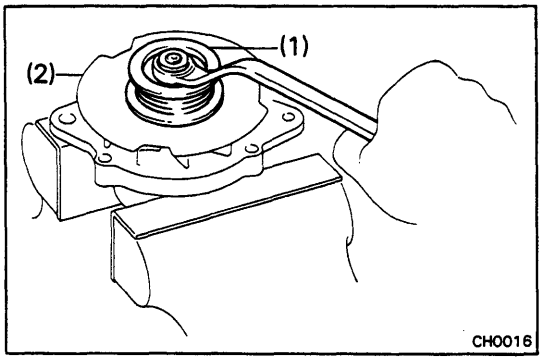
(See page CH-7)

1. REMOVE DRIVE END FRAME AND ROTOR ASSEMBLY FROM STATOR

(a) Remove the three through bolts.

(b) Using a screwdriver, pry the end frame and remove it together with the rotor.

CAUTION: Do not pry on the oil wires.



2. REMOVE PULLEY, FAN AND DRIVE END FRAME FROM ROTOR

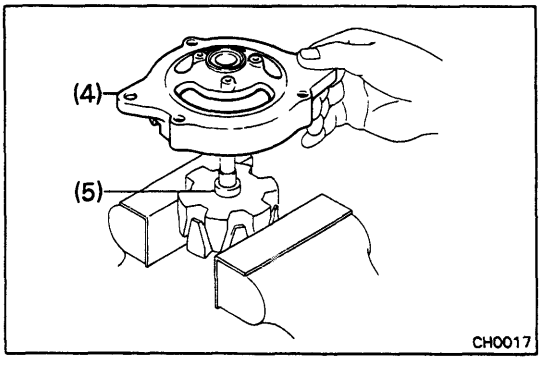
(a) Mount the rotor in a soft jaw vise.

(b) Remove the nut, spring washer and following parts from the rotor.

(1) Pulley

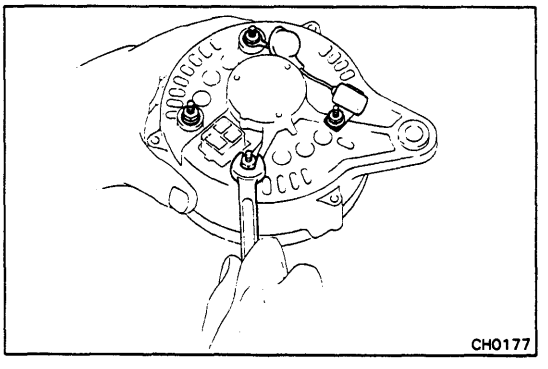
(2) Fan

(3) Spacer collar



(4) Drive end frame

(5) Spacer ring



3. REMOVE RECTIFIER END FRAME

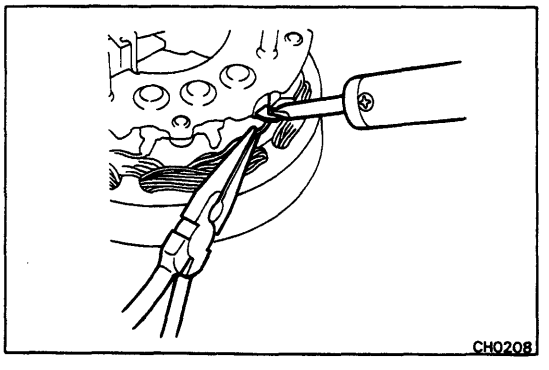
Remove the four nuts and following parts from the rectifier holder.

(1) Noise suspensión condenser

(2) Two terminal insulators

(3) Rectifier end frame

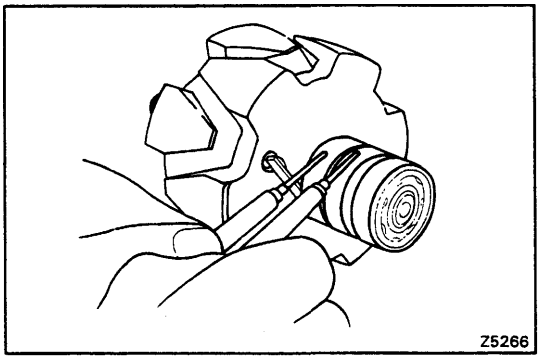
(4) Two insulator washers



5. REMOVE RECTIFIER HOLDER

Hold the rectifier terminal with needle-nose pliers, and unsolder the leads.

CAUTION: Protect the rectifiers from heat.



INSPECTION OF ALTERNATOR

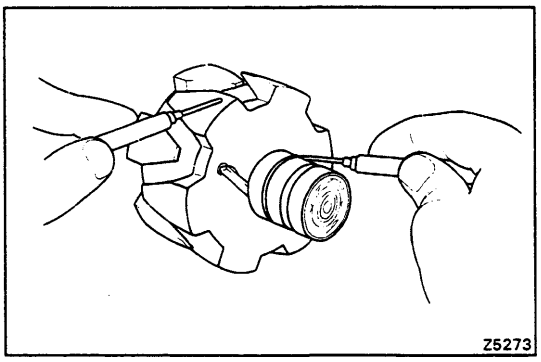
Rotor

1. INSPECT ROTOR FOR OPEN CIRCUIT

Using an ohmmeter, check that there is continuity between the slip rings.

Standard resistance: 4.0 — 4.2 *O,*

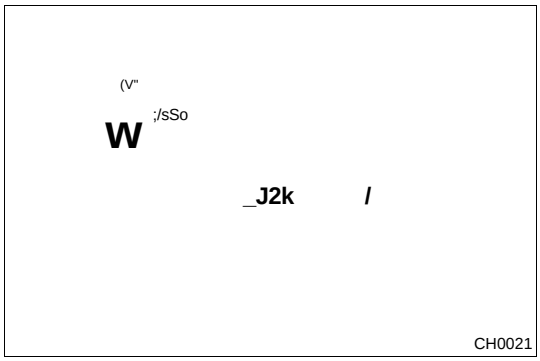
If there is no continuity, replace the rotor.



2. INSPECT ROTOR FOR GROUND

Using an ohmmeter, check that there is no continuity between the slip ring and the rotor.

If there is continuity, replace the rotor.



3. INSPECT SLIP RINGS

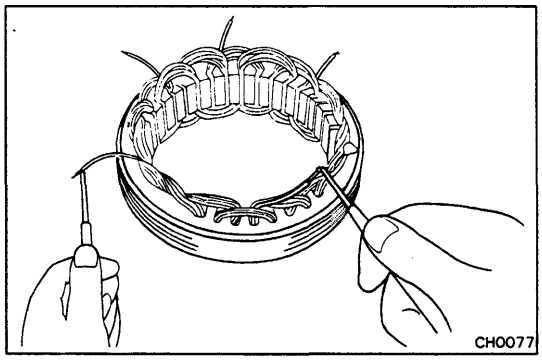
(a) Check the slip rings for roughness or scoring.

If rough or scored, replace the rotor.

(b) Using calipers, measure the slip ring diameter.

Standard diameter: 32.5 mm (1.280 in.)
Mínimum diameter: 32.1 mm (1.264 in.)

If the diameter is less than mínimum, replace the rotor.



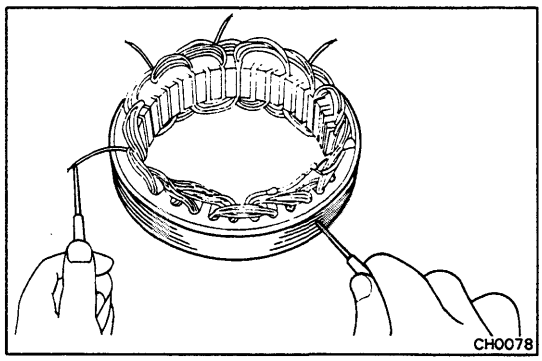
Stator

1. INSPECT STATOR FOR OPEN CIRCUIT

Using an ohmmeter, check all leads for continuity.

NOTE: At this time, the meeting wires should be connected with solder.

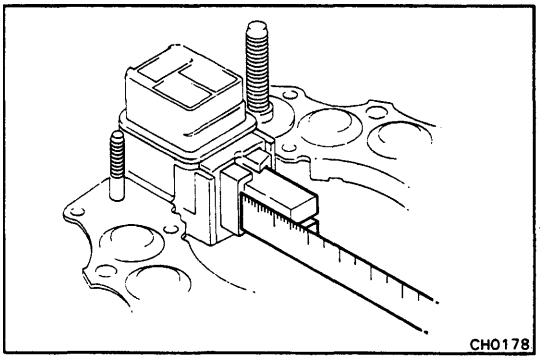
If there is no continuity, replace the stator.



2. INSPECT STATOR FOR GROUND

Using an ohmmeter, check that there is no continuity between the coil leads and stator core.

If there is continuity, replace the stator.

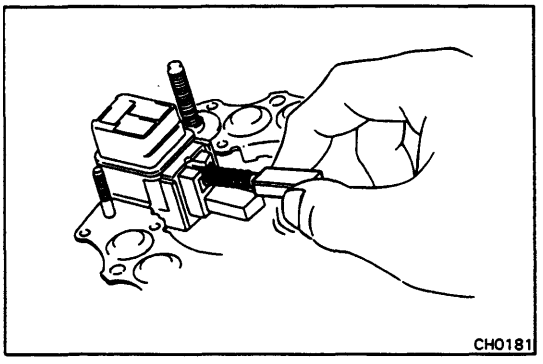


Brushes

1. INSPECT EXPOSED BRUSH LENGTH

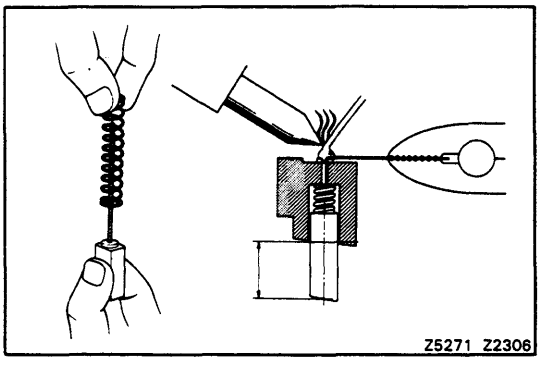
Minimum exposed length: 5.5 mm (0.217 in.)

If the exposed length is less than minimum, replace the brushes.



2. IF NECESSARY REPLACE BRUSHES

(a) Unsolder and remove the brush and spring.



(b) Put the brush wire through the spring, and ¡nsert the brush into the brush holder.

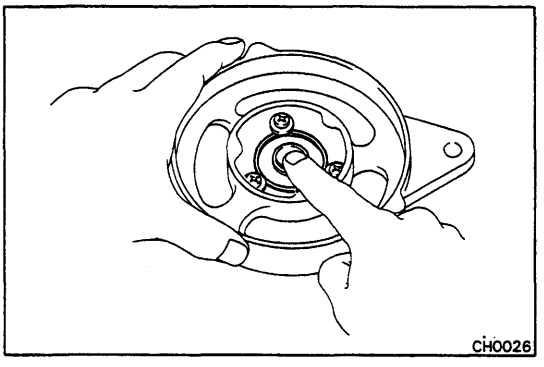
(c) Solder the wire to the brush holder as shown.

Standard exposed length: 12.5 mm (0.492 in.)

(d) Check that the brush moves smoothly in the brush holder.

(e) Cut off the excess wire.

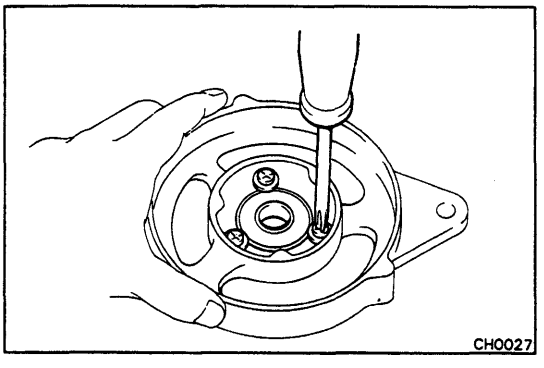
(f) Apply insulation paint to the soldered point.



Bearings

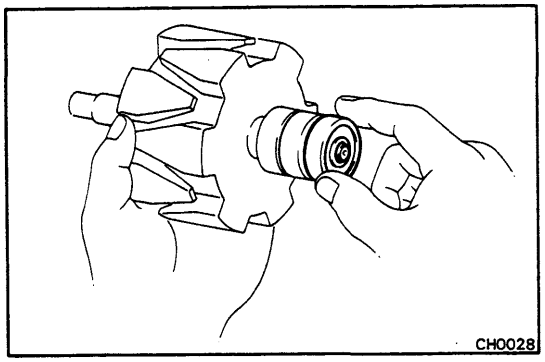
1. INSPECT FRONT BEARING

Check that the bearing is not rough or worn.



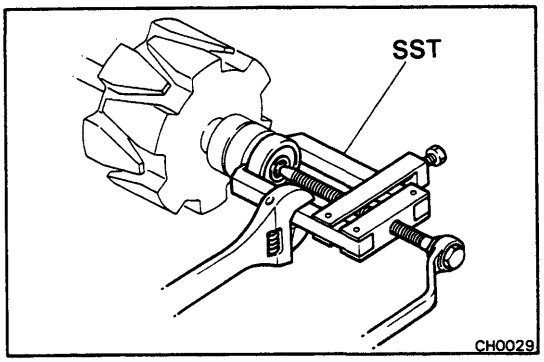
2. IF NECESSARY, REPLACE FRONT BEARING

Remove the three screws, and replace the bearing.



3. INSPECT REAR BEARING

Check that the bearing is not rough or worn.



IF NECESSARY, REPLACE REAR BEARING

(a) Using SST, remove the bearing from the rotor shaft.

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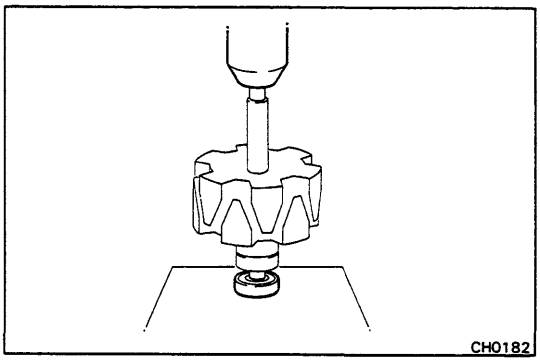
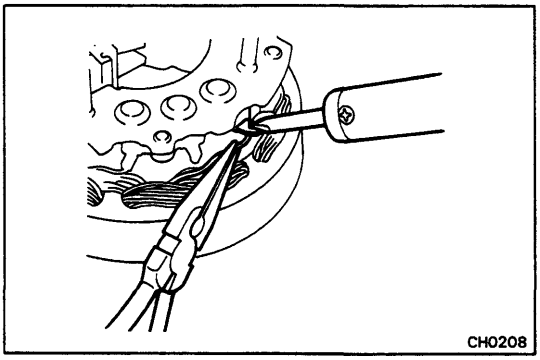


(b) Using a press, install a new rear bearing onto the rotor shaft.



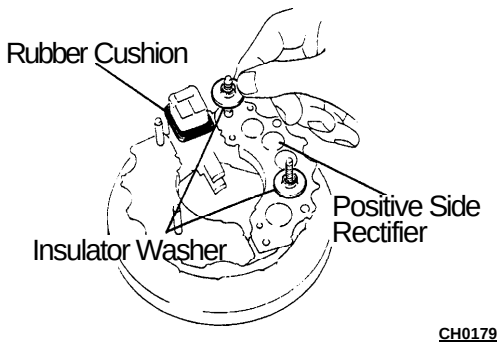
ASSEMBLY OF ALTERNATOR

(See page CH-7)

1. INSTALL RECTIFIER HOLDER

Hold the rectifier terminal with needle-nose pliers while soldering the leads.

CAUTION: Protect the rectifiers from heat.

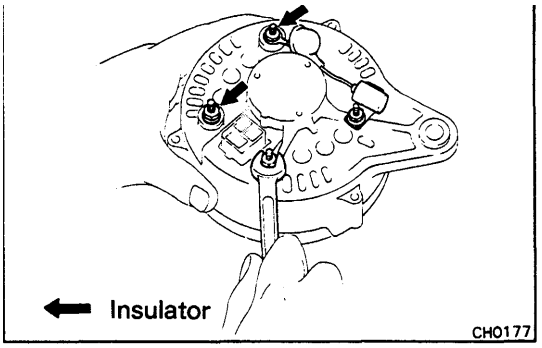


2. INSTALL RECTIFIER END FRAME TO RECTIFIER HOLDER

(a) Place the two insulator washers on the positive side studs.

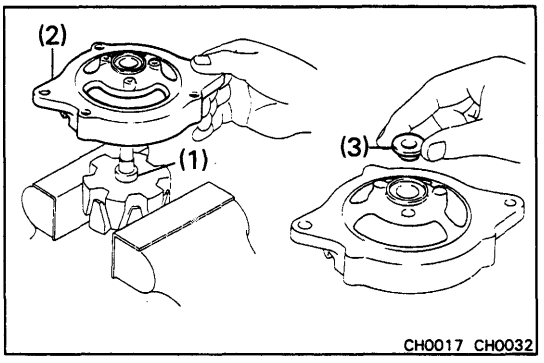
(b) Place a rubber cushion on the brush holder.

(c) Install the rectifier end frame on the rectifier holder. Check that the wires are not touching the case.



(d) Place the two terminal insulators on the positive side studs.

(e) Install the noise suppression condenser and four nuts on the studs.



3. **INSTALL DRIVE END FRAME, FAN AND PULLEY**

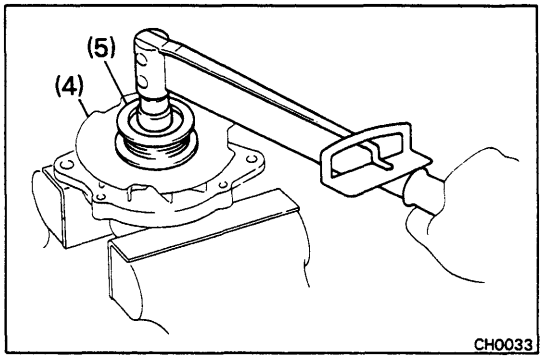
(a) Mount the rotor in a soft jaw vise.

(b) Slide the following parts on the rotor shaft.

(1) Spacer ring

(2) Drive end frame

(3) Spacer collar

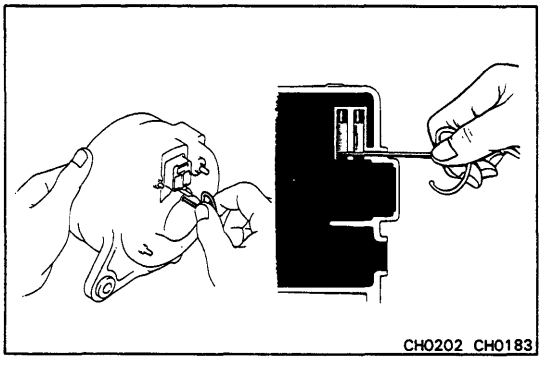


(4) Fan

(5) Pulley

(c) Install the spring washer and nut. Torque the nut.

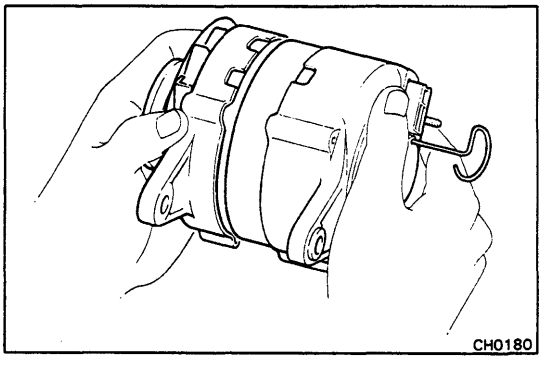
Torque: 625 kg-cm (45 ft-lb, 61 Nm)



4. **ASSEMBLE DRIVE END FRAME AND RECTIFIER END FRAME**

(a) Bend the rectifier lead wires back to clear the rotor.

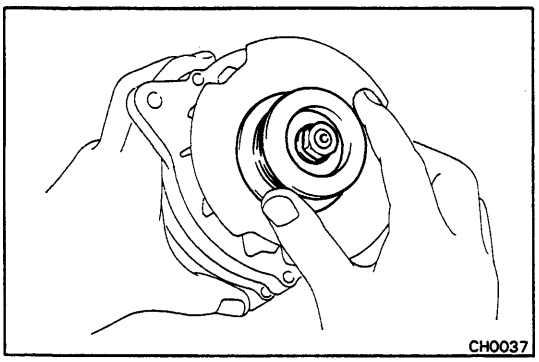
(b) Using a curved tool, push the brushes in as far as they will go and hold them in place by ¡nserting a stiff wire through the access hole in the rectifier end frame.



(c) Assemble the drive end frame and the rectifier end frame by ¡nserting the rear bearing on the rotor shaft into the rectifier end frame.

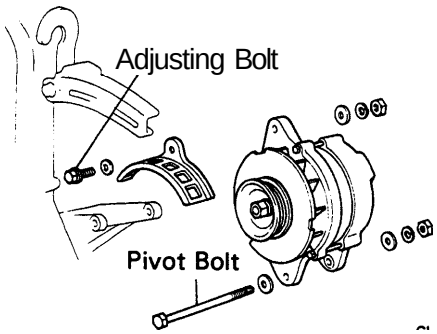
(d) Install the three through bolts.

(e) Remove the wire from the access hole.



(f) Make sure the rotor rotates smoothly.

(g) Seal the access hole.



INSTALLATION OF ALTERNATOR

(See page CH-7)

1. INSTALL ALTERNATOR

(a) Place the alternator in position.

(b) Install the pivot bolt and nut. Do not tighten the nut yet.

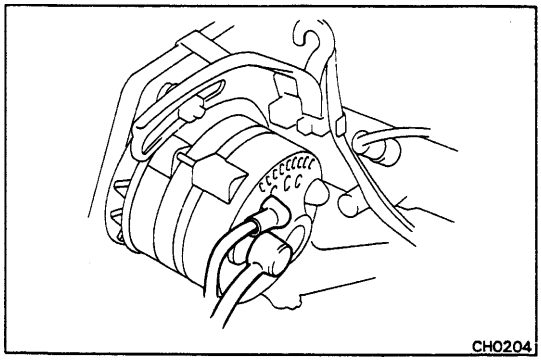
(c) Install the cover with the adjusting bolt.

(d) Install the adjusting nut Do not tighten the nut yet

2. INSTALL AND ADJUST DRIVE BELT

(a) Install the drive belt, and tighten the adjusting and pivot nuts.

(b) Check and adjust the drive belt (See page CH-3)



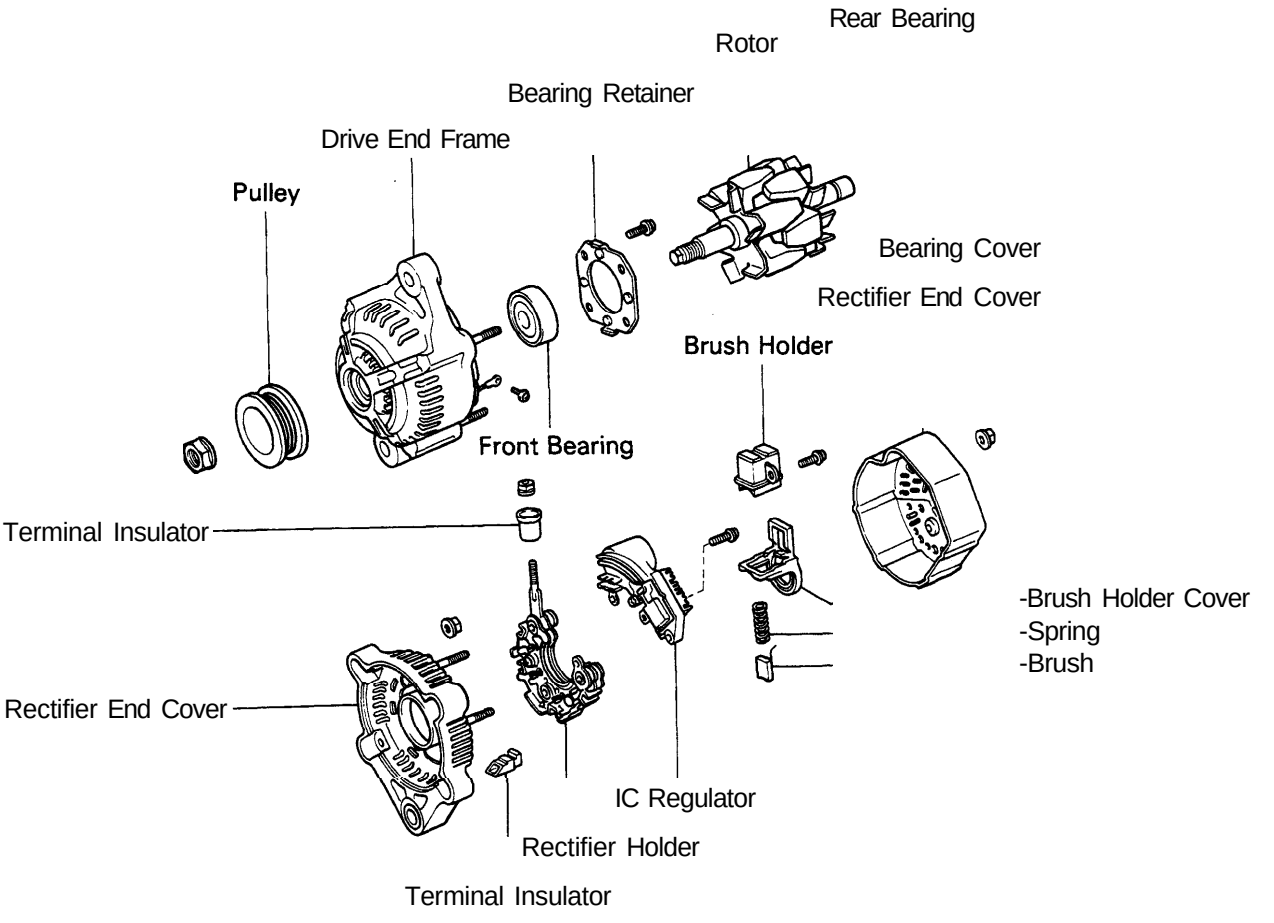
3. CONNECT CONNECTOR AND WIRE TO ALTERNATOR

4. CONNECT CABLE TO NEGATIVE TERMINAL OF BATTERY

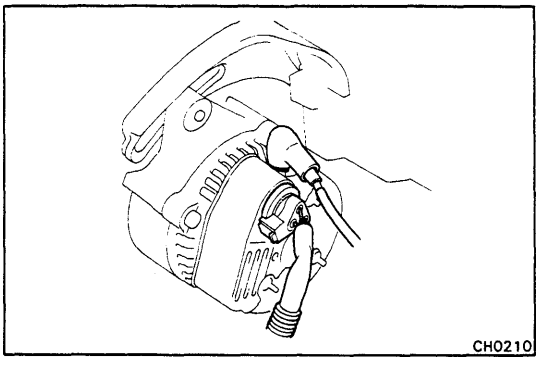
5. PERFORM ON-VEHICLE INSPECTION
(See page 5 to 7 on pages CH-4 to 6)

w/ IC Regulator

COMPONENTS

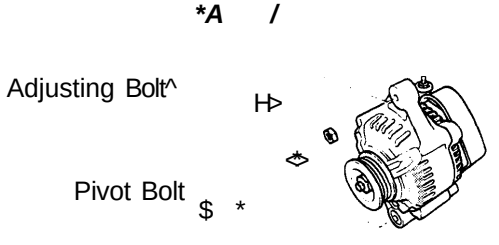


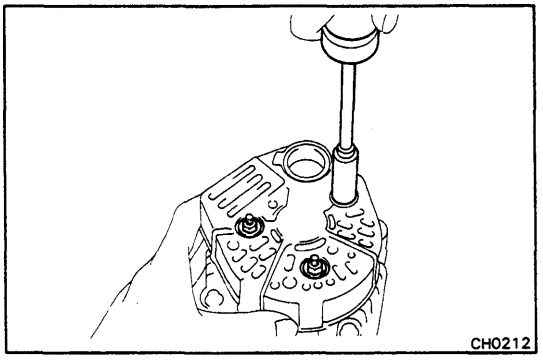
CH0209



REMOVAL OF ALTERNATOR

1. **DISCONNECT CABLE FROM NEGATIVE TERMINAL OF BATTERY**
2. **DISCONNECT CONNECTOR AND WIRE FROM ALTERNATOR**
3. **DISCONNECT DRIVE BELT FROM ALTERNATOR**
   (a) Loosen the adjusting and pivot bolts.
   (b) Disconnect the drive belt.
4. **REMOVE ALTERNATOR**
   (a) Remove the adjusting and pivot bolts.
   (b) Remove the altemator





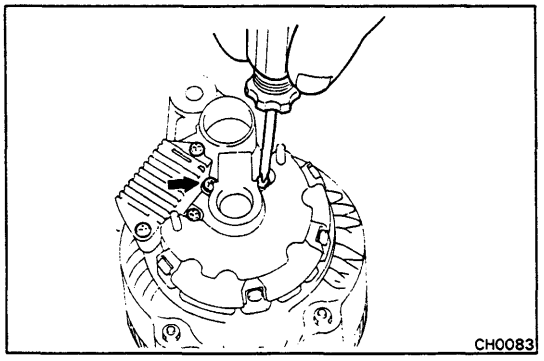
DISASSEMBLY OF ALTERNATOR

(See page CH-14)

1. REMOVE REAR END COVER

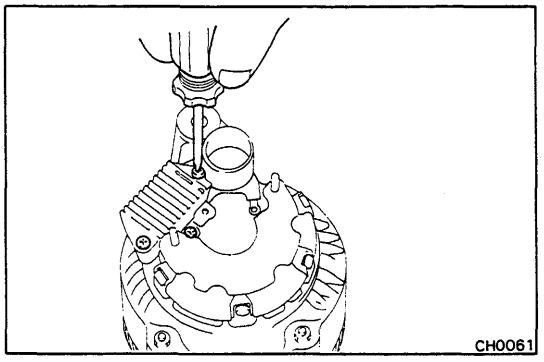
(a) Remove the nut and terminal insulator.

(b) Remove the three nuts and end cover.



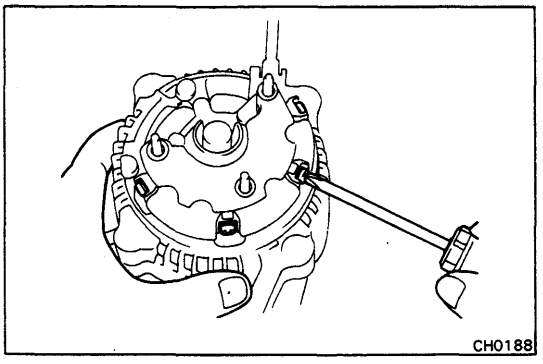
2. REMOVE BRUSH HOLDER

Remove the two screws, brush holder and cover.



3. REMOVE IC REGULATOR

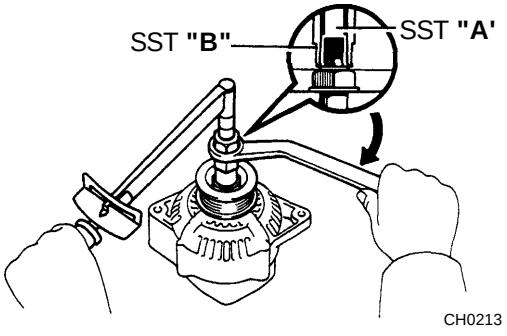
Remove the three screws and IC regulator.



4. REMOVE RECTIFIER HOLDER

(a) Remove the four screws and rectifier holder.

(b) Remove the four terminal ¡nsulators.



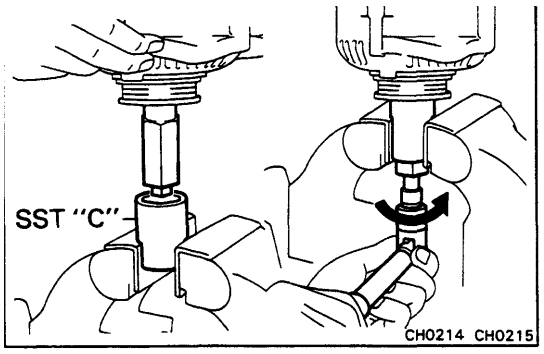
5. REMOVE PULLEY

(a) Hold SST "A" with a torque wrench, and tighten SST "B" clockwise to the specified torque.

SST 09820-63010

Torque: 400 kg-cm (29 ft-lb, 39 N-m)

(b) Check that SST "A" is secured to the rotor shaft.



(c) As shown in the figure, mount SST "C" in a vise, and install the alternator to SST "C".

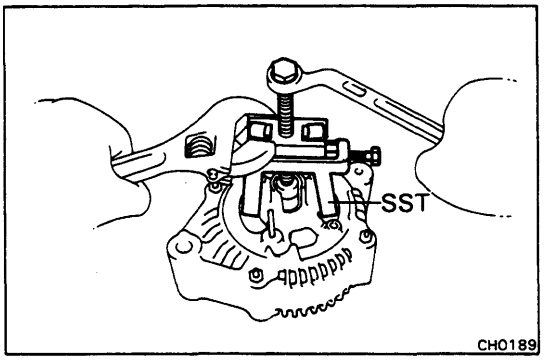
(d) To loosen the pulley nut turn SST "A" in the direction shown in the figure.

CAUTION: To prevent damage to the rotor shaft, do not loosen the pulley nut more that one-half of a turn.

(e) Remove the alternator from SST "C".

(f) Turn SST "B" and remove SSTs "A" and "B".

(g) Remove the pulley nut and pulley.



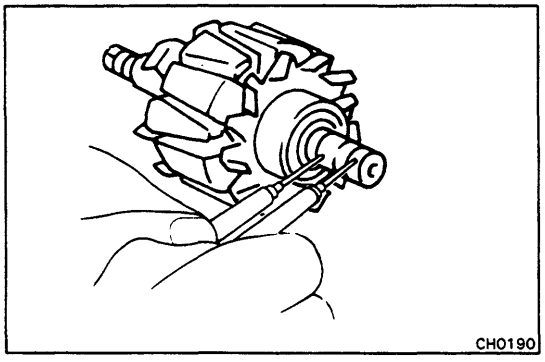
6. **REMOVE RECTIFIER END FRAME**

(a) Remove the four nuts.

(b) Using SST, remove the rectifier end frame.

SST 09286-46011

REMOVE ROTOR FROM DRIVE END FRAME



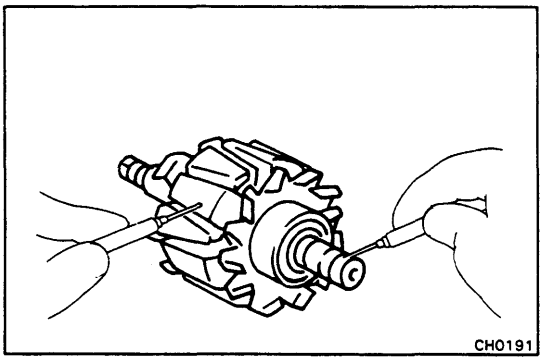
INSPECTION AND REPAIR OF ALTERNATOR Rotor

1 INSPECT ROTOR FOR OPEN CIRCUIT

Using an ohmmeter, check that there is continuity between the slip rings.

Standard resistance (cold): 2.8 - 3.0 fí

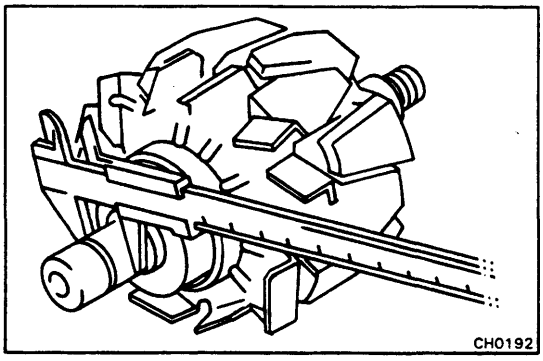
If there is no continuity, replace the rotor.



2. INSPECT ROTOR FOR GROUND

Using an ohmmeter, check that there is no continuity between the slip ring and the rotor.

If there is continuity, replace the rotor.



3. INSPECT SLIP RINGS

(a) Check that the slip rings are not rough or scored.

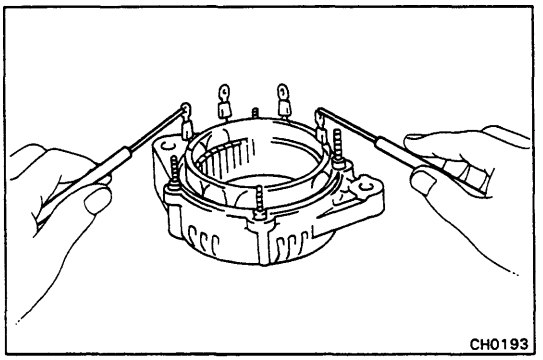
If rought or scored, replace the rotor.

(b) Using calipers, measure the slip ring diameters.

Standard diameter: 14.2 - 14.4 mm (0.559 - 0.567 in.)

Mínimum diameter: 14.0 mm (0.551 in.)

If the diameter is less than mínimum, replace the rotor.

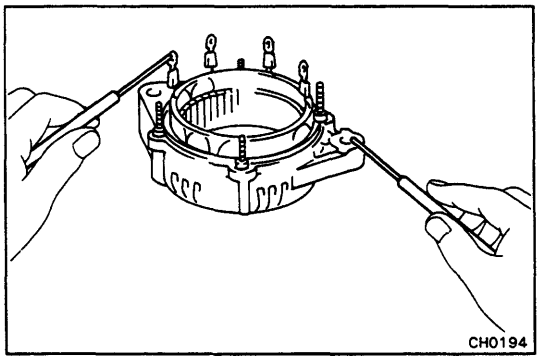


Stator

1. INSPECT STATOR FOR OPEN CIRCUIT

Using an ohmmeter, check that there is continuity between the coil leads.

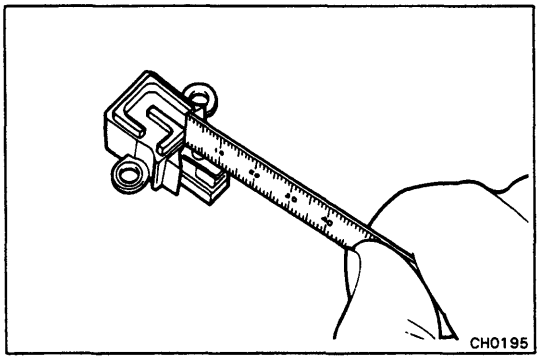
If there is no continuity, replace the drive end frame assembly.



2. INSPECT STATOR FOR GROUND

Using an ohmmeter, check that there is no continuity between the coil leads and drive end frame.

If there is continuity, replace the drive end frame assembly.



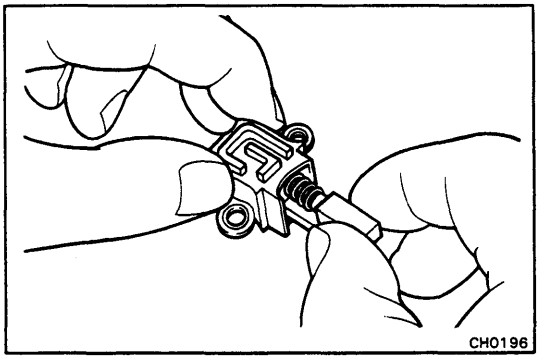
Brushes

1. INSPECT EXPOSED BRUSH LENGH

(a) Using a scale, measure the exposed brush length.

Standard exposed length: 10.5 mm (0.413 in.)
Minimum exposed length: 4.5 mm (0.177 in.)

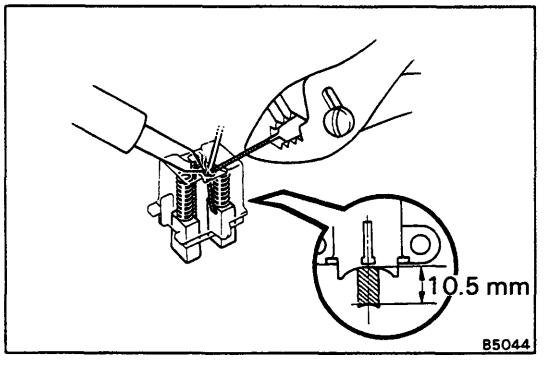
If the exposed length is less than minimum, replace the brushes.



2. IF NECESSARY, REPLACE BRUSHES

(a) Unsolder and remove the brush and spring.

(b) Run the wire of the brush through the hole in the brush holder, and inserí the spring and brush into the brush holder.



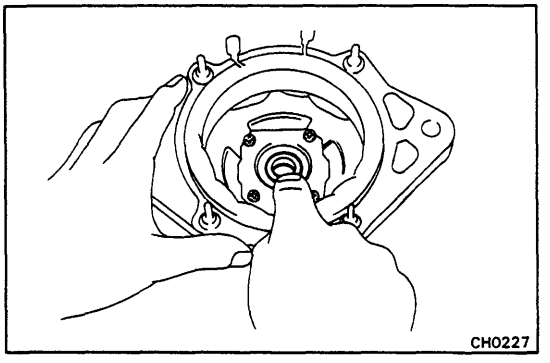
(c) Solder the brush wire to the brush holder at the exposed length.

Exposed length: 10.5 mm (0.413 in.)

(d) Check that the brush moves smoothly in the brush holder.

(e) Cut off the excess wire.

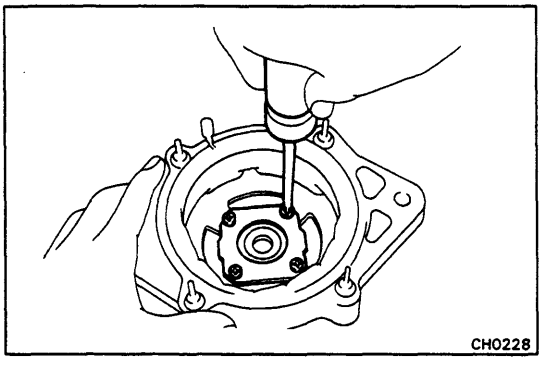
(f) Apply insulation paint to the soldered point.



Bearings

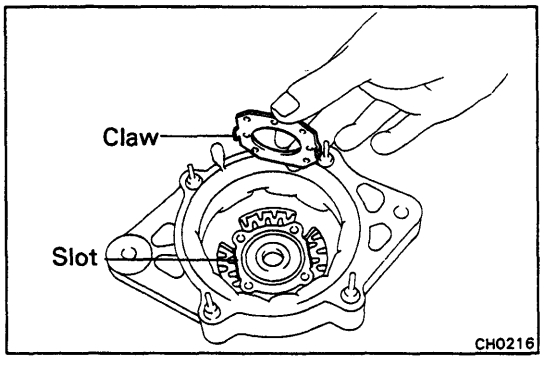
1. INSPECT FRONT BEARING

Check that the bearing is not rough or worn.



2. IF NECESSARY, REPLACE FRONT BEARING

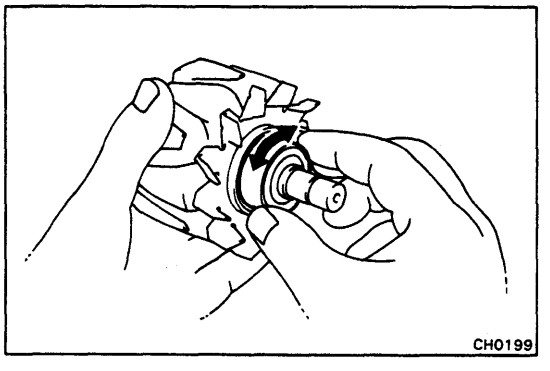
(a) Remove the four screws, bearing retainer and bearing.



(b) Instad the bearing.

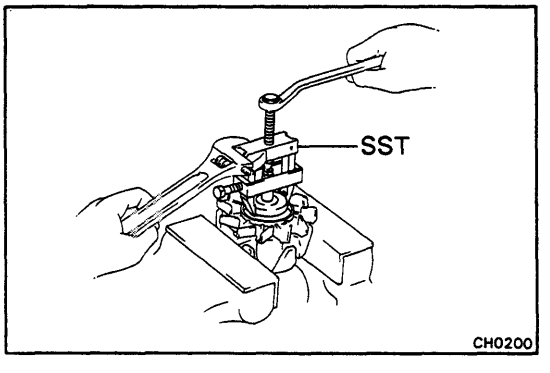
(c) Align the claws of the bearing retainer with the slots of the drive end frame.

(d) Insta 11 the bearing retainer with the four screws.



3. INSPECT REAR BEARING

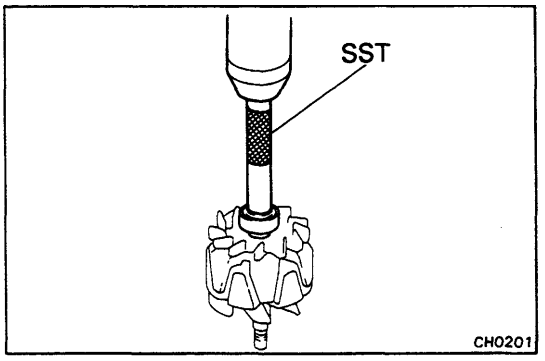
Check that the bearing is not rough or worn.



4. IF NECESSARY, REPLACE REAR BEARING

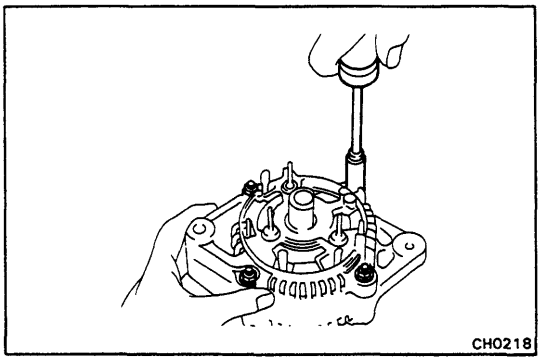
(a) Using SST, remove the bearing cover and cover.

SST 09820-00021



(b) Using SST and a press, press in the bearing and bearing cover.

SST 09285-76010



ASSEMBLY OF ALTERNATOR

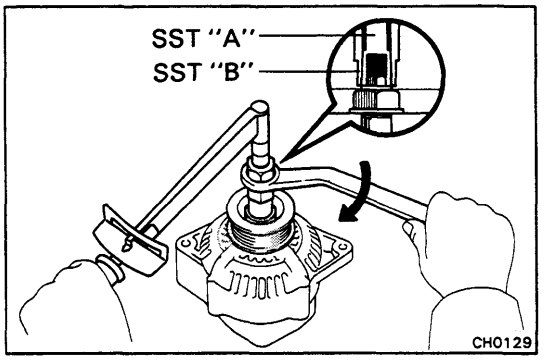
(See page CH-14)

1. INSTALL ROTOR TO DRIVE END FRAME

2. INSTALL RECTIFIER END FRAME

(a) Using a plastic-faced hammer, lightly tap in the end frame.

(b) Install the four nuts.



3. INSTALL PULLEY

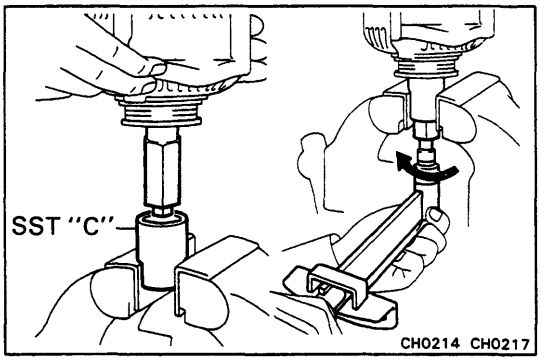
(a) Install the pulley to the rotor shaft by tightening the pulley nut by hand.

(b) Hold SST "A" with a torque wrench, and tighten SST "B" clockwise to the specified torque.

SST 09820-63010

Torque: 400 kg-cm (29 ft-lb, 39 N-m)

(c) Check that SST "A" is secured to the pulley shaft.



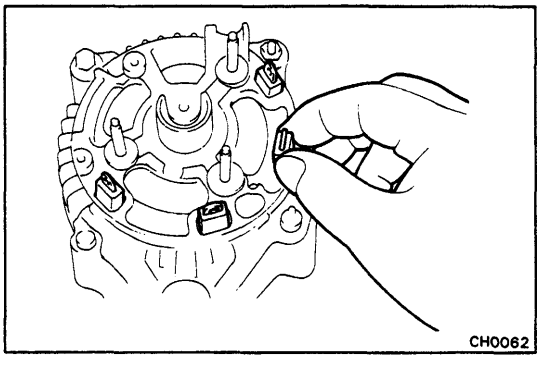
(d) As shown in the figure, mount SST "C" in a vise, and install the altemator to SST "C".

(e) To torque the pulley nut tum SST "A" in the direction shown in the figure.

Torque: 1,125 kg-cm (81 ft-lb, 110 N-m)

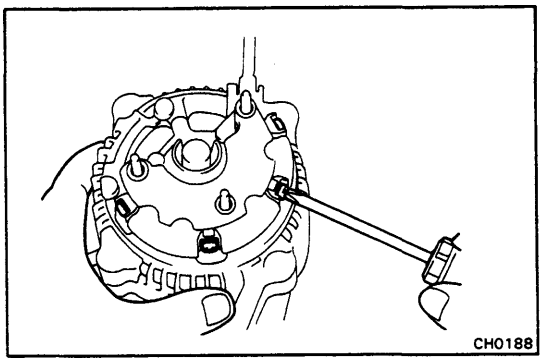
(f) Remove the altemator from SST "C".

(g) Turn SST "B" and remove SSTs "A" and **"B".**

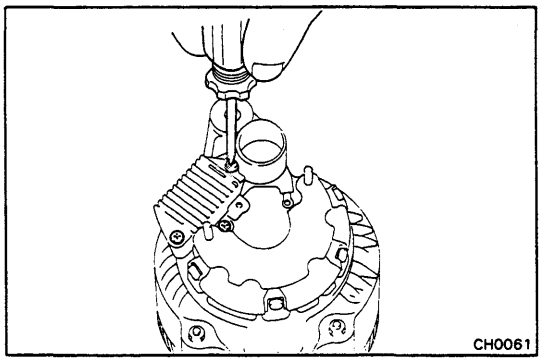


4. INSTALL RECTIFIER HOLDER

(a) Install the four rubber insulators on the lead wires.

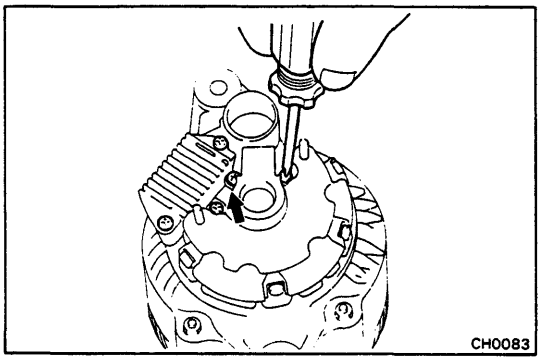


(b) Install the rectifier with the four screws.



5. INSTALL IC REGULATOR

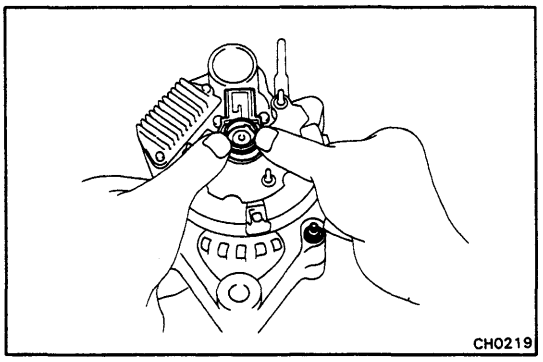
Install the IC regulator with the three screws.



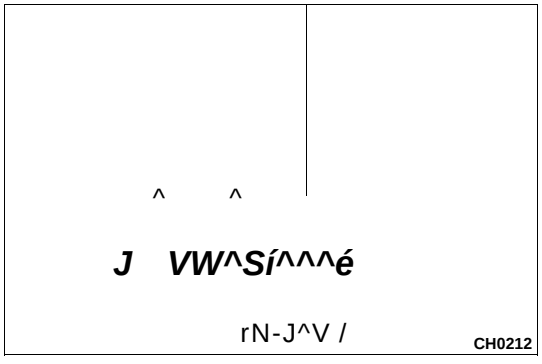
6. INSTALL BRUSH HOLDER

(a) Install the brush holder cover to the brush holder.

(b) Install the brush holder with the two screws.



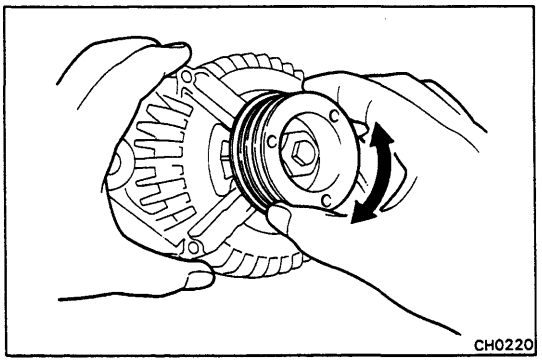
(c) Install the brush holder cover to the rear end frame.



7. INSTALL REAR END COVER

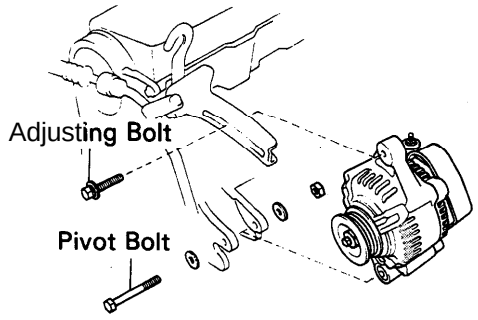
(a) Install the end cover with the three nuts.

(b) Install the terminal insulator with the nut.



8. MAKE SURE ROTOR ROTATES SMOOTHLY

INSTALLATION OF ALTERNATOR



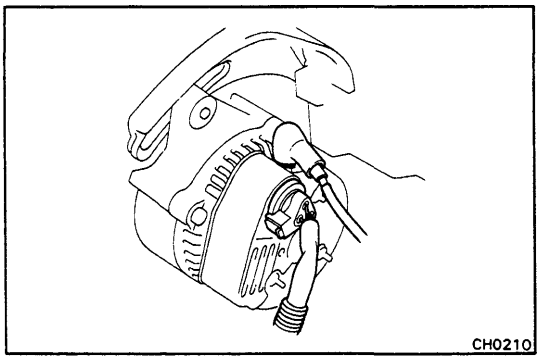
1. INSTALL ALTERNATOR

Mount the alternator on the engine bracket with the pivot and adjusting bolts. Do not tighten the bolts yet.

2. INSTALL AND ADJUST DRIVE BELT

(a) Instad the drive belt, and tighten the adjusting and pivot bolts.

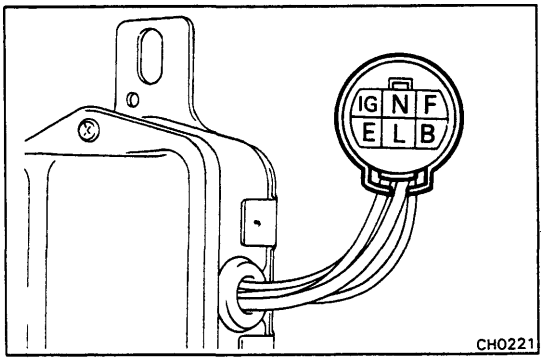
(b) Check and adjust the drive belt (See page CH-3)



3. CONNECT CONNECTOR AND WIRE TO ALTERNATOR

4. CONNECT CABLE TO NEGATIVE TERMINAL OF BATTERY

5. PERFORM ON-VEHICLE INSPECTION
(See steps 5 to 7 on pages CH-4 to 6)

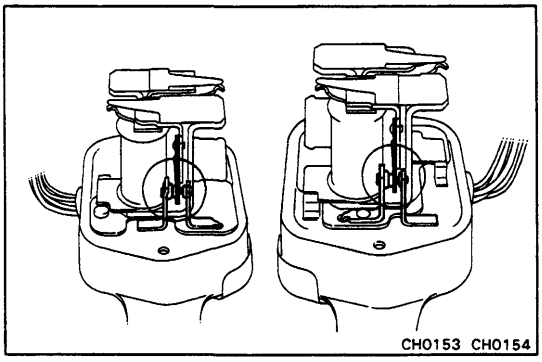


ALTERNATOR REGULATOR (w/o IC Regulator)

INSPECTION OF ALTERNATOR REGULATOR

LOCATION: On the left tender apron in the engine compartment.

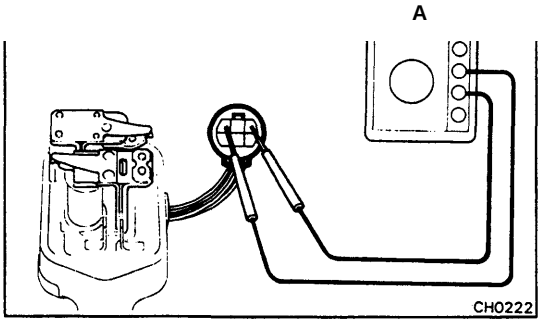
1. REMOVE ALTERNATOR REGULATOR COVER



2. INSPECT POINT SURFACES FOR BURN OR DAMAGE

If detective, replace the regulator.

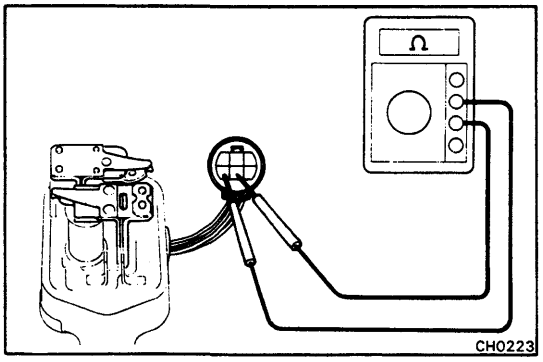
INSPECT RESISTANCE BETWEEN TERMINALS



(a) Using an ohmmeter, measure the resistance between terminái IG and F.

Resistance (voltage regulator):

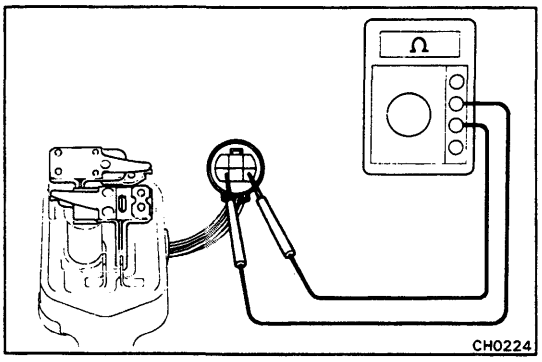
At rest	**0 fí**
Pulled in	**Approx. 11 ü**



(b) Using an ohmmeter measure the resistance between terminái L and E.

Resistance (voltage relay):

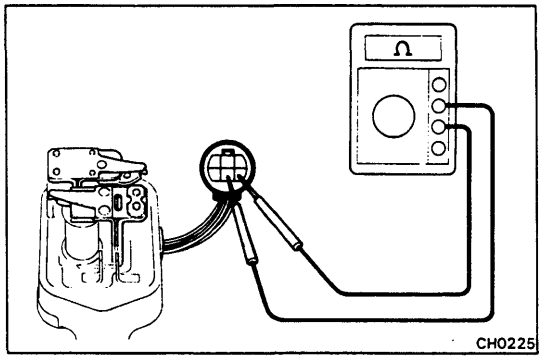
At rest	**0 O**
Pulled in	**Approx. 100** fí



(c) Using an ohmmeter, measure the resistance between terminái B and E.

Resistance (voltage relay):

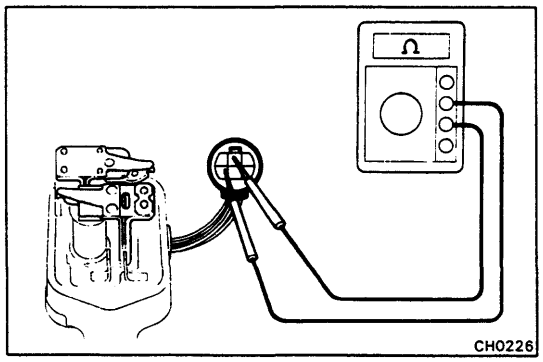
At rest	**Infinity**
Pulled in	**Approx. 100 O**



(d) Using an ohmmeter, measure the resistance between terminái B and L

Resistance (voltage relay):

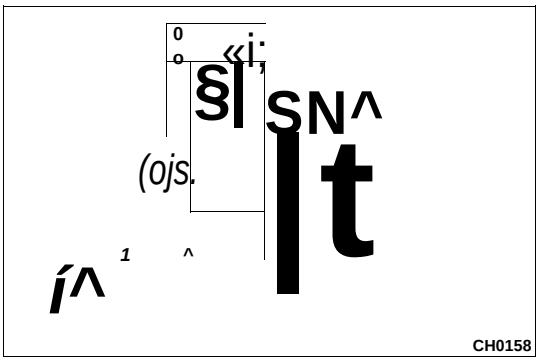
At rest	**Infinity**
Pulled in	**0** O



(e) Using an ohmmeter, measure the resistance between terminái N and E.

Resistance: Approx. 24 O

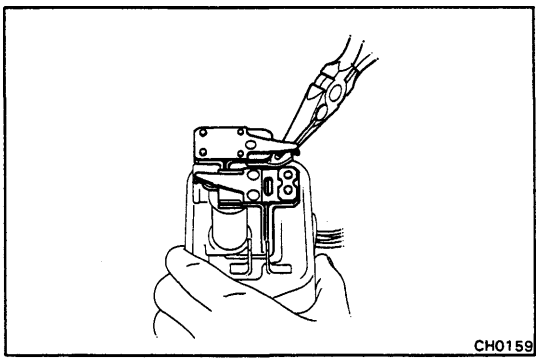
If any of the above checks are not positive, replace the alternator regulator.



4. ADJUST ALTERNATOR REGULATOR

(a) Adjust the voltage regulator by bending the regulator adjusting arm.

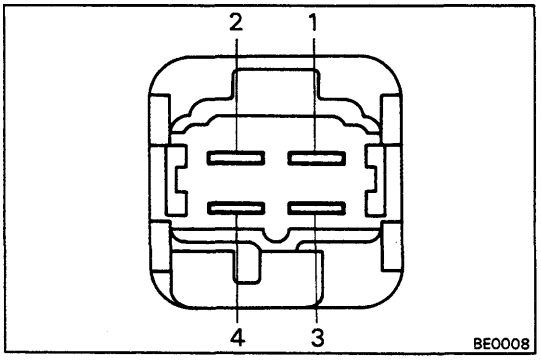
Regulation voltage: 13.8 - 14.8 V



(b) Adjust the voltage relay by bending the relay adjusting arm.

Relay actuating voltage: 4.0 — 5.8 V

5. INSTALL ALTERNATOR REGULATOR COVER



IGNITION MAIN RELAY

LOCATION: In the engine compartment relay box.

INSPECTION OF IGNITION MAIN RELAY

INSPECT RELAY OPERATION AND CONTINUITY
(See Sun Roof Relay on page BE-34)

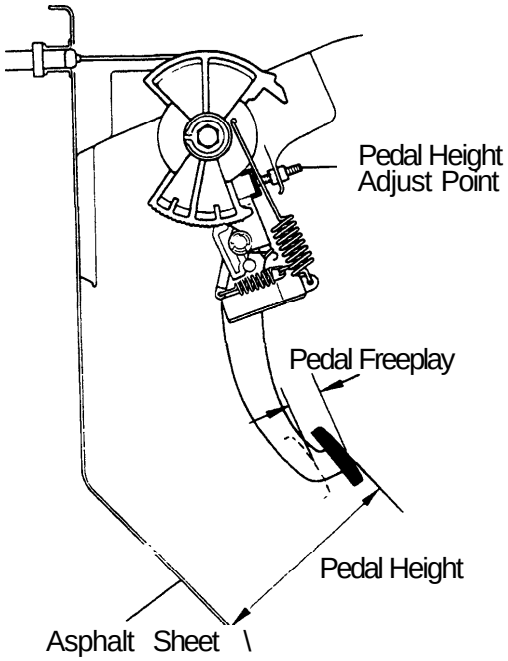
CLUTCH

•n

TROUBLESHOOTING

Problem	Possible cause	Remedy	Page
Hard to shift or will not shift	Clutch pedal freeplay excessive	Inspect clutch pedal	CL-3
	Clutch disc out of true, lining greasy or broken	Inspect clutch disc	CL-9
	Spiines on input shaft or clutch disc dirty or burred	Repair as necessary	
	Clutch pressure píate faulty	Replace clutch cover	
	Reléase cable faulty	Replace reléase cable	
Clutch slips	Clutch pedal freeplay insufficient	Check pedal freeplay	CL-3
	Clutch disc lining oily or wom out	Inspect clutch disc	CL-9
	Pressure píate faulty	Replace clutch cover	
Clutch grabs/chatters	Clutch disc lining oily or wom out	Inspect clutch disc	CL-9
	Pressure píate faulty	Replace clutch cover	
	Clutch linkage binding	Repair as necessary	
	Engine mounts loóse	Repair as necessary	
Clutch pedal spongy	Reléase cable faulty	Replace reléase cable	CL-6
Clutch noisy	Loóse part inside housing	Repair as necessary	
	Reléase bearing wom or dirty	Replace reléase bearing	CL-10
	Pilot bearing worn	Replace pilot bearing	CL-10
	Reléase cable broken	Replace reléase cable	CL-6
	Reléase fork or linkage sticking	Repair as necessary	

CHECK AND ADJUSTMENT OF CLUTCH PEDAL



1. CHECK THAT PEDAL HEIGHT IS CORRECT AS SHOWN

Pedal height from asphalt sheet: 177 — 187 mm (6.97 - 7.36 in.)

2. IF NECESSARY, ADJUST PEDAL HEIGHT

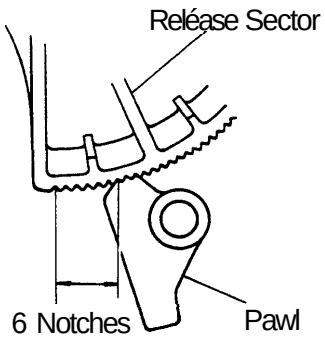
(a) Loosen the lock nut and turn the adjusting bolt until the height is correct.

(b) Tighten the lock nut.

3. CHECK THAT PEDAL FREEPLAY IS CORRECT

Push in on the pedal until the beginning of clutch resistance is felt.

Pedal freeplay: 2 - 2 8 mm (0.08 - 1.10 in.)



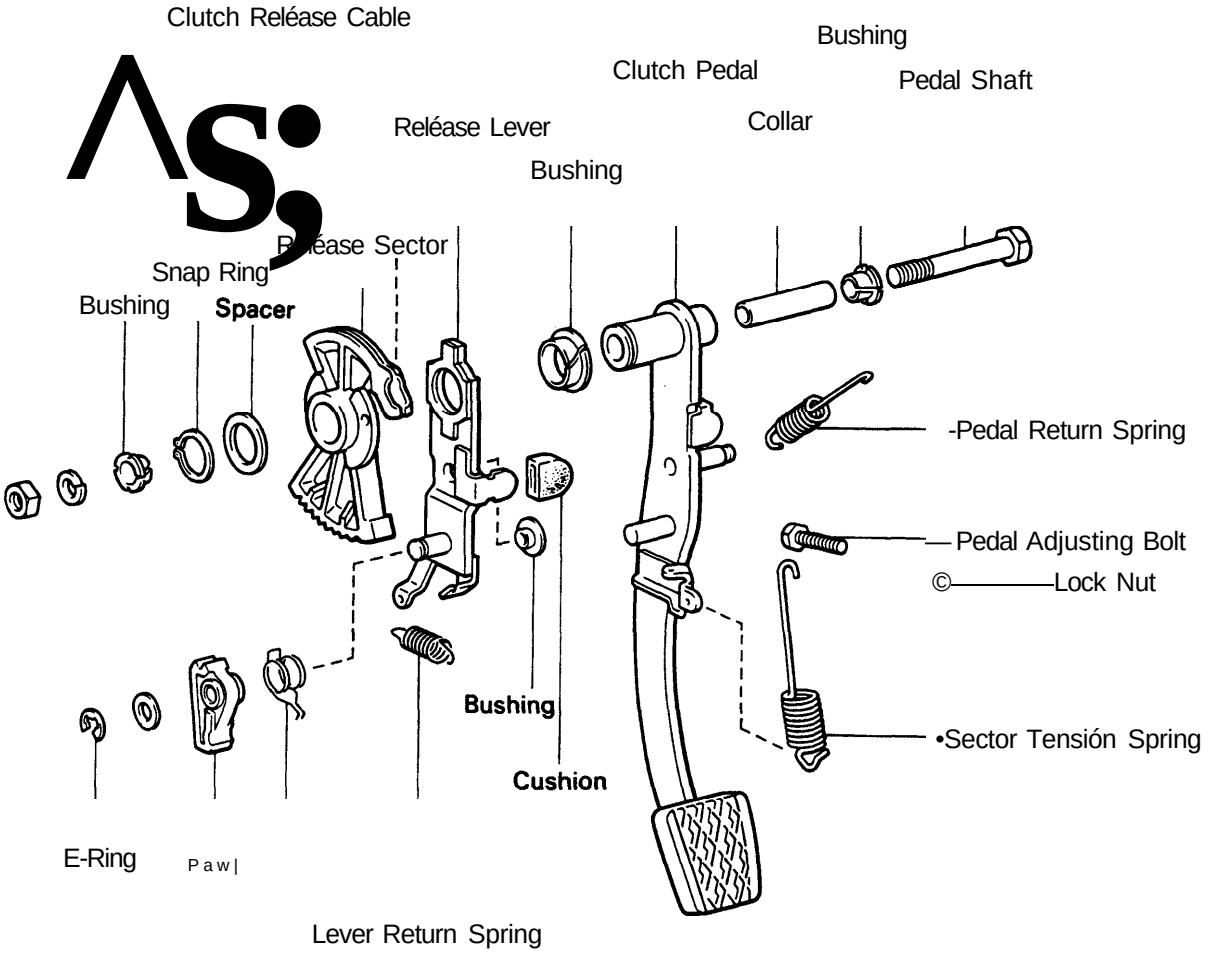
4. CHECK RELÉASE SECTOR AND PAWL POSITION

Check that there are at least six notches remaining on the sector.

NOTE: If there are less than six notches remaining, replace the clutch disc.

CLUTCH PEDAL

COMPONENTS

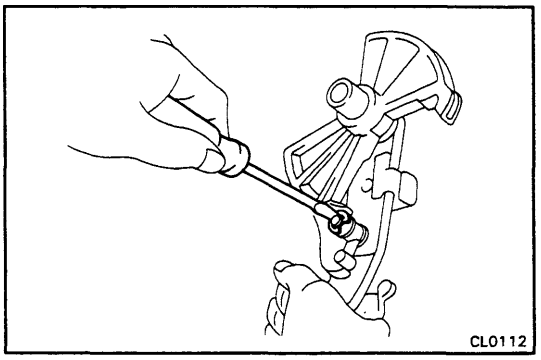


REMOVAL OF CLUTCH PEDAL

1. **REMOVE PEDAL RETURN SPRING**
2. **REMOVE SECTOR TENSIÓN SPRING**
3. **REMOVE CLUTCH PEDAL**
   (a) Remove the pedal shaft and nut.
   (b) Disconnect the reléase cable from the reléase sector and remove the pedal.

DISASSEMBLY OF CLUTCH PEDAL

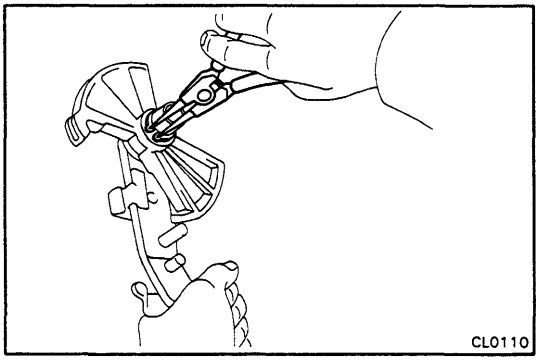
1. **REMOVE PEDAL SHAFT COLLAR AND BUSHINGS**
2. **REMOVE RELÉASE LEVER RETURN SPRING**



REMOVE PAWL

(a) Using a screwdriver, remove the E-ring and washer.

(b) Remove the pawl together with the spring.



4. REMOVE RELÉASE SECTOR AND LEVER

Using snap ring pliers, remove the snap ring, spacer, reléase sector, lever and bushings.

ASSEMBLY OF CLUTCH PEDAL

(See page CL-4)

NOTE: Coat MP grease to all bushings before assembly.

1. INSTALL RELÉASE LEVER AND SECTOR

(a) Install new bushings, the reléase lever, sector and spacer.

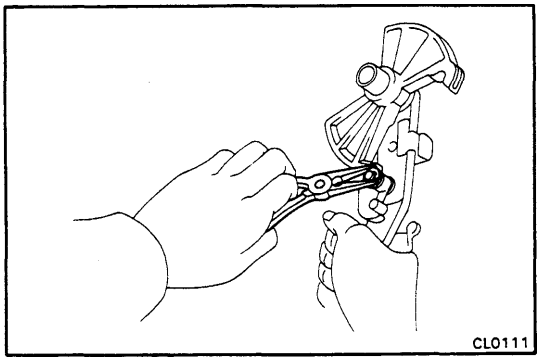
(b) Using snap ring pliers, install the snap ring.

2. INSTALL PAWL

(a) Assemble the spring to the pawl.

(b) Install the assembly to the pedal.

(c) Using pliers, install the washer and E-ring.



3. INSTALL RELÉASE LEVER RETURN SPRING

4. INSTALL PEDAL SHAFT COLLAR AND NEW BUSHINGS

INSTALLATION OF CLUTCH PEDAL

(See page CL-4)

1. INSTALL CLUTCH PEDAL

(a) Connect the reléase cable to the sector.

(b) Install the pedal with the pedal shaft and nut.

(c) Torque the nut.

Torque: 375 kg-cm (27 ft-lb, 37 Nm)

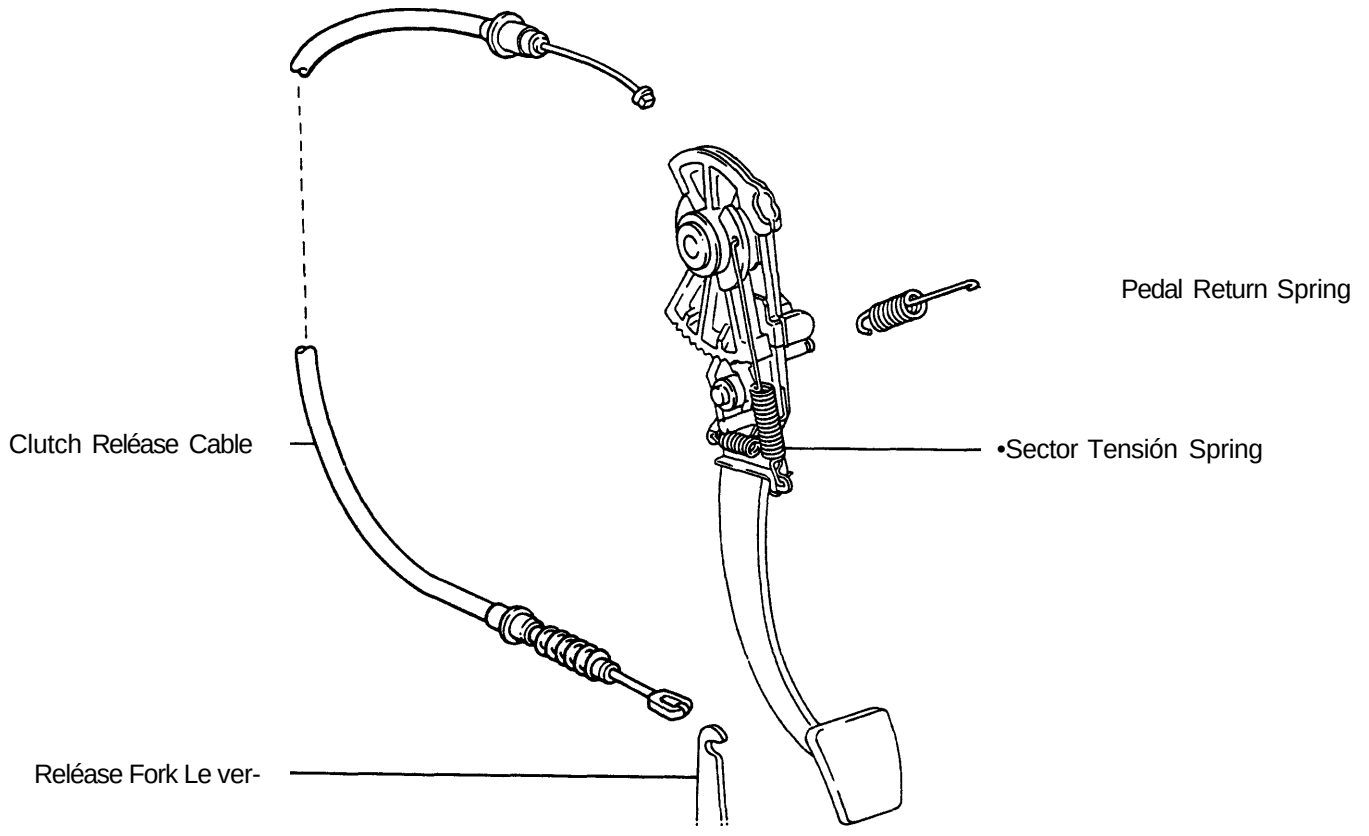
2. INSTALL SECTOR TENSIÓN SPRING

3. INSTALL PEDAL RETURN SPRING

4. CHECK AND ADJUST CLUTCH PEDAL
(See page CL-3)

CLUTCH RELÉASE CABLE

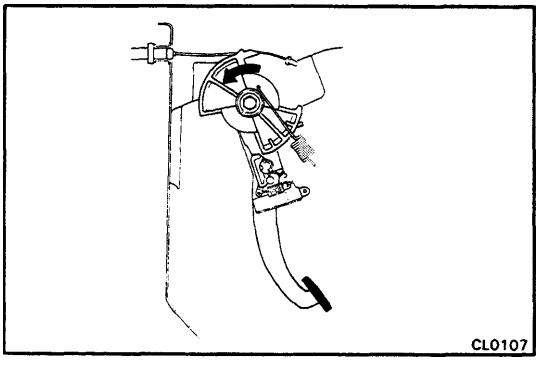
COMPONENTS



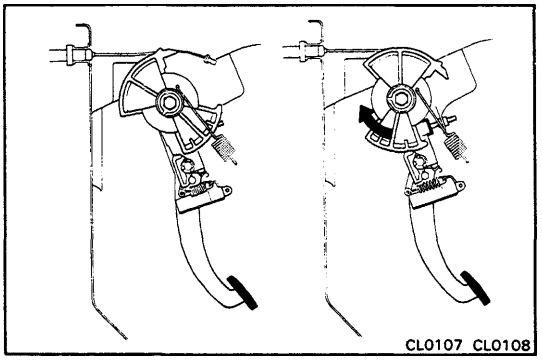
CL0109

REMOVAL OF CLUTCH RELÉASE CABLE

1. **DISCONNECT SECTOR TENSIÓN SPRING FROM CLUTCH PEDAL**
2. **DISCONNECT CLUTCH RELÉASE CABLE FROM FORK LEVER**



3. **REMOVE CLUTCH RELÉASE CABLE**
   (a) Turn the reléase sector toward the front side and disconnect the reléase cable from the reléase sector.
   (b) Remove the reléase cable.



INSTALLATION OF CLUTCH RELÉASE CABLE

(See page CL-6)

1. CONNECT CLUTCH RELÉASE CABLE IN PEDAL

(a) Run the reléase cable through the hole in the floorboard.

(b) Turn the reléase sector, and connect the reléase cable in the groove of it.

2. CONNECT CLUTCH RELÉASE CABLE IN FORK LEVER

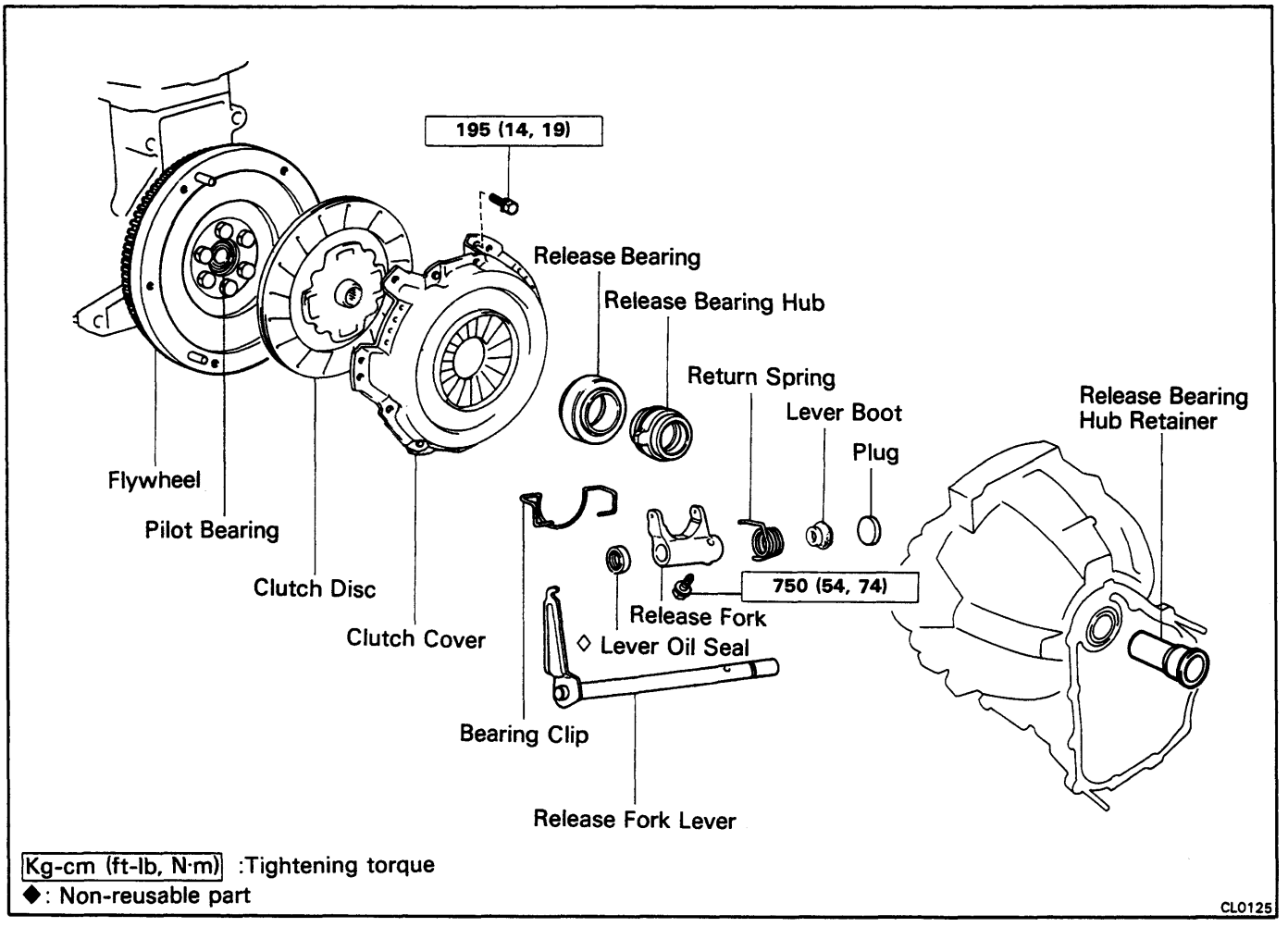
3. CONNECT PEDAL TENSIÓN SPRING

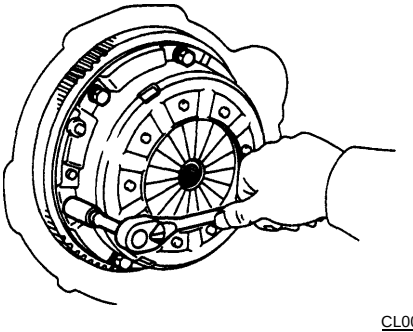
4. CHECK PEDAL FREEPLAY (See page CL-3)

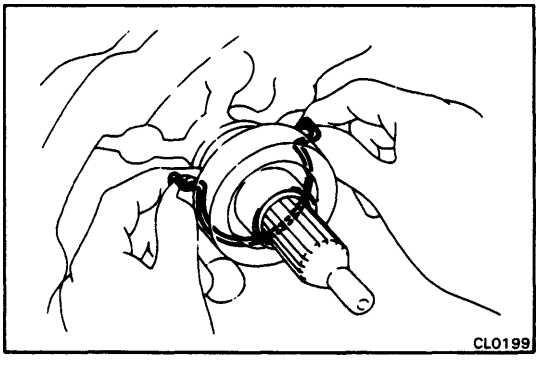
5. CHECK CLUTCH RELÉASE SECTOR AND PAWL POSITION (See page CL-3)

CLUTCH UNIT

COMPONENTS




CL0015


CL0199

REMOVAL OF CLUTCH UNIT

1. **REMOVE TRANSAXLE (See page TA-4)**

   NOTE: Do not drain the gear oil.

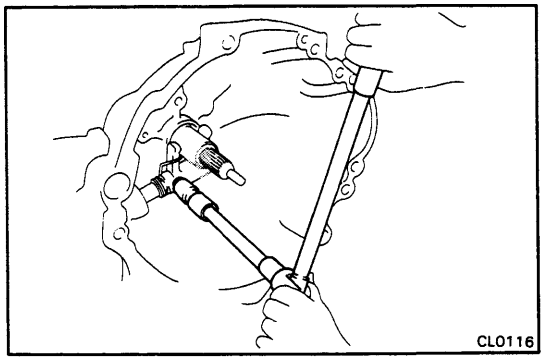
2. **REMOVE CLUTCH COVER AND DISC**

   (a) Loosen each mount bolt one tum at a time until spring tensión is released.

   (b) Remove the mount bolts, and pulí off the clutch assembly.

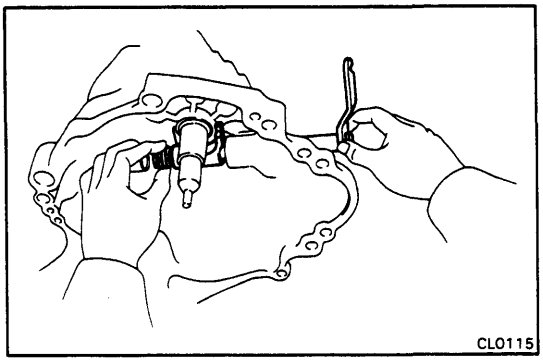
REMOVE RELÉASE BEARING AND HUB

Remove the bearing clip and pulí off the reléase bearing and hub.



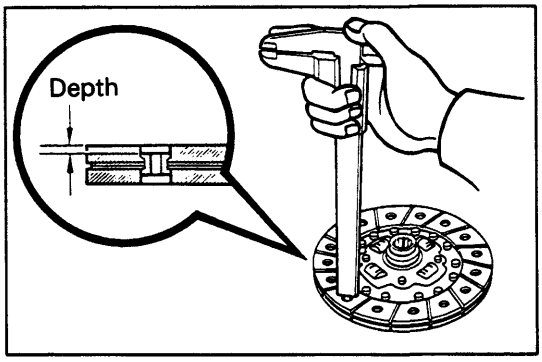
4. REMOVE RELÉASE FORK, RETURN SPRING AND FORK LEVER

(a) Remove the mount bolt.



(b) Pulí out the reléase f ork lever, and remove the reléase fork and retum spring.

(c) Remove the lever boot.



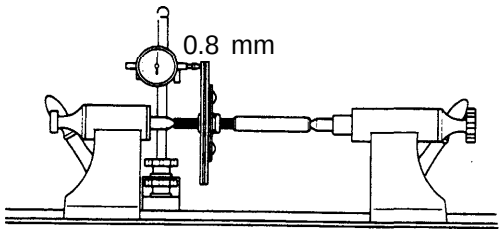
INSPECTION AND REPAIR OF CLUTCH PARTS

1. INSPECT CLUTCH DISC FOR WEAR OR DAMAGE

Using calípers, measure the rivet head depth.

Mínimum rivet depth: 0.3 mm (0.012 in.)

If a problem is found, replace the clutch disc.

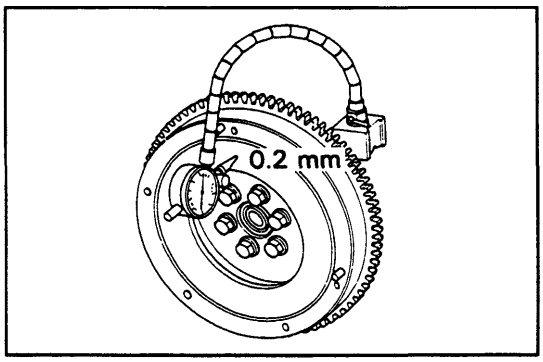


2. INSPECT CLUTCH DISC RUNOUT

Using a dial indicator, measure the disc runout.

Máximum runout: 0.8 mm (0.031 in.)

If runout is excessive, replace the disc.

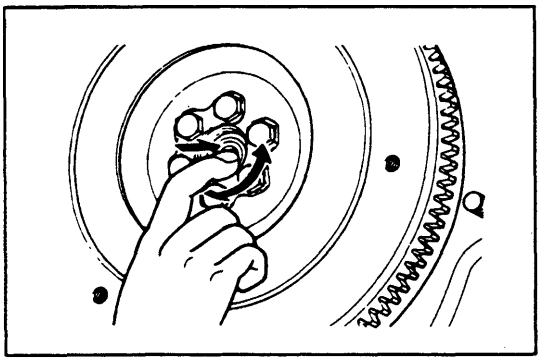


INSPECT FLYWHEEL RUNOUT

Using a dial indicator, measure the flywheel runout.

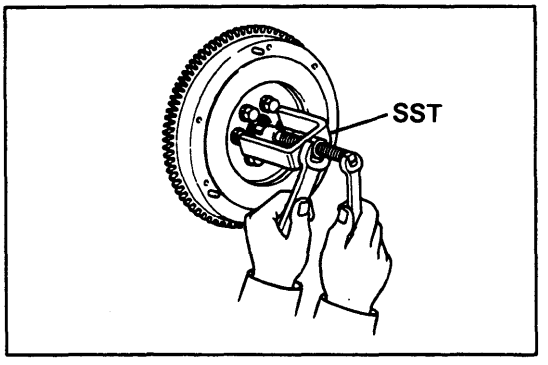
Máximum runout: 0.2 mm (0.008 in.)

If runout is excessive, repair or replace the flywheel.



4. INSPECT PILOT BEARING

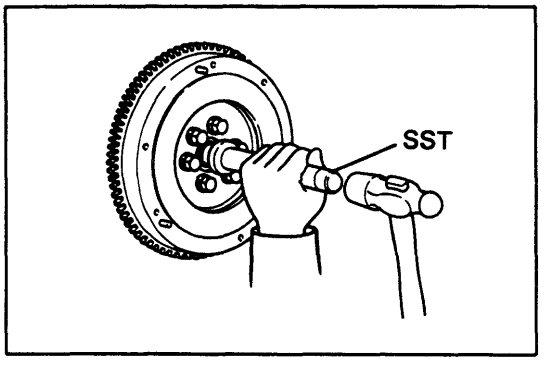
Turn the bearing by hand while appiying forcé in the axial direction.



5. IF NECESSARY, REPLACE PILOT BEARING

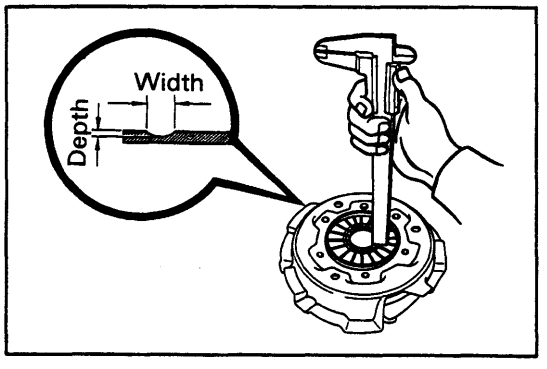
(a) Using SST, remove the pilot bearing.

SST 09303-35011



(b) Using SST, install a new pilot bearing.

SST 09304-30012

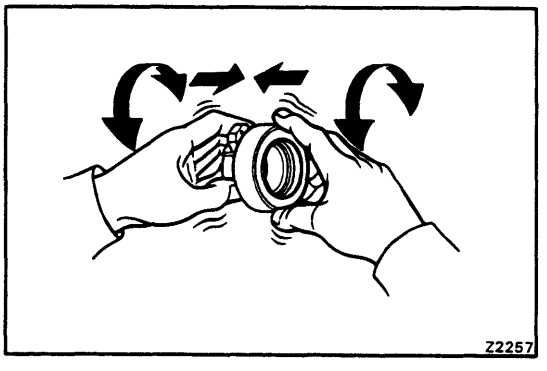


6. INSPECT DIAPHRAGM SPRING FOR WEAR

Using calipers, measure the diaphragm spring for depth and width of wear.

Máximum: **Depth 0.6 mm (0.024 in.)**
Width 5.0 mm (0.197 in.)

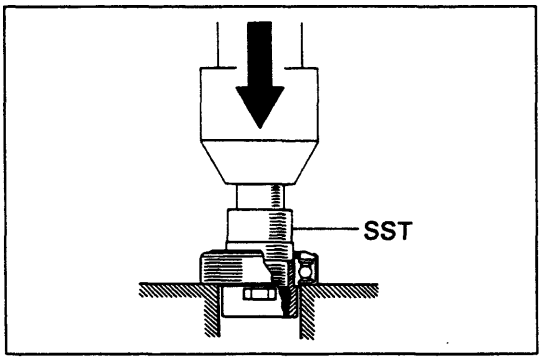
If necessary, replace the clutch cover.



7. INSPECT RELÉASE BEARING

Turn the bearing by hand while appiying forcé in the axial direction.

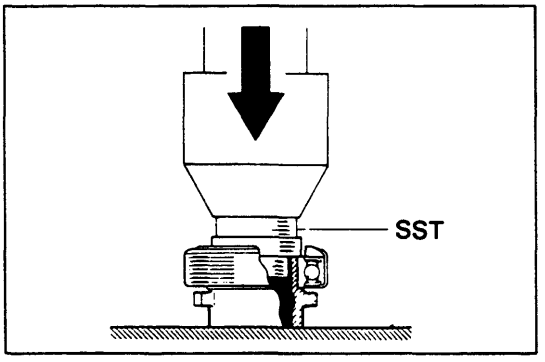
NOTE: The bearing is permanently lubricated and requires no cleaning or lubrication.



8. IF NECESSARY, REPLACE RELÉASE BEARING

(a) Using a press and SST, press the reléase bearing from the hub.

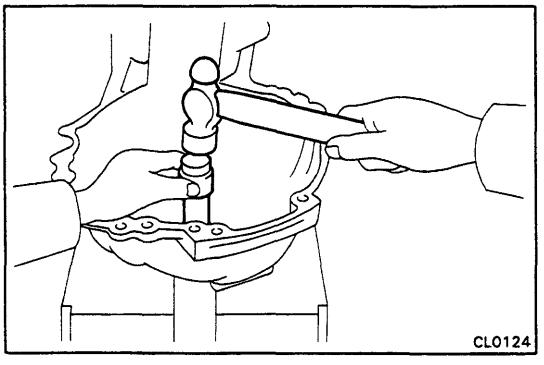
SST 09315-00010



(b) Using a press and SST, press a new reléase bearing into the hub.

SST 09315-00010

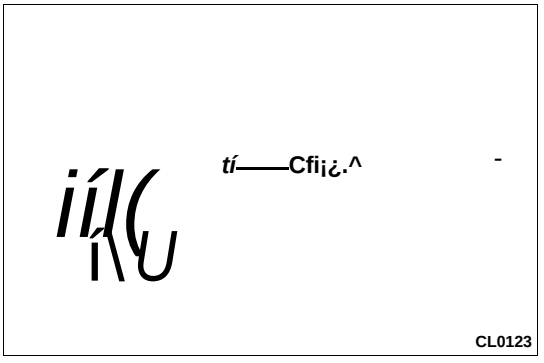
(c) After installing the bearing, check that there is no drag on the bearing when it is turned **under** pressure.



9. IF NECESSARY, REPLACE RELÉASE BEARING HUB RETAINER

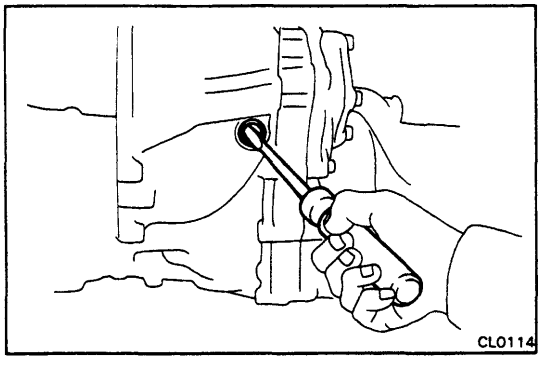
(a) Using **SST and a hammer, tap out the hub retainer.**

SST 09315-00010



(b) Using SST and a hammer, tap in a new hub retainer.

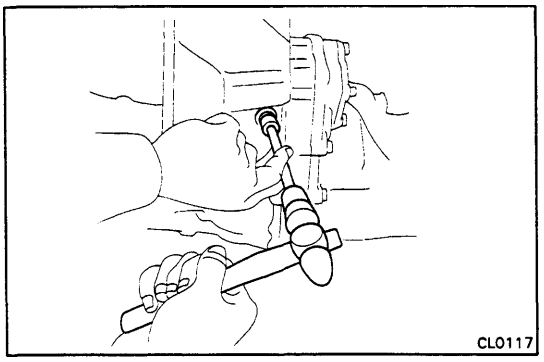
SST 09315-00010



REPLACEMENT OF OIL SEAL

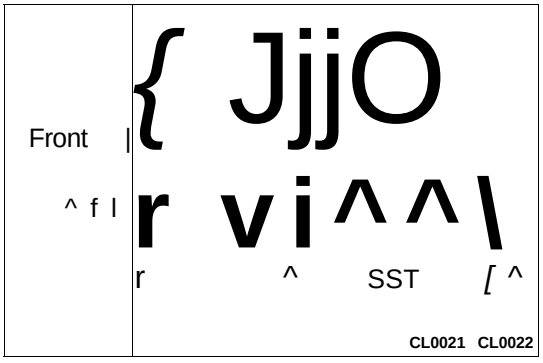
REPLACE OIL SEAL

(a) Using a screwdriver, pry **out** the oil seal.



(b) Using a socket wrench, drive in a new oil seal.

Oil seal depth: **2.2** mm **(0.087** in.)



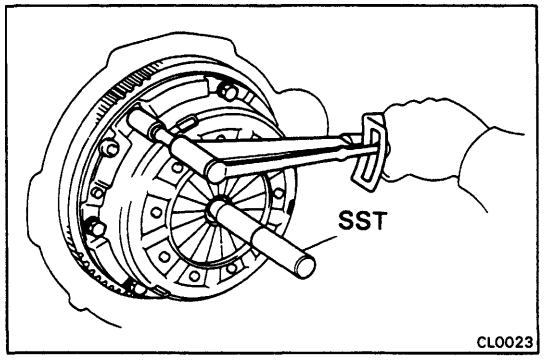
INSTALLATION OF CLUTCH UNIT

(See page **CL-8)**

1. INSTALL DISC ON FLYWHEEL

Using SST, install the clutch on the flywhee!.

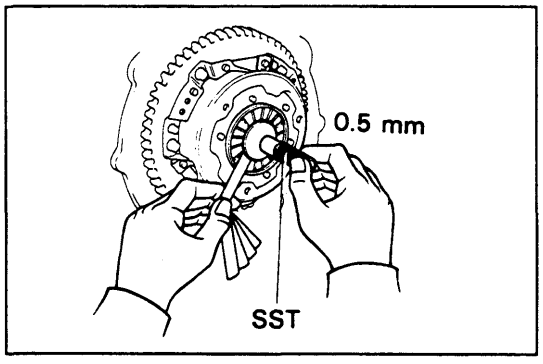
SST 09301-36010



2. INSTALL CLUTCH COVER

Tighten the bolts evenly and gradually. Make several passes around the cover until the cover is snug. Torque the bolts.

Torque: **195** kg-cm **(14 ft-lb, 19 N-m)**



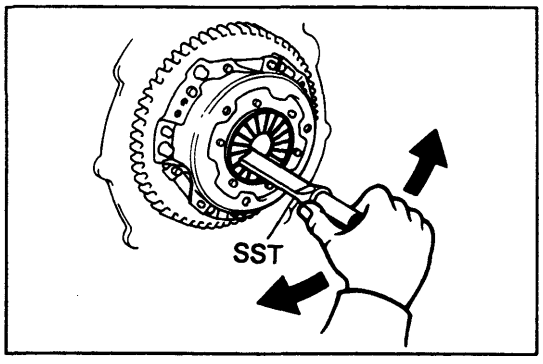
3. CHECK DIAPHRAGM SPRING TIP ALIGNMENT

Using a feeler gauge and SST, measure the gap between the spring tips and the tool.

SST 09302-20021

Máximum gap: 0.5 mm (0.020 in.)

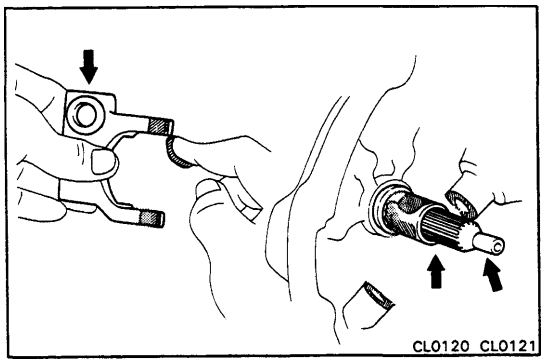
If gap is excessive, adjust as follows.



4. IF NECESSARY, ADJUST SPRINGS

Using SST, bend the springs until alignment is corred

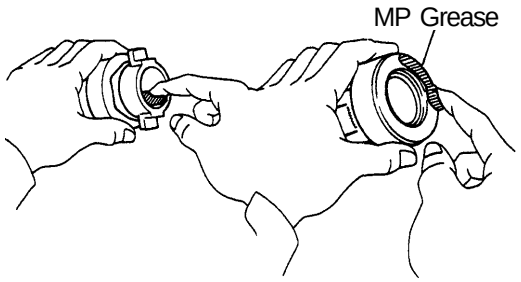
SST 09333-00012



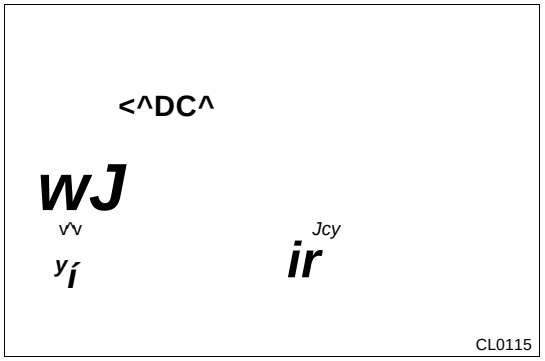
APPLY MOLYBDENUM DISULPHIDE LITHIUM BASE GREASE (NLGI NO.2) OR MP GREASE

(a) Apply molybdenum disulphide lithium base grease to the following parts:
- Reléase fork and hub contact points
- Reléase fork and fork lever contact points
- Reléase fork lever and bushings contact points
- Reléase fork lever and oil seal contact points
- Reléase bearing hub inside
- Clutch disc spline

(b) Apply MP grease to the following parts:
- Front of the reléase bearing
- Input shaft end



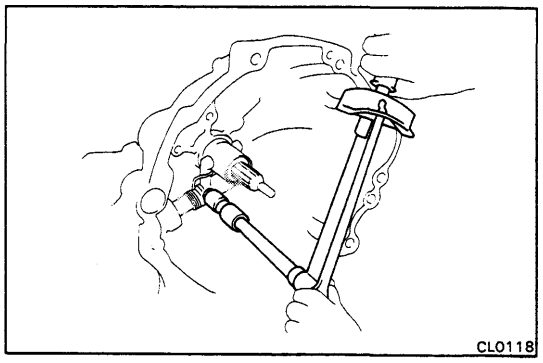
CL0122 CL0113



INSTALL RELÉASE FORK, RETURN SPRING AND FORK LEVER

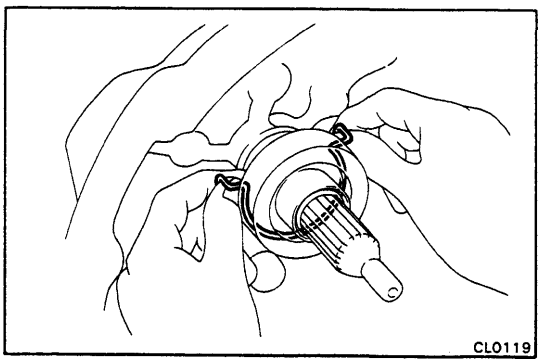
(a) Install the lever boot.

(b) Put in the reléase fork lever and install the reléase fork and return spring.



(c) Install and torque the mount bolt.

Torque: 750 kg-cm (54 ft-lb, 74 N-m)



7. INSTALL RELÉASE BEARING AND HUB

Inserí the bearing and hub and install the bearing clip.

8. INSTALL TRANSAXLE (See page TA-6)

CHECK AND ADJUST CLUTCH PEDAL (See page CL-3)

MANUAL TRANSAXLE

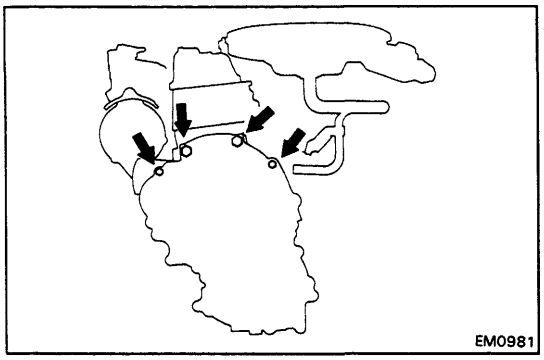
TROUBLESHOOTING

Transaxle

Problem	Possible cause	Remedy	Page
Noise	Transmission of differential faulty	Disassembly and inspect transmission or differential	MT-3
	Wrong oil grade	Replace oil	
	Oil level low	Add oil	MT-66, 70
Oil leakage	Oil level too high	Drain oil	MT-66, 70
	Oil seal or gasket worn or damaged	Replace oil seal or gasket	

Manual Transmission

Problem	Possible cause	Remedy	Page
Hard to shift oil will not shift	Lack of grease on control linkage	Repair as necessary	
	Transmission faulty	Disassemble and inspect transmission	MT-11
Jumps out of gear	Transmission faulty	Disassemble and inspect transmission	MT-11

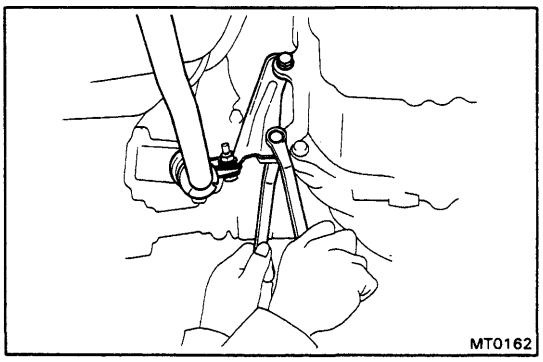


MANUAL TRANSAXLE

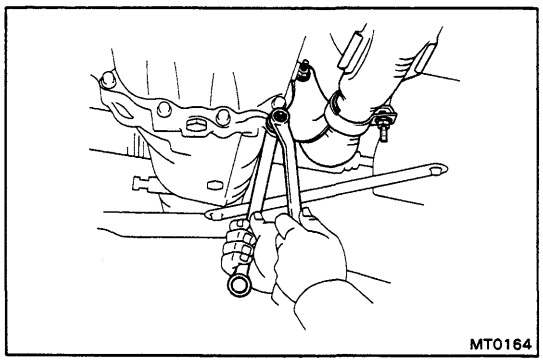
REMOVAL OF TRANSAXLE (FWD)

1. DISCONNECT CABLE FROM NEGATIVE TERMINAL OF BATTERY
2. REMOVE TRANSAXLE UPPER MOUNT BOLTS
3. REMOVE BOTH DRIVE SHAFTS (See page FA-13)
4. RAISE VEHICLE

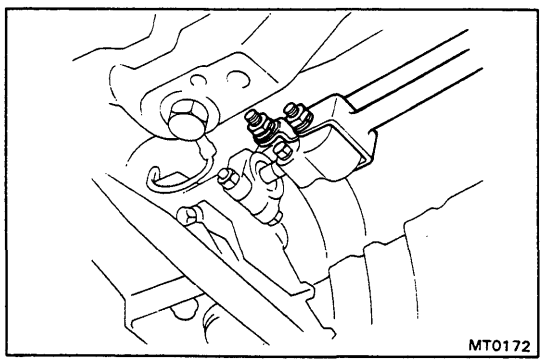
   CAUTION: Be sure the vehicle is securely supported.
5. DISCONNECT CLUTCH CABLE (See page CL-4)



6. (Fed.)
   REMOVE CONVERTER AIR INLET PIPE



7. REMOVE EXHAUST FRONT PIPE

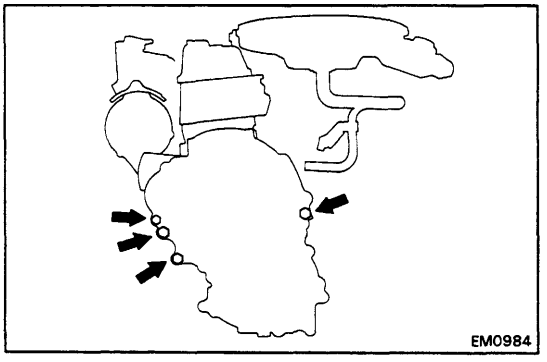


8. DISCONNECT GEAR SHIFTING ROD
9. DISCONNECT SHIFT LEVER HOUSING ROD

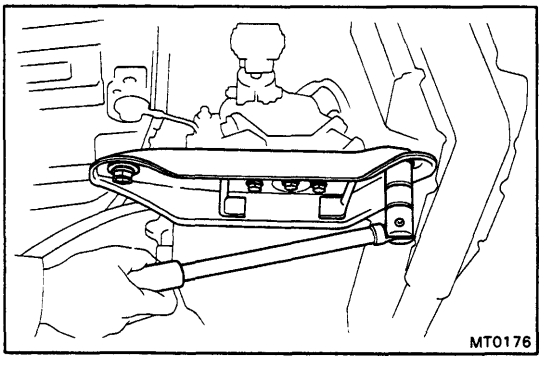
10. DISCONNECT BACKUP LIGHT SWITCH CONNECTOR

11. DISCONNECT SPEEDOMETER CABLE

12. REMOVE RIGHT STIFFENER PLATE



13. REMOVE TRANSAXLE LOWER MOUNT BOLTS



14. REMOVE REAR SUPPORT MEMBER

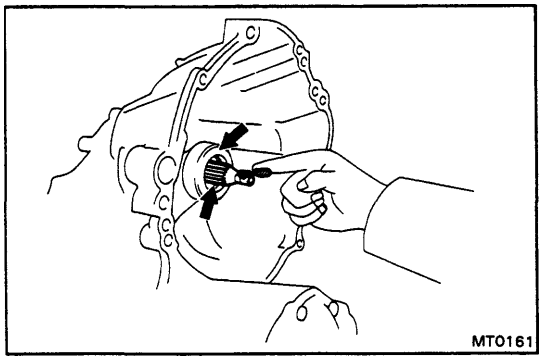
(a) Put a wooden block between the engine and dash panel because the HA will make contact with the brake booster when the rear support member is removed.

(b) Support the transaxle with a jack.

(c) Remove the four bolts and rear support member.

15. REMOVE TRANSAXLE

Draw out the transaxle down toward the rear.



INSTALLATION OF TRANSAXLE (FWD)

1. APPLY MOLYBDENUM DISULPHIDE LITHIUM BASE GREASE (NLGI NO. 2) OR MP GREASE TO INPUT SHAFT

(a) Apply molybdenum disulphide lithium base grease to the input shaft spiine.

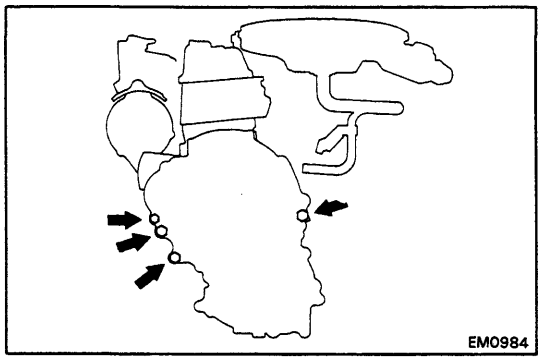
(b) Apply MP grease to the input shaft end.

(c) Apply MP grease to the front of the reléase bearing.

2. ALIGN TRANSAXLE AT INSTALLATION POSITION

3. CONNECT TRANSAXLE TO ENGINE

Align the input shaft spiine with the clutch disc, and push the transaxle fully into position.

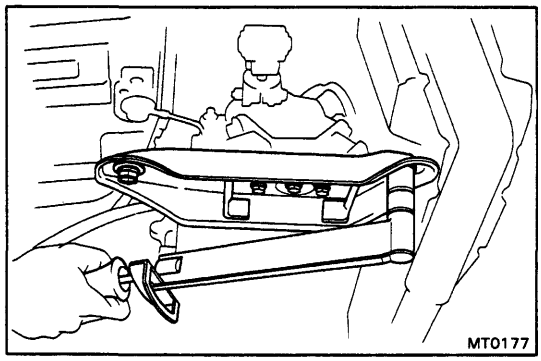


4. INSTALL TRANSAXLE LOWER MOUNT BOLTS

Install the starter on the left side of the transaxle case.

Torque:

14 mm bolt head 400 kg-cm (29 ft-lb, 39 Nm)
17 mm bolt head 600 kg-cm (43 ft-lb, 59 Nm)



5. INSTALL REAR SUPPORT MEMBER

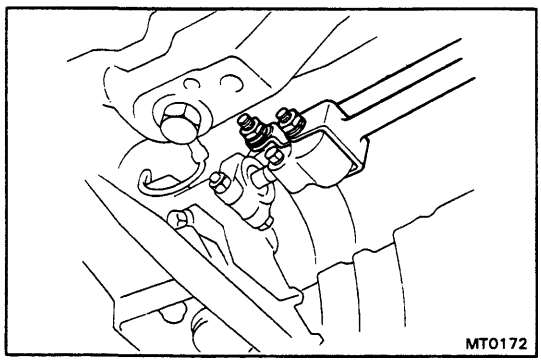
Torque: 970 kg-cm (70 ft-lb, 95 Nm)

6. INSTALL RIGHT STIFFENER PLATE

Torque: 400 kg-cm (29 ft-lb, 39 Nm)

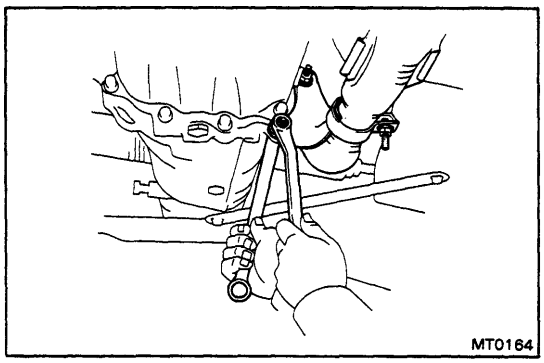
7. CONNECT SPEEDOMETER CABLE

8. CONNECT BACKUP LIGHT SWITCH



9. CONNECT SHIFT LEVER HOUSING ROD

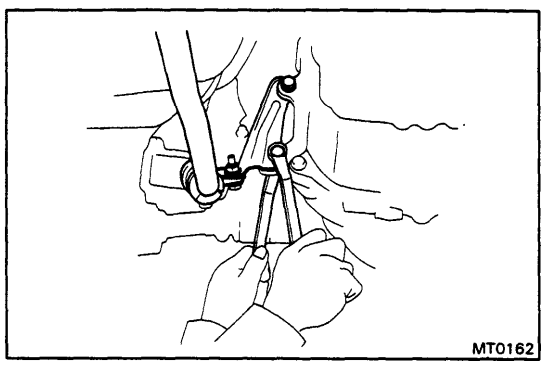
10. CONNECT GEAR SHIFTING ROD



11. INSTALL EXHAUST FRONT PIPE

Torque the two nuts holding the front pipe to the exhaust manifold.

Torque: 630 kg-cm (46 ft-lb, 62 N-m)

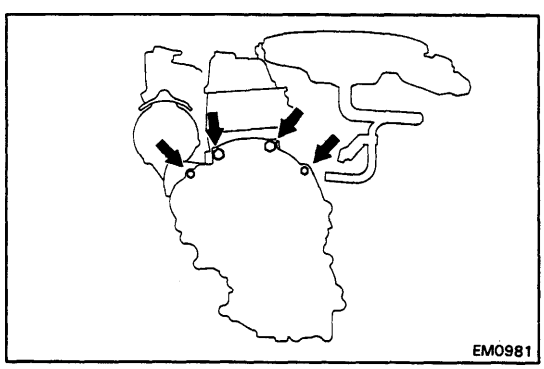


12. (Fed.)
INSTALL CONVERTER AIR INLET PIPE

13. CONNECT CLUTCH CABLE (See page CL-7)

14. LOWERVEHICLE

15. INSTALL BOTH DRIVE SHAFTS (See page FA-18)



16. INSTALL TRANSAXLE UPPER MOUNT BOLT

Torque:
14 mm bolt head 400 kg-cm (29 ft-lb, 39 N-m)
17 mm bolt head 600 kg-cm (43 ft-lb, 59 N-m)

17. CHECK GEAROIL

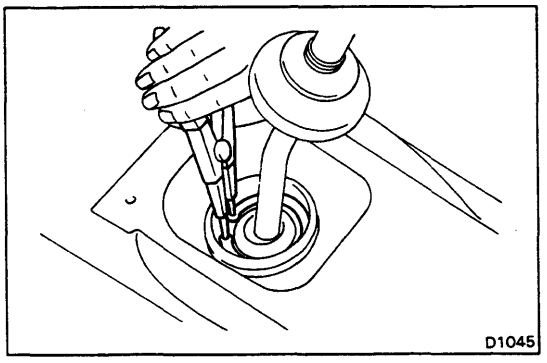
If necessary, fill with gear oil (See page MT-66)

18. CONNECT CABLE TO NEGATIVE TERMINAL OF BATTERY

19. CHECK FRONT WHEEL ALIGNMENT (See page FA-3)

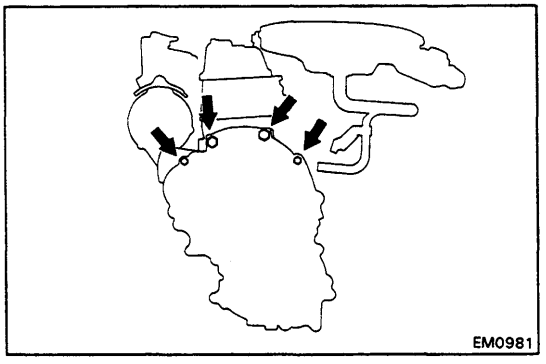
20. PERFORM ROAD TEST

21. CHECK FOR GEAR OIL LEAKAGE



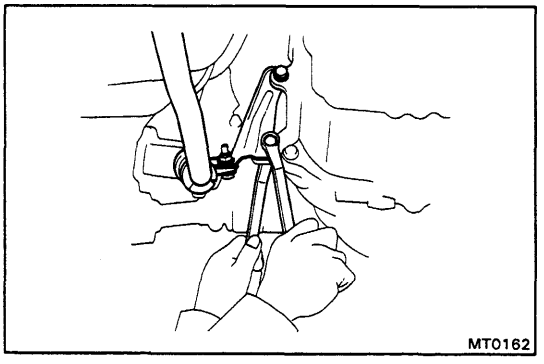
REMOVAL OF TRANSAXLE (4WD)

1. DISCONNECT CABLE FROM NEGATIVE TERMINAL OF BATTERY
2. REMOVE CONSOLÉ BOX
3. REMOVE SHIFT LEVER FROM INSIDE OF VEHICLE
   Using snap ring pliers, remove the snap ring.

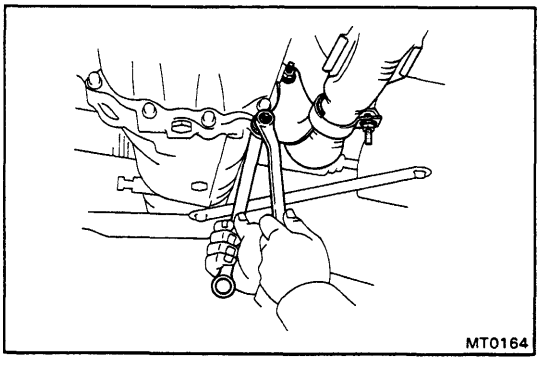


4. REMOVE TRANSAXLE UPPER MOUNT BOLTS
5. REMOVE BOTH SHAFTS
6. RAISE VEHICLE

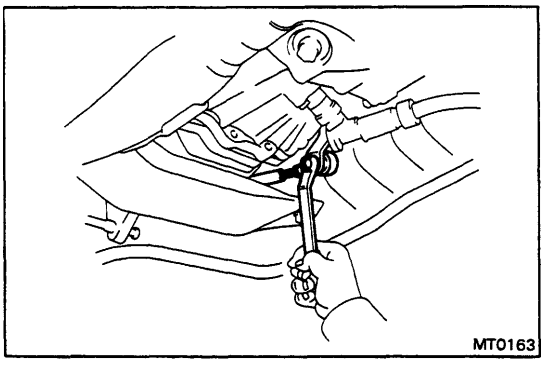
   CAUTION: Be sure the vehicle is securely supported.
7. DISCONNECT CLUTCH CABLE (See page CL-4)
8. REMOVE PROPELLER SHAFT (See page PR-3)



9. (Fed.)
   REMOVE CONVERTER AIR INLET PIPE



10. REMOVE EXHAUST FRONT PIPE



11. DISCONNECT SELECTING ROD FROM REAR DRIVE SHIFT LINK LEVER

12. DISCONNECT FOLLOWING CONNECTORS:

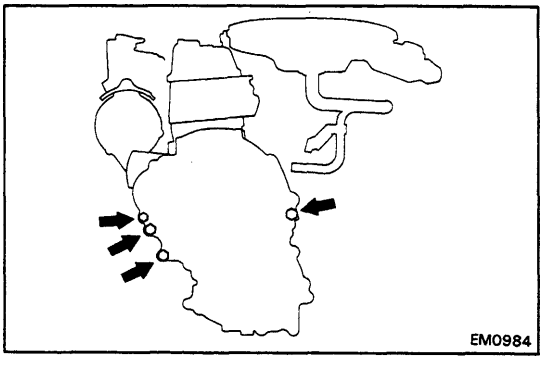
(a) Back-up light switch connector

(b) 4WD indiacator switch connector

(c) Extra low (EL) gear indicator siwtch connector

13. DISCONNECT SPEEDOMETER CABLE

14. REMOVE RIGHT STIFFENER PLATE



15. REMOVE TRANSAXLE LOWER MOUNT BOLTS

16. REMOVE REAR SUPPORT MEMBER

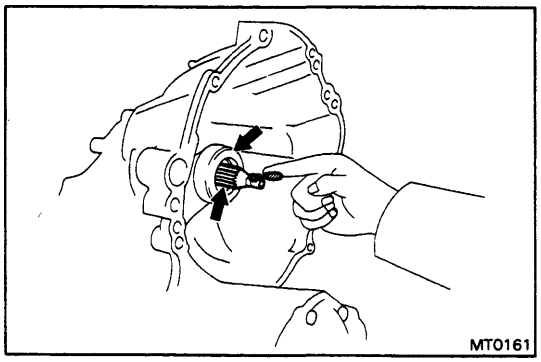
(a) Put a wooden block between the engine and dash panel because the HA will make contact with the brake booster when the rear support member is removed.

(b) Support the transaxle with a jack.

(c) Remove the four bolts and rear support member.

17. REMOVE TRANSAXLE

Draw out the transaxle down and toward the rear.



INSTALLATION OF TRANSAXLE (4WD)

1. APPLY MOLYBDENUM DISULPHIDE LITHIUM BASE GREASE (NLGI NO. 2) OR MP GREASE TO INPUT SHAFT

(a) Apply moiybdenum disuiphide lithium base grease to the input shaft spiine.

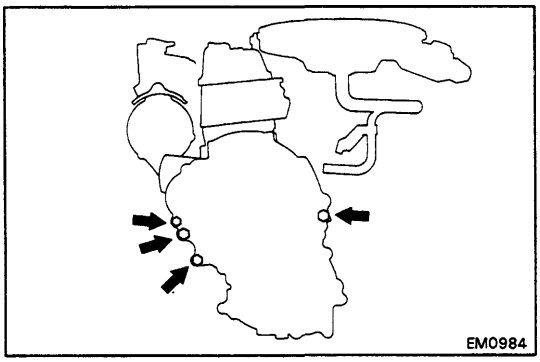
(b) Apply MP grease to the input shaft end.

(c) Apply MP grease to the front of the reléase bearing.

2. ALIGN TRANSAXLE INSTALLATION POSITION

3. INSTALL TRANSAXLE TO ENGINE

Align the input shaft spiine with the clutch disc, and push the transmission fully into position.



4. INSTALL TRANSAXLE LOWER MOUNT BOLTS

Instad the starter on the left side of the transaxle case.

Torque:

14 mm bolt head 400 kg-cm (29 ft-lb, 39 Nm)
17 mm bolt head 600 kg-cm (43 ft-lb, 59 Nm)

5. INSTALL REAR SUPPORT MEMBER

Torque: 970 kg-cm (70-lb, 95 N-m)

6. INSTALL RIGHT STIFFENER PLATE

Torque: 400 kg-cm (29 ft-lb, 39 N-m)

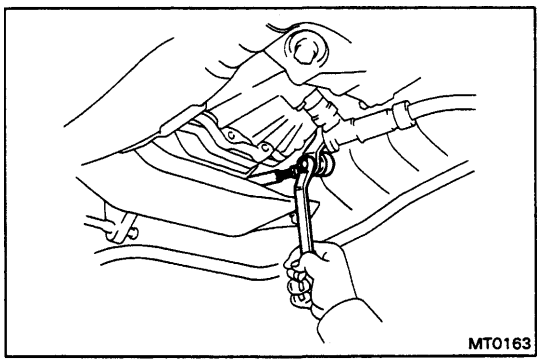
7. CONNECT SPEEDOMETER CABLE

8. CONNECT FOLLOWING CONNECTOR:

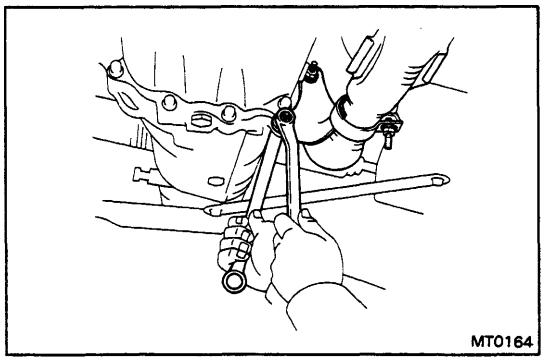
(a) Back-up light switch connector

(b) 4WD indicator switch connector

(c) Exstra low gear (EL) indicator switch connector



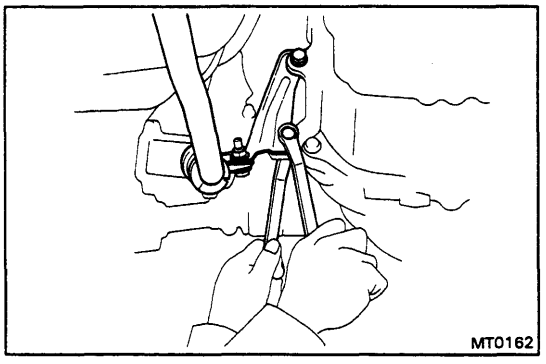
9. CONNECT SELECTING ROD TO REAR DRIVE SHIFT LINK LEVER



10. INSTALL EXHAUST FRONT PIPE

Torque the two nuts holding the front pipe to the exhaust manifold.

Torque: 630 kg-cm (46 ft-lb, 62 N-m)



11. (Fed.)
INSTALL CONVERTER AIR INLET PIPE

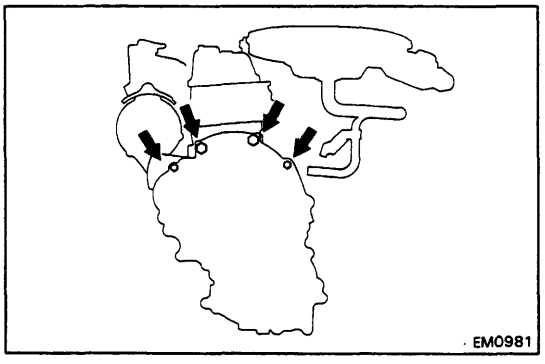
12. INSTALL PROPELLER SHAFT (See page PR-6)

Torque: 430 kg-cm (31 ft-lb, 42 N-m)

13. CONNECT CLUTCH CABLE (See page CL-7)

14. LOWERVEHICLE

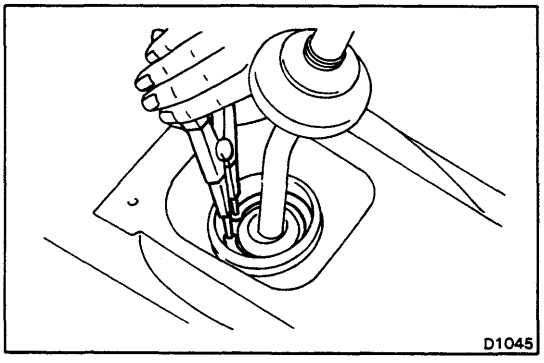
15. INSTALL BOTH DRIVE SHAFTS (See page FA-18)



16. INSTALL TRANSAXLE UPPER MOUNT BOLTS

Torque:

14 mm bolt head	400 kg-cm (29 ft-lb, 39 N-m)
17 mm bolt head	600 kg-cm (43 ft-lb, 59 N-m)



17. INSTALL SHIFT LEVER

18. INSTALL CONSOLÉ BOX

19. CHECKGEAROIL

If necessary, fill with gear oil (See page MT-70)

20. CONNECT CABLE TO NEGATIVE TERMINAL OF BATTERPY

21. CHEC FRONT WHEEL ALIGNMENT (See page FA-3)

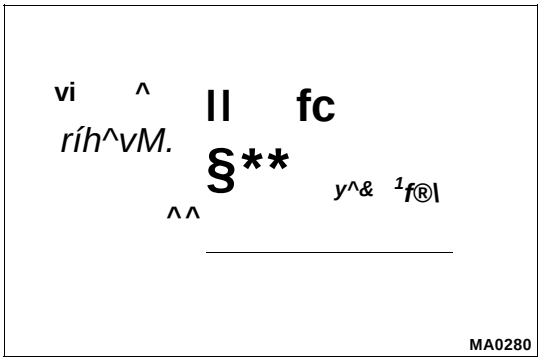
22. PERFORM ROAD TEST

23. CHECK **FOR** GEAR OIL LEAKAGE

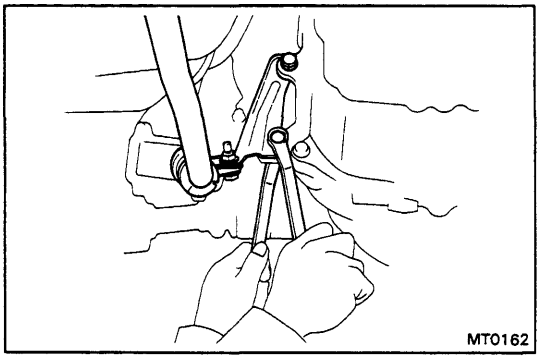
MANUAL TRANSMISSION

REMOVAL OF TRANSMISSION (FWD)

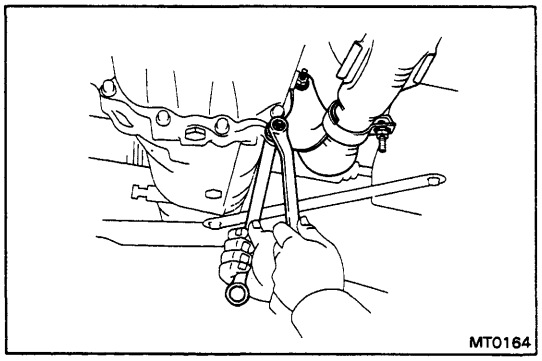
1. DISCONNECT CABLE FROM NEGATIVE TERMINAL OF BATTERY
2. DISCONNECT AIR CLEANER INLET DUCT



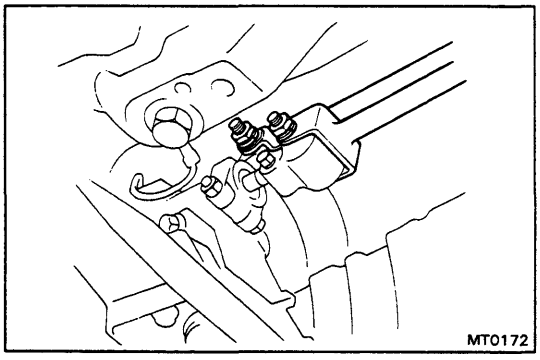
3. RAISE VEHICLE
   CAUTION: Be sure the vehicle is secureiy supported.
4. DRAIN GEAR OIL
   Remove the three drain plugs and drain the gear oil.



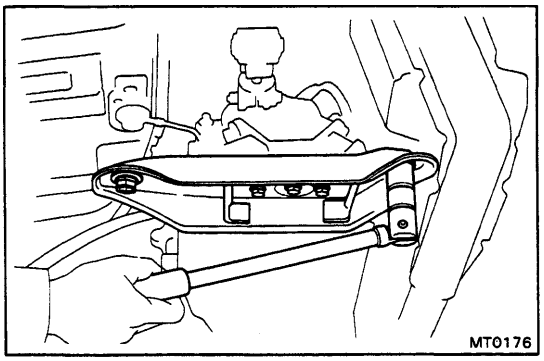
5. (Fed.)
   REMOVE CONVERTER AIR INLET PIPE



6. REMOVE EXHAUST FRONT PIPE



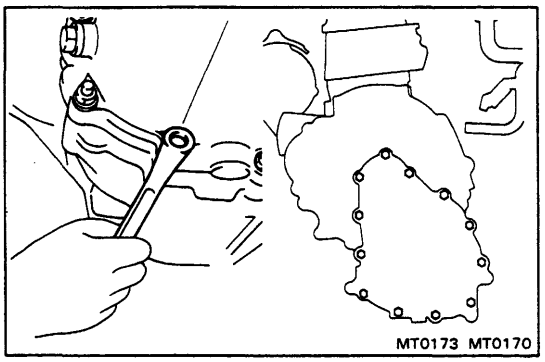
7. DISCONNECT GEAR SHIFTING ROD
8. DISCONNECT SHIFT LEVER HOUSING ROD
9. DISCONNECT BACK-UP LIGHT SWITCH CONNECTOR
10. DISCONNECT SPEEDOMETER CABLE



11. REMOVE REAR SUPPORT MEMBER

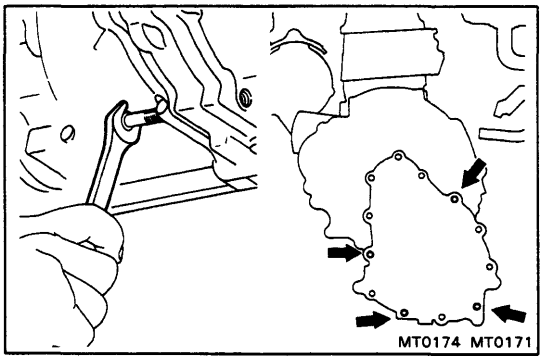
(a) Put a wooden block between the engine and dash panel because the HA will make contact with the brake booster when the rear support member is removed.

(b) Remove the four bolts and rear support member.



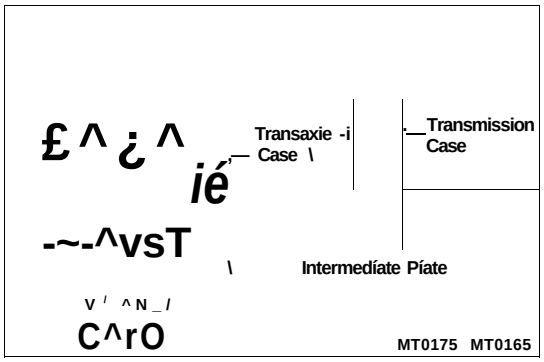
12. REMOVE TRANSMISSION FROM TRANSAXLE CASE

(a) Remove the ten bolts and two nuts.



(b) From the transaxie side, install four bolts about an equal distance apart at the locations indicated by arrows in the figure.

Bolt size: 8 mm <*f*> **(0.31** in. *6)*
Pitch: 1.25 mm (0.0492 in.)



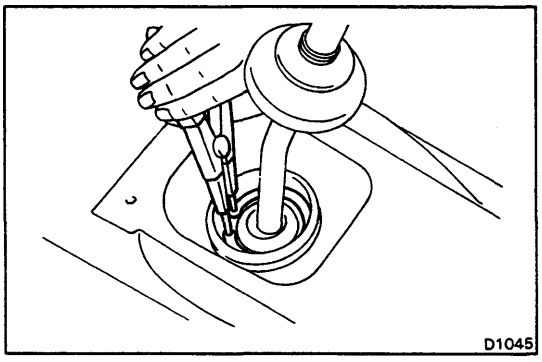
(c) Sepárate the transmission by turning the four bolts a little at a time on the transmission case side.

Bolt size: **10 mm** <*f*> **(0.39** in. <*f*>*)*
Pitch: 1.25 mm (0.0492 in.)

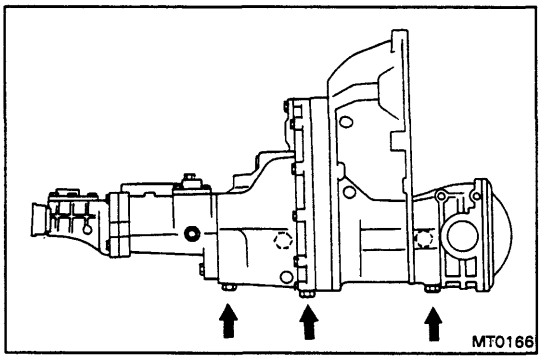
(d) Remove the transmission from the transaxie.

REMOVAL OF TRANSMISSION (4WD)

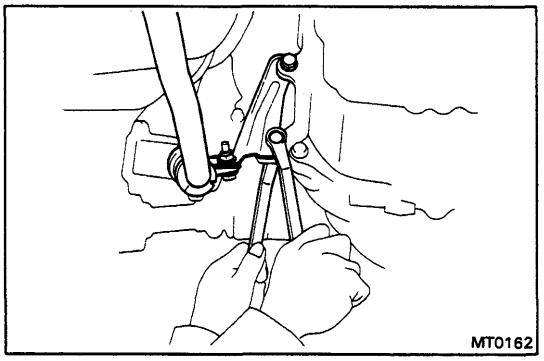
1. DISCONNECT CABLE FROM NEGATIVE TERMINAL OF BATTE
2. DISCONNECT AIR CLEANER INLET DUST



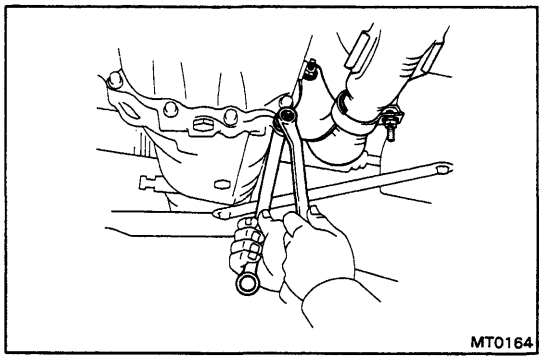
3. REMOVE CONSOLÉ BOX
4. REMOVE SHIFT LEVER FROM INSIDE OF VEHICLE



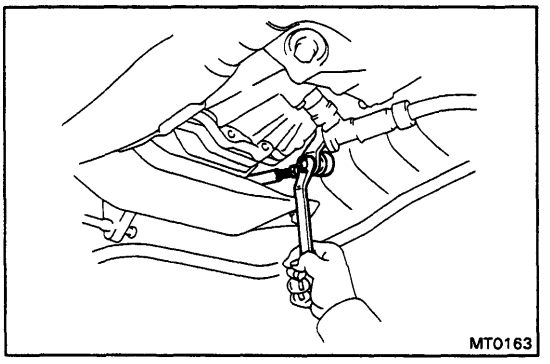
5. RAISE VEHICLE
   CAUTION: Be sure the vehicle is securely supported.
6. DRAIN GEAR OIL
   Remove the three drain plugs and drain the gear oil.



7. (Fed.)
   REMOVE CONVERTER AIR INLET PIPE



8. REMOVE EXHAUST FRONT PIPE


MT0163

9. DISCONNECT SELECTING ROD FROM REAR DRIVE SHIFT LINK LEVER

10. DISCONNECT FOLLOWING CONNECTOR

(a) Back-up light connector

(b) 4WD indicator switch connector

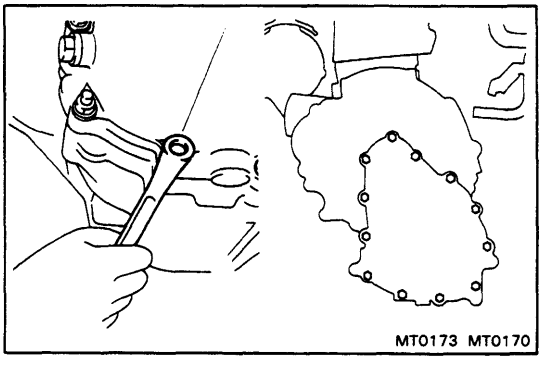
(c) Extra low gear (EL) indicator switch connector

11. DISCONNECT SPEEDOMETER CABLE

12. REMOVE REAR SUPPORT MEMBER

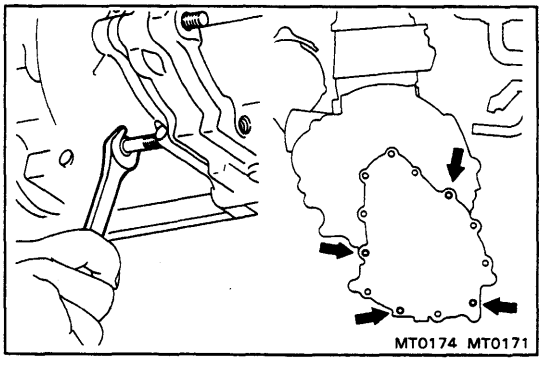
(a) Put a wooden block between the engine and dash panel because the HA will make contact with the brake booster when the rear support member is removed.

(b) Remove the four bolts and rear support member.


MT0173 MT0170

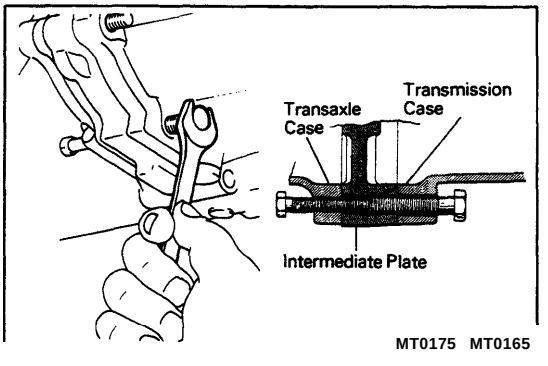
13. REMOVE TRANSMISSION FROM TRANSAXLE CASE

(a) Remove the ten bolts and two nuts.


MT0174 MT0171

(b) From the transaxie side, install four bolts about an equal distance apart at the locations indicated by arrows in the figure.

Bolts size: 8 mm <*f*> **(0.31** in. <*f*>*)*
Pitch: 1.25 mm (0.0492 in.)



MT0175 MT0165

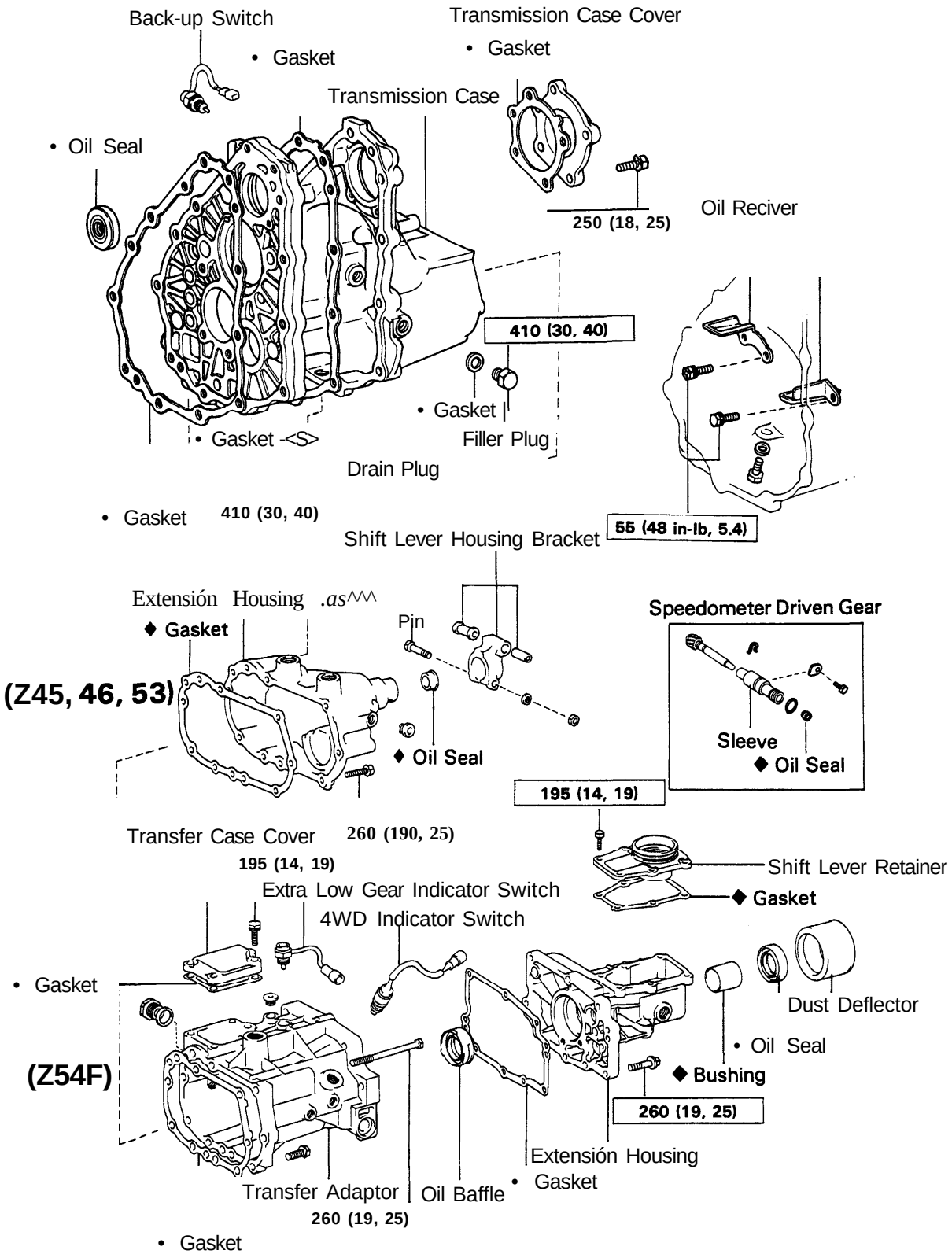
(c) Sepárate the transmission by turning the four bolts a little at a time on the transmission case side.

Bolts size: 10 mm <*f*> **(0.39 in.** <*f*>*)*
Pitch: 1.25 mm (0.0492 in.)

(d) Remove the transmission from the transaxie.

COMPONENTS

Z45, 46, 53, 54F



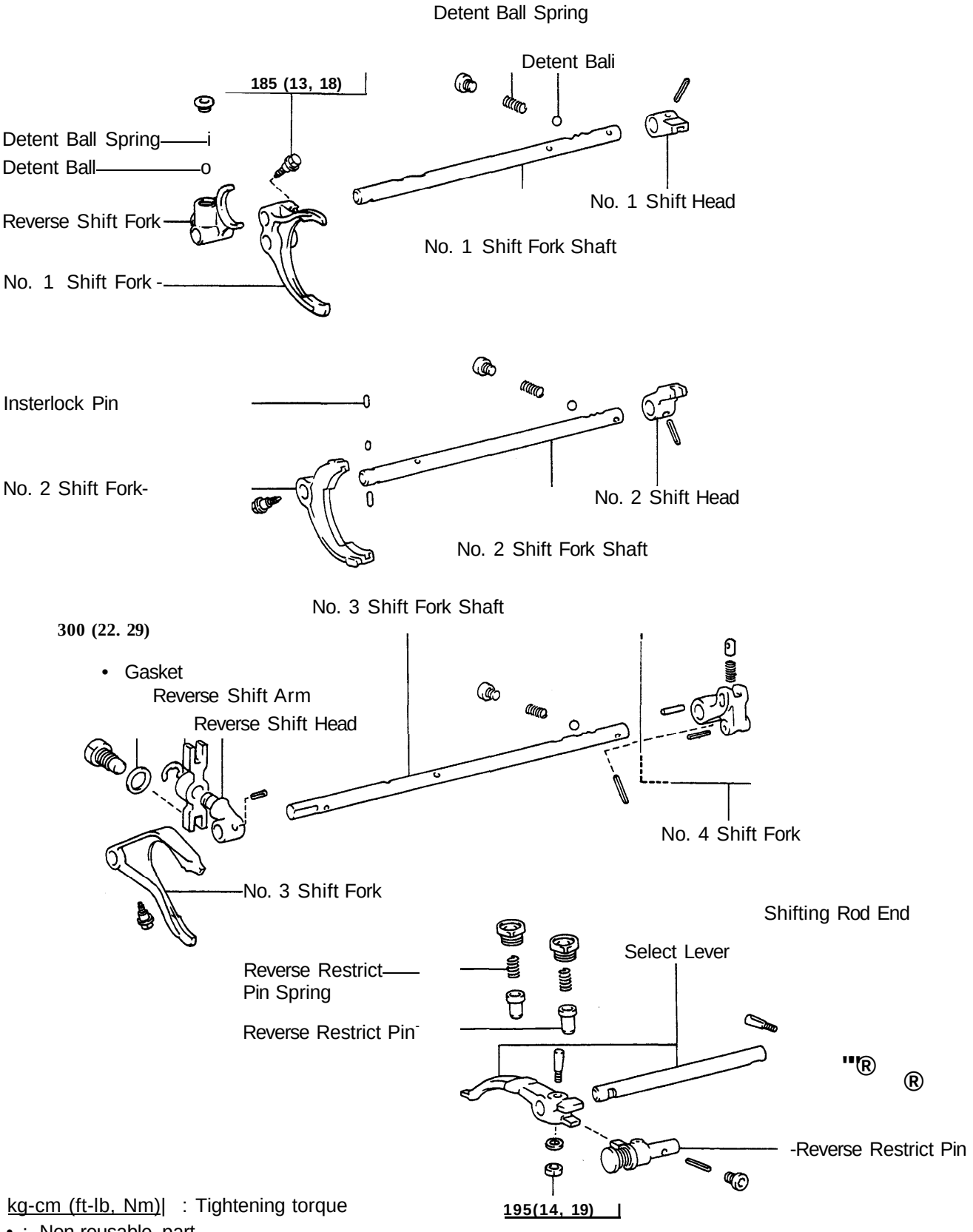
kg-cm (ft-lb, Nm) : Tightening torque

•: Non-reusable part

ZM0065

COMPONENTS (Cont'd)

Z45, 46, 53

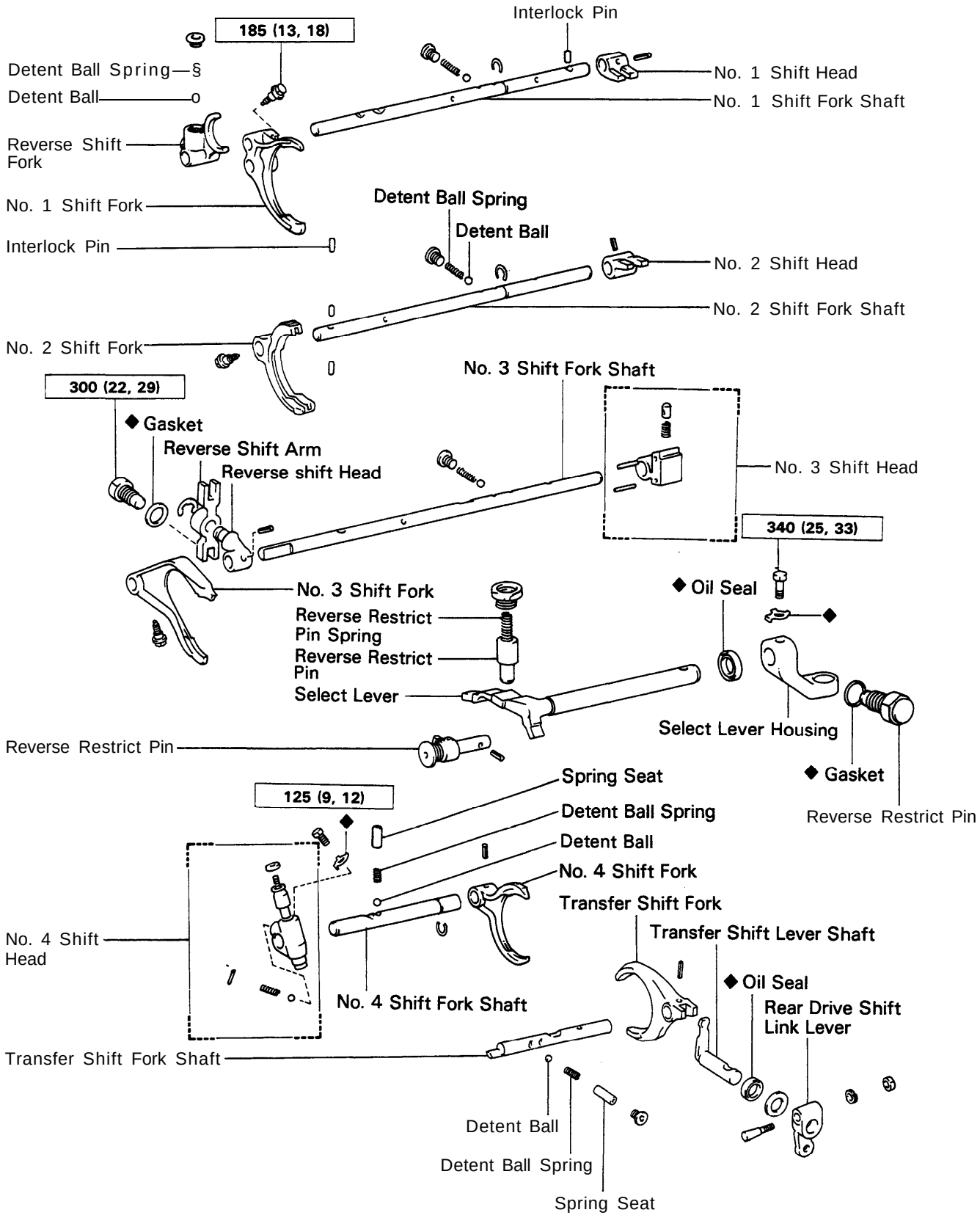


kg-cm (ft-lb, Nm)| : Tightening torque
• : Non-reusable part

ZM0066

COMPONENTS (Cont'd)

Z54F



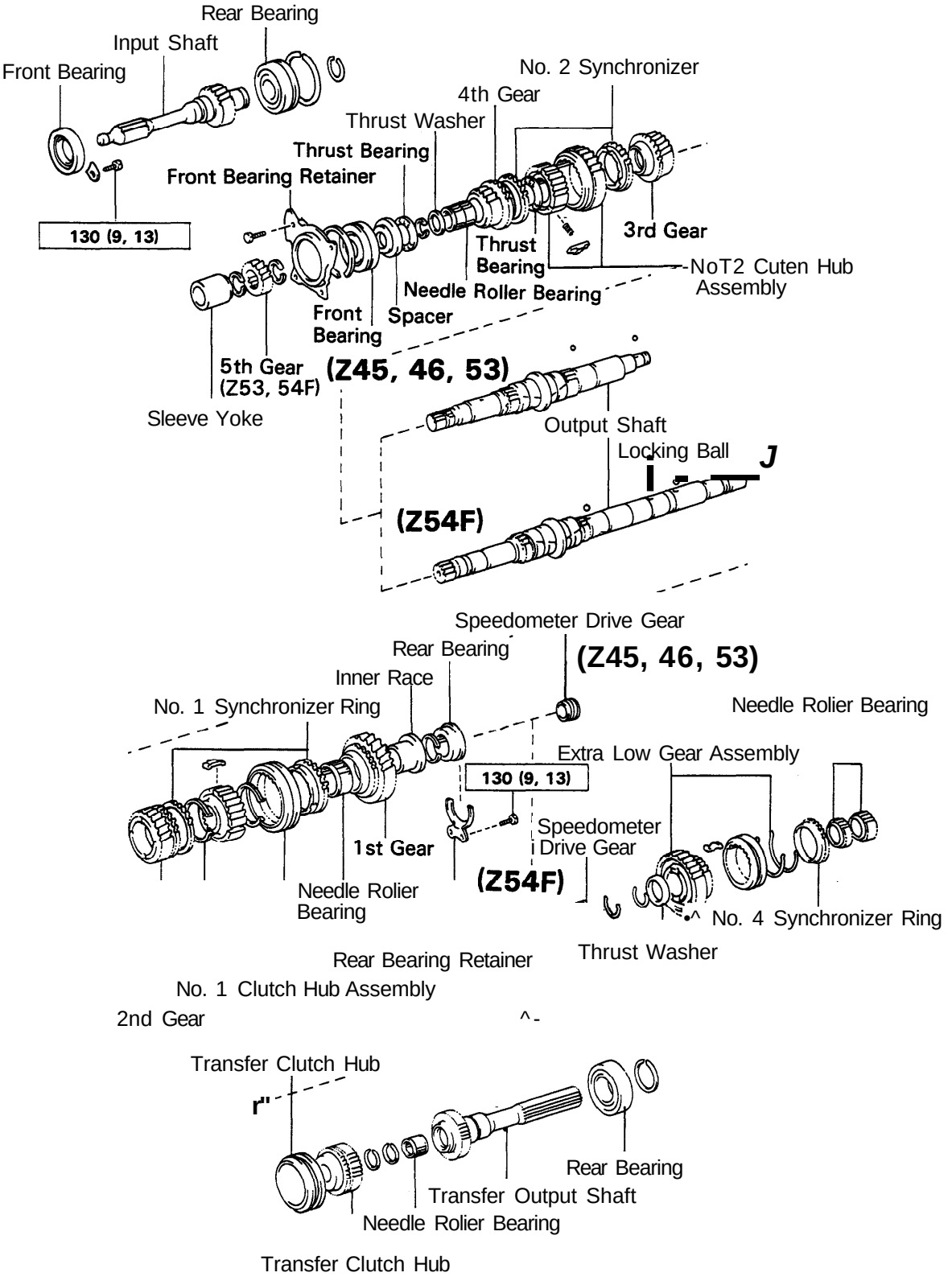
kg-cm (ft-lb, NPmJl : Tightening torque

• : Non-reusable part

ZM0067

COMPONENTS (Cont'd)

Z45, 46, 53, 54F

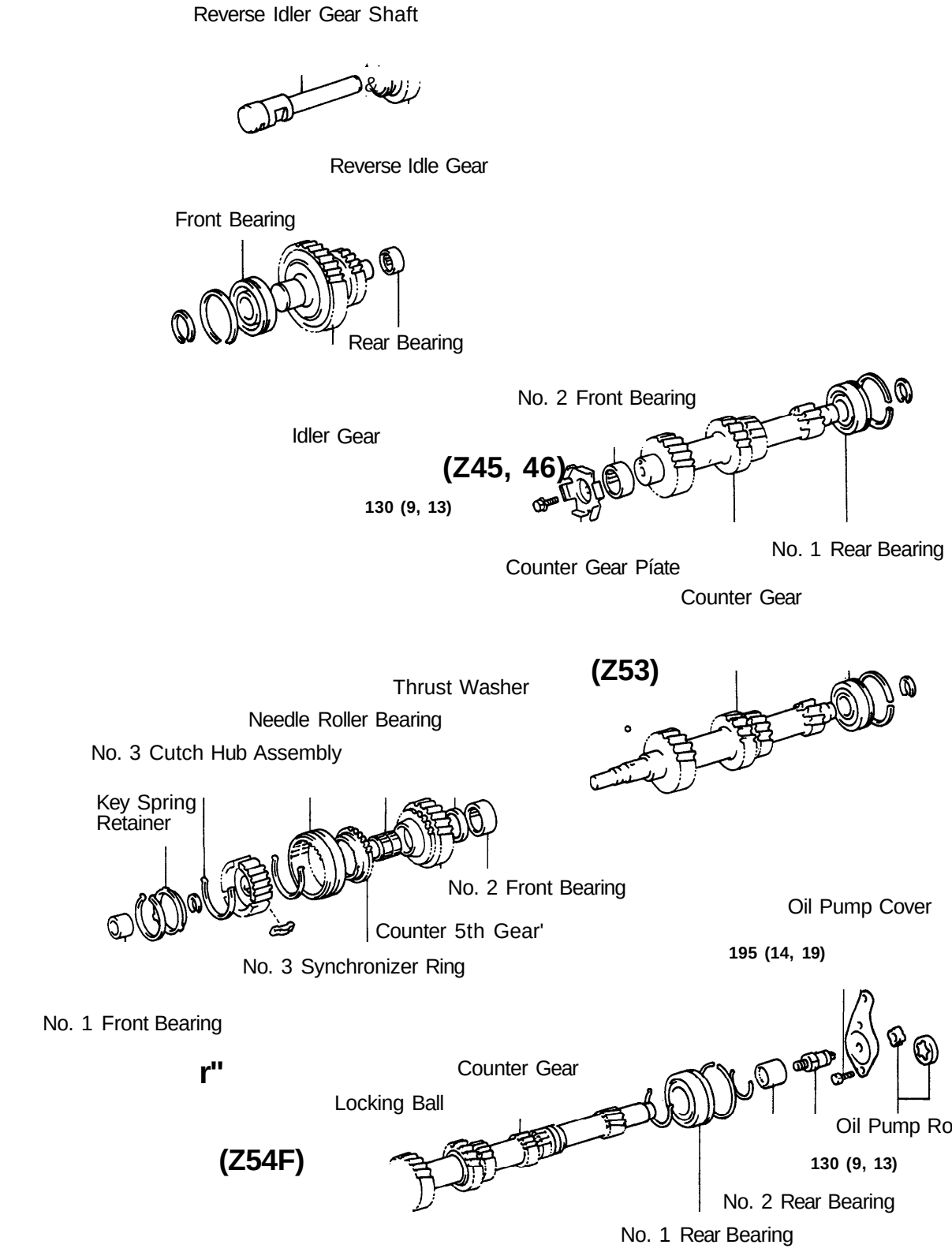


kg-cm (ft-lb, Nm)] : Tightening torque

MTOO68

COMPONENTS (Cont'd)

Z45, 46, 53, 54F



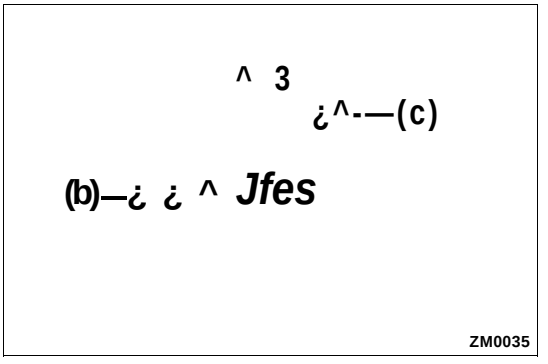
kg-cm (ft-lb, Nm)[: Tightening torque

DISASSEMBLY OF TRANSMISSION

(See page MT-15)

1. REMOVE MOUNTING INSULATOR

2. REMOVE SPEEDOMETER DRIVEN GEAR

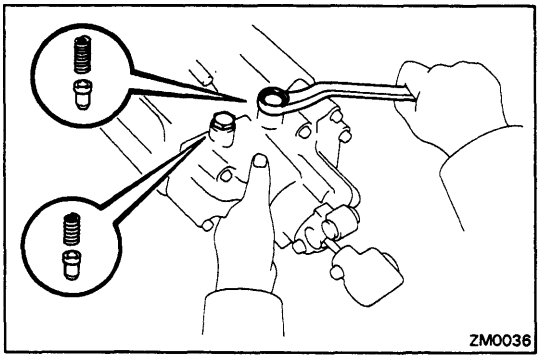


3. REMOVE FOLLOWING SWITCH:

(a) Back-up light switch

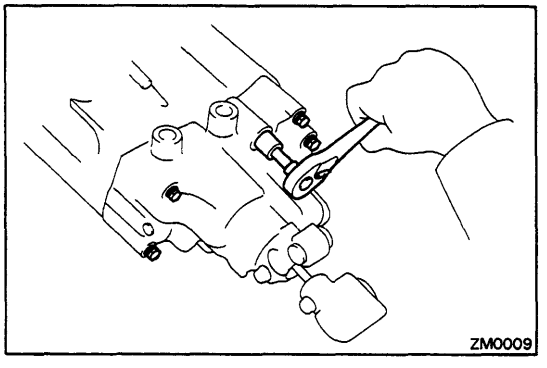
(b) (Z54F)
4WD indicator switch

(c) (Z54F)
Extra low gear (EL) indicator switch



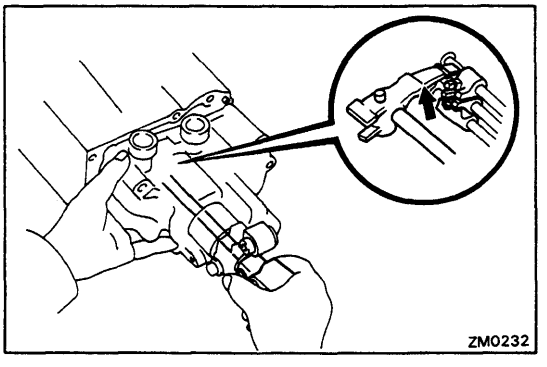
4. REMOVE EXTENSIÓN HOUSING
(Z45, 46, 53)

(a) Remove the two plug, spring and reverse restrict pin.



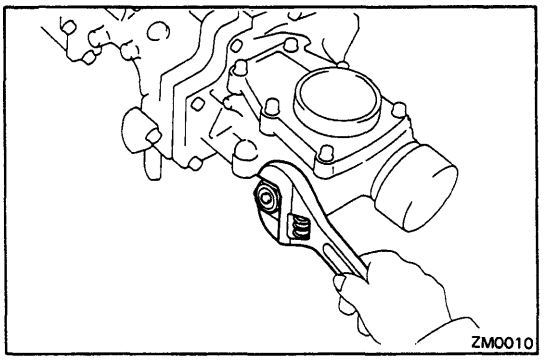
(b) Remove the nine bolts.

(c) Using a plastic-faced hammer, tap the extensión housing.



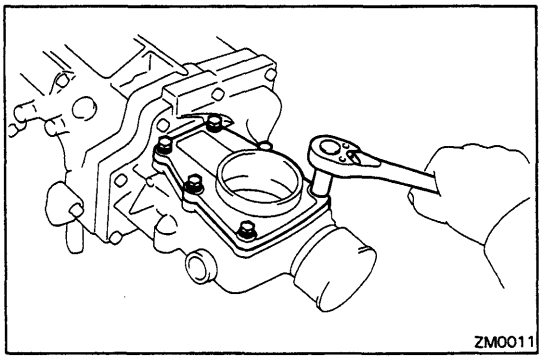
(d) Turn the select lever and disconnect the tip from the shift head groove. Remove the extensión housing and gasket.

(e) If necessary, remove the shifting rod end and remove the select lever from the extensión housing.

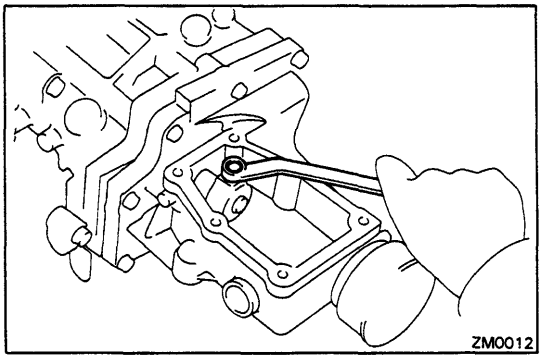


(Z54F)

(a) Remove the reverse restrict pin.

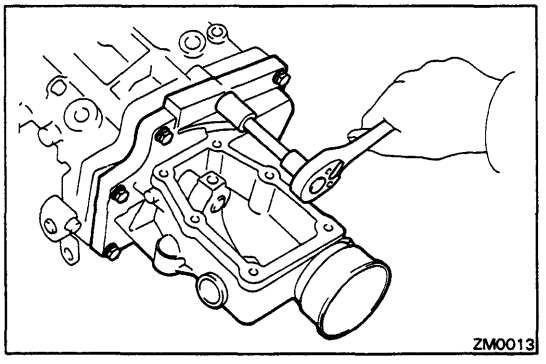


(b) Remove the six bolts, shift lever retainer and gasket.

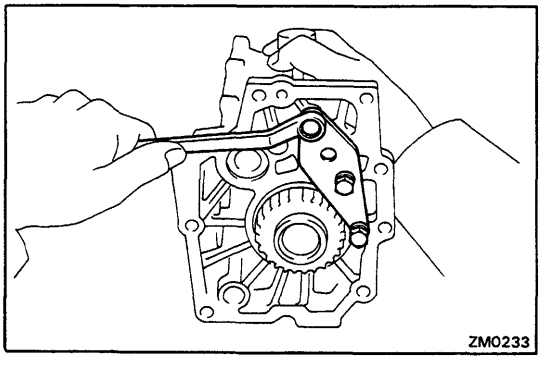


(c) Unstake the lock washer of the select lever housing mount bolt.

(d) Remove the select lever housing mount bolt.



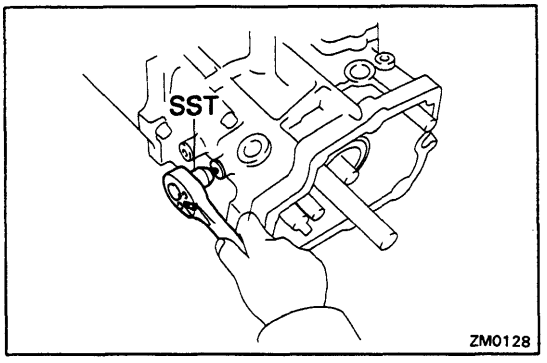
(e) Remove the nine bolts, extensión housing, select lever housing and gasket.



5. (Z54F)
REMOVE TRANSFER OUTPUT SHAFT AND OIL PUMP ROTORS

Remove the three bolts, oil pump cover and following parts:

(1) Oil pump rotors
(2) Transfer output shaft
(3) Oil baffle.

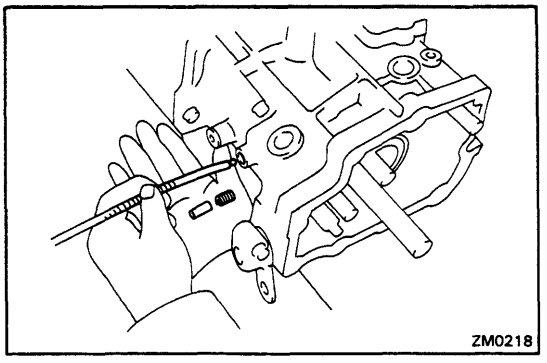


(Z54F)

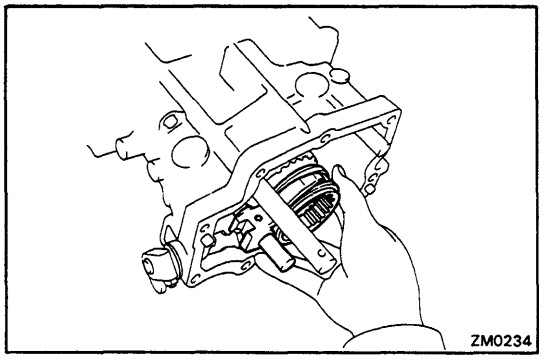
REMOVE TRANSFER SHIFT FORK

(a) Using SST, remove the screw plug.

SST 09313-30021



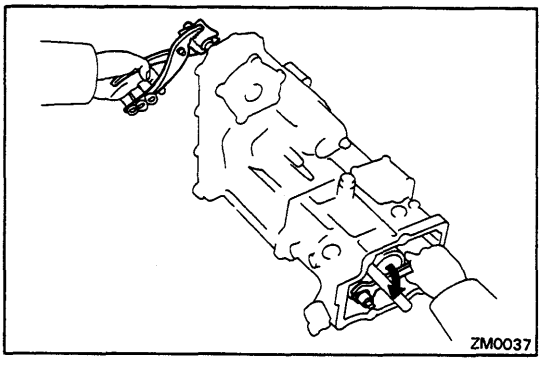
(b) Using a magnetic finger, remove the spring seat, spring and detent ball.



(c) Pulí out the shift fork, shift shaft and hub sieeve together.

(d) Remove the No. 4 cynchronizer ring.

(e) If necessary, disassemble the shift fork and shift fork shaft.



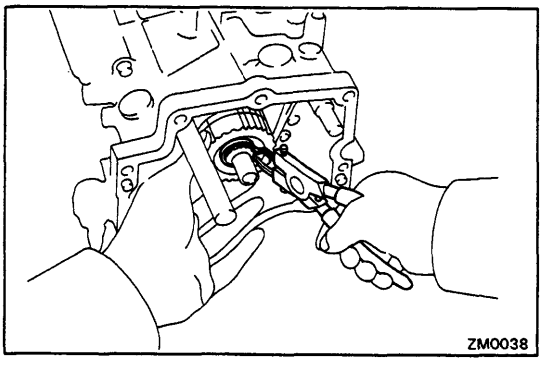
7. **(Z54F)**

REMOVE OIL PUMP DRIVE SHAFT

(a) Cover the tip of the input shaft with a shop cloth and secure it with pliers.

(b) Remove the oil pump drive shaft.

NOTE: The oil pump drive shaft has left-hand threads.

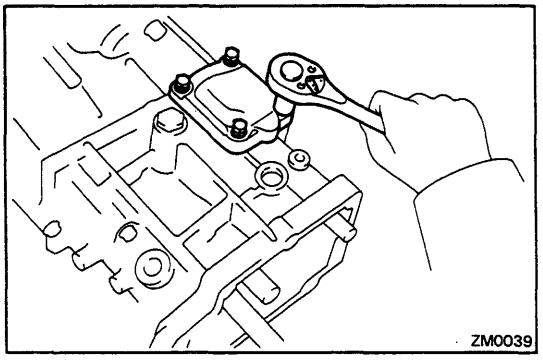


8. **(Z54F)**

REMOVE TRANSFER CLUTCH HUB

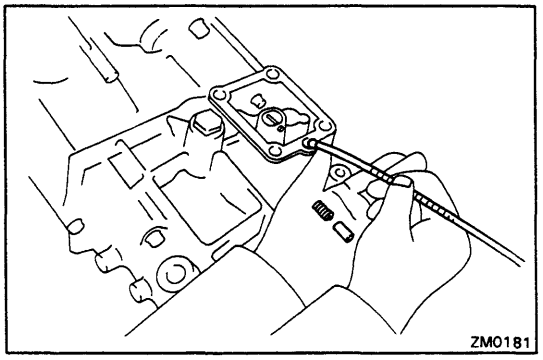
(a) Using snap ring pliers, remove the snap ring.

(b) Remove the clutch hub and No. 4 cynchronizer ring.



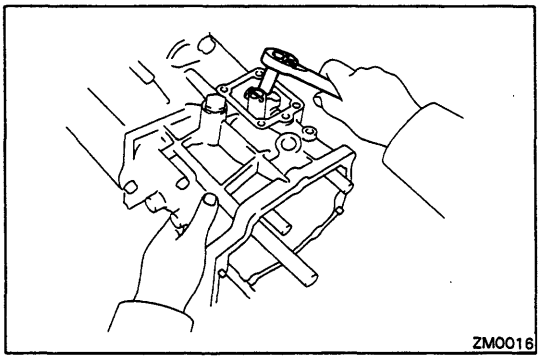
9. (Z54F)
REMOVE NO. 4 SHIFT FORK SHAFT AND NO. 4 SHIFT HEAD

(a) Remove the four bolts, transfer case cover and gasket.



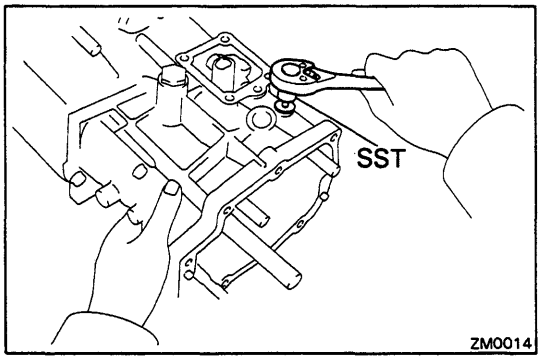
(b) Remove the spring seat and spring.

(c) Using a magnetic finger remove the detent ball.



(d) Unstake the lock píate of the No. 4 shift head mount bolt.

(c) Remove the No. 4 shift head mount bolt



(f) Using SST, remove the screw plug.

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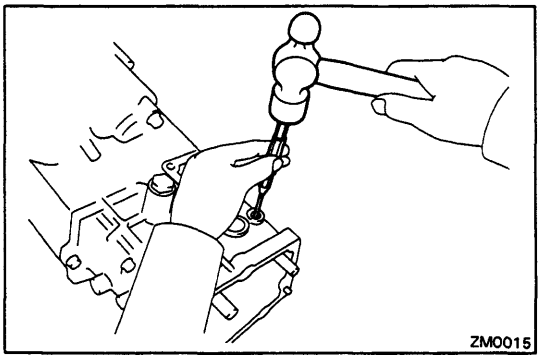
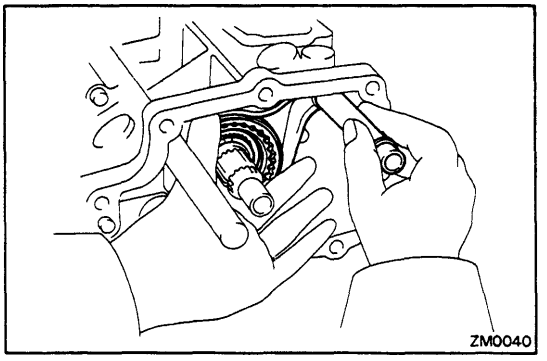
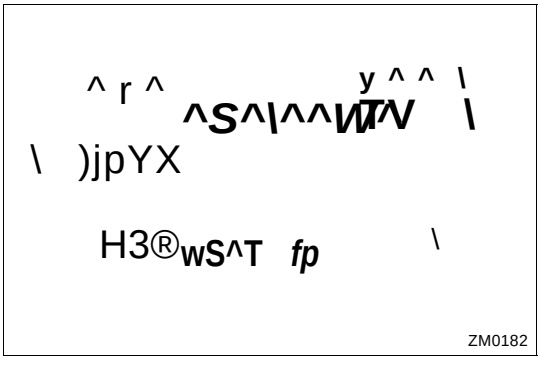


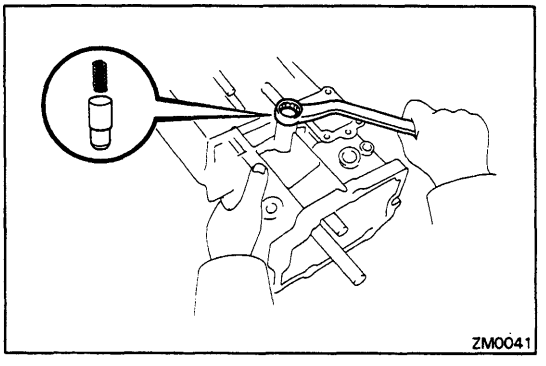
(g) Using a pin punch and hammer, tap out the slotted spring pin.



(h) Pulí out the No. 4 shift fork shaft and remove the No. 4 shift head.

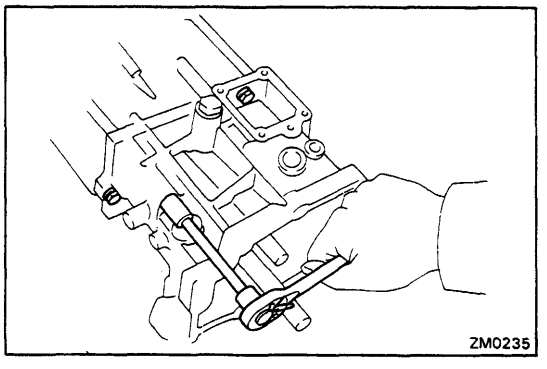


(i) Using a magnetic finger, remove the interlock pin.



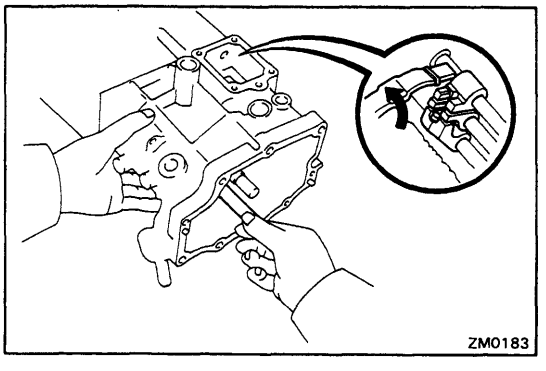
10. (Z54F)
REMOVE TRANSFER ADAPTOR

(a) Remove the plug, spring and reverse restrict pin.

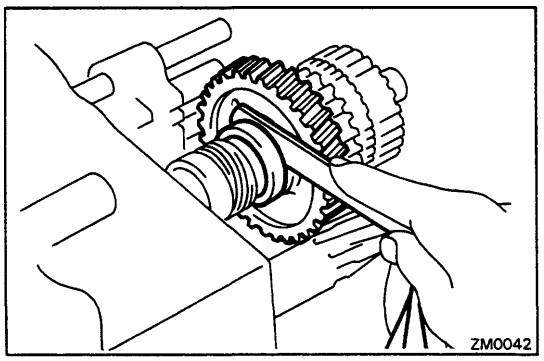


(b) Remove the nine bolts.

(c) Using a plastic-faced hammer, tap the transfer adaptor.



(d) Tum the select lever and disconnect the tip from the shift head groove. Remove the transfer adaptor, select lever No. 4 shift fork and the extra low gear assembly.



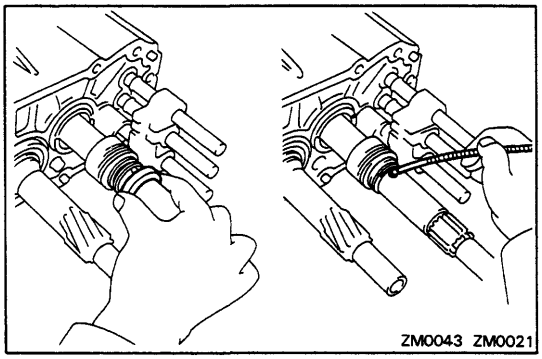
11. (Z54F)
CHECK EXTRA LOW GEAR THRUST CLEARANCE

(a) Install the needle roller bearing, extra low gear, transfer clutch hub with the snap ring.

(b) Using a feeler gauge, measure the extra low gear thrust clearance, and record the result for later reference.

Standard clearance: 0.180 - 0.430 mm (0.0070 - 0.0169 in.)
Máximum clearance: 0.50 mm (0.0197 in.)

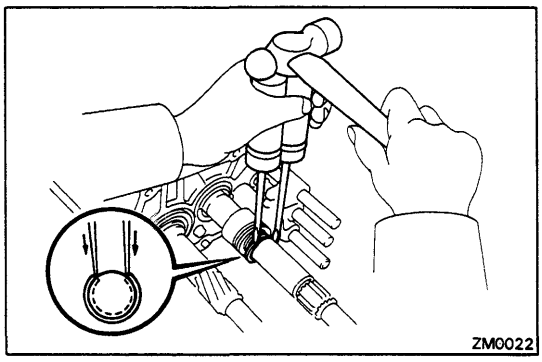
(c) Remove the snap ring, transfer clutch hub, extra low gear and needle roller bearing.



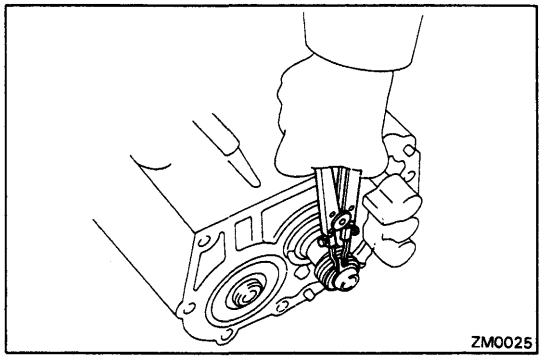
12. (Z54F)
REMOVE EXTRA LOW GEAR THRUST WASHER

(a) Remove the thrust washer.

(b) Using a magnetic finger, remove the locking ball.



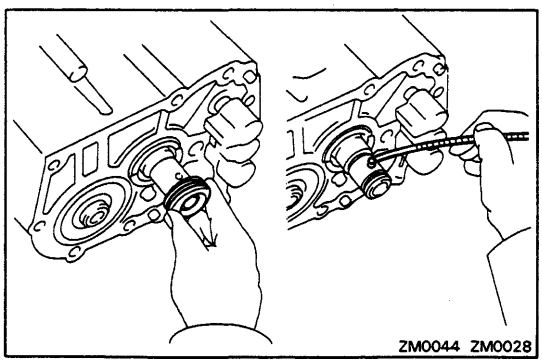
(c) Using two screwdrivers and a hammer, tap out the snap ring.



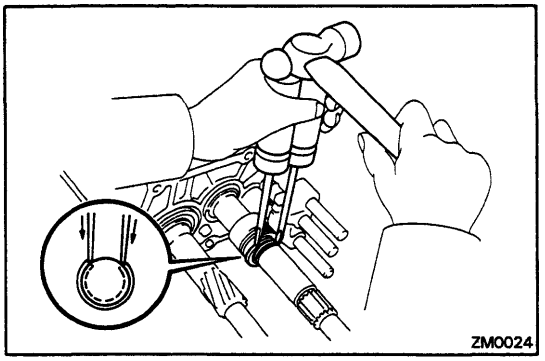
13. REMOVE SPEEDOMETER DRIVE GEAR (Z45, 46, 53)

(a) Using snap ring pliers, remove the snap ring.

(b) Remove the drive gear.

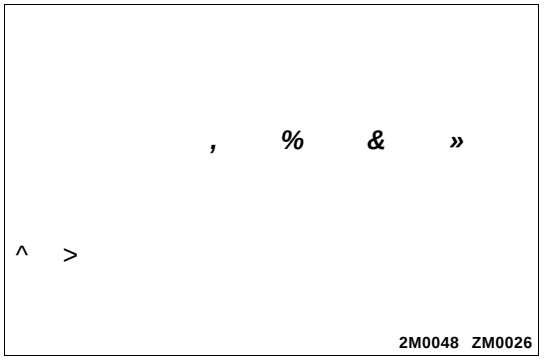


(c) Using a magnetic finger, remove the snap ring.



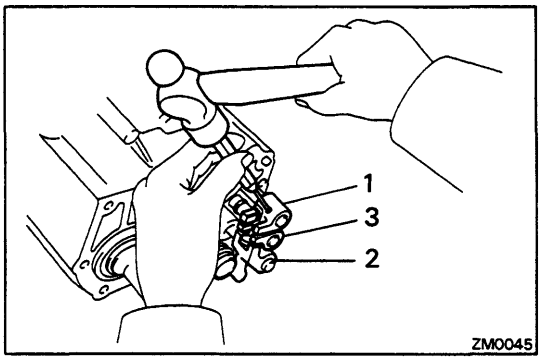
(Z54F)

(a) Using two screwdriver and a hammer, tap out the snap ring.



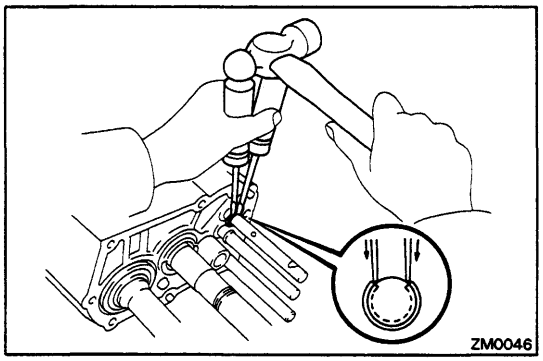
(b) Remove the drive gear.

(c) Using a magnetic finger, remove the locking ball.



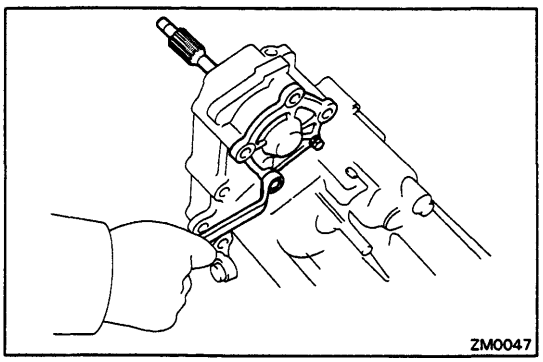
14. (Z54F)
REMOVE SHIFT HEADS (NO. 1, NO. 2 AND NO. 3)

Using a pin punch and hammer, tap out the slotted spring pin and remove the shift head. Remove the three shift head in sequence as shown.



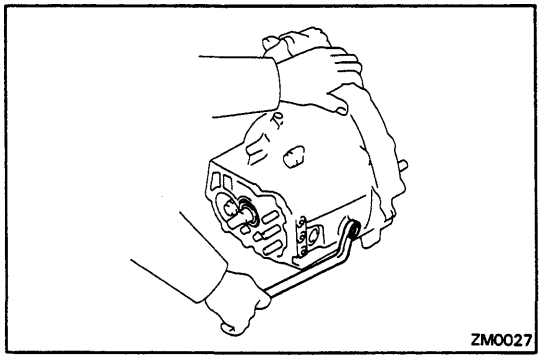
15. (Z54F)
REMOVE SNAP RINGS

Using two screwdriver and a hammer, tap the snap ring out of the No. 1 and No. 2 shift fork shafts.

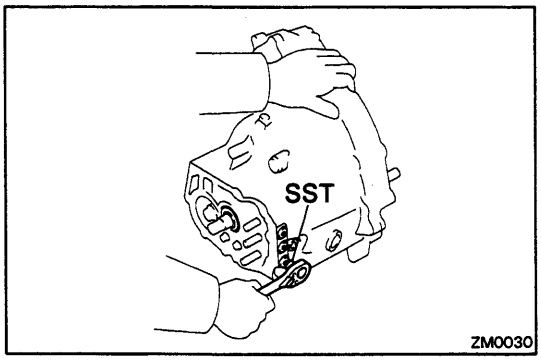


16. REMOVE INPUT SHAFT

Remove the two bolts, transmission case cover, gasket and input shaft.



17. REMOVE REVERSE SHIFT ARM PIVOT



18. REMOVE TRANSMISSION CASE

(a) Using SST, remove the three screw plugs.

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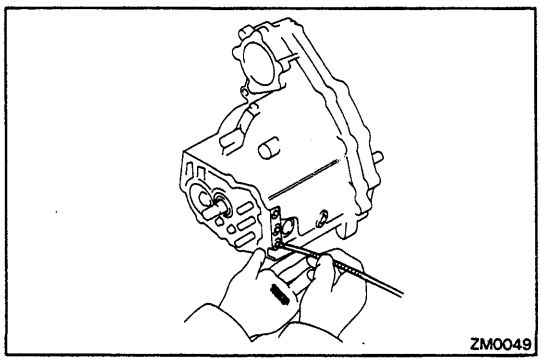
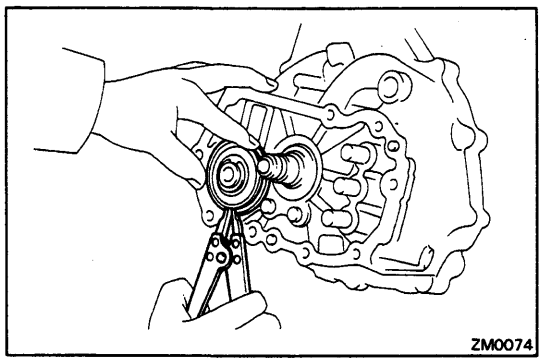
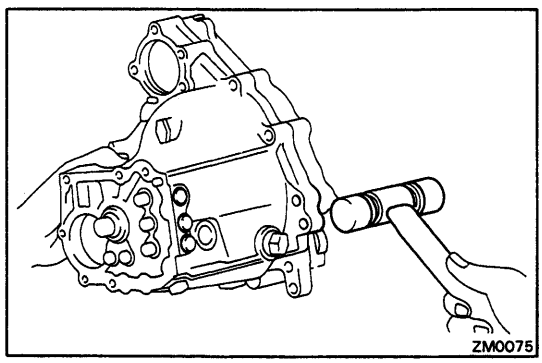


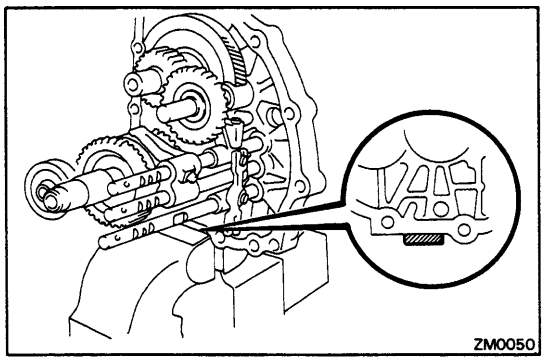
(b) Using a magnetic finger, remove the three springs and detent balls.



(c) Using snap ring pliers, remove the snap ring.

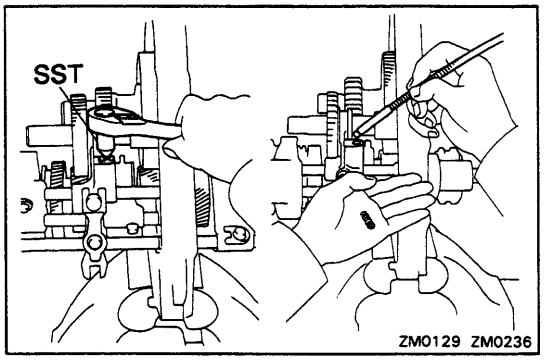


(d) Using a plastic-faced hammer, tap the case protrusion to remove the case from the intermidíate píate.



19. MOUNT INTERMEDÍATE PLATE IN VISE

Secure the protrusion on the lower part of the intermedíate píate.



20. REMOVE SHIFT FORKS, SHIFT ARM AND SHIFT FORK SHAFTS

(a) Using SST, remove the screw plug.

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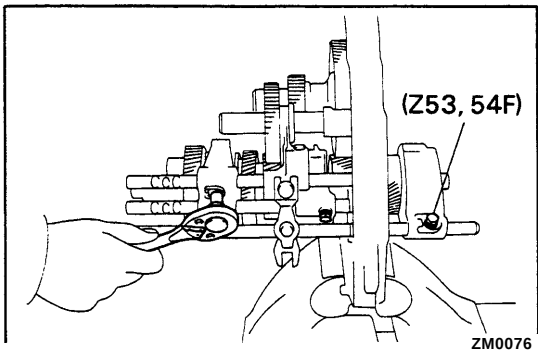
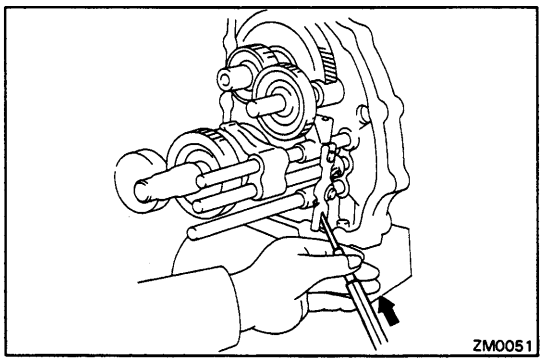
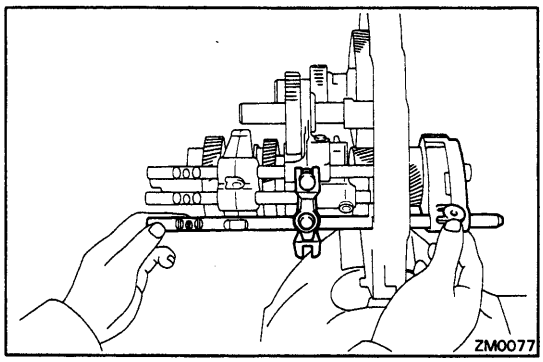
(b) Using a magnetic finger, remove the spring and detent ball.



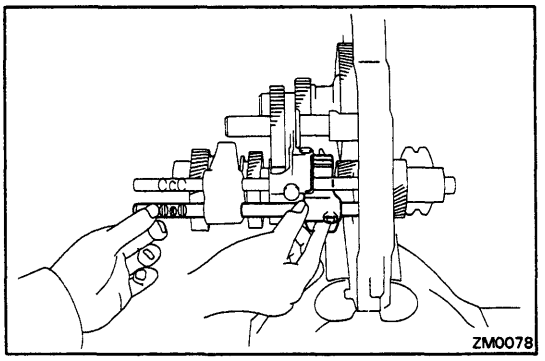
(c) Remove the shift fork mount bolts.



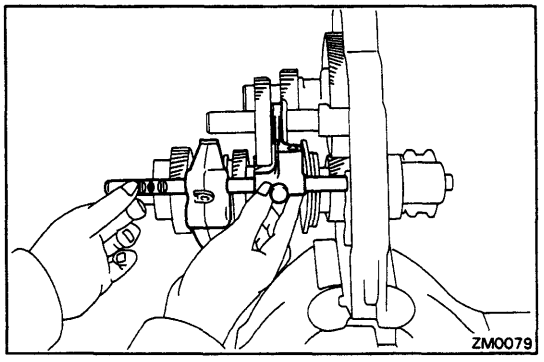
(d) Using a pin punch and hammer, tap out the slotted spring pin (for the reverse shif head).



(e) Remove the No. 3 shift fork (Z53, 54F), reverse shift arm and No. 3 shift fork shaft.

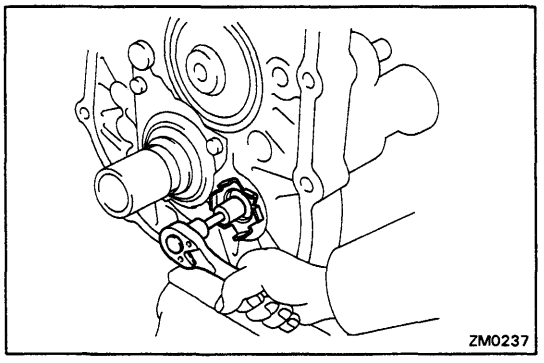


(f) Remove the No. 2 shift fork and No. 2 shift fork shaft.



(g) Remove the reverse shift fork. No. 1 shift fork and No. 1 shift fork shaft.

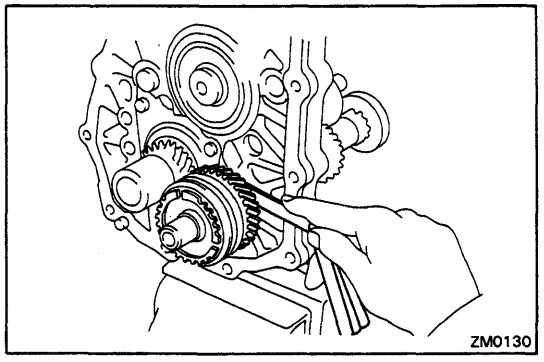
(h) Remove the three interlock pin from the No. 2 shift fork shaft and intermedíate píate.



21. (Z45, 46)
REMOVE COUNTER GEAR PLATE

Remove the bolt and gear píate.

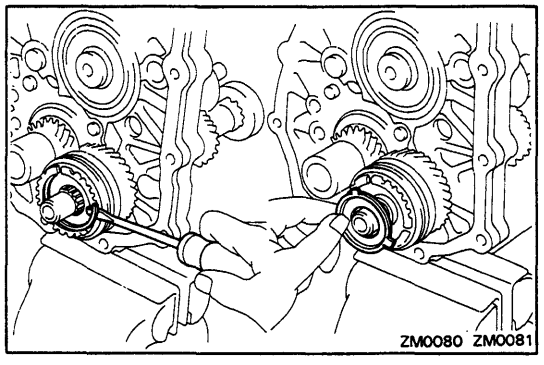
NOTE: Mesh the gears and lock the counter gear.



22. (Z53, 54F)
CHECK COUNTER FIFTH GEAR THRUST CLEARANCE

Using a feeler gauge, measure the counter 5th gear thrust clearance and record the result for later reference.

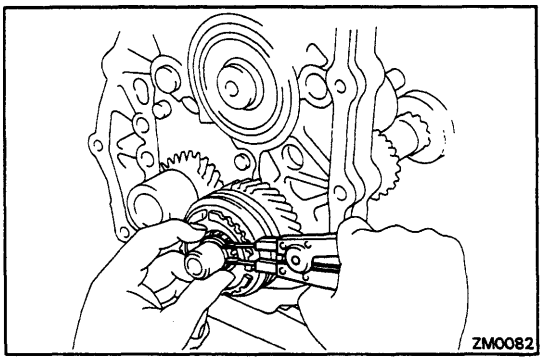
Standard clearance: 0.150 - 0.325 mm (0.0059-0.0128 in.)
Máximum clearance: 0.40 mm (0.0157 in.)



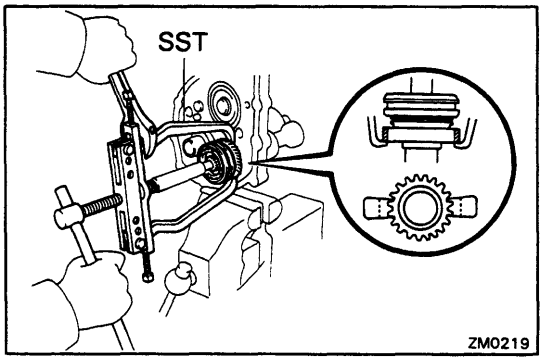
23. (Z53, 54F)
REMOVE NO. 3 CLUTCH HUB ASSEMBLY AND COUNTER FIFTH GEAR

(a) Using a screwdriver, pry out the snap ring.

(b) Remove the shifting key retainer.



(c) Using snap ring pliers, remove the snap ring.



(d) Using SST, remove the No. 3 clutch hub assembly, No. 3 cynchronizer ring and counter 5th gear together. Remove the needle roller bearing.

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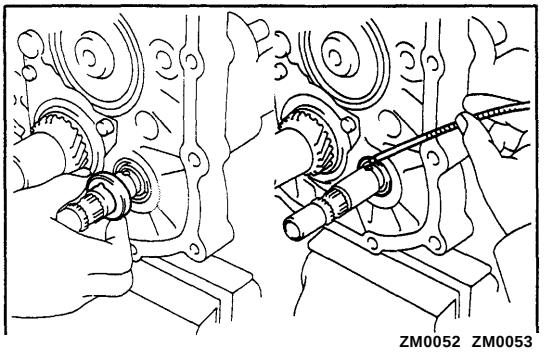
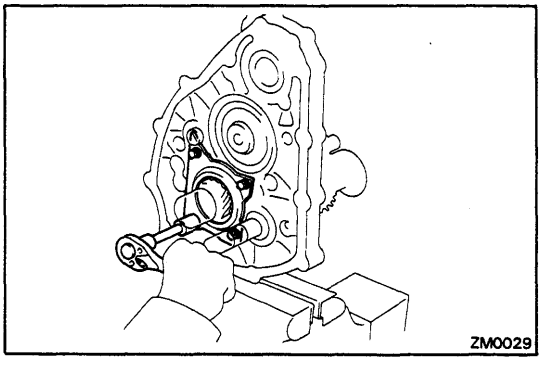
CAUTION: Be careful not to drop the needle roller bearing when removing the 5th gear.



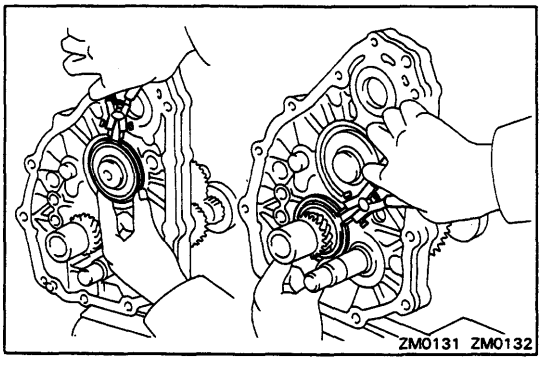
(e) Remove the thrust washer.

(f) Using a magnetic finger, remove the locking ball.

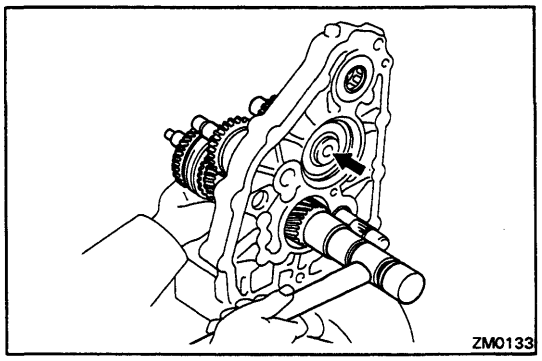


24. REMOVE IDLER GEAR, REVERSE IDLER GEAR, OUTPUT SHAFT AND COUNTER GEAR

(a) Remove the four bolts and the front bearing reatainer of the output shaft.

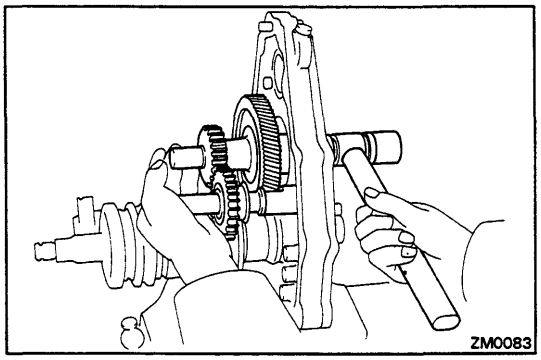


(b) Using snap ring pliers, remove the two snap rings.

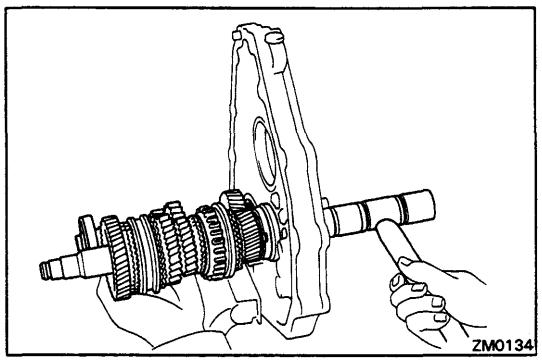


(c) Using a plastic-faced hammer, tap the idler gear and output shaft halfway out from the intermedíate.

NOTE: Support the gear shaft by hand.

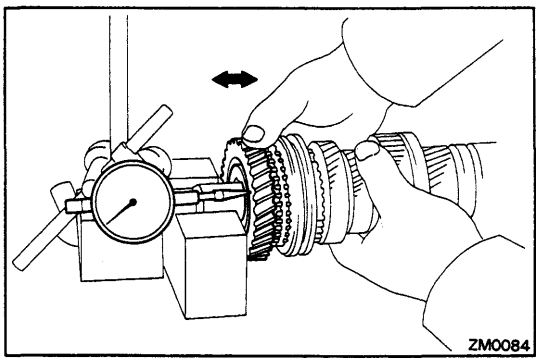


(d) Using a plastic-faced hammer, tap the idler gear to remove the idler gear, reverse idler gear and reverse idler gear shaft together.



(e) Using a plastic-faced hammer, tap the output shaft to remove the output shaft and counter gear together

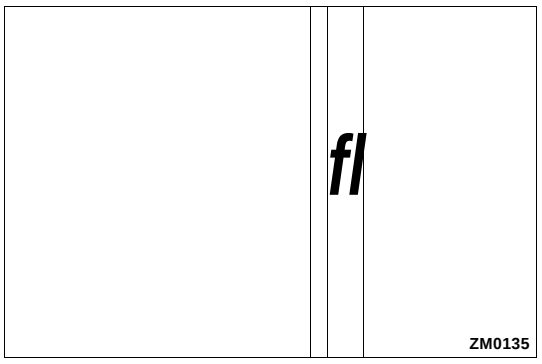
NOTE: Support the gear and shaft by hand.



25. CHECK EACH GEAR THRUST CLEARANCE

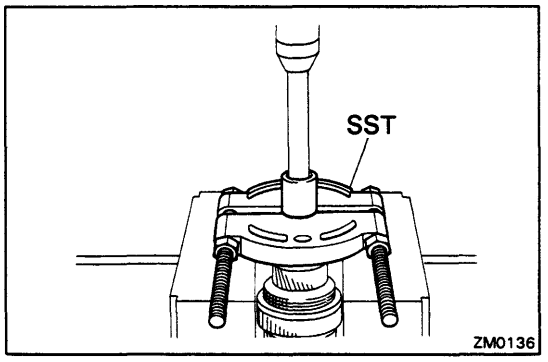
(a) Using a dial indicator, measure the 1st and 4th gear thrust clearances and record the result for later reference.

Standard clearance:
1 st gear 0.150 - 0.275 mm (0.0059- 0.0108 in.)
4th gear 0.020 - 0.0240 mm (0.0008 - 0.0094 in.)
Máximum clearance: 0.30 mm (0.0118 in.)



(b) Using a feeier gauge, measure the 2nd and 3rd gear thrust clearances and record the resuld for later reference.

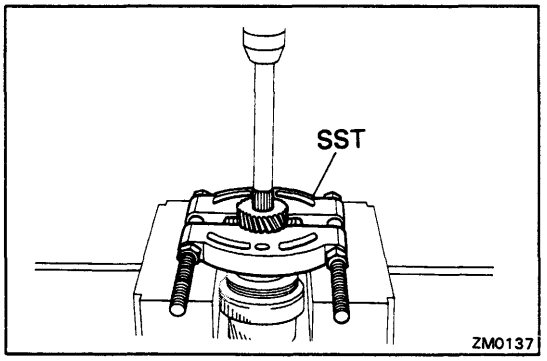
Standard clearance: 0.150 - 0.250 mm (0.0059 - 0.0098 in.)
Máximum clearance: 0.30 mm (0.0118 in.)



26. REMOVE SLEEVE YOKE

Using SST and a press, press out the sleeve yoke.

SST 09950-00020

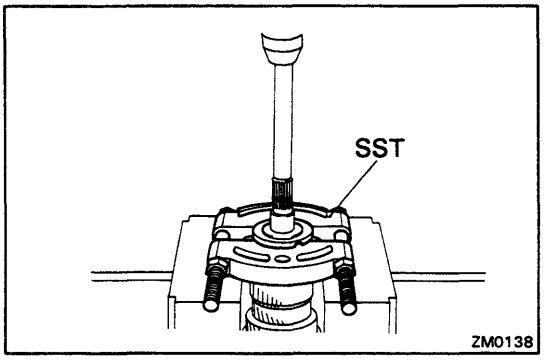


27. (Z53, 54F)
REMOVE FIFTH GEAR

(a) Using snap ring pliers, remove the snap ring.

(b) Using SST and a press, press out the 5th gear.

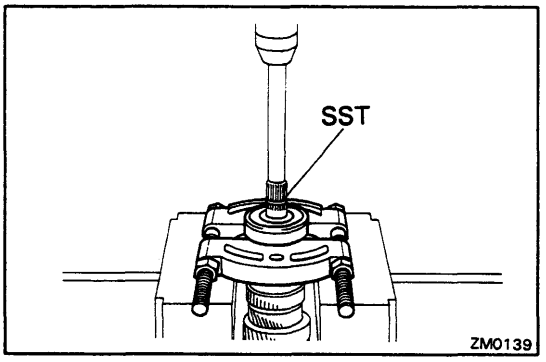
SST 09950-00020



28. REMOVE OUTPUT SHAFT FRONT BEARING

(a) Using snap ring pliers, remove the snap ring.

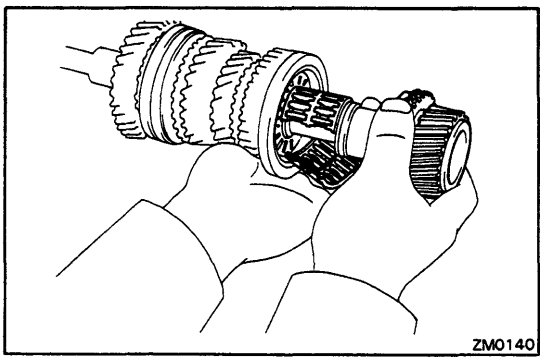
(b) Using SST and a press, press out the bearing.



29. REMOVE SPACER AND FOURTH GEAR THRUST BEARING

Using SST and a press, press out the spacer and thrust bearing.

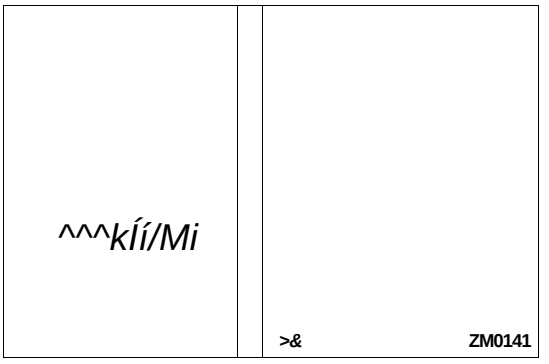
SST 09950-00020



30. REMOVE FOURTH GEAR

Remove the 4th gear and needle roller bearing.

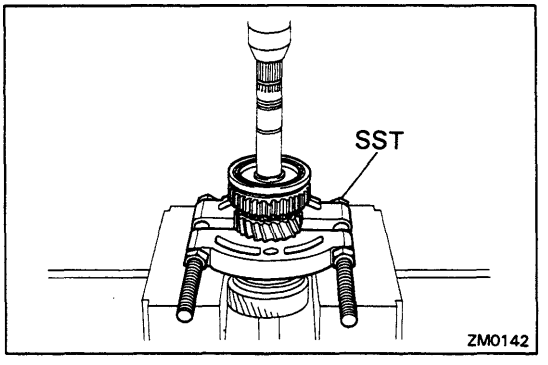
CAUTION: Be careful not to drop the needle roller bearing when removing the 4th gear.



31. REMOVE FOURTH GEAR THRUST WASHER AND THRUST BEARING

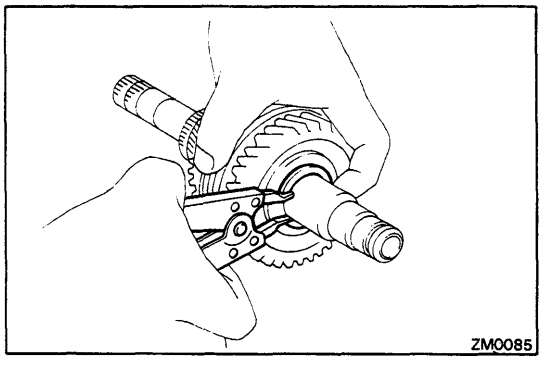
(a) Using two screwdriver and a hammer, tap out the snap ring.

(b) Remove the thrust washer and thrust bearing.



32. REMOVE NO. 2 CLUTCH HUB ASSEMBLY AND THIRD GEAR

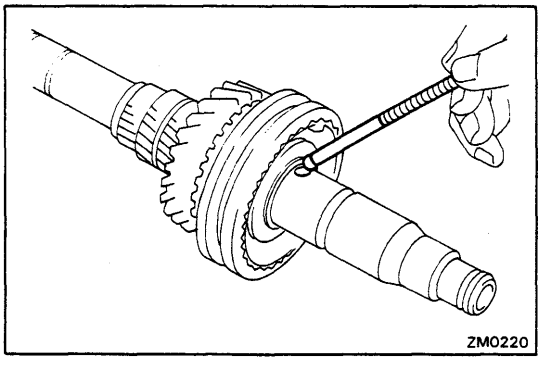
Using SST and a press, press the 3rd gear and remove the No. 2 clutch hub assembly, No. 2 cynchronizer ring and 3rd gear.



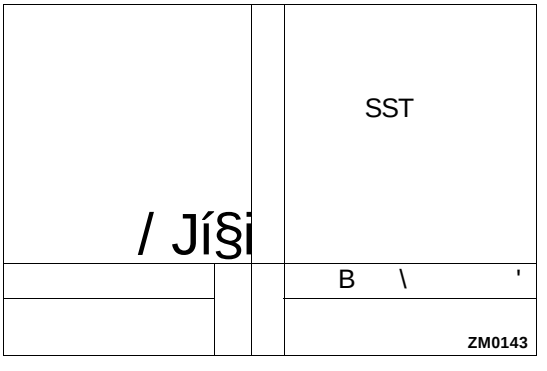
33. REMOVE FIRST GEAR

(a) Using snap ring pliers, remove the snap ring.

(b) Remove the 1 st gear, inner race, needle roller bearing and No. 1 cynchronizer ring.

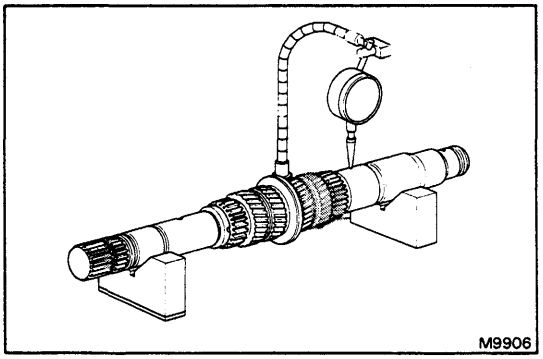


(c) Using a magnetic finger, remove the locking ball.



34. REMOVE NO. 1 CLUTCH HUB ASSEMBLY AND SECOND GEAR

Using SST and a press, press the 2nd gear and remove the No. 1 clutch hub assembly, No. 1 cynchronizer ring and 2nd gear.

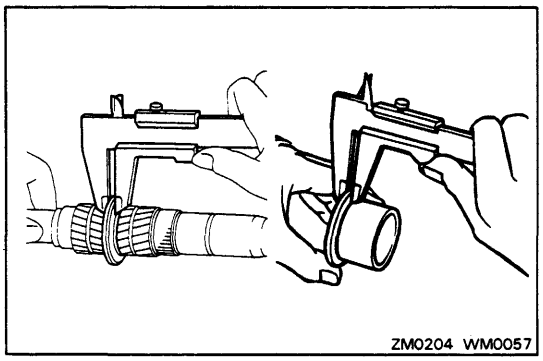


INSPECTION OF TRANSMISSION COMPONENTS

1. INSPECT OUTPUT SHAFT AND FIRST GEAR INNER RACE

(a) Using a dial indicator, measure the circle runout.

Máximum runout: 0.06 mm (0.0024 in.)

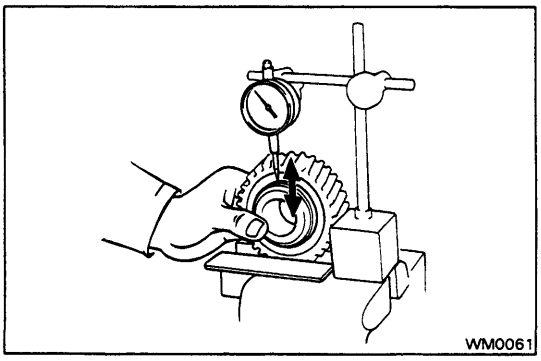


(b) Using calipers, measure the output shaft flange thickness.

Standard thickness: 4.24 - 4.54 mm (0.1669-0.1787 in.)
Mínimum thickness: 3.00 mm (0.1181 in.)

(c) Using calipers, measure the inner race flange thickness.

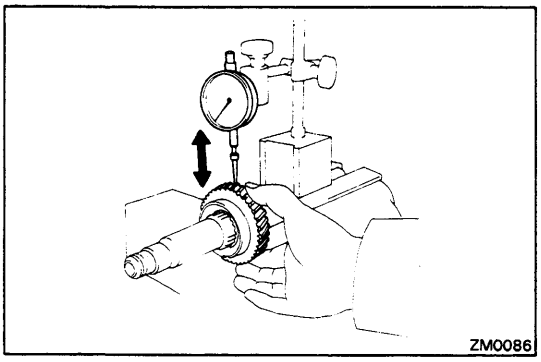
Standard thickness: 4.175 — 4.275 mm (0.1643- 0.1683 in.)
Mínimum thickness: 3.00 mm (0.1181 in.)



2. INSPECT OIL CLEARANCE OF FIRST GEAR

Using a dial indicator, measure the oil clearance between the gear and inner race with the needle roller bearing installed.

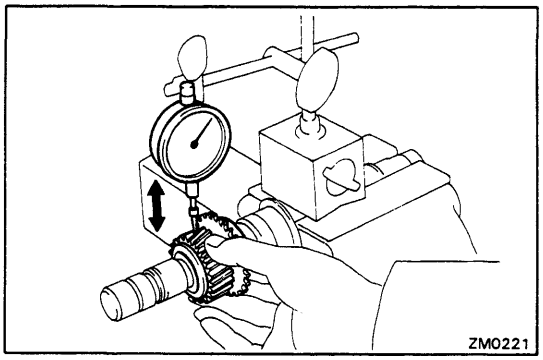
Standard clearance: 0.009 - 0.062 mm (0.0004 - 0.0024 in.)
Máximum clearance: 0.07 mm (0.0028 in.)



INSPECT OIL CLEARANCE OF SECOND AND THIRD GEARS

Using a dial indicator, measure the oil clearance between the gear and output shaft.

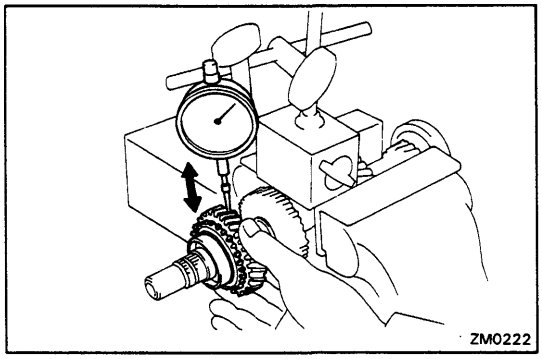
Standard clearance: 0.060 - 0.101 mm (0.0024 - 0.0040 in.)
Máximum clearance: 0.11 mm (0.0043 in.)



4. INSPECT OIL CLEARANCE OF FOURTH AND EXTRA LOW GEAR

Using a dial indicator, measure the oil clearance between the gear and output shaft with the needle roller bearing installed.

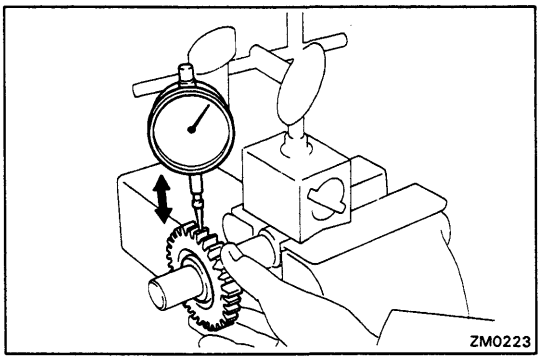
Standard clearance:
4th gear 0.015 - 0.035 mm (0.0006 - 0.0014 in.)
Extra low gear 0.009 - 0.032 mm (0.0004-0.0013 in.)
Máximum clearance: 0.04 mm (0.0016 in.)



5. INSPECT OIL CLEARANCE OF COUNTER FIFTH GEAR

Using a dial indicator, measure the oil clearance between the gear and counter gear shaft with the needle roller bearing installed.

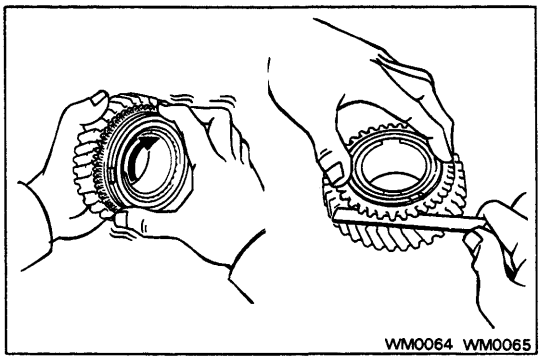
Standard clearance: 0.009 — 0.055 mm (0.0004 - 0.0022 in.)
Máximum clearance: 0.06 mm (0.0024 in.)



6. INSPECT OIL CLEARANCE OF REVERSE IDLER GEAR

Using a dial indicator, measure the oil clearance between the gear and reverse idle gear shaft.

Standard clearance: 0.055 - 0.092 mm (0.0022 - 0.0036 in.)
Máximum clearance: 0.06 mm (0.0024 in.)

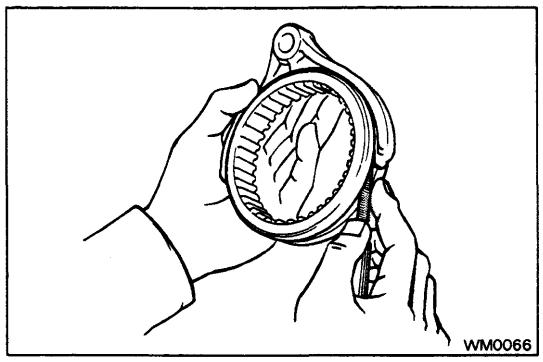


7. INSPECT SYNCHRONIZER RINGS

(a) Turn the ring and push it in to check the braking action.

(b) Measure the clearance between the synchronizer ring back and the gear spline end.

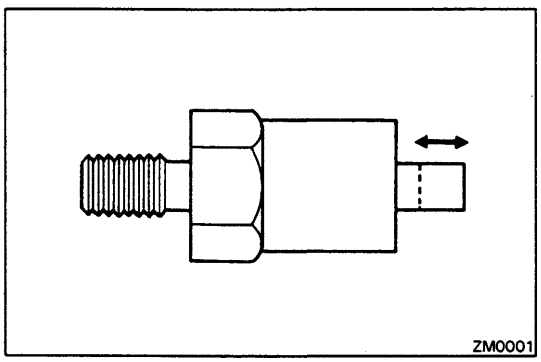
Standard clearance:
5th and extra low gears 0.7 ~1.3 mm (0.028 - 0.051 in.)
Others 0.9 — 1.5 mm (0.035 - 0.059 in.)
Máximum clearance: 0.6 mm (0.024 in.)



8. INSPECT SHIFT FORKS AND HUB SLEEVES

Using a feeler gauge, measure the clearance between the hub sleeve and shift fork.

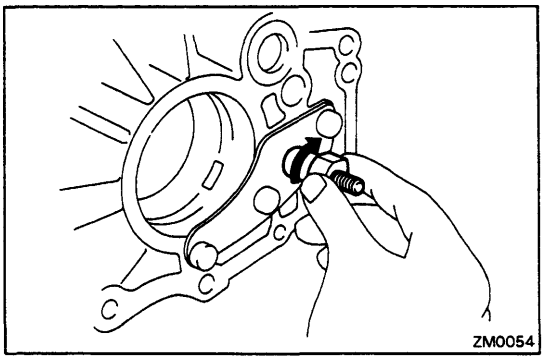
Máximum clearance: 1.0 mm (0.039 in.)



9. INSPECT OIL PUMP

(a) Check that the pump drive shaft slides smoothly in the axial direction.

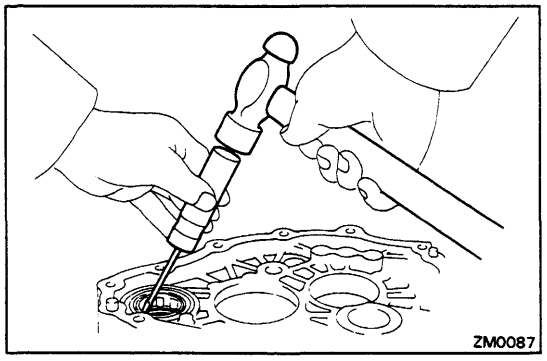
Shaft stroke: 6.0 mm (0.236 in.)



(b) Install the pump rotors with the pump cover and three bolts. Torque the bolts.

Torque: **195** kg-cm (14 ft-lb, **19** N-m)

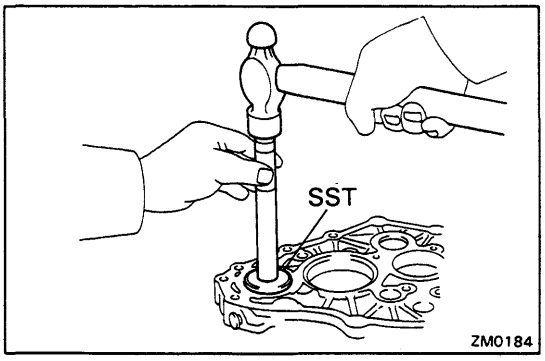
(c) Check that the rotors rotates smoothly.



REPLACEMENT OF TRANSMISSION COMPONENTS

1. REPLACE INPUT SHAFT FRONT BEARING AND OIL SEAL

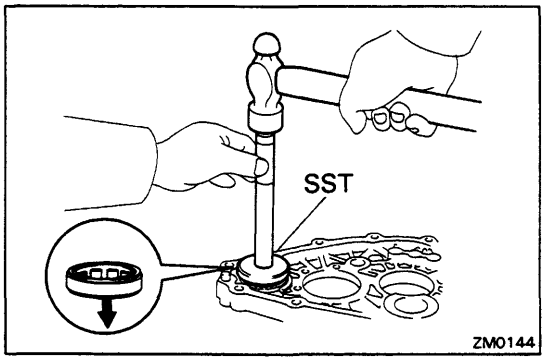
(a) Using a screwdriver and hammer, tap out the oil seal.



(b) Remove the bolt and bearing lock píate.

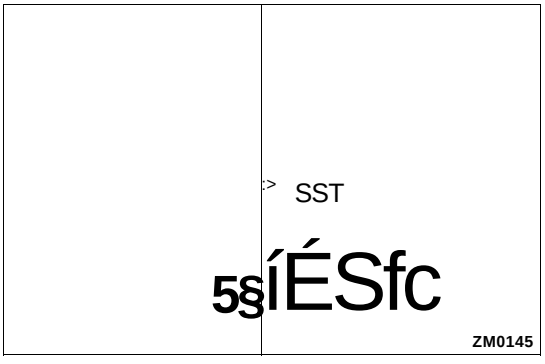
(c) Using SST and a press, press out the bearing.

SST 09608-30021



(d) Using SST and a press, press in a new bearing.

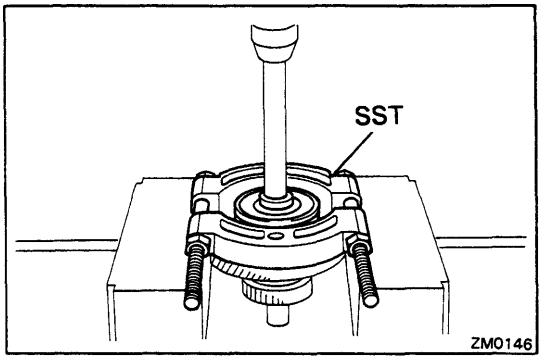
SST 09608-30021



(e) Using SST and a hammer, tap in a new oil seal until its surface is flush with the intermedíate píate edge.

SST 09608-30021

(f) Apply MP grease to the oil seal lip.

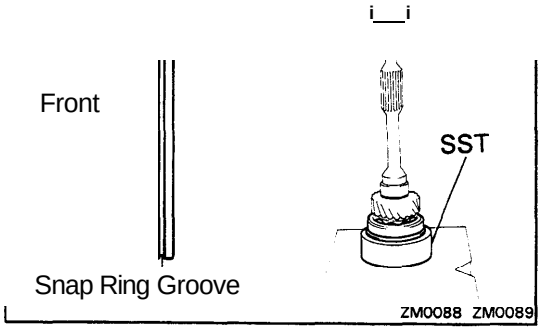


2. REPLACE INPUT SHAFT REAR BEARING

(a) Using snap ring pliers, remove the snap ring.

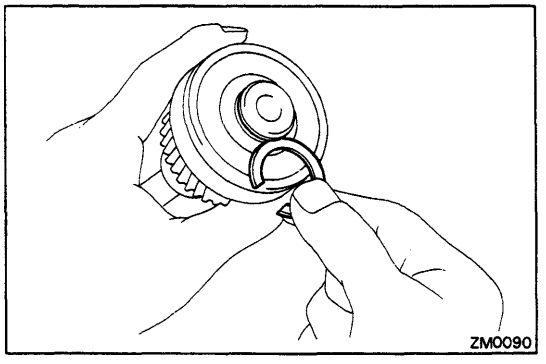
(b) Using SST and a press, press out the bearing.

SST 09950-00020



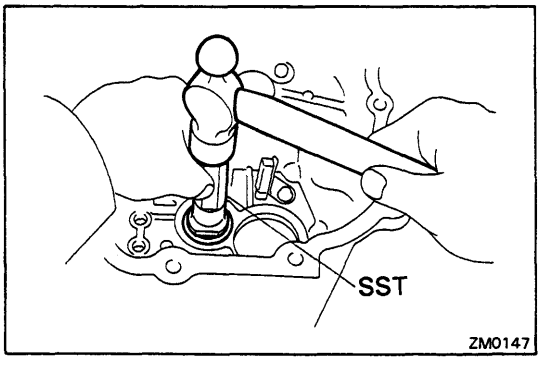
(c) Using SST and a press, press in a new bearing.

SST 09515-20010



(d) Select a snap ring that will allow minimum axial play and install it on the shaft.

Snap ring thickness	mm (in.)
2.10 - 2.15 (0.0827 - 0.0846)	
2.25 - 2.30 (0.0886 - 0.0906)	

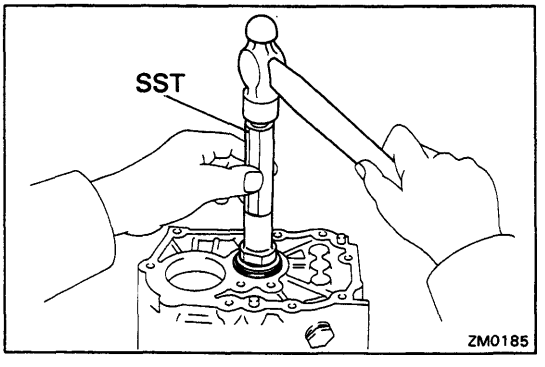


3. **REPLACE OUTPUT SHAFT REAR BEARING**

(a) Remove the two bolts and bearing retainer.

(b) Using SST and a hammer, tap out the bearing.

SST 09304-47010

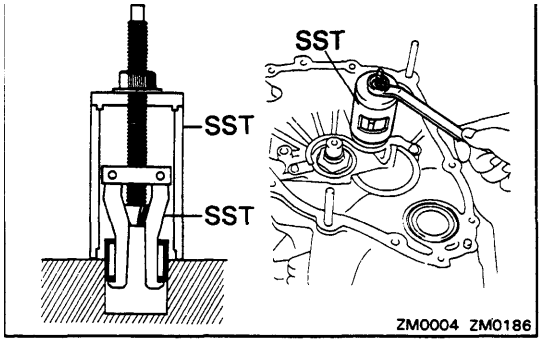


(c) Using SST and a hammer, tap in a new bearing.

SST 09304-47010

(d) Install the bearing retainer with the two bolts. Torque the bolts.

Torque: **130** kg-cm (9 ft-lb, **13** Nm)

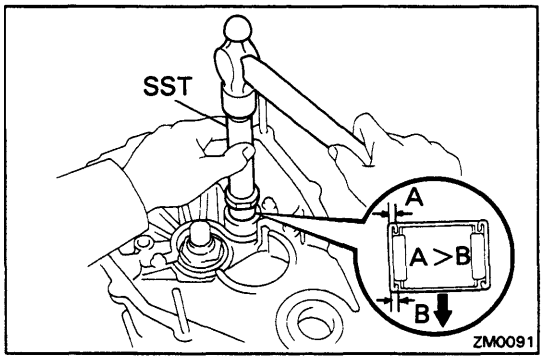


4. **(Z53, 54F)**

REPLACE COUNTER GEAR NO. 1 FRONT BEARING

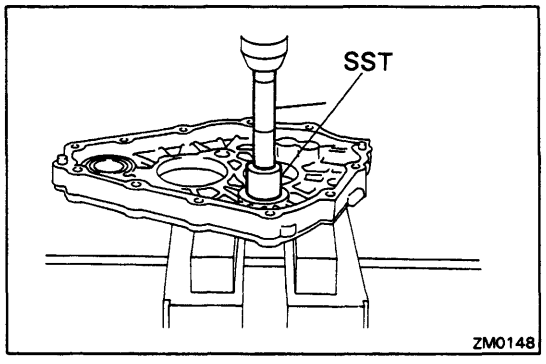
(a) Using SST, remove the bearing.

SST 09310-36021 and 09612-10092



(b) Using SST and a hammer, tap in a new bearing until its surface is flush with the transaxle case edge.

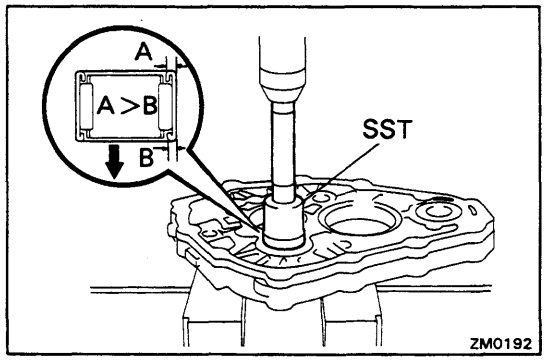
SST 09304-47010



5. **REPLACE COUNTER GEAR NO. 2 FRONT BEARING**

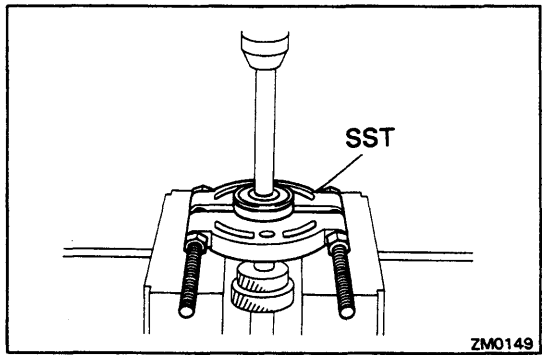
(a) Using SST and a press, press out the bearing.

SST 09710-30020



(b) Using SST and a press, press in a new bearing until its surface is flush with the intermedíate píate edge.

SST 09710-30020

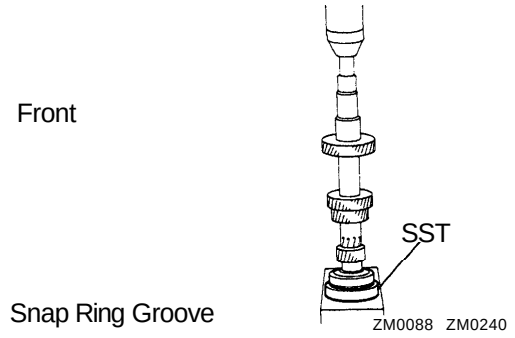


6. **REPLACE COUNTER GEAR NO. 1 REAR BEARING (Z45, 46, 53)**

(a) Using snap ring pliers, remove the snap ring.

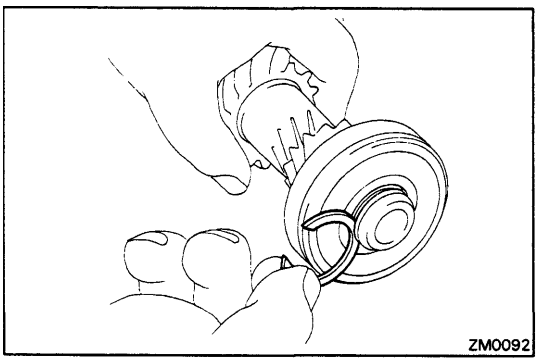
(b) Using SST and a press, press out the bearing.

SST 09950-00020



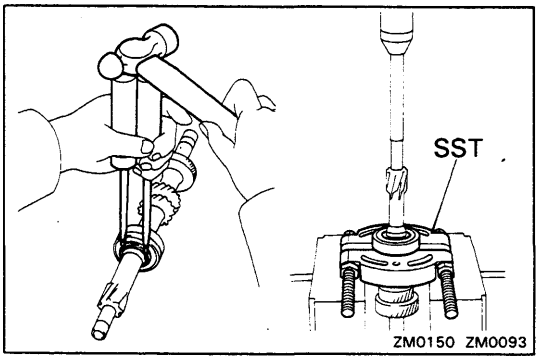
(c) Using SST and a press, press in a new bearing.

SST 09515-20010



(d) Select a snap ring that will allow minimum axial play and install it on the shaft.

Snap ring thickness	mm (in.)
1.80 - 1.85	(0.0709 - 0.0728)
1.95 - 2.00	(0.0768 - 0.0787)

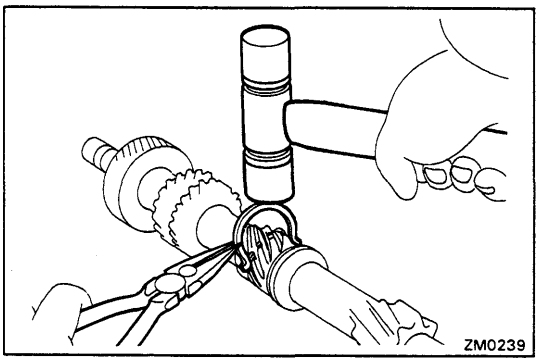


(Z54F)

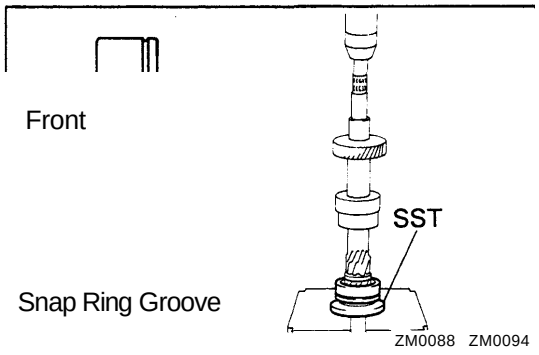
(a) Using two screwdrivers and a hammer, tap out the two snap rings.

(b) Using SST and a press, press out the bearing.

SST 09950-00020

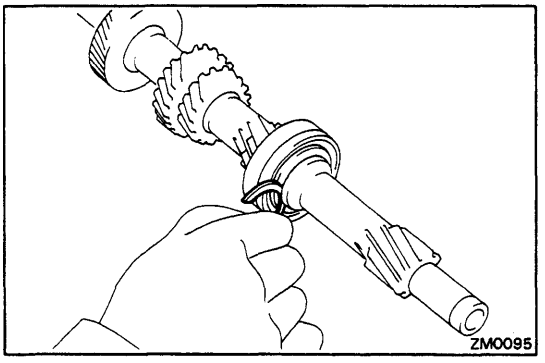


(c) Using a plastic-faced hammer, tap in the front snap ring.



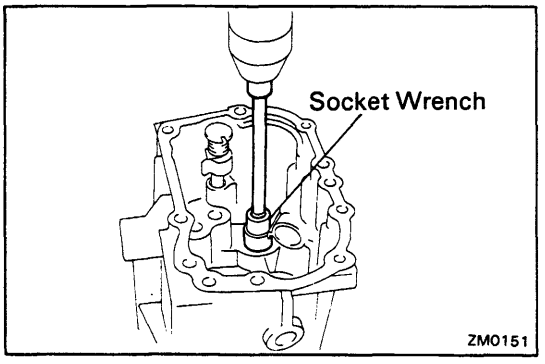
(d) Using SST and a press, press in a new bearing.

SST 09608-20011



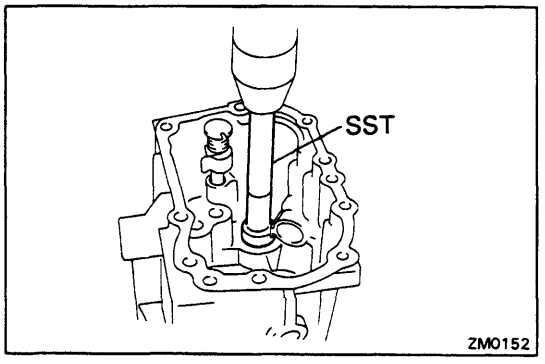
Select a rear snap ring that will allow mínimum axial play and install it on the shaft.

Snap ring thickness	mm un.,
1.925 - 1.975 (0.0758 - 0.0778)	
1.975 - 2.025 (0.0778 - 0.0797)	
2.025 - 2.075 (0.0797 - 0.0817)	
2.075 - 2.125 (0.0817 - 0.0837)	
2.125 - 2.175 (0.0837 - 0.0856)	
2.175 - 2.225 (0.0856 - 0.0876)	



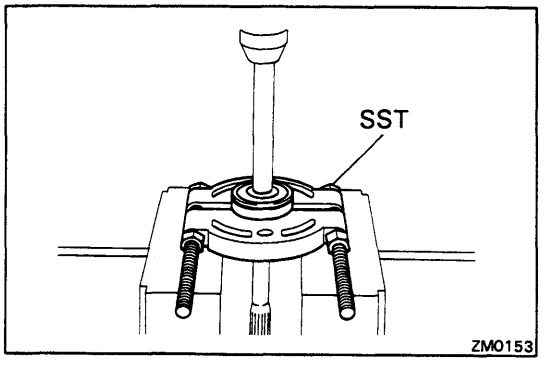
(Z54F)
REPLACE COUNTER GEAR NO. 2 REAR BEARING

(a) Using a 17 mm socket wrench and press, press out the bearing.



(b) Using SST and a press, press in a new bearing until its surface is flush with the transfer adaptor edge.

SST 09304-12012



8. REPLACE IDLER GEAR FRONT BEARING

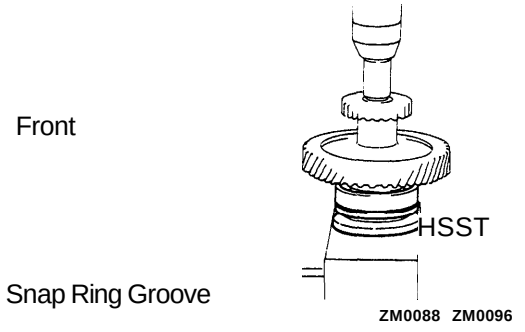
(a) Using snap ring pliers, remove the snap ring.

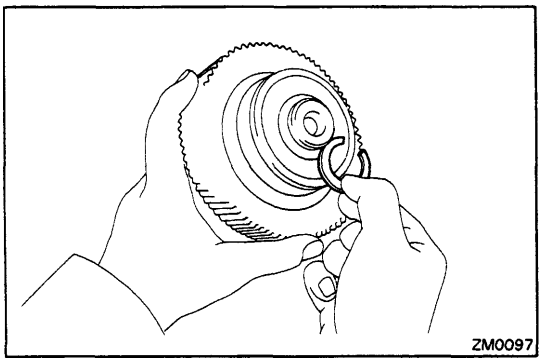
(b) Using SST and a press, press out the bearing.

SST 09950-00020

(c) Using SST and a press, press in a new bearing.

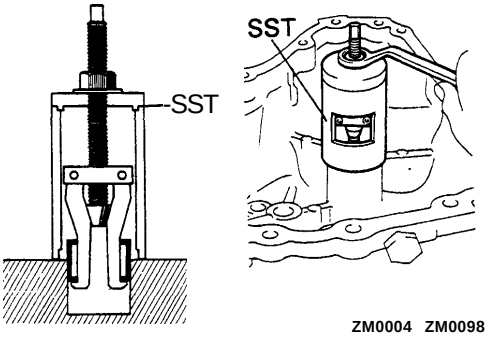
SST 09506-30011





(d) Select a snap ring that will allow minimum axial play and install it on the shaft.

Snap ring thickness	mm (in.)
2.40 - 2.45	(0.0945 - 0.0965)
2.45 - 2.50	(0.0965 - 0.0984)

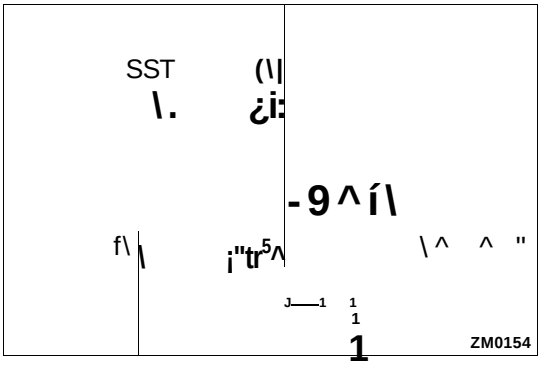


9. **REPLACE REAR BEAR OF IDLER GEAR**

(a) Remove the two bolts and oil receiver.

(b) Using SST, remove the bearing.

SST 09612-10092

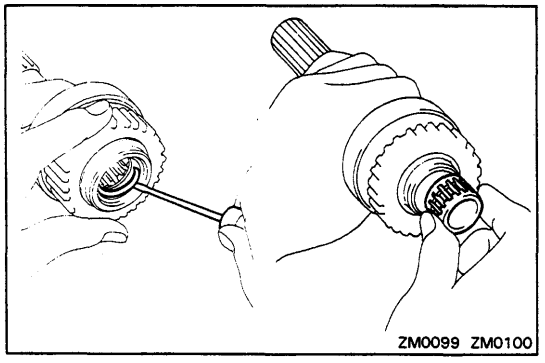


(c) Using SST and a hammer, tap in a new bearing until its surface is flush with the transmission case edge.

SST 09304-47010

(d) Install the oil receiver with the two nut. Torque the nuts.

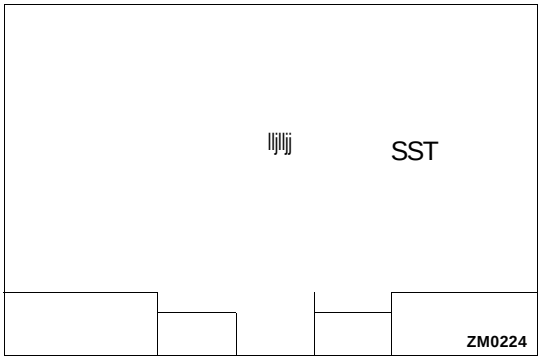
Torque: 55 kg-cm (48 in.-lb, 5.4 N-m)



10. (Z54F)
REPLACE FRONT BEARING OF TRANSFER OUTPUT SHAFT

(a) Using a screwdriver, pry out the snap ring and remove the bearing.

(b) Install a new bearing with the snap ring.

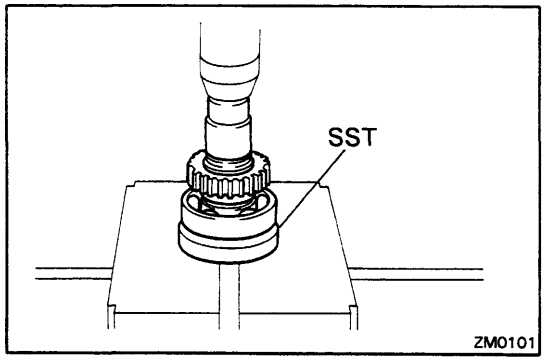


11. (Z54F)
REPLACE REAR BEARING OF TRANSFER OUTPUT SHAFT

(a) Using snap ring pliers, remove the snap ring.

(b) Using SST and a press, press out the bearing.

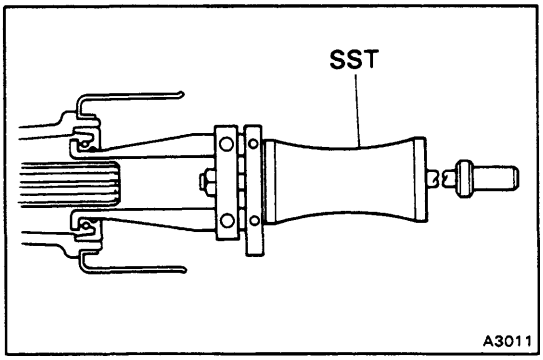
SST 09950-00020



(c) Using SST and a press, press in a new bearing.

SST 09608-20011

(d) Using snap ring pliers, install the snap ring.



12. (Z54F)
REPLACE EXTENSIÓN HOUSING BUSHING AND OIL SEAL

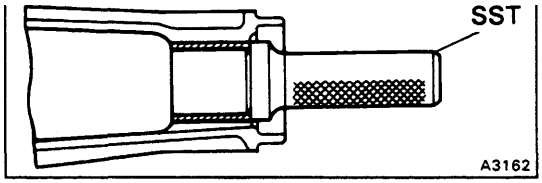
(a) Using SST, remove the oil seal.

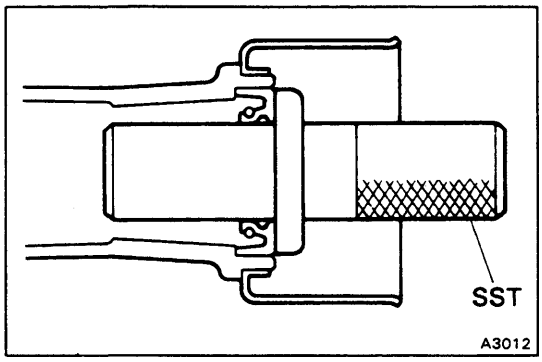
SST 09308-00010 or
09308-10010 with output shaft installed

(b) Gradually heat the extensión housing end 80 - 100°C (176 - 212°F) in an oil bath.

(c) Using SST and a press, press out the bushing and press in a new bushing until it's surface is flush with the extensión housing edge.

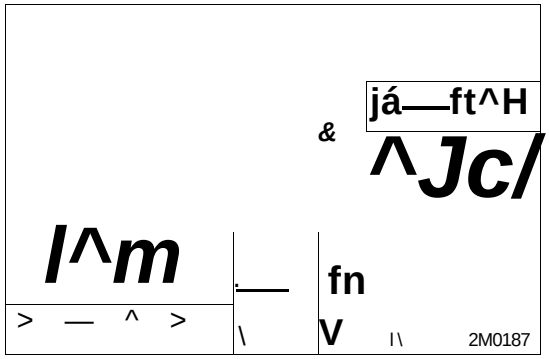
SST 09307-12010





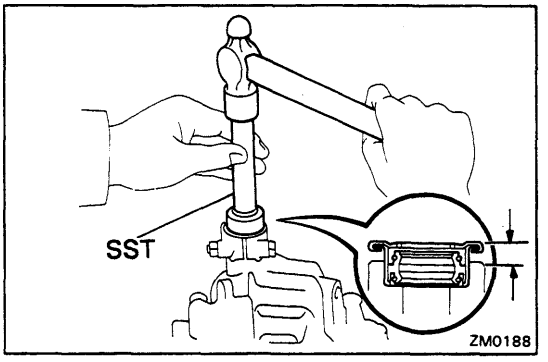
(d) Using SST and a hammer, tap in a new oil seal until it's surface is flush with the extensión housing edge.

SST 09325-12010



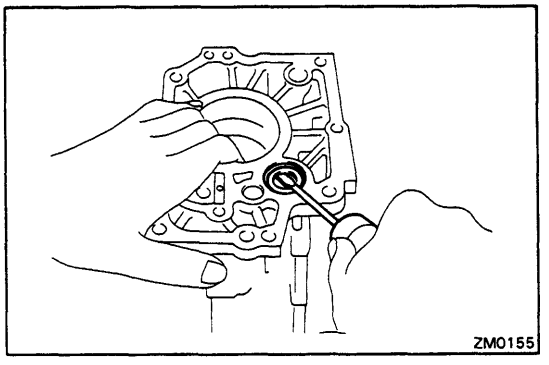
13. (Z45, 46, 53)
REPLACE EXTENSIÓN HOUSING OIL SEAL

(a) Using a screwdriver, pry out the oil seal.



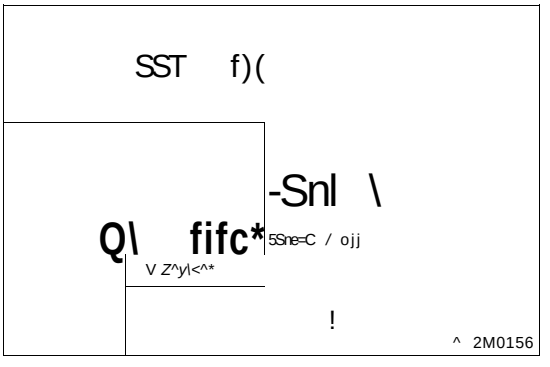
(b) Using SST and a hammer, tap in a new oil until 4.7 - 5.7 mm (0.185 - 0.224 in.) of it is left protruding from the extensión housing.

SST 09304-30012



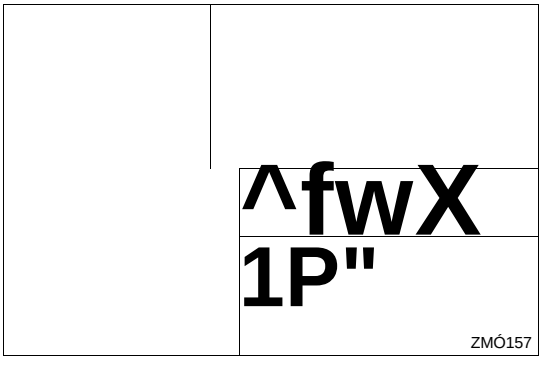
14. (Z54F)
REPLACE SELECT LEVER OIL SEAL

(a) Using a screwdriver, pry out the oil seal.



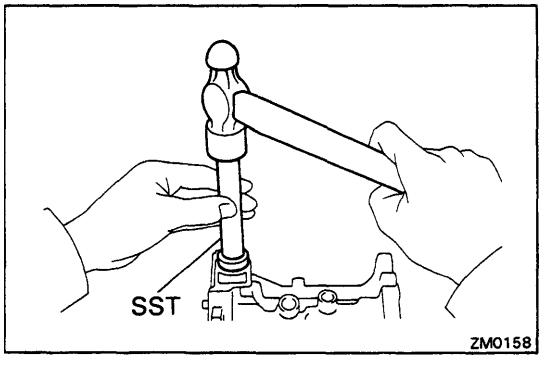
(b) Using SST and a hammer, tap in a new oil seal until it's surface is flush with the extensión housing edge.

SST 09304-30012



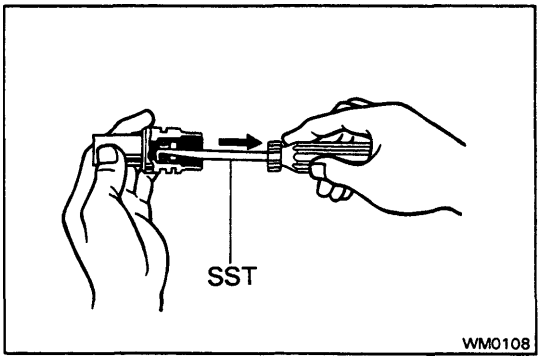
15. (Z54F)
REPLACE OIL SEAL OF TRANSFER SHIFT LEVER

(a) Using a screwdriver, pry out the oil seal.



(b) Using SST and a hammer, tap in a new oil seal until it's surface is flush with the transfer adaptor edge.

SST 09304-12012



16. REPLACE SPEEDOMETER DRIVEN GEAR OIL SEAL

(a) Using SST, pulí out the oil seal.

SST 09921-00010

(b) Using SST and a hammer, tap in a new oil seal to a depth of 20 mm (0.79 in.) from the sieeve edge.

SST 09201-60011