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.

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.

1985 TOYOTA TERCEL REPAIR MANUAL

INTRODUCTION IN
MAINTENANCE MA
ENGINE MECHANICAL EM
EMISSION CONTROL SYSTEM EC
FUEL SYSTEM FU
COOLING SYSTEM CO
LUBRICATION SYSTEM LU
IGNITION SYSTEM IG
STARTING SYSTEM ST
CHARGING SYSTEM CH
CLUTCH CL
MANUAL TRANSAXLE MT
AUTOMATIC TRANSAXLE AT
PROPELLER SHAFT PR
FRONT AXLE AND SUSPENSION FA
REAR AXLE AND SUSPENSION RA
BRAKE SYSTEM BR
STEERING SR
BODY ELECTRICAL SYSTEM BE
BODY BO
AIR CONDITIONING SYSTEM AC
SERVICE SPECIFICATIONS A
STANDARD BOLT TORQUE SPECIFICATIONS B
SST AND SSM C
AUTOMATIC TRANSMISSION HYDRAULIC CIRCUIT D
ELECTRICAL WIRING DIAGRAMS E

INTRODUCTION

	Page
HOW TO USE THIS MANUAL	IN-2
IDENTIFICATION INFORMATION	IN-4
GENERAL REPAIR INSTRUCTIONS	IN-4
PRECAUTIONS FOR VEHICLES EQUIPPED WITH CATALYTIC CONVERTER	IN-6
VEHICLE LIFT AND SUPPORT LOCATIONS	IN-7
ABBREVIATIONS USED IN THIS MANUAL	IN-8

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.

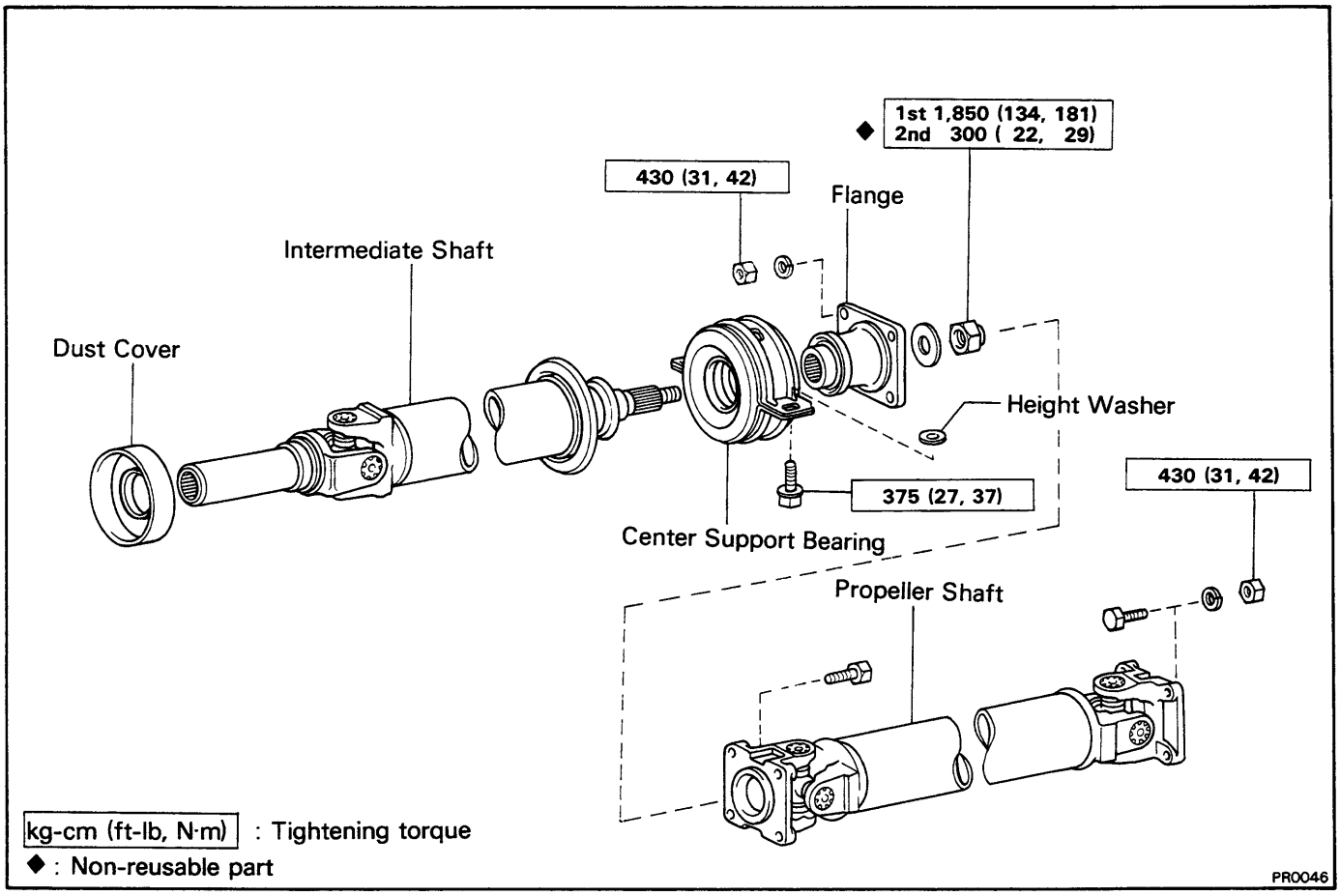
At the beginning of each section, **PRECAUTIONS** are given that pertain to *all* repair operations contained in that section. ***Read these precautions before starting any repair task.***

TROUBLESHOOTING 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.

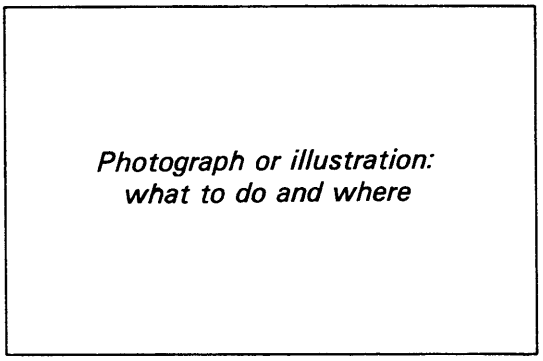
Example:



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

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

Example:



Task heading: what to do

CONNECT PROPELLER SHAFT FLANGE TO COMPANION FLANGE ON DIFFERENTIAL

(a) Align the marks on the flanges and connect the them with the four bolts and nuts.

Detailed text: how to do it

(b) Torque the nuts.

Torque: 430 kg-cm (31 ft-lb, 42 N·m)

Specification

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

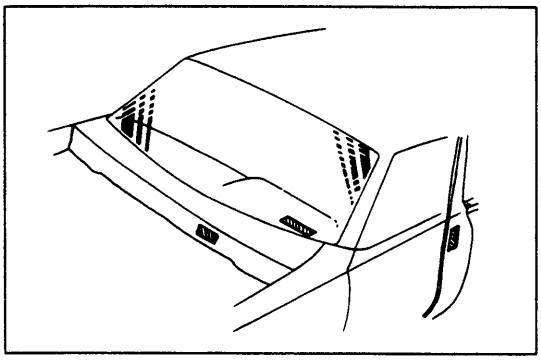
References have been kept to a minimum. However, when they are required you are given the *page* to go to.

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:

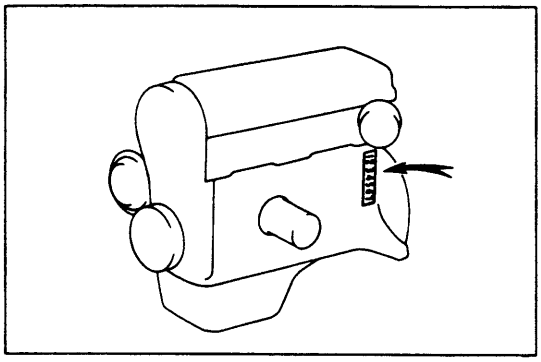
- WARNINGS are presented in bold type, and indicate there is a possibility of injury to you or other people.
- CAUTIONS are also presented in bold type, and indicate the possibility of damage to the components being repaired.
- NOTES are separated from the text but do not appear in bold. They provide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

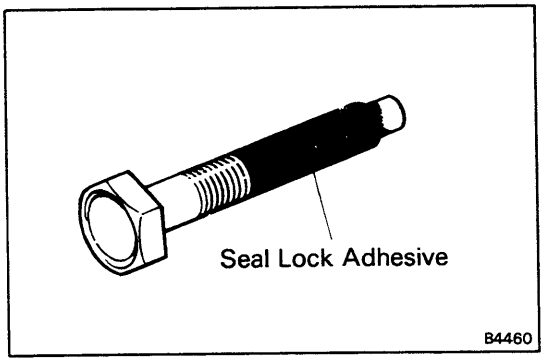


ENGINE SERIAL NUMBER

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 facilitate 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 loose, 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 seals etc. With new ones.
   (b) Non-reusable parts are indicated in the component illustrations by the symbol "◆".



6. 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

      (1) Clean off the old 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.

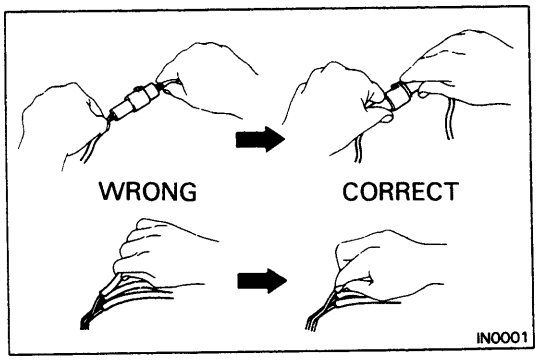
9. Use of special service tools (SST) and special service materials (SSM) may be required, depending on the nature of the repair. Be sure to use SST and SSM where specified and follow the proper work procedure. A list of SST and SSM can be found at the back of this manual.

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, pull on the end, not the middle of the hose.

    (b) To pull apart electrical connectors, pull 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 cleaning an engine, protect the IIA, air filter, and VCV from water.

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

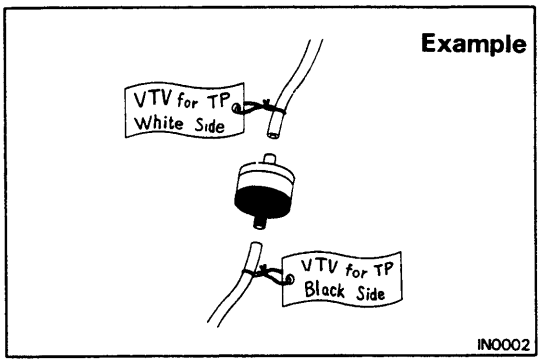
(f) When checking continuity at the wire connector, insert the tester probe carefully to prevent terminals from bending.

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

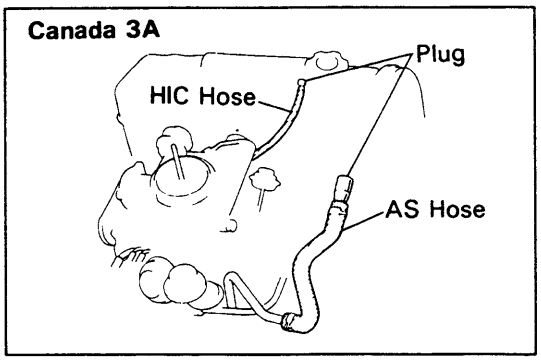
13. Tag hoses before disconnecting them:

(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.



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 create 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 idle speed for more than 10 minutes and at idle 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.**

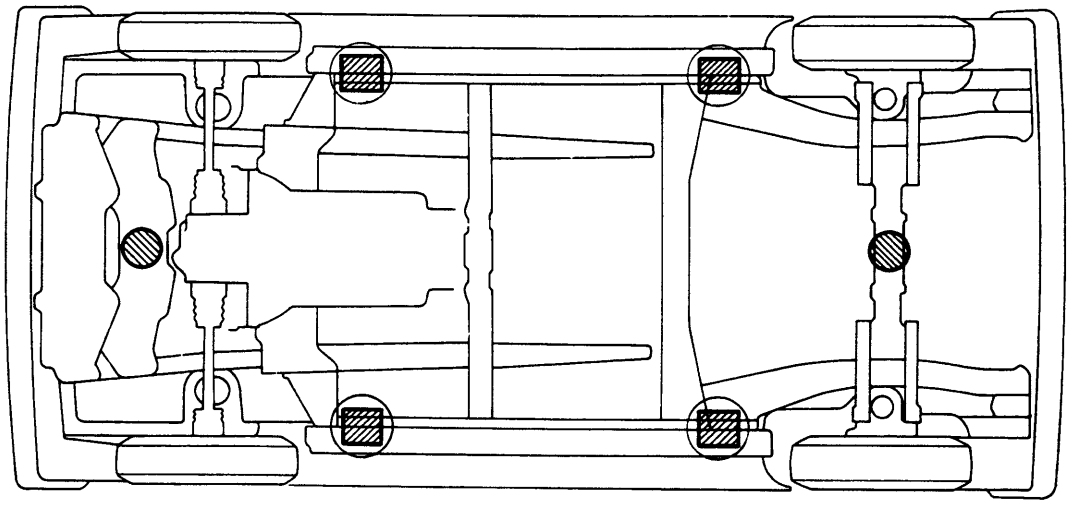
   This may cause the engine to misfire and create an extra load on the converter.

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.**

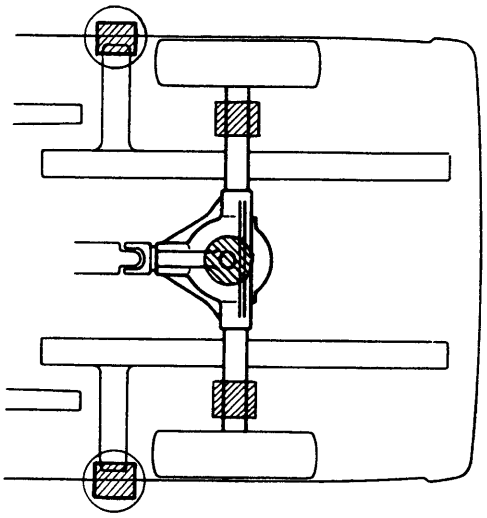
VEHICLE LIFT AND SUPPORT LOCATIONS

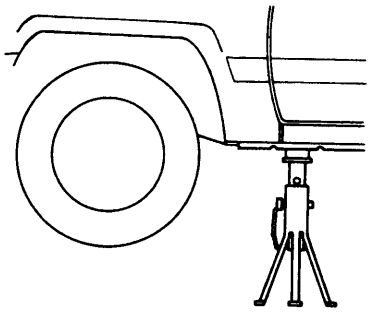
FWD

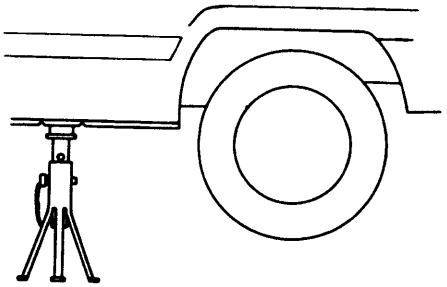


4WD

Front ⬅







JACK POSITION ——— ⬤

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

PANTOGRAPH JACK POSITION ——— ○

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
IIA	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

	Page
MAINTENANCE SCHEDULE	MA-2
MAINTENANCE OPERATIONS	MA-4
GENERAL MAINTENANCE	MA-19

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 lubricate;
I = Inspect and correct or replace if necessary

NORMAL CONDITION SCHEDULE

System	Service interval (Odometer reading or 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(item 14)
	Drive belts(1)	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(item 7)
	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(item 16)
	Choke system ★*					I				I	MA-8(item 13)
	Throttle positioner system *	3A-C engine(3)		A							MA-11(item 17)
		3A engine		I		I		I		I	MA-12(item 18)
	Air filter★*					R				R	MA-5(item 4)
	Fuel line and connections					I				I	MA-7(item 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	
EVAP	Charcoal canister									I	MA-6(item 9)
BRAKES	Brake lining and drums					I				I	MA-13(item 20)
	Brake pads and discs			I		I		I		I	MA-13(item 21)
	Brake line pipes and hoses			I		I		I		I	MA-13(item 19)
CHASSIS	Steering linkage			I		I		I		I	MA-14(item 22)
	Drive shaft boots			I		I		I		I	MA-14(item 24)
	Ball joints and dust covers			I		I		I		I	MA-14(item 25)
	Automatic transmission, manual transmission, differential and steering gear housing oil			I		I		I		I	MA-14(item 23) MA-15(item 26)
	Rear wheel bearing grease (ex. wagon)(4)							R			MA-17(item 30)
	Bolts and nuts on chassis and body			I				I			MA-17(item 31)

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

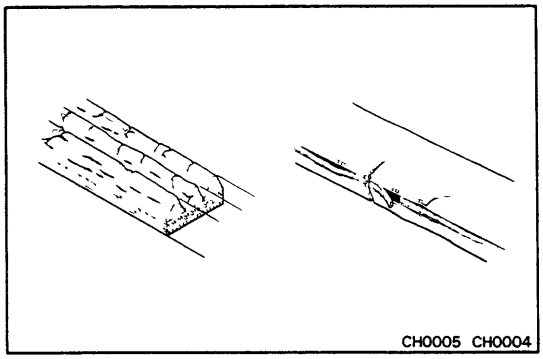
SEVERE CONDITION SCHEDULE

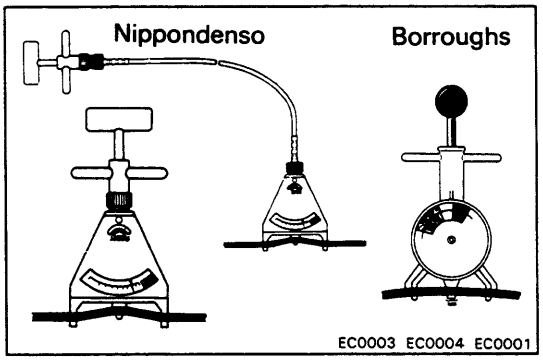
System	Service interval (Odometer reading or months, whichever comes first) / Maintenance items	Maintenance services beyond 60,000 miles (96,000 km) should be performed at the same intervals shown in each maintenance schedule.																See page (item No.)
		Miles x 1,000	5	7.5	10	15	20	22.5	25	30	35	37.5	40	45	50	52.5	55	60	
		Km x 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 belts(1) V-ribbed belt (Alternator)																	I	MA-4(item 1)
	Drive belts(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 coolant(2)																	R	MA-6(item 8)
	Exhaust pipes and mountings				I				I				I					I	MA-8(item 12)
FUEL	Idle speed and fast idle speed * 3A-C engine(3)				A														MA-9(item 15)
	Idle speed and fast idle speed * 3A engine				A				A				A					A	MA-10(item 16)
	Choke system ★*								I									I	MA-8(item 13)
	Throttle positioner system * 3A-C engine(3)				A														MA-11(item 17)
	Throttle positioner system * 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(item 3,4)
	Fuel line and connections								I									I	MA-7(item 11)
	Fuel filler cap gasket																	R	MA-7(item 10)
IGNITION	Spark plugs 3A-C engine ★*								R									R	MA-5(item 5)
	Spark plugs 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				I				I				I					I	MA-13(item 20)
	Brake pads and discs		I		I		I		I		I		I		I			I	MA-13(item 21)
	Brake line pipes and hoses				I				I				I					I	MA-13(item 19)
CHASSIS	Steering linkage(7)		I		I		I		I		I		I		I			I	MA-14(item 22)
	Drive shaft boots		I		I		I		I		I		I		I			I	MA-14(item 24)
	Ball joints and dust covers		I		I		I		I		I		I		I			I	MA-14(item 25)
	Automatic transmission, manual transmission, differential and steering gear housing (8) oil				R				R				R					R	MA-14(item 23) MA-15(item 27) MA-16(item 28) MA-16(item 29)
	Rear wheel bearing grease (ex. wagon)(5)												R						MA-17(item 30)
	Bolts and nuts on chassis and body(7)				I				I				I					I	MA-17(item 31)

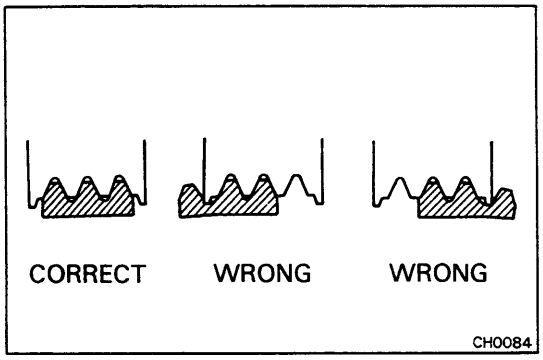
Maintenance services indicated by a star (★) or asterisk (*) are required under the terms of the Emission Control Systems Warranty. See Owner's Guide for complete warranty information.

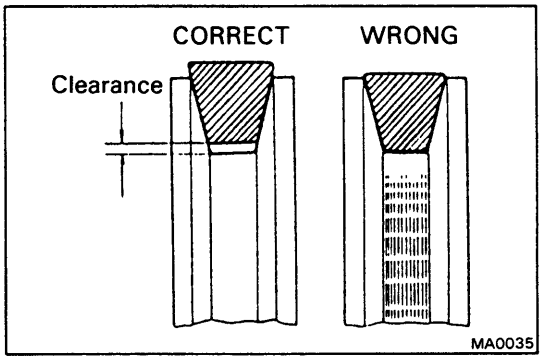
★ For vehicles sold in California
* For vehicles sold outside California

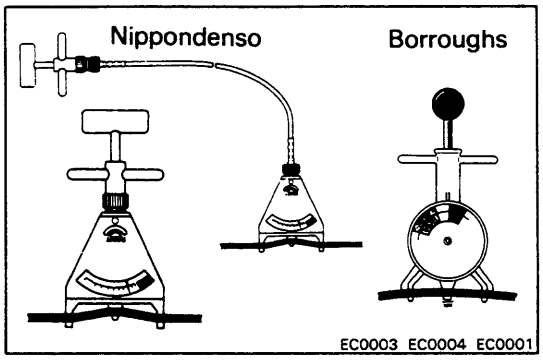
NOTE:
(1) After 60,000 miles (96,000 km) or 72 months, inspect every 10,000 miles (16,000 km) or 12 months.
(2) After 60,000 miles (96,000 km) or 72 months, replace every 30,000 miles (48,000 km) or 36 months.
(3) After 15,000 miles (24,000 km) or 18 months, adjustment is not necessary.
(4) In areas 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, torn or worn ribs or cracks in the inner ridges of the ribs.

If necessary, replace the drive belt.

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

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

Drive belt tension: Used belt 80 ± 20 lb
New belt 125 ± 25 lb

If necessary, adjust the drive belt tension.

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.

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.

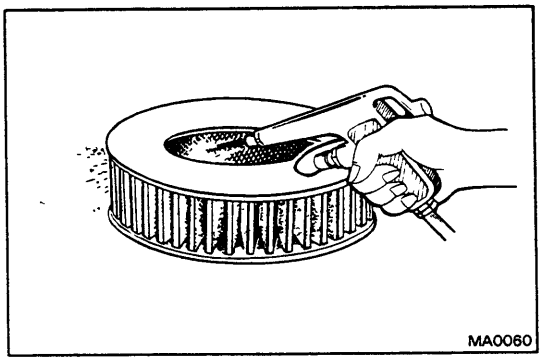
If necessary, replace the drive belt.

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

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

Drive belt tension: Used belt 80 ± 20 lb
New belt 125 ± 25 lb

If necessary, adjust the drive belt tension.



3. INSPECT AIR FILTER

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

NOTE: Oiliness may indicate a stuck PCV valve.

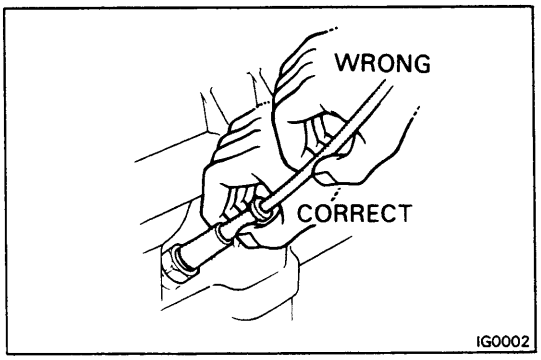
If necessary, replace the air cleaner element.

(b) Clean the element with compressed air.

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

4. REPLACE AIR FILTER

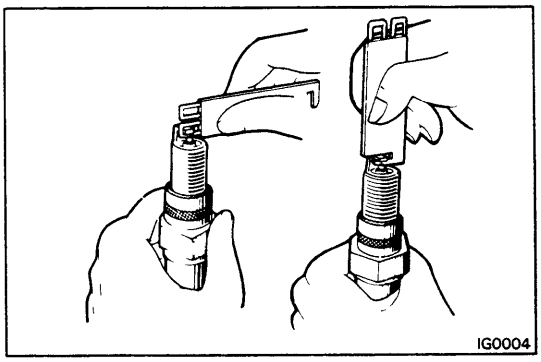
Replace the used air cleaner element with a new one.



5. REPLACE SPARK PLUGS

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

(b) Remove the spark plugs.



(c) Set the gap on the new plugs.

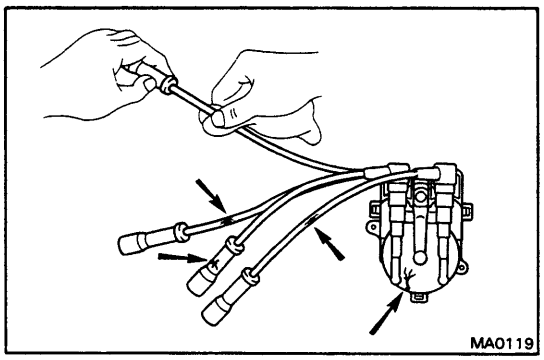
Gap: 3A-C (ex. Canada Wagon M/T)
1.1 mm (0.043 in.)
3A & 3A-C (for Canada Wagon M/T)
0.8 mm (0.031 in.)

Recommended spark plugs:

Federal
ND W14EXR-U11 or W16EXR-U11
NGK BPR4EY11 or BPR5EY11

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

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


MA0119

6. INSPECT IGNITION WIRING AND DISTRIBUTOR (IIA) CAP

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

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

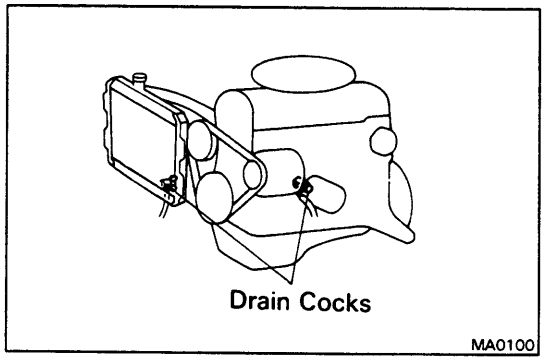
(c) Visually inspect the wiring for cracks or damage.

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

NOTE: In areas 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
MA0100

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.)

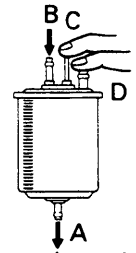
(b) Close the drain cocks.

(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 manufacturer's instructions.

3A-C Engine (Ex. Canada Wagon M/T)



Air should flow through freely and no charcoal should come out.
EC1124

9. INSPECT CHARCOAL CANISTER

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

(b) Plug pipe C and D (ex. Canada Wagon M/T) with your fingers and blow compressed air (3 kg/cm², 43 psi or 294 kPa) through pipe B (fuel tank side).

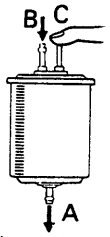
- Check that air comes out of the bottom pipe A without resistance.
- Check that no activated charcoal comes out.

If necessary, replace the charcoal canister.

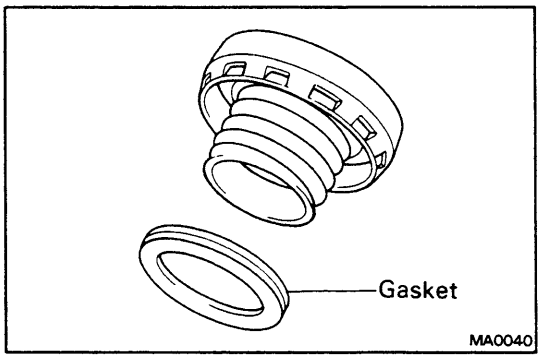
NOTE: Do not attempt to wash the charcoal.

(c) Connect the hoses to the charcoal canister.

3A & 3A-C (Canada Wagon M/T only) Engine



Air should flow through freely and no charcoal should come out.
EC1109



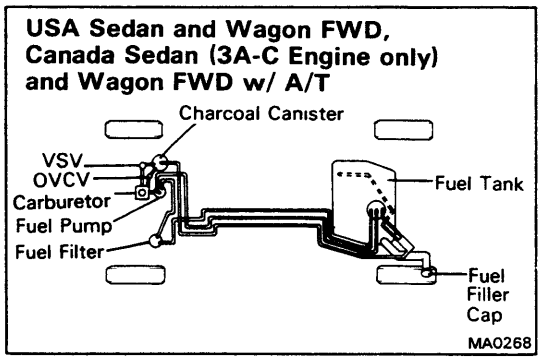
10. REPLACE GASKET IN FUEL FILLER CAP

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

(b) Install the new gasket by hand.

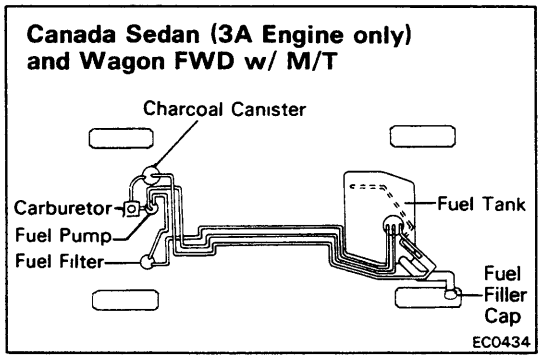
(c) Inspect the cap for damage or cracks.

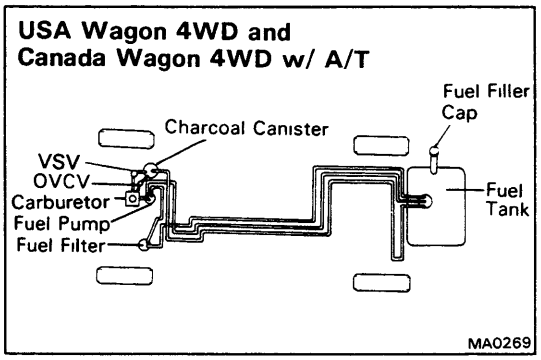
(d) Install the cap and check the torque limiter.

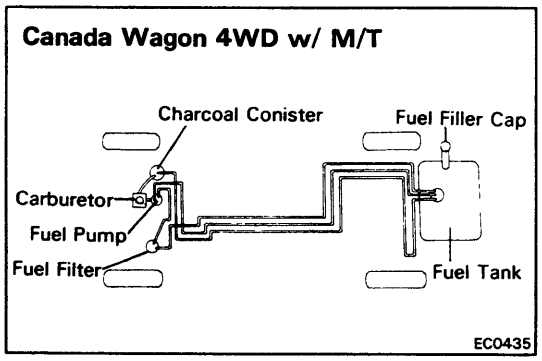


11. INSPECT FUEL LINES AND CONNECTIONS

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







12. INSPECT EXHAUST PIPES AND MOUNTINGS

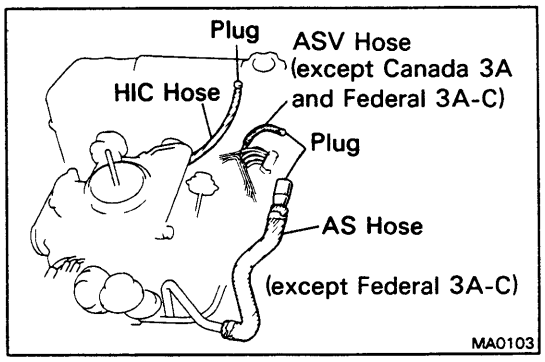
Visually inspect the pipes, hangers and connections for severe corrosion, leaks or damage.

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.



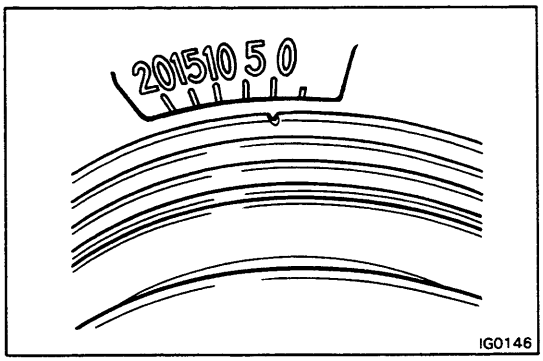
Hot Engine Operations

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.

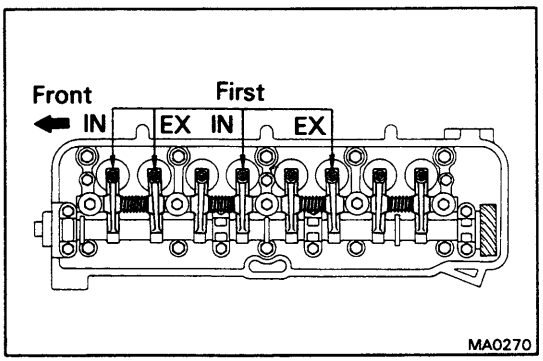
(b) Stop the engine and remove the valve cover.



(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 loose and rockers on No. 4 are tight.

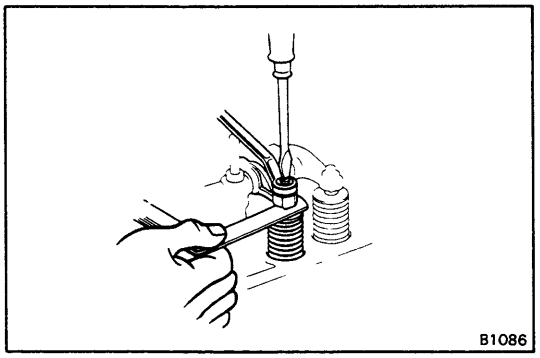
If not, turn the crankshaft one complete revolution and align marks as above.



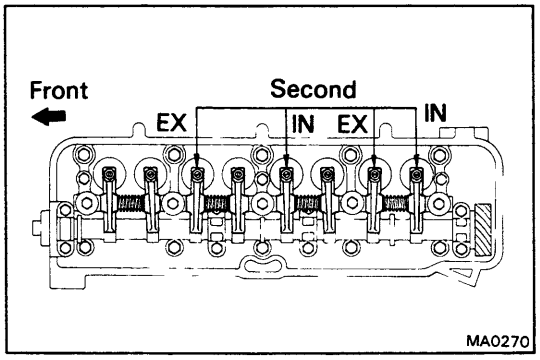
(d) Adjust the clearance of half of the valves.

- 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 turn the adjusting screw to set the proper clearance. Hold the adjusting screw in position and tighten the lock nut.
- Reckeck the clearance. The feeler gauge should move with a very slight drag.



(e) Turn the crankshaft one complete revolution (360°) and align timing marks in the manner mentioned above. Adjust only the valves indicated by arrows.

(f) Reinstall the valve cover.

(g) Reinstall the air cleaner.

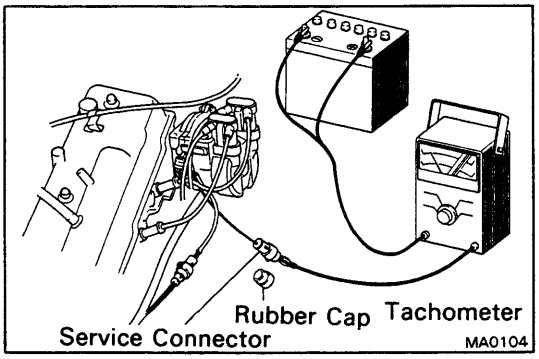
15. ADJUST IDLE SPEED

(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 idling at normal operating temperature
- Engine cooling fan OFF

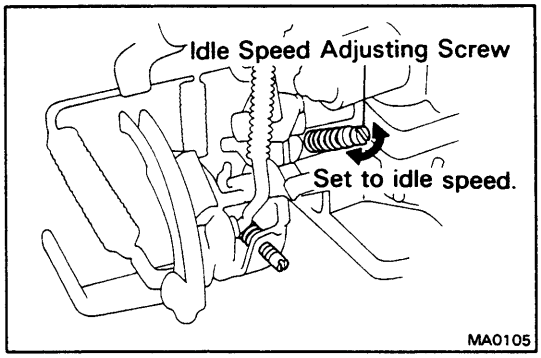
(b) Connect a tachometer to the engine.

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



CAUTION:

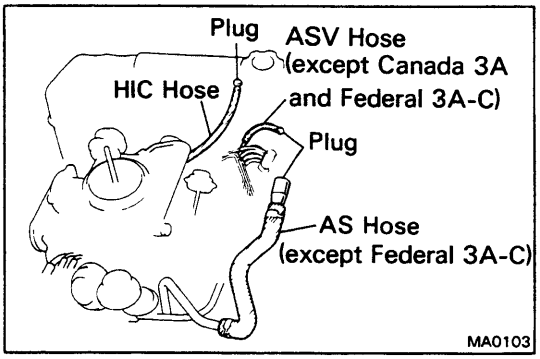
1. **NEVER allow the ignition coil terminals to touch ground as it could result in damage to the igniter and/or ignition coil.**
2. **As some tachometers are not compatible with this ignition system, it is recommended that you consult with the manufacturer.**



(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**

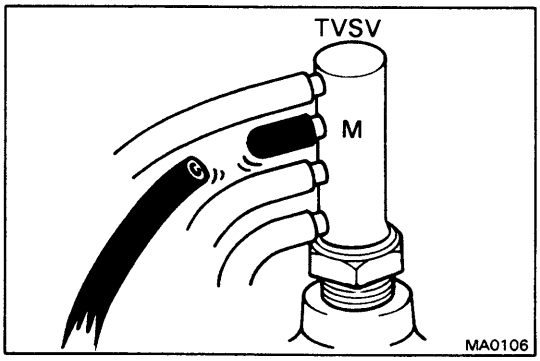
NOTE:
- Make adjustments with the engine cooling fan OFF.
- Leave tachometer connected for further adjustments.



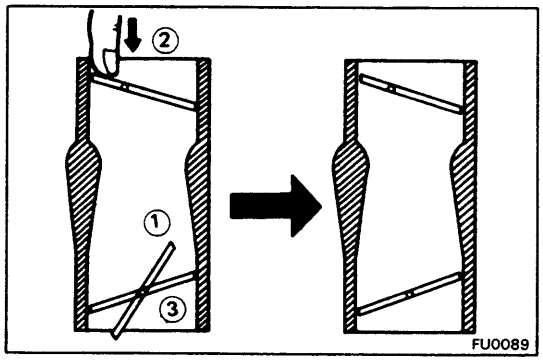
16. ADJUST FAST IDLE SPEED

(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.

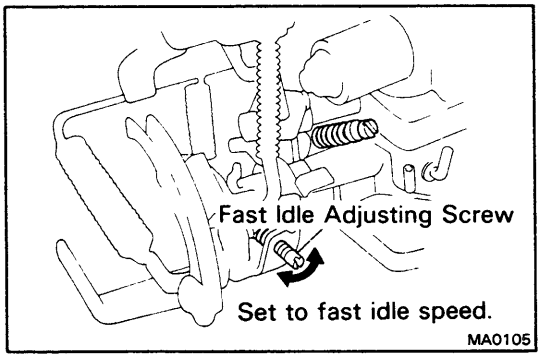


(c) Disconnect the hose from the TVSV M port and plug the M port.
This will shut off the choke opener and EGR systems.



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

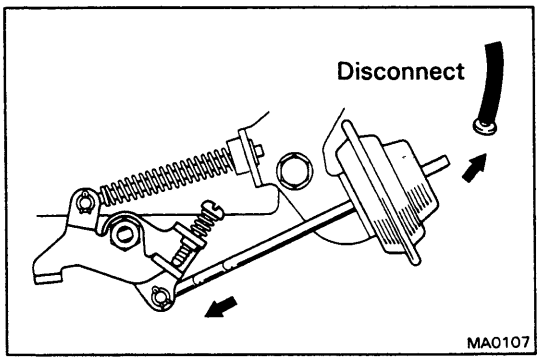
(e) Start the engine, but do NOT touch the accelerator pedal.



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

Fast idle speed: 3,000 rpm

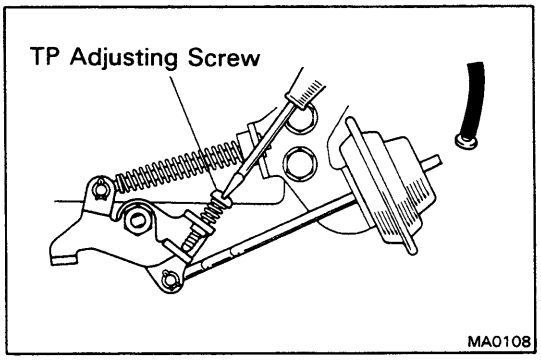
NOTE:
- Make adjustments with the engine cooling fan OFF.
- Leave the tachometer connected for further adjustment.



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

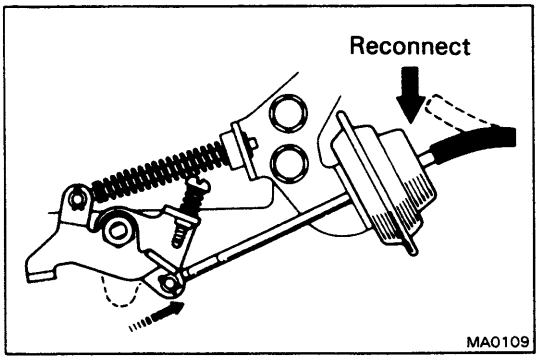
(a) Preparation
- Air cleaner removed
- Choke opener and EGR systems OFF

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



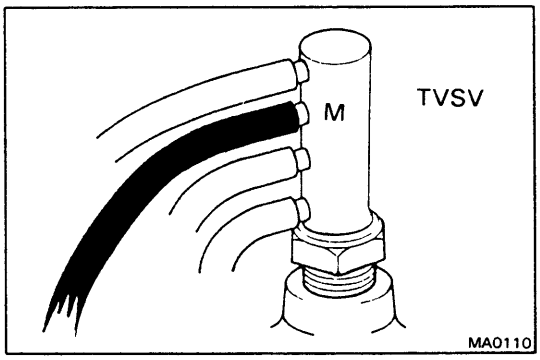
(c) Set the TP setting speed by turning the TP adjusting screw.

TP setting speed: 1,400 rpm



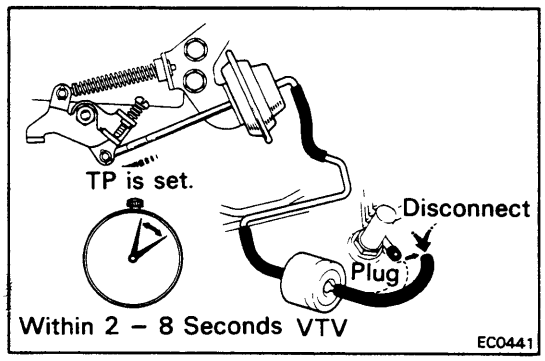
(d) Reconnect the hose to the TP diaphragm. Check that the engine speed slowly returns to idle speed.

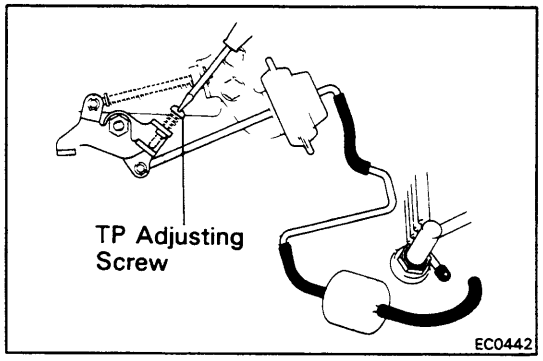
(e) Stop the engine and remove the tachometer.

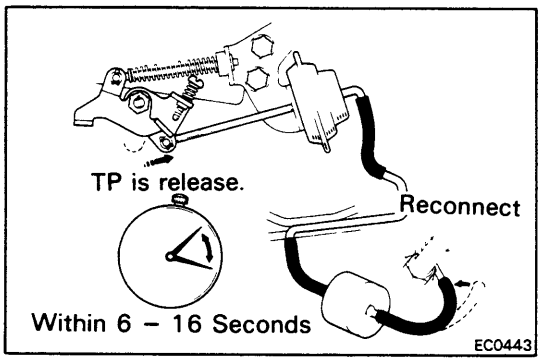


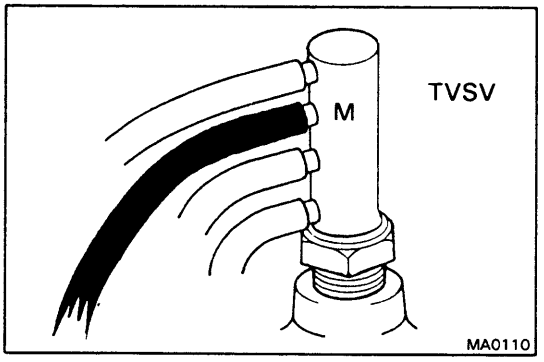
(f) Reconnect the hose to the TVSV M port.

(g) Reinstall the air cleaner.









18. CANADA 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, turn the TP adjusting screw until the specified rpm is reached.

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

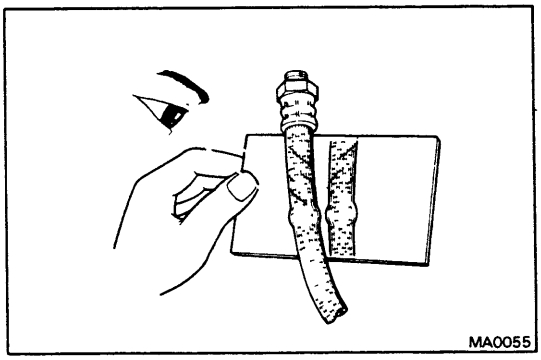
(f) Check that the engine returns to idle speed within 6 – 16 seconds after reconnecting the hose.

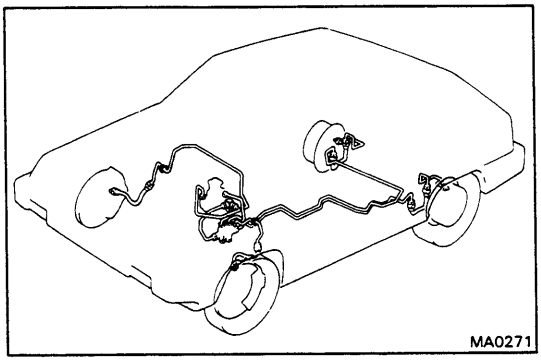
If a problem is found, check the TP diaphragm, linkage and VTV.

(g) Stop the engine and remove the tachometer.

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

(i) Reinstall the air cleaner.


MA0055


MA0271

BRAKES

19. INSPECT BRAKE LINE PIPES AND HOSES

NOTE: Inspect in a well lighted area. 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.

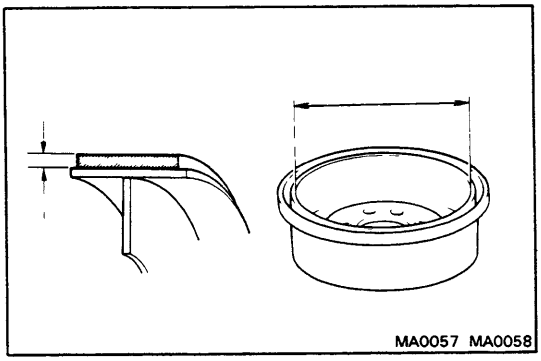
(a) Check all brake lines and hoses for:

- Damage
- Wear
- Deformation
- Cracks
- Corrosion
- 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.


MA0057 MA0058

20. INSPECT REAR BRAKE LININGS AND DRUMS (See page BR-22, 29 or 36)

(a) Check the linings for wear.

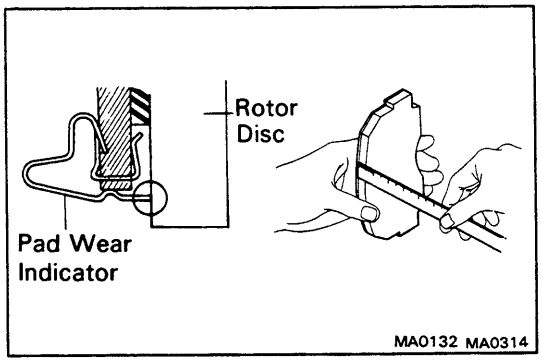
Minimum lining thickness: 1.0 mm (0.039 in.)

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

Maximum drum inside diameter:
181.0 mm (7.126 in.) – Sedan
201.0 mm (7.913 in.) – Wagon

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

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



MA0132 MA0314

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

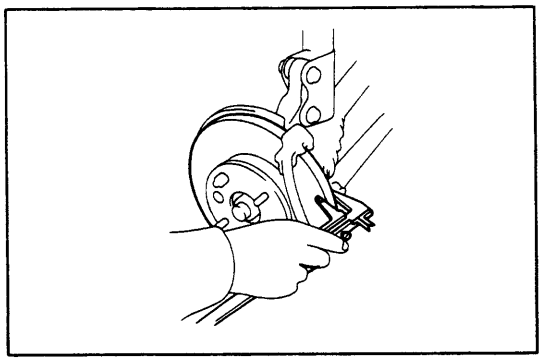
(a) Check the thickness of the disc brake pads and check for irregular wear.

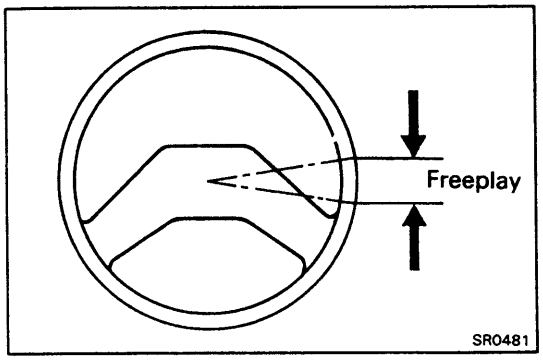
Minimum pad thickness: 1.0 mm (0.039 in.)

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.

Minimum disc thickness: 10.0 mm (0.394 in.)
Maximum disc runout: 0.15 mm (0.0059 in.)





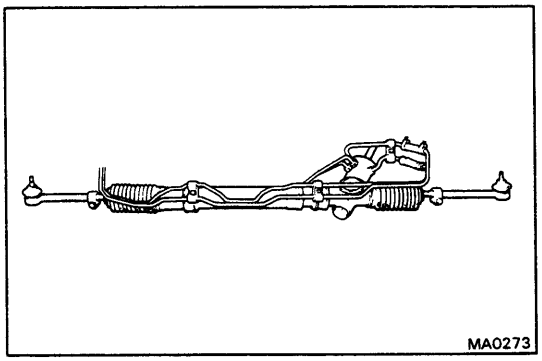
CHASSIS

22. INSPECT STEERING LINKAGE

(a) Check that the steering wheel freeplay.

Maximum 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.



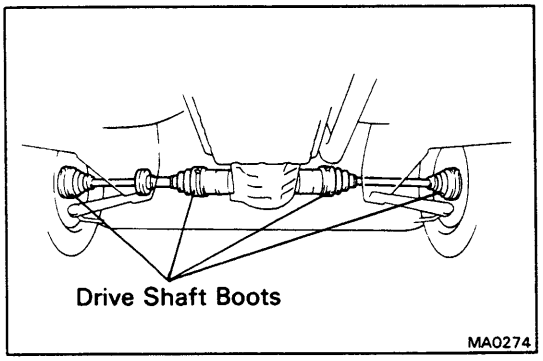
(b) Check the steering linkage for looseness and damage.

Check that:

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

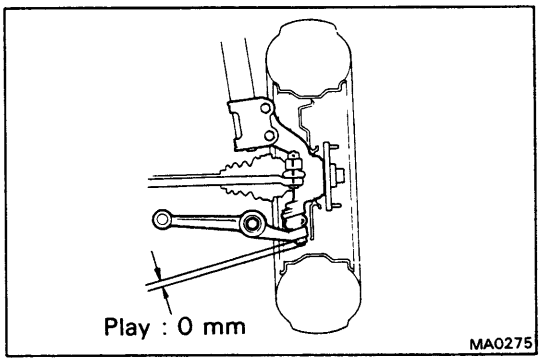
23. INSPECT STEERING GEAR HOUSING OIL

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

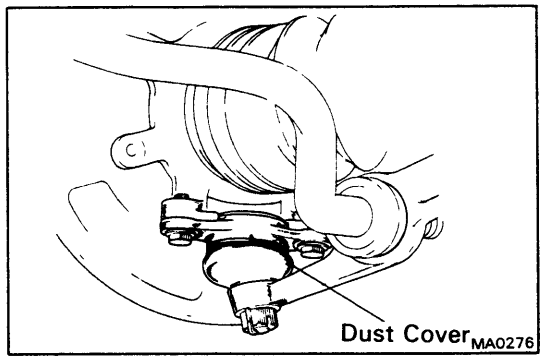
(a) Inspect the ball joints for excessive looseness.

- 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.

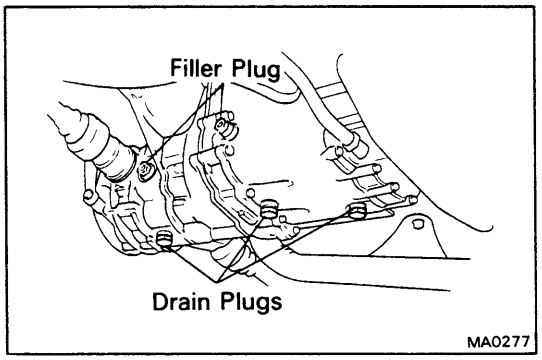
(b) Inspect the dust cover for damage.



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.

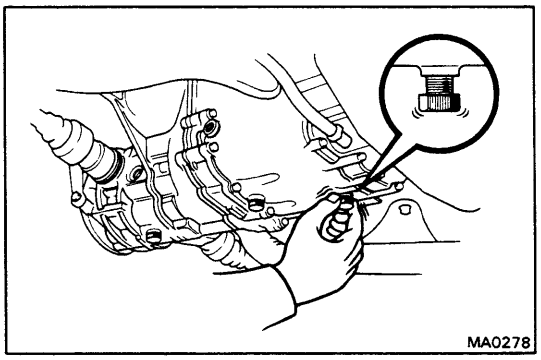


27. REPLACE MANUAL TRANSMISSION AND DIFFERENTIAL OIL

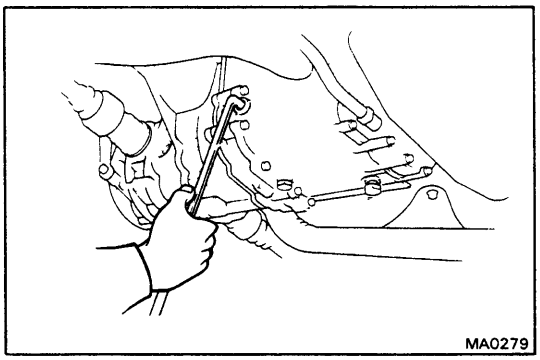
A. FWD

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

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



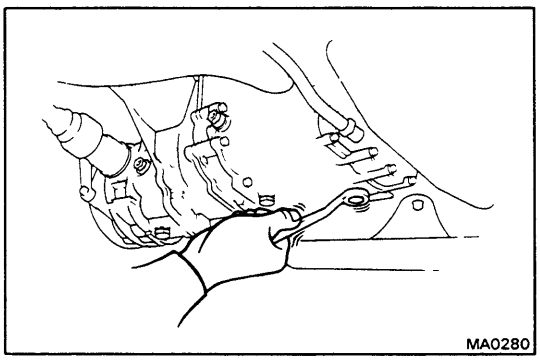
(c) Leave the extension housing drain plug loose about 7 or 8 turns.



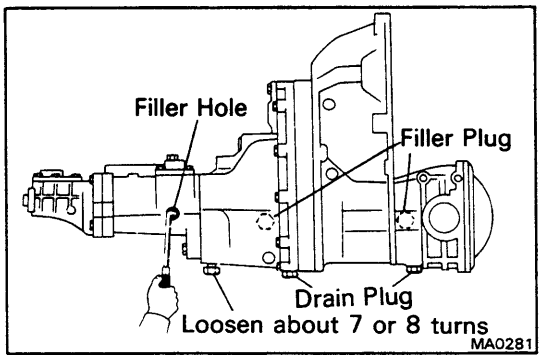
(d) Add new oil until it begins to run out of the filler holes.

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)

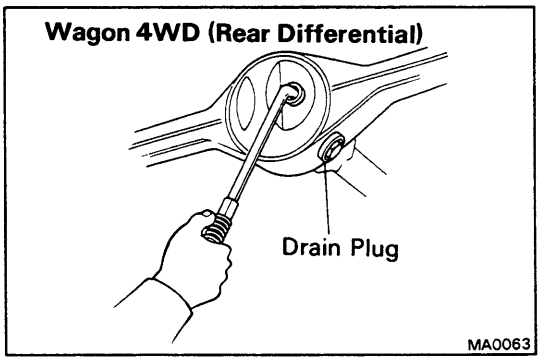


(e) Tighten the extension housing drain plug securely.



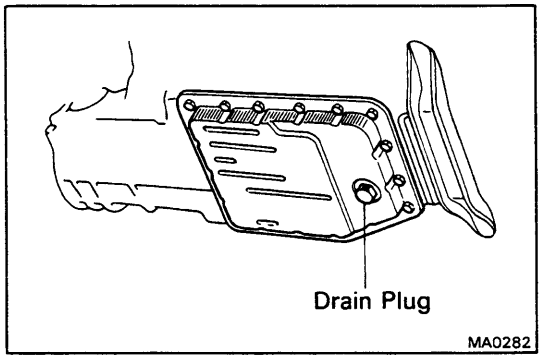
B. For Wagon 4WD with M/T

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)



28. REPLACE REAR DIFFERENTIAL OIL (for Wagon 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)



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.

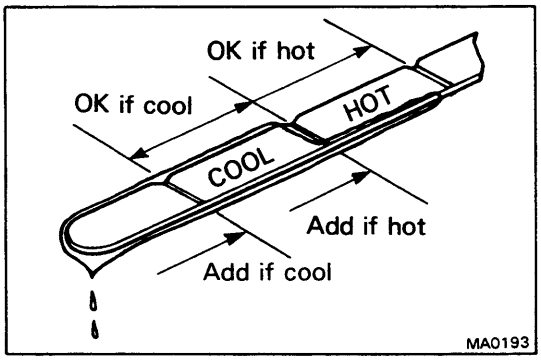
(c) With the engine OFF, add new fluid through the dipstick tube.

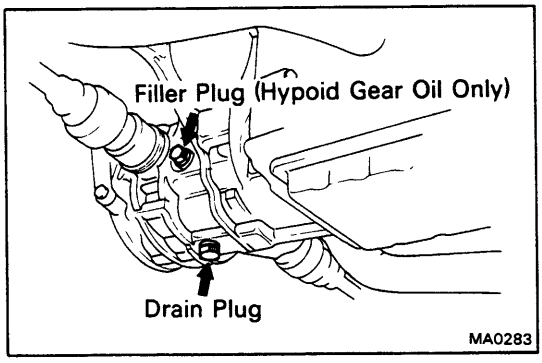
A/T fluid: ATF DEXRON II
Drain and refill capacity:
A55 2.2 liters (2.3 US qts, 1.9 Imp. qts)
A55F 4.2 liters (4.4 US qts, 3.7 Imp. qts)
Dry fill capacity:
A55 4.5 liters (4.8 US qts, 4.0 Imp. qts)
A55F 6.5 liters (6.9 US qts, 5.7 Imp. qts)

(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 separate 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.

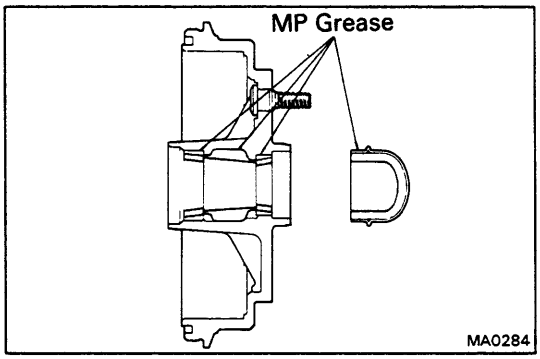
(c) Add new oil until it begins to run out of the filler hole.

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 separate units. Do not attempt to replenish differential oil by way of the transmission filler tube.

30. REPACK REAR WHEEL BEARINGS (ex. Wagon)



(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.

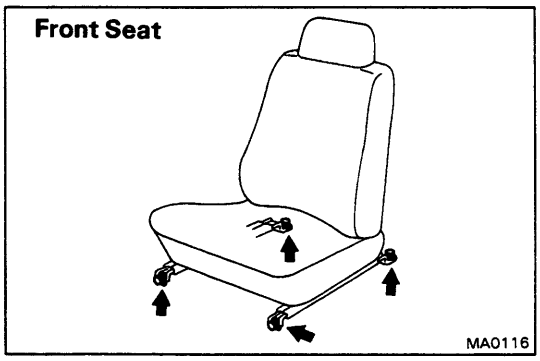
(c) Install the hub and adjust the wheel bearing preload. (See pages RA-5 to 11)

31. TIGHTEN BOLTS AND NUTS ON CHASSIS AND BODY

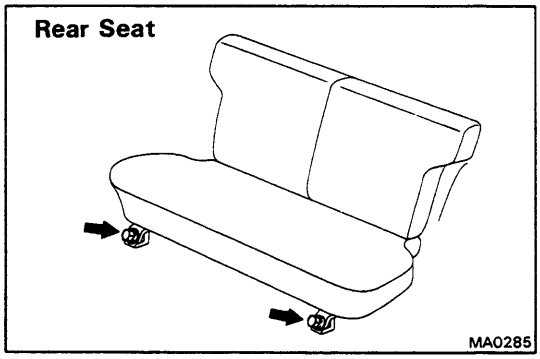
Tighten the following parts:

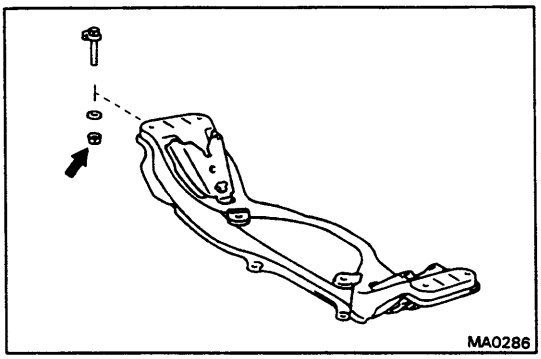
- Front and rear seats mounting bolts and nuts

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



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





- Front suspension 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 operate properly
  Doors close 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 pull to one side.
- Check that the brakes work properly and do not drag.

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

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

GENERAL MAINTENANCE

These are the maintenance and inspection items 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.
Items 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 underneath 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 operate 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. operate 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 operate properly and smoothly.

(b) Check that the belt webbing is not cut, frayed, worn 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 pull 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 release 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 loose 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) Pull 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 loose 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

	Page
TROUBLESHOOTING	EM-2
ENGINE TUNE-UP	EM-4
IDLE HC/CO CONCENTRATION CHECK METHOD	EM-5
COMPRESSION CHECK	EM-6
TIMING BELT	EM-7
CYLINDER HEAD	EM-14
CYLINDER BLOCK	EM-36

TROUBLESHOOTING

Problem	Possible cause	Remedy	Page
Engine overheats	Cooling system faulty	Troubleshoot cooling system	CO-2
	Incorrect ignition timing	Reset timing	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	Check fuel line	
	Carburetor problems	Troubleshoot fuel system	FU-2
	Ignition problems	Troubleshoot ignition system	IG-2
	Vacuum leaks ● HIC line ● PCV line ● EGR line ● MC line ● Intake manifold	Repair as necessary	
	Compression low	Check compression	EM-6
	Feed back system problems	Check air bleed feed back system	EM-32
Rough idle or stalls	Vacuum leaks ● PCV line ● MC line ● EGR line ● Intake manifold ● HAC line	Repair as necessary	
	Ignition problems	Troubleshoot ignition system	IG-2
	Carburetor problems	Troubleshoot fuel system	FU-3
	HAI system faulty	Check HAI system	EC-43
	Engine overheats	Troubleshoot cooling system	CO-2
	EGR valve faulty	Check EGR valve	EC-20
	Incorrect valve clearance	Adjust valve clearance	EM-35
	Compression low	Check compression	EM-6
	Feed back system problems	Check air bleed feed back system	EC-32
Engine hesitates/ Poor acceleration	Ignition problems	Troubleshoot ignition system	IG-2
	Vacuum leaks ● HIC line ● PCV line ● EGR line ● HAC line ● Intake manifold ● Carburetor hoses	Repair as necessary	
	Air cleaner clogged	Check air filter	MA-5
	Fuel line clogged	Check fuel line	
	Carburetor problems	Troubleshoot fuel system	FU-2
	Emission control system problem		
	● HAI system always on (hot engine)	Check HAI system	EC-43
	● AAP system faulty (cold engine)	Check AAP system	EC-54
	● EGR system always on (cold engine)	Check EGR system	EC-20
	● HAC system faulty	Check HAC system	EC-40
	● CMH system faulty (cold engine)	Check CMH system	EC-61

TROUBLESHOOTING (Cont'd)

Problem	Possible cause	Remedy	Page
	Engine overheats	Troubleshoot cooling system	CO-2
	Compression low	Check compression	EM-6
	Feed back system problem	Check air bleed feed back system	EC-32
Engine dieseling (runs after ignition switch is turned off)	Carburetor problems	Troubleshoot fuel system	FU-3
	Incorrect ignition timing	Reset timing	IG-13
Muffler explosion (after fire) on deceleration only	AS system faulty	Check AS system	EC-27
	TP system faulty	Check TP system	EC-15
	Deceleration fuel cut system alway off	Check fuel cut system	EC-56
Muffler explosion (after fire) all the time	Air cleaner clogged	Check air filter	MA-5
	Choke system faulty	Check choke system	EC-47
	Incorrect ignition timing	Reset timing	IG-13
	Incorrect valve clearance	Adjust valves	EM-35
Engine backfires	Choke valve open (cold engine)	Check choke system	EC-47
	Carburetor vacuum leak	Check hoses and repair as necessary	
	EBCV vacuum leak	Check air bleed with fleed back system	EC-32
	Insufficient fuel flow	Troubleshoot fuel system	FU-2
	Incorrect ignition timing	Reset timing	IG-13
	Incorrect valve clearance	Adjust valve clearance	EM-35
Excessive oil consumption	Oil leak	Repair as necessary	
	PCV line clogged	Check PCV system	EC-7
	Piston ring worn or damaged	Check rings	EM-47
	Valve stem worn	Check valves an guides	EM-22
	Valve stem oil seal worn or damaged	Check oil seal	
Poor fuel mileage	Fuel leak	Repair as necessary	
	Air cleaner clogged	Check air filter	MA-5
	Ignition problems	Troubleshoot ignition system	IG-2
	Carburetor problems	Troubleshoot fuel system	FU-2
	EGR system always on	Check EGR system	EC-20
	EVAP system problems	Check EVAP system	EC-9
	Compression low	Check compression	EM-6
	Tires improperly inflated	Inflate tires to proper pressure	FA-3
	Clutch slips	Troubleshoot clutch	CL-2
	Brakes drag	Troubleshoot brakes	BR-2
Unpleasant odor	Incorrect idle speed	Adjust idle speed	FU-25
	Incorrect ignition timing	Reset timing	IG-13
	Vacuum leaks ● PCV line ● EGR line ● MC line ● Intake manifold ● Carburetor hoses	Repair as necessary	
	AS system faulty	Check air bleed with feed back system	EC-27
	Feed back system proglems		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. Canada Wagon M/T)
   1.1 mm (0.043 in.)
   3A & 3A-C (Canada Wagon 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. **ADJUST IDLE 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 is 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 PROBE 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 filter 2. Plugged PCV valve 3. AS system problem 4. Faulty carburetor: ● Faulty choke action ● Incorrect float setting ● Leaking needle or seat

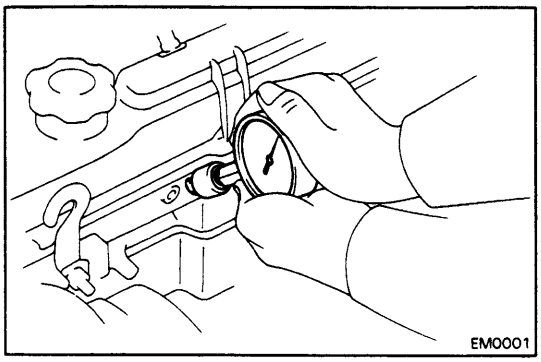
NOTE: If the HC/CO concentration cannot be corrected in accordance with this troubleshooting table, adjust the idle mixture.

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**



3. **MEASURE CYLINDER COMPRESSION PRESSURE**

(a) Insert 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.

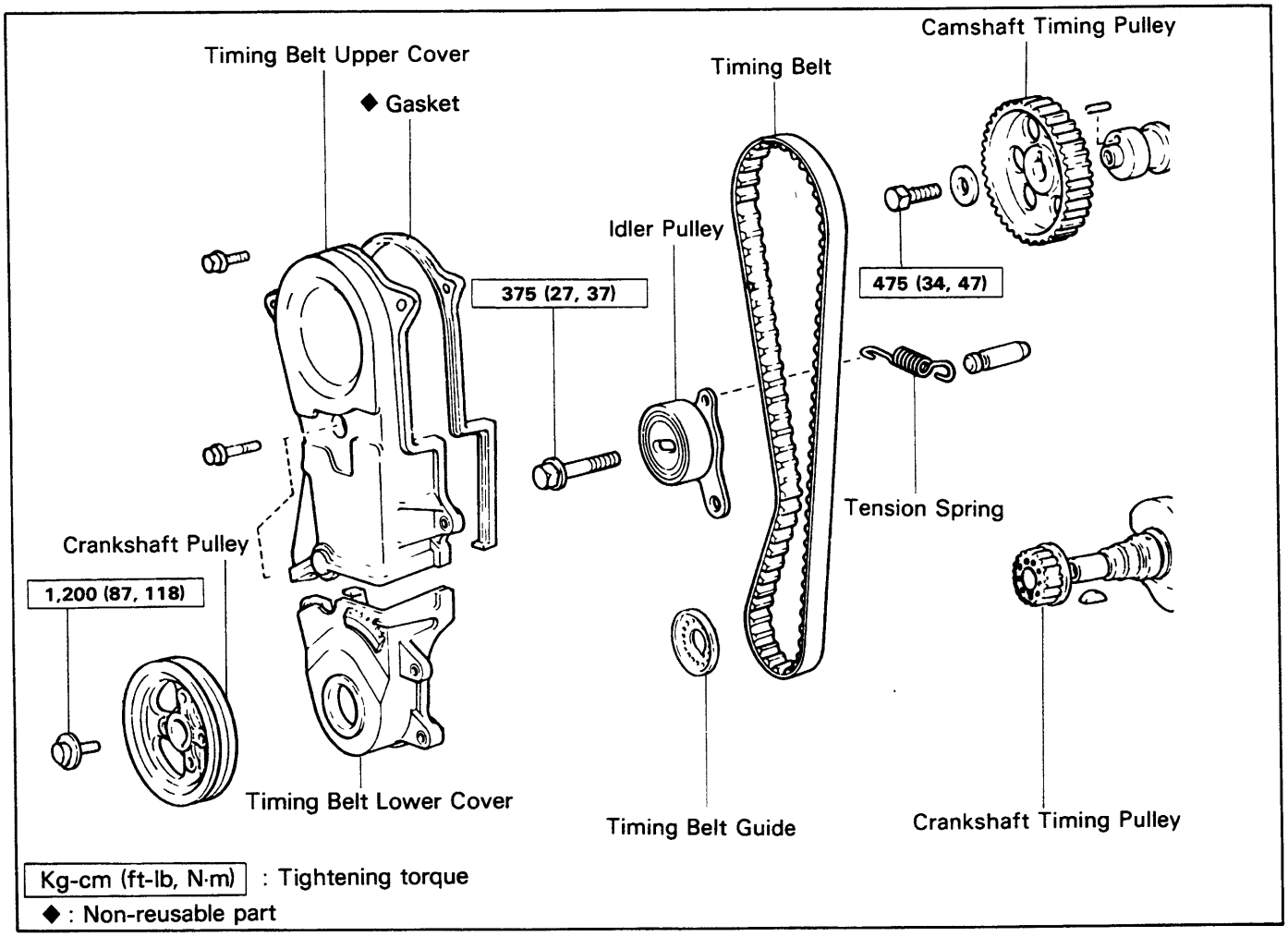
Compression pressure:
12.5 kg/cm² (178 psi, 1,226 kPa)
Minimum pressure:
9 kg/cm² (128 psi, 883 kPa)
Difference between each cylinder:
1.0 kg/cm² (14 psi, 98 kPa) or less

(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 piston 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.

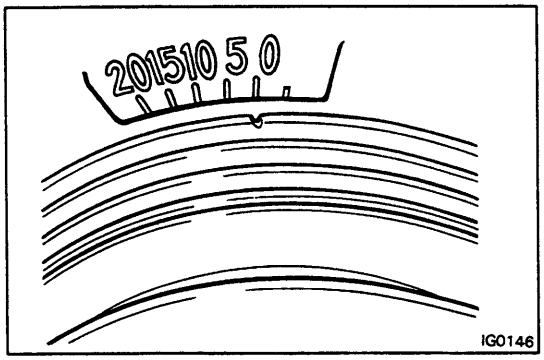
TIMING BELT

COMPONENTS



REMOVAL OF TIMING BELT

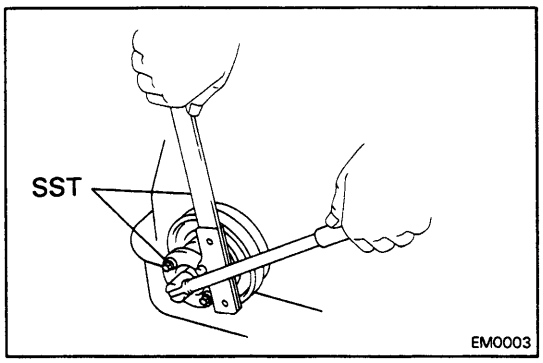
1. **REMOVE RADIATOR (See page CO-12)**
2. **REMOVE AIR CLEANER ASSEMBLY (See page FU-7)**
3. **REMOVE DRIVE BELTS**
4. **REMOVE WATER PUMP PULLEY**
5. **(w/ A/C)**
   REMOVE IDLER PULLEY BRACKET TOGETHER WITH PULLEY
6. **REMOVE CYLINDER HEAD COVER**
   (a) Disconnect the PCV hose from the PCV valve.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



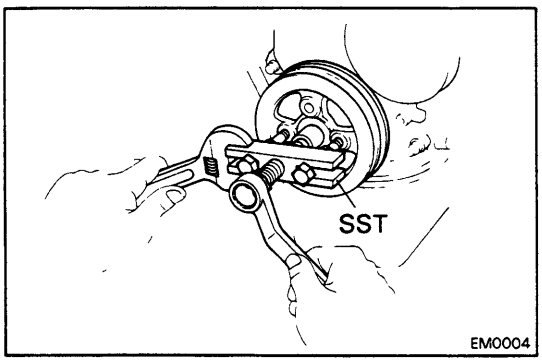
7. REMOVE CRANKSHAFT PULLEY

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

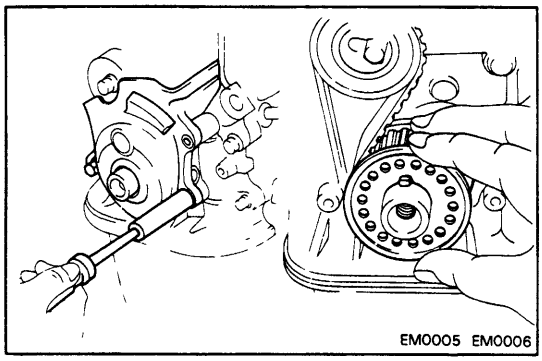
NOTE: Check that the rocker arms on the No. 1 cylinder are loose. If not, turn the crankshaft one full turn.



(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

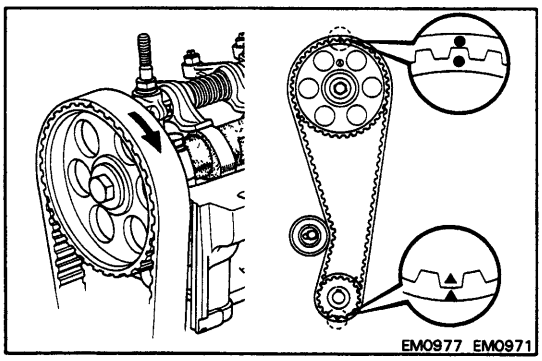


8. REMOVE TIMING BELT COVERS

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

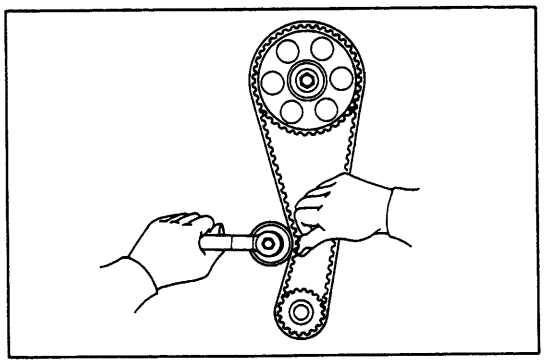
(b) Remove the three bolts and timing belt lower cover.

9. REMOVE TIMING BELT GUIDE



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.

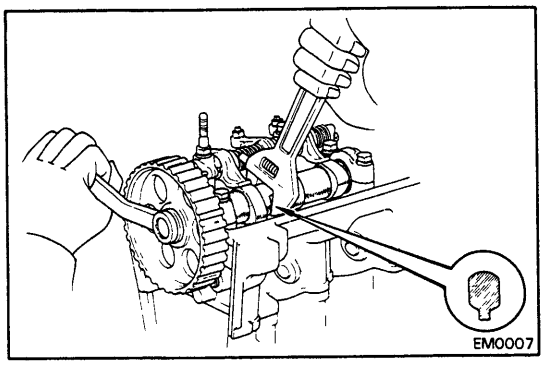


(a) Loosen the idler pulley mount bolt, push it left as far as it will go and then temporarily tighten it.

(b) Remove the belt.

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

11. REMOVE CRANKSHAFT TIMING PULLEY

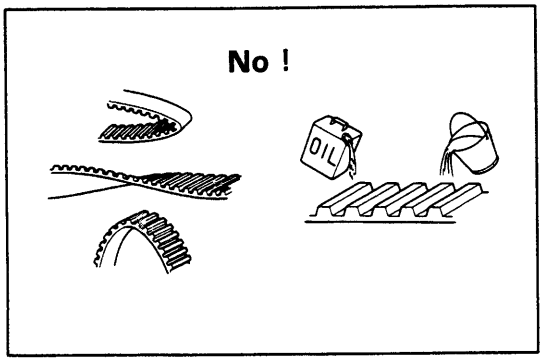


12. REMOVE CAMSHAFT TIMING PULLEY

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

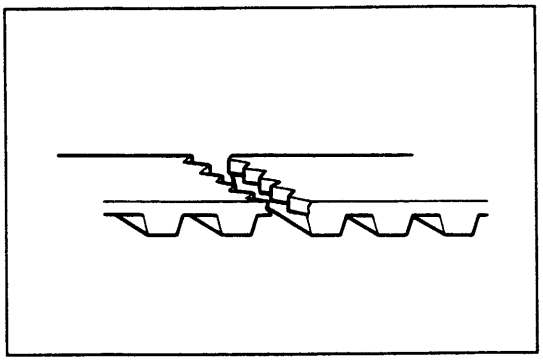
INSPECTION OF COMPONENTS

1. INSPECT TIMING BELT



CAUTION:

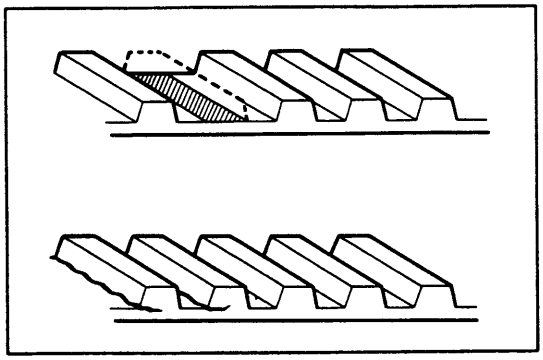
1. **Do not bend, twist or turn the belt inside out.**
2. **Do not allow the belt to come into contact with oil, water or steam.**
3. **Do not utilize belt tension when installing or removing the set bolt of the camshaft timing pulley.**



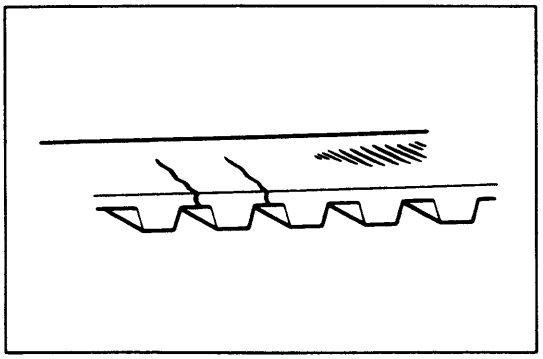
If there are defects, as shown in the figures, check the following points and replace the timing belt if necessary.

(a) Premature severance

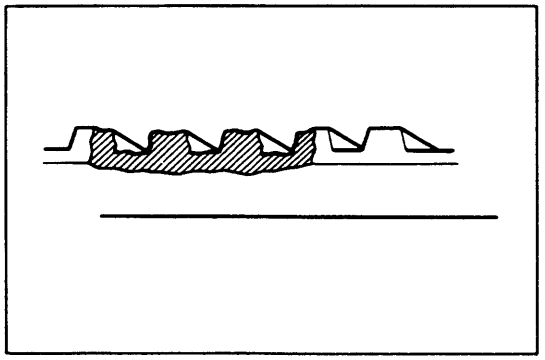
- Check for proper installation.
- Check the timing cover gaskets for damage, and check for installation.



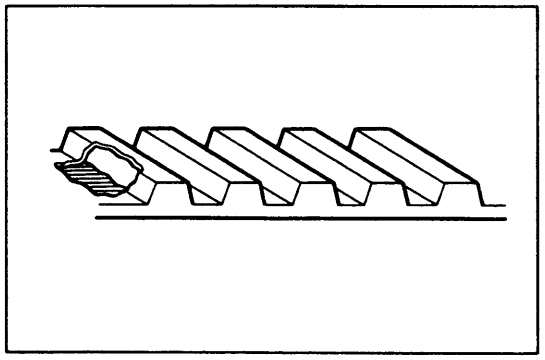
(b) If the belt teeth are cracked or damaged, check to see if the camshaft, water pump or oil pump is locked.



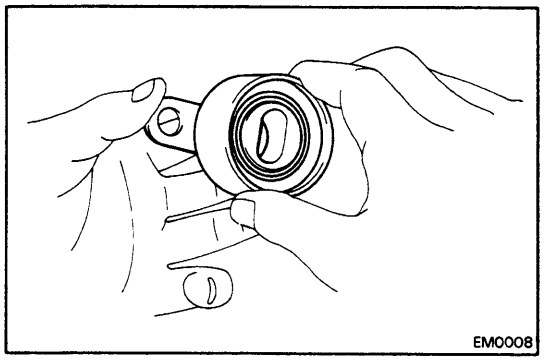
(c) If there is noticeable wear or cracks on the belt face, check to see if there are nicks on one side of the idler pulley lock.



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



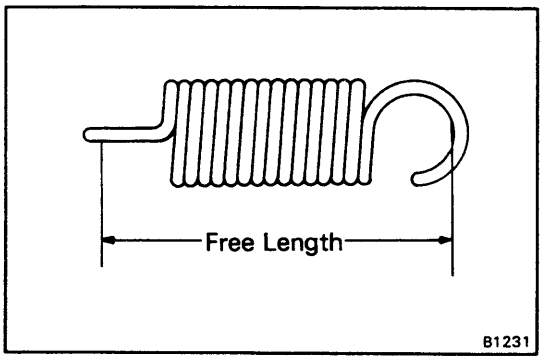
(e) If there is noticeable wear on the belt teeth, check the timing cover gasket for damage and check for correct gasket installation. Check for foreigh matter on the pulley teeth.



2. INSPECT IDLER PULLEYS

Check the turning smoothness of the timing belt idler pulleys.

If not smooth, replace the idler pulley.



3. INSPECT TENSION SPRING

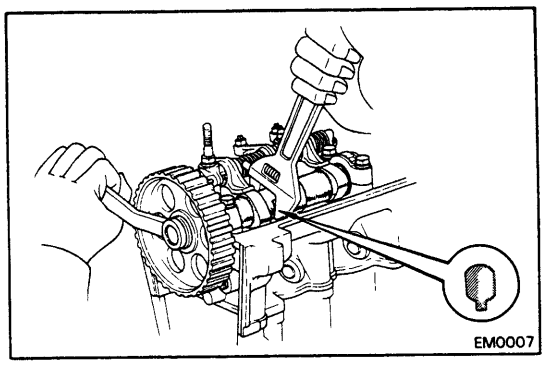
(a) Check the free length of the spring.

Free length: 38.4 mm (1.512 in.)

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

Installed tension:
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

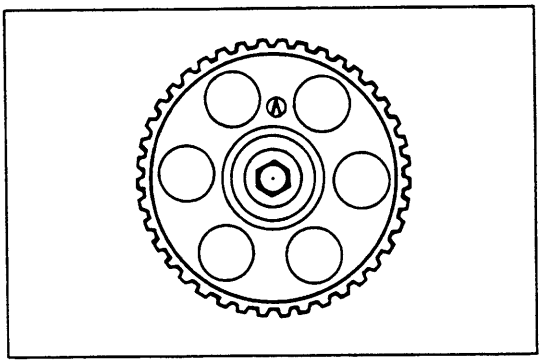
(See page EM-7)

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 plate washer and mount bolt.

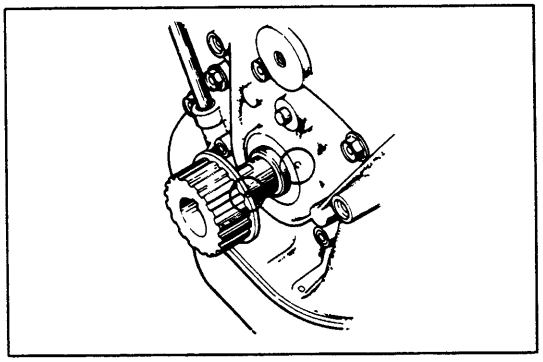
(b) Secure the camshaft and tighten the mount bolt.

Torque: 475 kg-cm (34 ft-lb, 47 N·m)



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

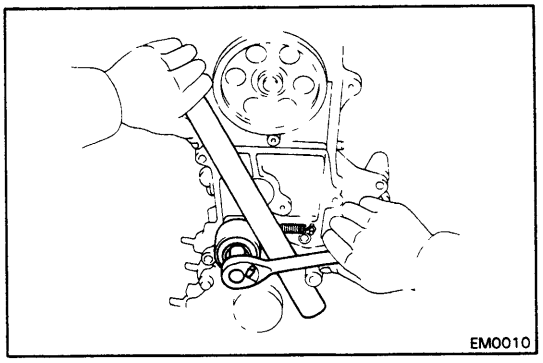
NOTE: Remove any oil or water on the camshaft timing pulley and keep it clean.



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.



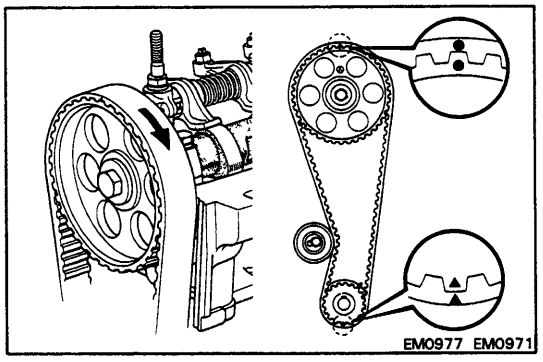
3. INSTALL TIMING BELT IDLER PULLEY

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

(b) Install the tension spring.

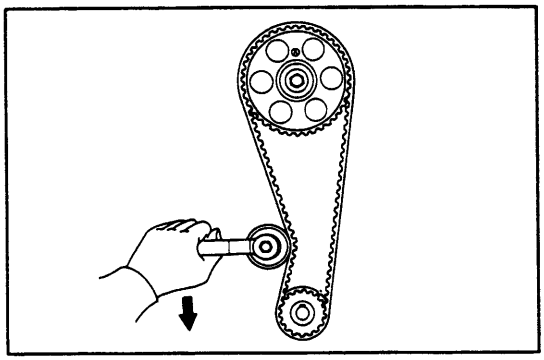
(c) Pry the timing belt idler pullay toward the left as far as it will go and temporarily tighten it.

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



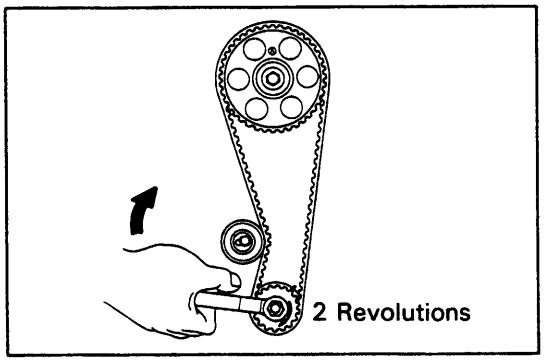
4. INSTALL TIMING BELT

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.



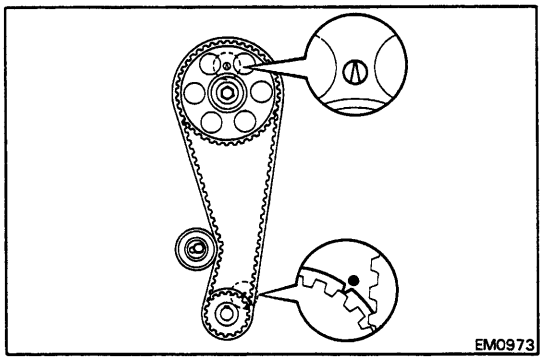
5. CHECK VALVE TIMING AND TIMING BELT TENSION

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



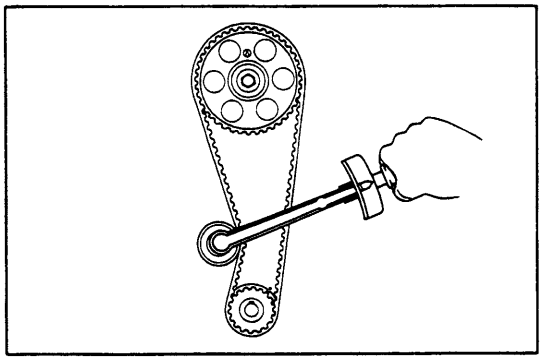
(b) Temporarily install the crankshaft pulley mount bolt and turn the crankshaft two revolutions from TDC to TDC.

CAUTION: Always turn the crankshaft clockwise.



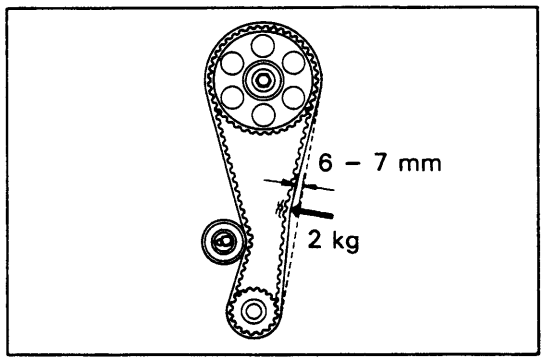
(c) Check the valve timing.

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



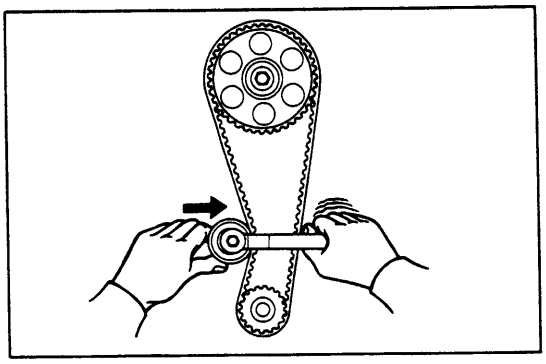
(d) Tighten the mount bolt of the timing belt idler pulley.

Torque: 375 kg-cm (27 ft-lb, 37 N·m)



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

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



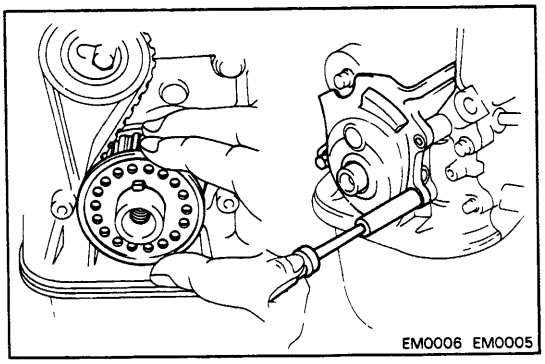
(f) If the measured value is not within standard, readjust with the idler pulley.

(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.



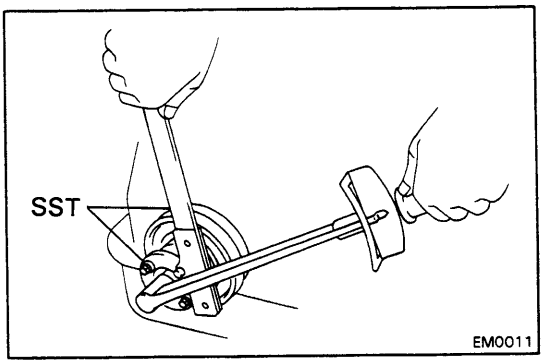
7. INSTALL TIMING BELT GUIDE

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.



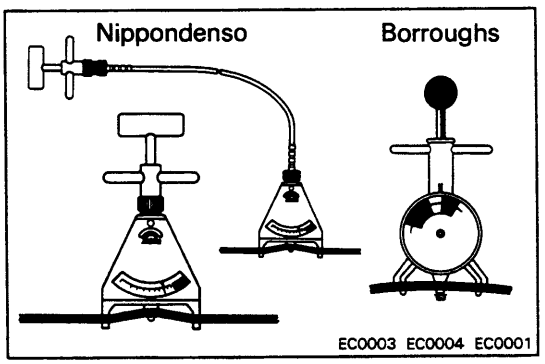
(c) Using SST, install and torque the mount bolt.

SST 09213-70010 and 09330-00020

Torque: 1,200 kg-cm (87 ft-lb, 118 N·m)

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

11. INSTALL WATER PUMP PULLEY



12. INSTALL AND ADJUST DRIVE BELTS

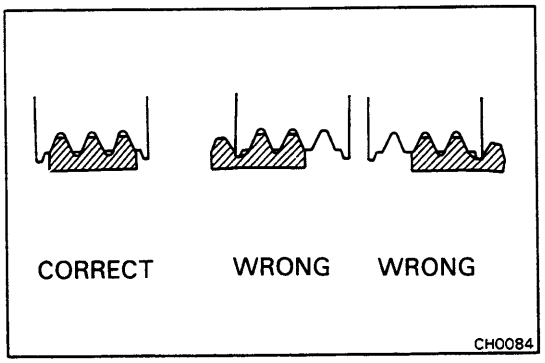
Using a belt tension gauge, check the drive belt tension.

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

Drive belt tension: Used belt 80 ± 20 lb
New belt 125 ± 25 lb

If necessary, adjust the drive belt tension.

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 installing the drive belt, check that it fits properly in the ribbed grooves. (V-ribbed type)



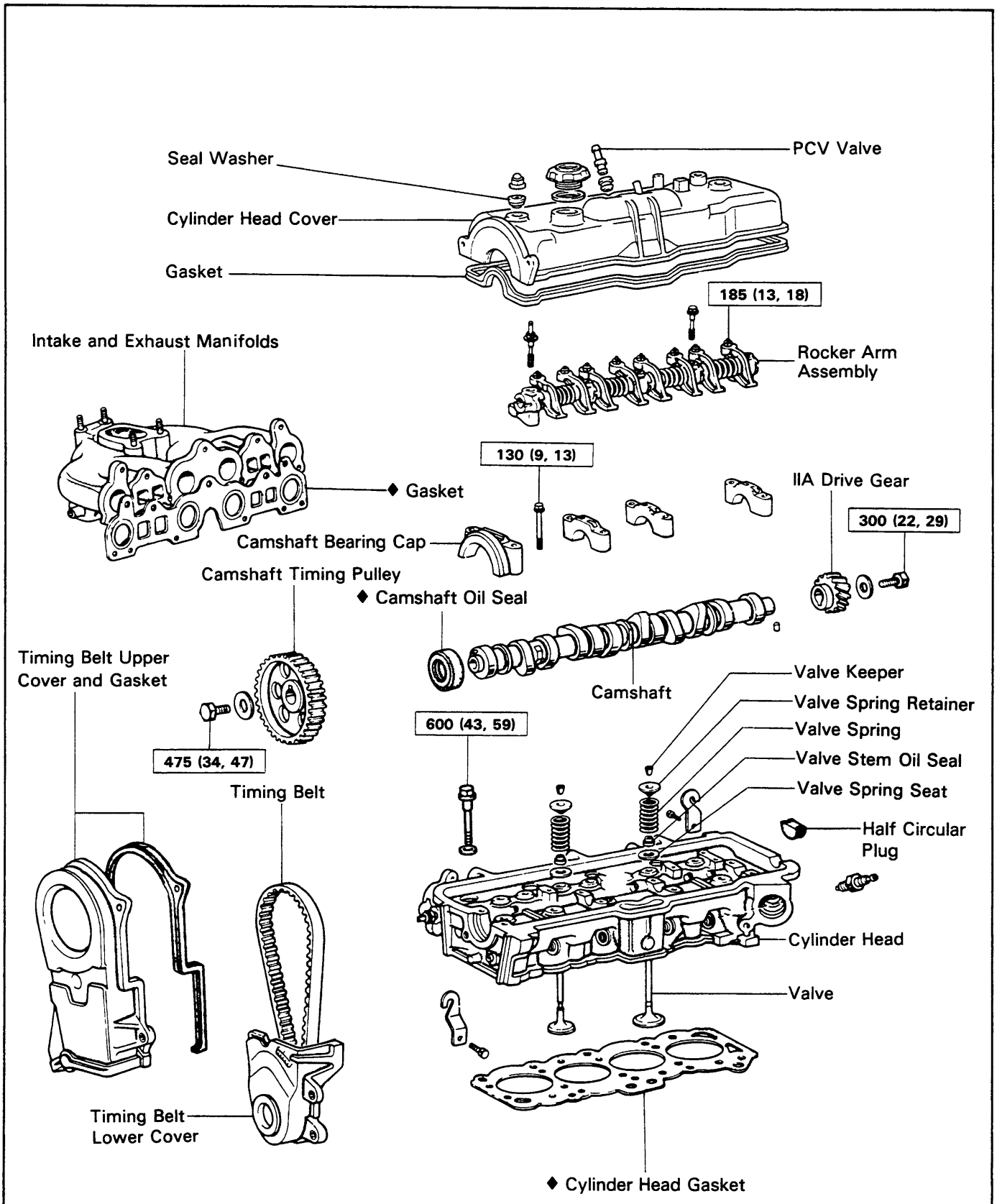
13. INSTALL AIR CLEANER ASSEMBLY
(See page FU-24)

14. INSTALL RADIATOR (See page CO-17)

15. START ENGINE AND CHECK FOR LEAKS

CYLINDER HEAD

COMPONENTS

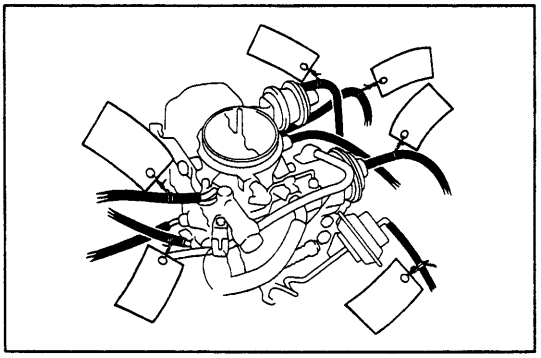


Kg-cm (ft-lb, N·m) : Tightening torque

◆ : Non-reusable part

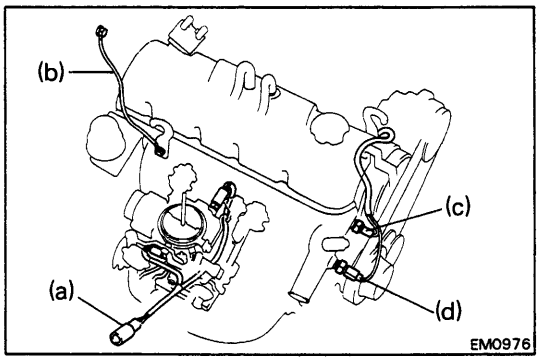
PREPARATION FOR REMOVAL

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 plate
   (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. Canada Wagon 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. Canada Wagon M/T)]**
    DISCONNECT Ox SENSOR CONNECTOR
11. **DISCONNECT RADIATOR OUTLET HOSE**

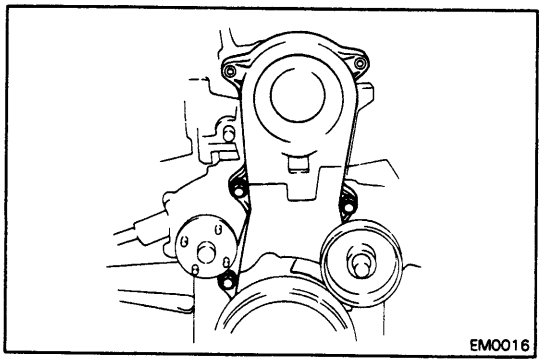
REMOVAL OF CYLINDER HEAD

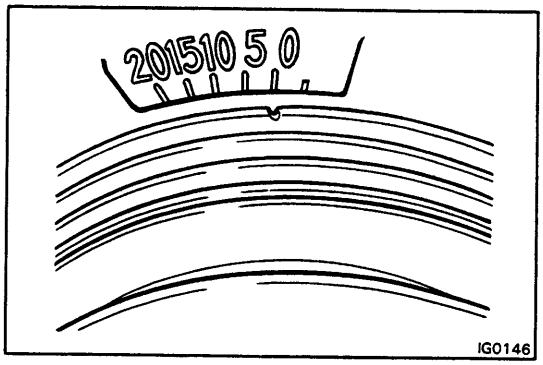
(See page EM-14)

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 alternator 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.

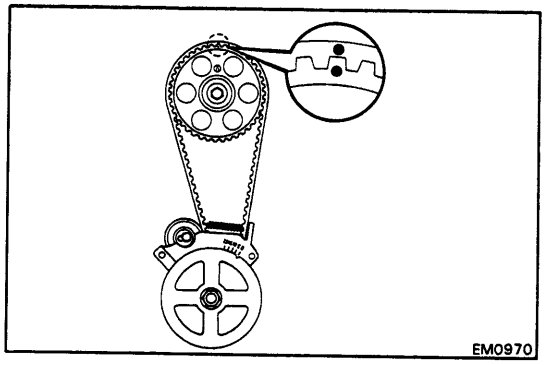

EM0016



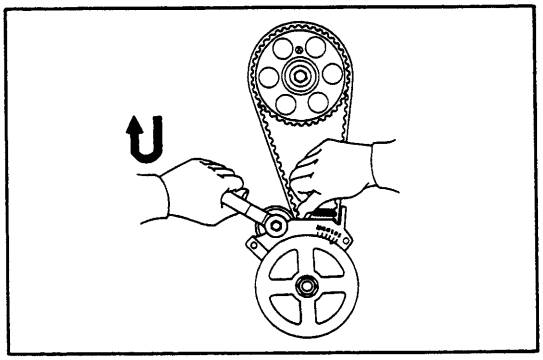
IG0146

10. REMOVE TIMING BELT FROM CAMSHAFT TIMING PULLEY
    (a) Turn the crankshaft clockwise, and set No. 1 cylinder at TDC/compression.

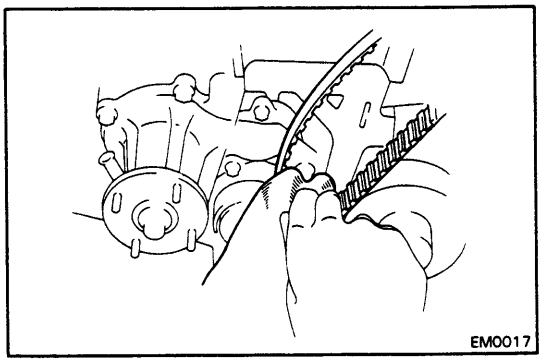
    NOTE: Check that the rocker arms on the No. 1 cylinder are loose. If not, turn the crankshaft one full turn.


EM0970

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

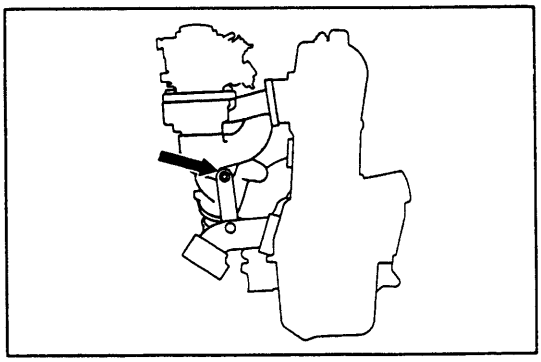


(c) Loosen the idler pulley mount bolt and push the idler pulley toward the left as far as it will go and temporarily tighten it.

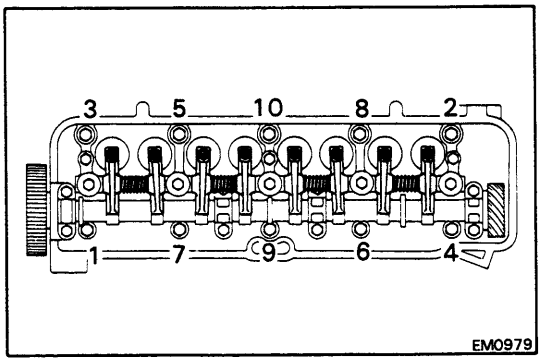


(d) Remove the timing belt from the camshaft timing pulley.

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.



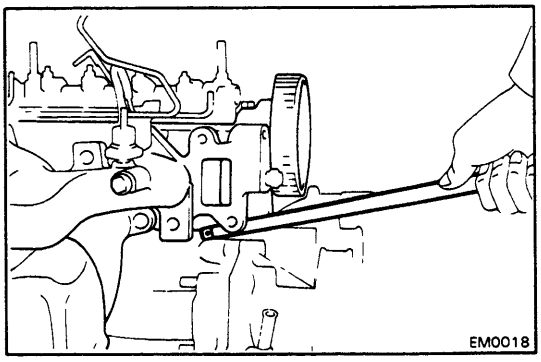
11. REMOVE MANIFOLD STAY MOUNT BOLT FROM EXHAUST MANIFOLD



12. REMOVE CYLINDER HEAD

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

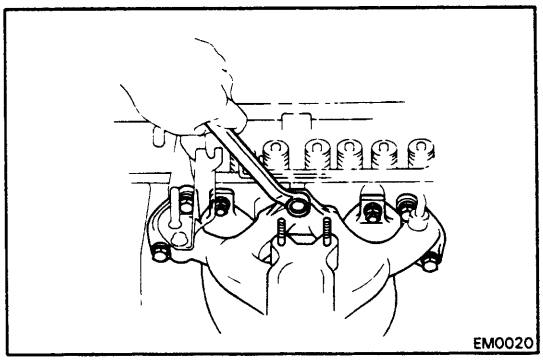
CAUTION: Head warpage or cracking could result from removing in incorrect order.



(b) Lift the cylinder head from the dowels 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.



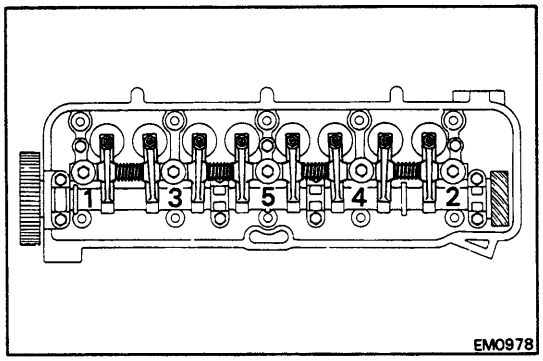
DISASSEMBLY OF CYLINDER HEAD

(See page EM-14)

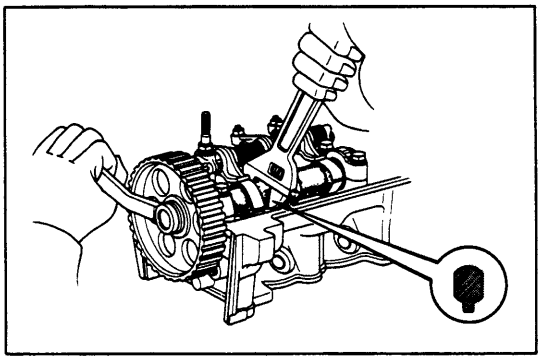
1. **REMOVE CARBURETOR (See page FU-7)**

2. **REMOVE FUEL PUMP**

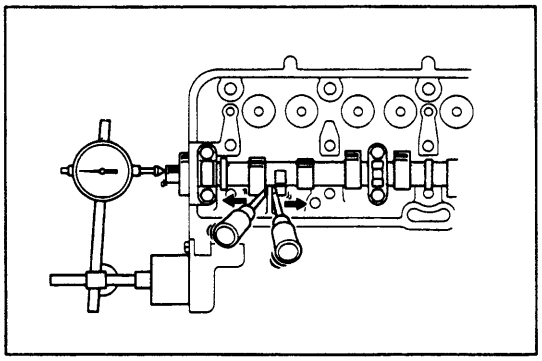
3. **REMOVE INTAKE AND EXHAUST MANIFOLDS**
   (a) Remove the nuts and bolts.
   (b) Remove the vacuum pipes with hoses, and remove the manifolds.



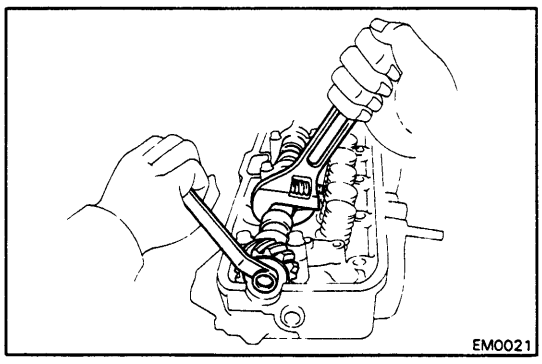
4. **REMOVE ROCKER ARM ASSEMBLY**
   (a) Uniformly loosen and remove each support bolt in several passes and in sequence shown.
   (b) Remove the rocker arm assembly.



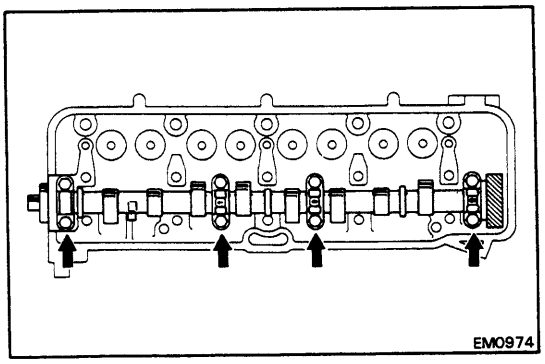
5. **REMOVE CAMSHAFT TIMING PULLEY FROM CAMSHAFT**
   Secure the camshaft and remove the camshaft timing pulley mount bolt, plate washer and pulley.



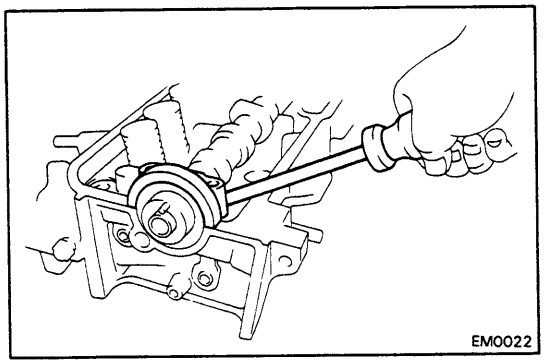
6. **MEASURE CAMSHAFT THRUST CLEARANCE**
   Standard clearance: 0.08 — 0.18 mm (0.0031 — 0.0071 in.)
   Maximum clearance: 0.25 mm (0.0098 in.)
   If clearance is greater than maximum, replace the head.



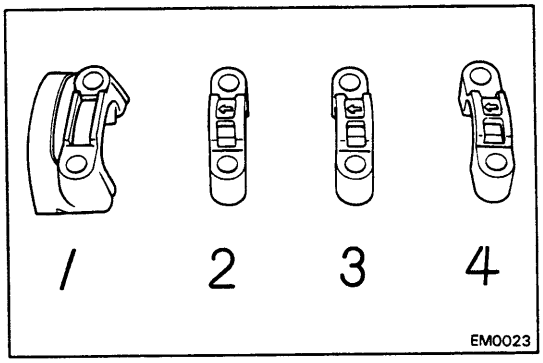
7. **REMOVE BEARING CAPS AND CAMSHAFT**
   (a) Secure the camshaft and loosen the IIA drive gear bolt.



(b) Remove the each bearing cap bolt.

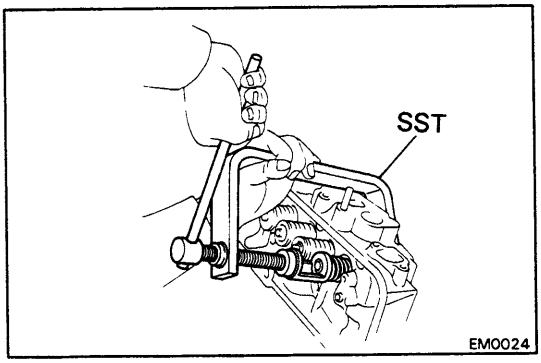


(c) Remove the camshaft, oil seal and camshaft bearing caps.



NOTE: Arrange the camshaft bearing caps in correct order.

(d) Remove the IIA drive gear mount bolt, plate washer and drive gear from the camshaft.

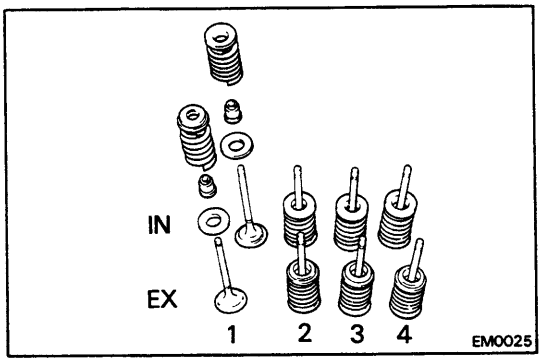


8. REMOVE VALVES

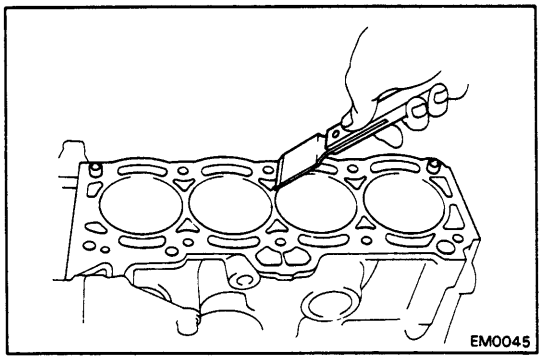
(a) Using SST, remove the two keepers, spring retainer and spring.

SST 09202-43013

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



NOTE: Arrange the disassembled parts in correct order.


EM0045

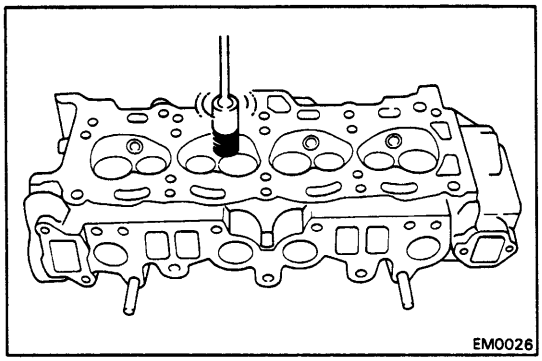
INSPECTION, CLEANING AND REPAIR OF CYLINDER HEAD COMPONENTS

1. CLEAN TOP OF PISTONS AND TOP OF BLOCK

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

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

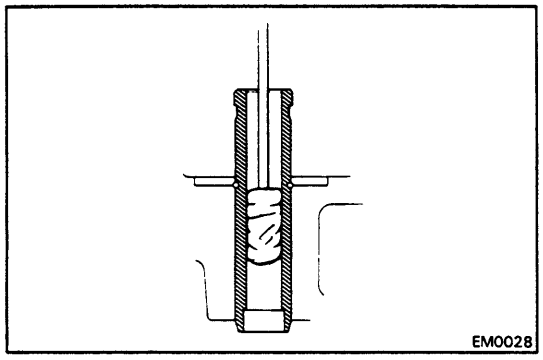
CAUTION: Protect your eyes when using high pressure air.


EM0026

2. CLEAN COMBUSTION CHAMBERS

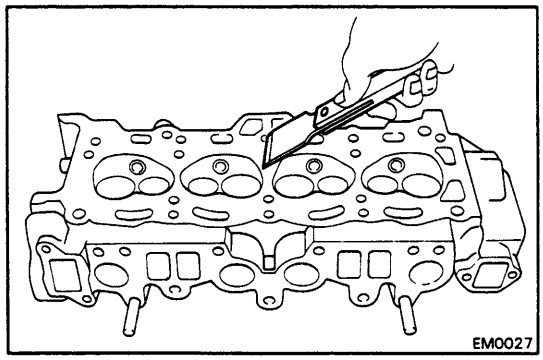
Using a wire brush, remove all the carbon from the combustion chambers.

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


EM0028

3. CLEAN VALVE GUIDE BUSHINGS

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


EM0027

4. REMOVE GASKET MATERIAL

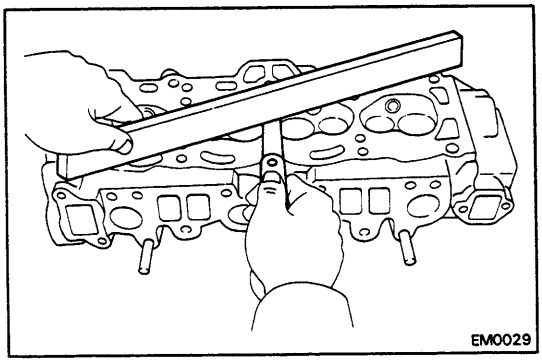
Using a gasket scraper, remove all the gasket material from the manifold and head surface.

CAUTION: Be careful not to scratch the surfaces.

5. CLEAN CYLINDER HEAD

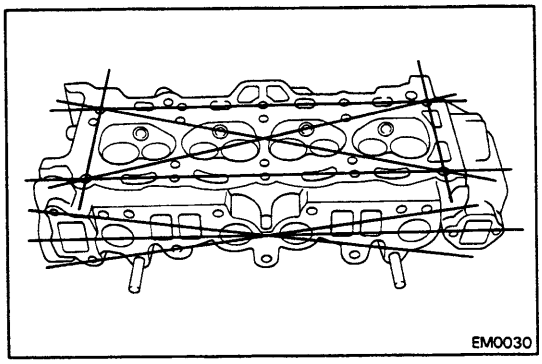
Using a soft bruch and solvent, clean the head.

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



5. INSPECT CYLINDER HEAD FLATNESS

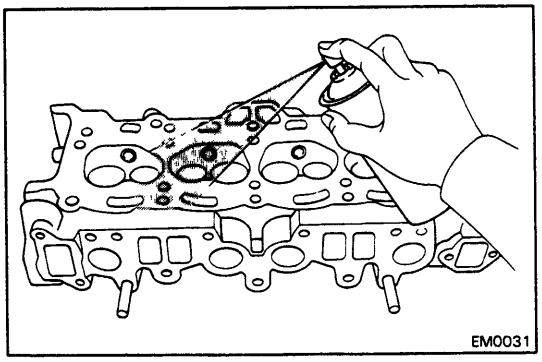
(a) Using a precision straight edge and feeler gauge, check that the head and manifold surfaces are not warped.



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

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

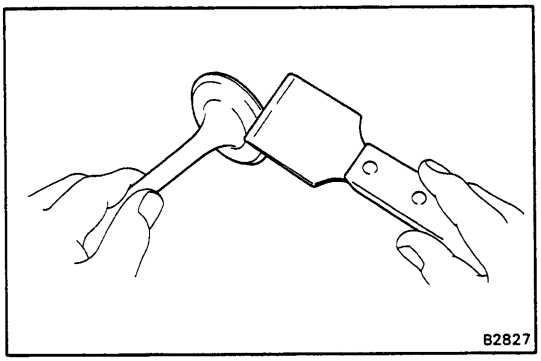
If warpage is exceeds maximum, replace the head.



6. INSPECT CYLINDER HEAD FOR CRACKS

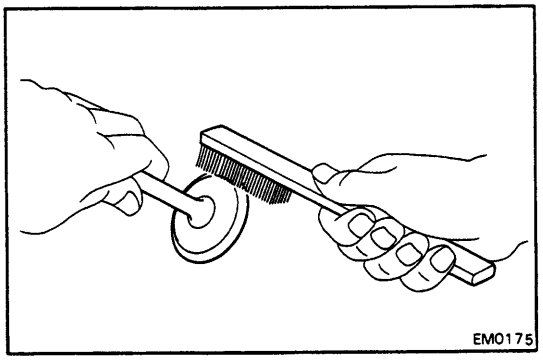
Using a dye penetrant, check the combustion chamber, intake and exhaust ports, head surface and the top of the head for cracks.

If cracked, replace the cylinder head.

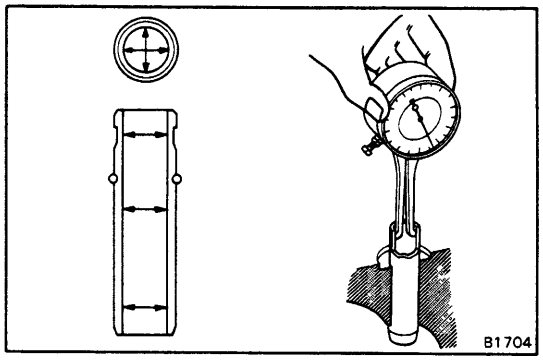


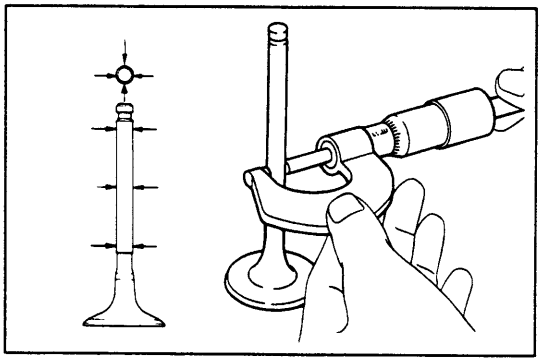
7. CLEAN VALVES

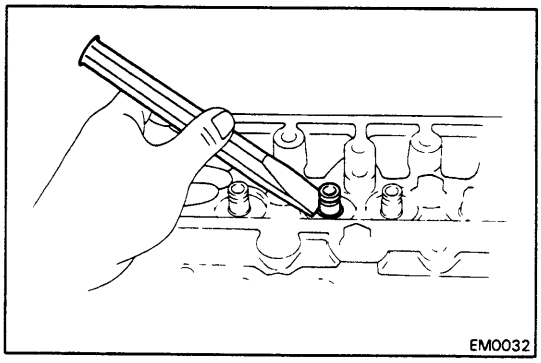
(a) Using a gasket scraper, chip any carbon from the valve head.

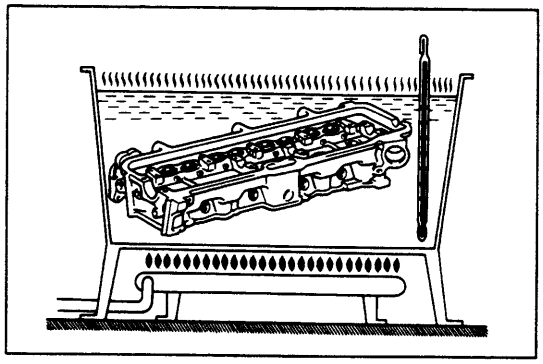


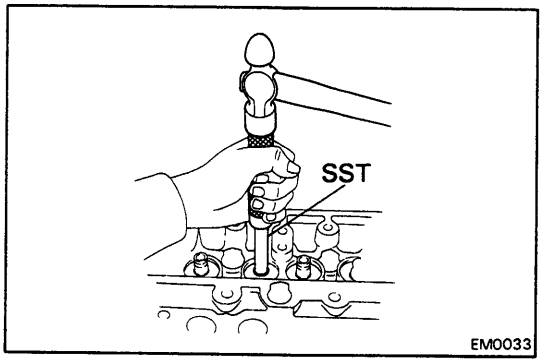
(b) Using a wire brush, thoroughly clean the valve.











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.)**

Maximum stem oil clearance:

Intake	**0.08 mm (0.0031 in.)**
Exhaust	**0.10 mm (0.0039 in.)**

If the clearance is exceeds than maximum, 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.

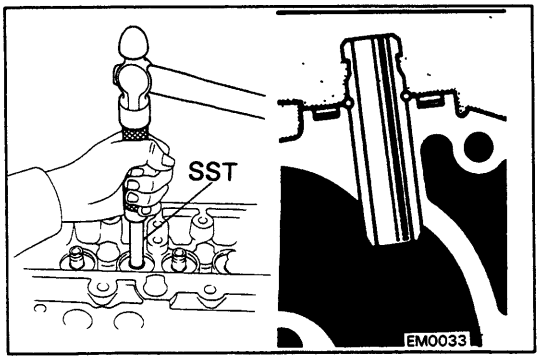
SST 09201-60011

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

(e) Select a new valve guide. (STD or O/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 dimension.

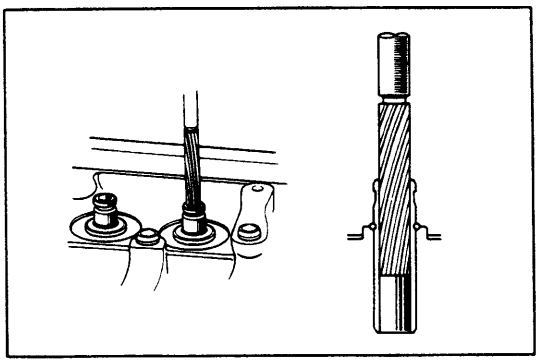
Rebored cylinder head bushing bore dimension:
11.550 – 11.577 mm (0.4547 – 0.4558 in.)



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

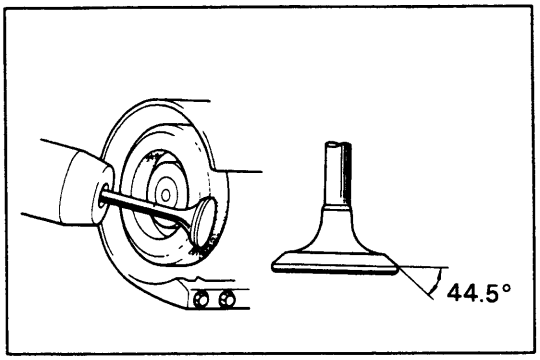
(g) Using SST and a hammer, drive in a new valve guide until the snap ring contacts the cylinder head.

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.

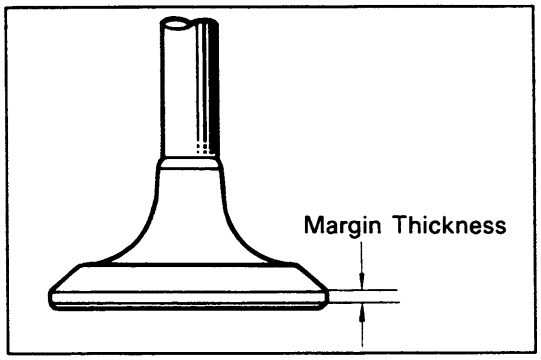
Intake oil clearance: **0.025 – 0.060 mm (0.0010 – 0.0024 in.)**
Exhaust oil clearance: **0.030 – 0.065 mm (0.0012 – 0.0026 in.)**



10. INSPECT AND GRIND VALVES

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

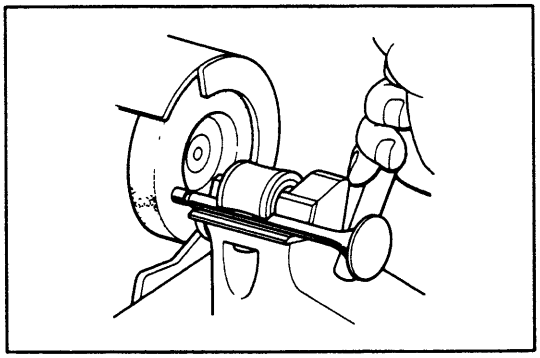
Valve face angle: **44.5°**



(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.

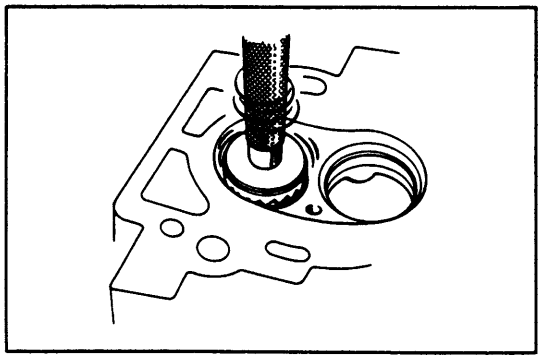


(c) Check the surface of the valve stem tip for wear.

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

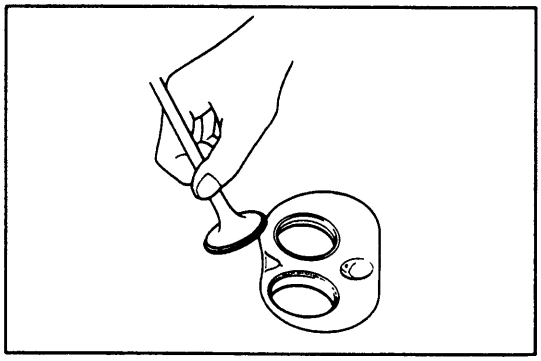
CAUTION: Do not grind more than 0.5 mm (0.020 in.).

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



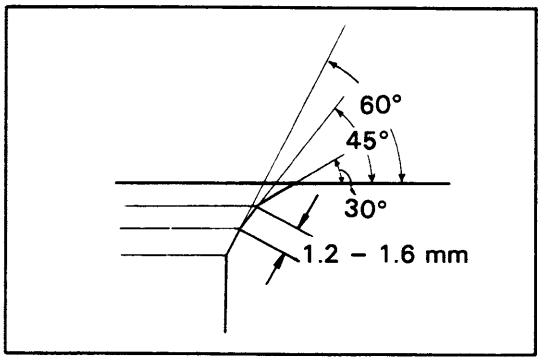
11. INSPECT AND CLEAN VALVE SEATS

(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.)

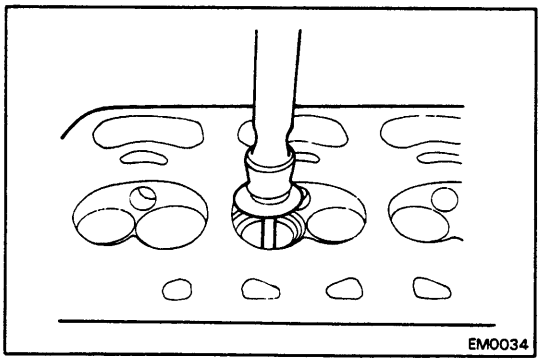
If not correct the valve seat as follows:

(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.

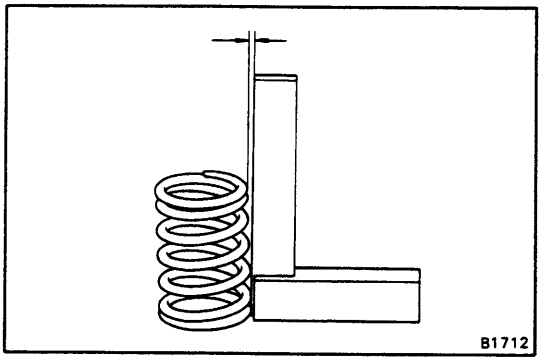


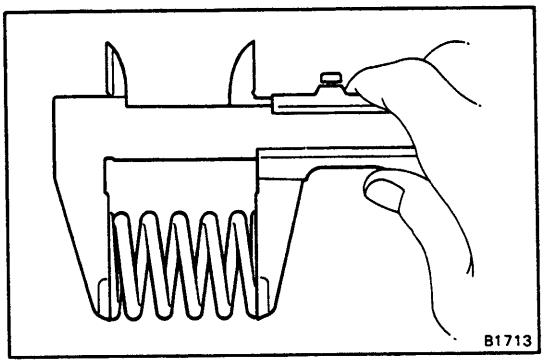
12. INSPECT VALVE SPRING

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

Maximum squareness: 2.0 mm (0.079 in.)

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

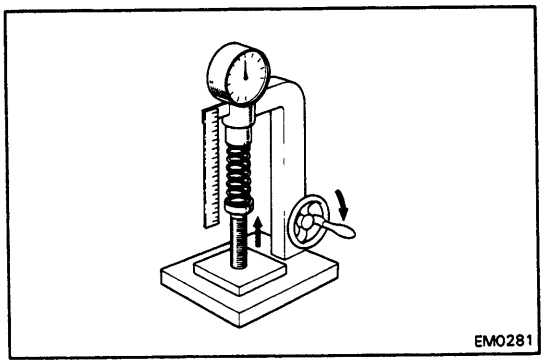




(b) Using calipers, measure the free length of the valve spring.

Free height: 44.6 mm (1.756 in.)

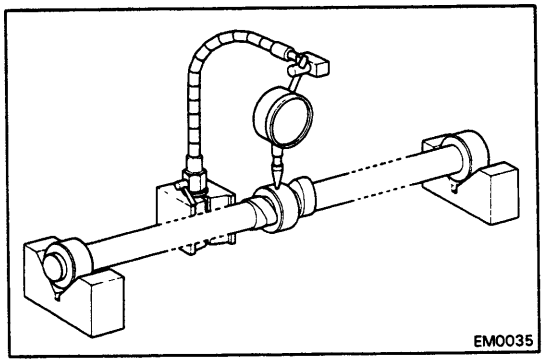
If the free height is not as specified, replace the valve spring.



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

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

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

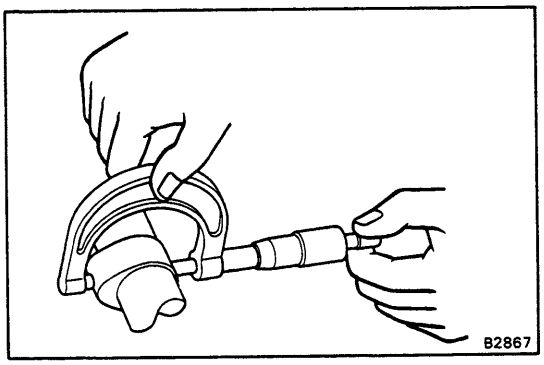


13. INSPECT CAMSHAFT

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

Maximum circle runout: 0.06 mm (0.0024 in.)

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



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

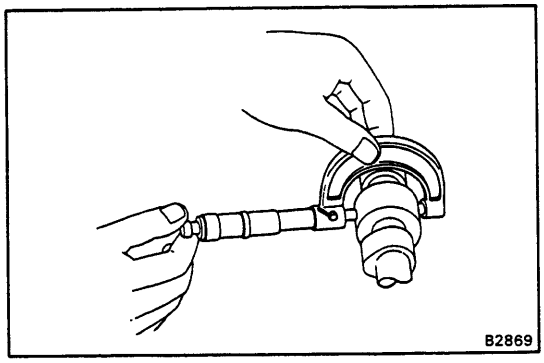
Standard lobe height:

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.)

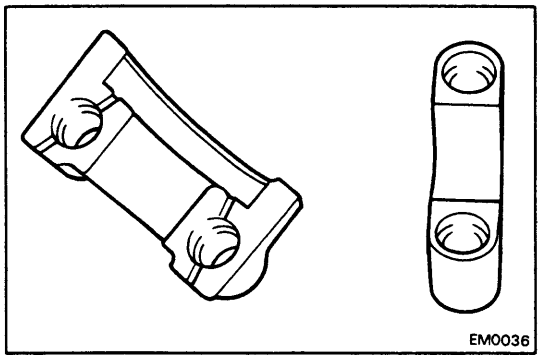
If the lobe height is less than minimum, replace the camshaft.



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

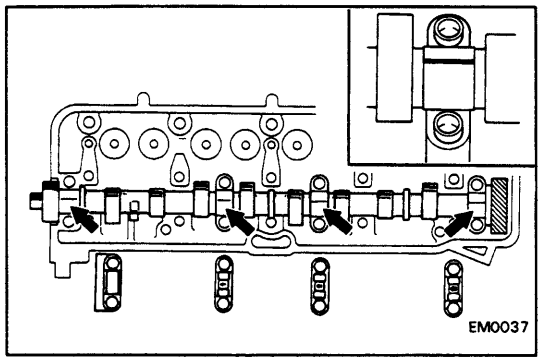
Journal diameter: 27.979 – 27.995 mm (1.1015 – 1.1022 in.)

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



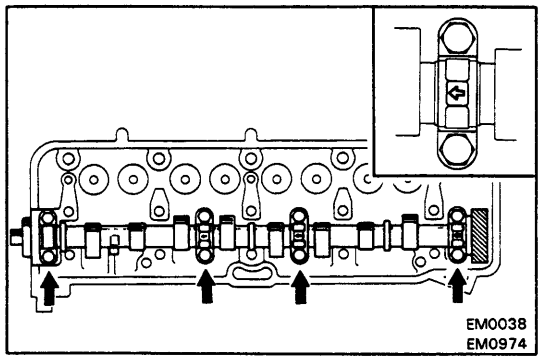
(d) Check the bearings for flaking or scoring.

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



(e) Measure the clearance of each camshaft journal.

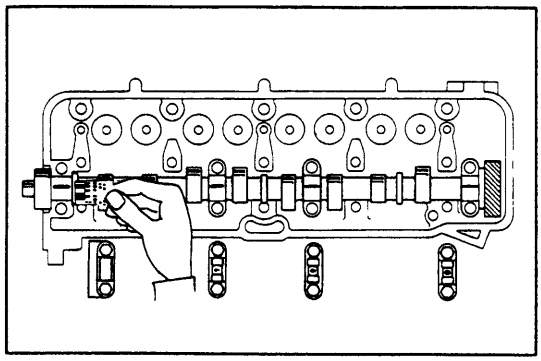
- Clean the bearing caps and camshaft journal.
- Lay a strip of Plastigage across each journal.



- 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.

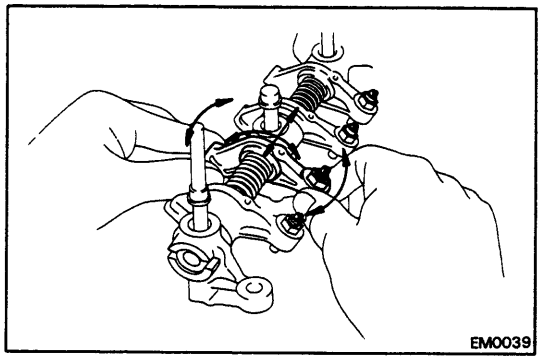


- Remove the caps. Measure the Plastigage at its widest point.

Standard clearance: 0.037 – 0.073 mm (0.0015 – 0.0029 in.)
Maximum clearance: 0.1 mm (0.004 in.)

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

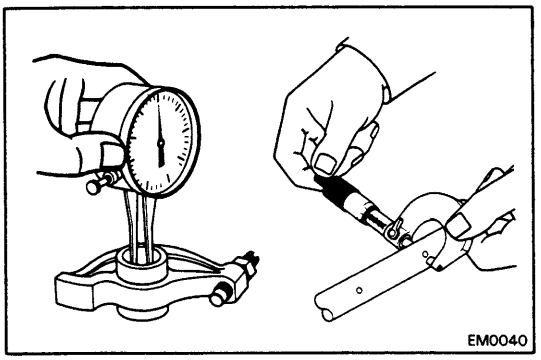
(f) Complerely remove the Plastigage.



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:

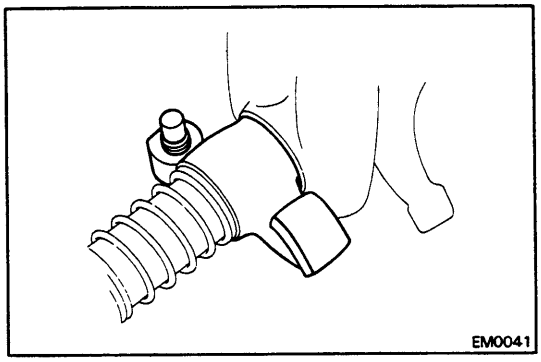


(a) Using calipers, measure the inside diameter of the rocker arm. Using a micrometer, measure the outside diameter of the shaft. Subtract the shaft diameter from the rocker arm diameter.

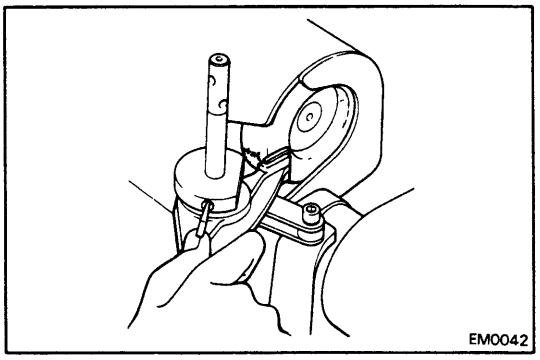
Standard oil clearance: 0.010 −0.048 mm (0.0004 − 0.0019 in.)

Maximum oil clearance: 0.06 mm (0.0024 in.)

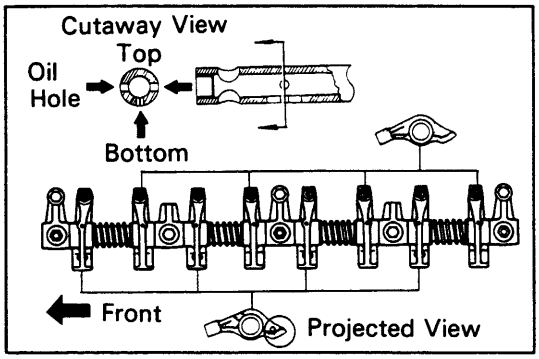
If the oil clearance is exceeds maximum, replace the rocker arm and/or shaft.



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

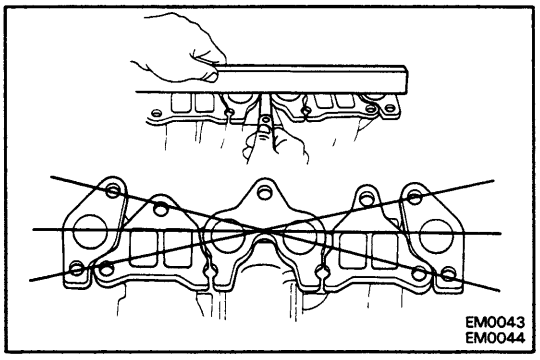


If the cam end is worn excessively, either grind or replace the rocker arm.



(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 precision straight edge and feeler gauge, check the surfaces contacting the cylinder head for warpage.

Maximum warpage:

Intake 0.2 mm (0.008 in.)

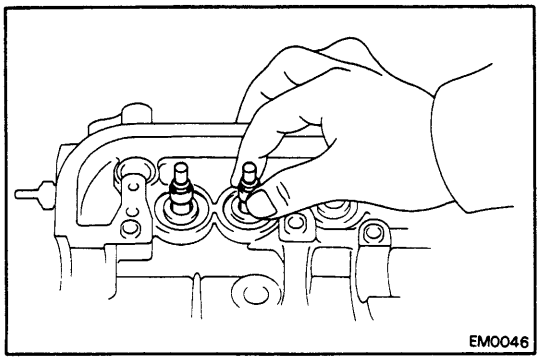
Exhaust 0.3 mm (0.012 in.)

If warpage is exceeds maximum, replace the manifold.

ASSEMBLY OF CYLINDER HEAD

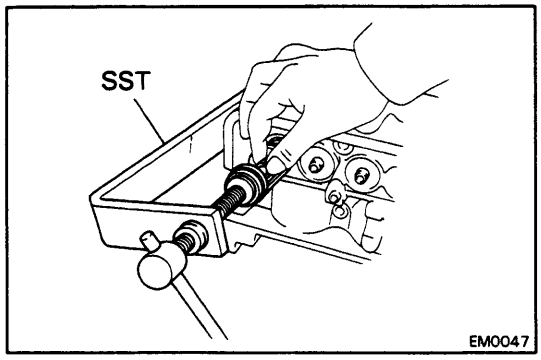
(See page EM-14)

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 seals with new parts.


EM0046

1. INSTALL VALVES

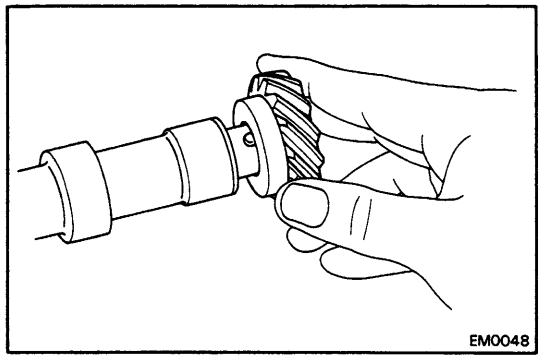
(a) Lubricate and insert valves in the cylinder head valve guides. Make sure the valves are installed in the correct order.
(b) Install the valve spring seat and oil seal.



EM0047

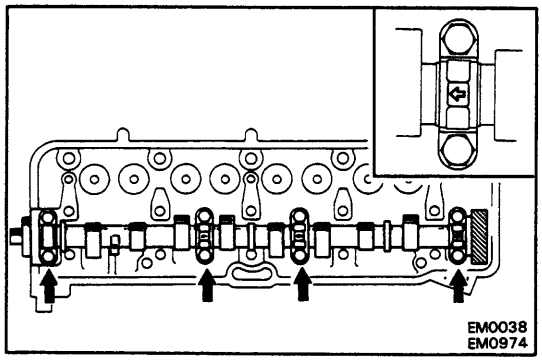
(c) Install spring and spring retainer on the valve.
(d) Using SST, compress the valve retainer and place the two keepers around the valve stem. Tap the stem lightly with a plastic-faced hammer to assure proper fit.

SST 09202-43013

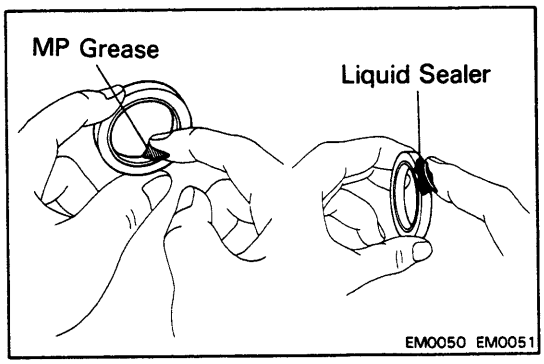

EM0048

2. INSTALL CAMSHAFT

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

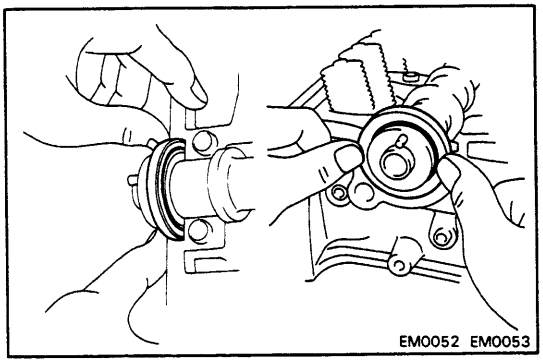

EM0038
EM0974

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



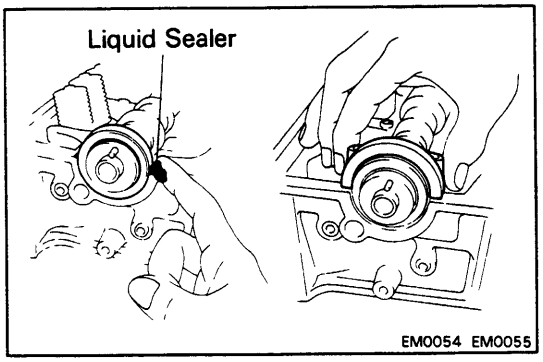
(e) Apply MP grease to a new oil seal.

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



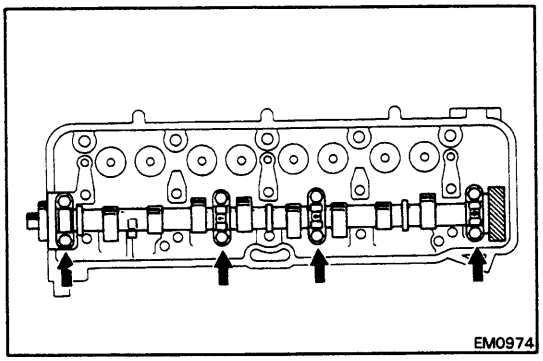
(g) Install the oil seal.

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



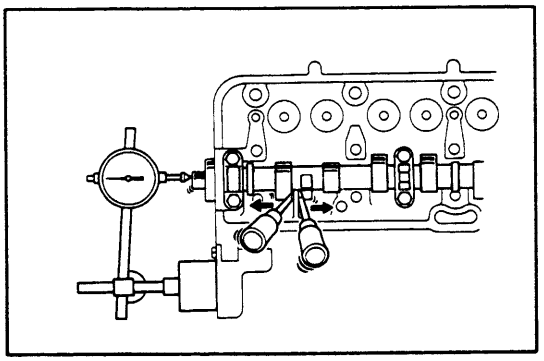
(h) Install the No.1 bearing cap.

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



(i) Install and torque each bearing cap.

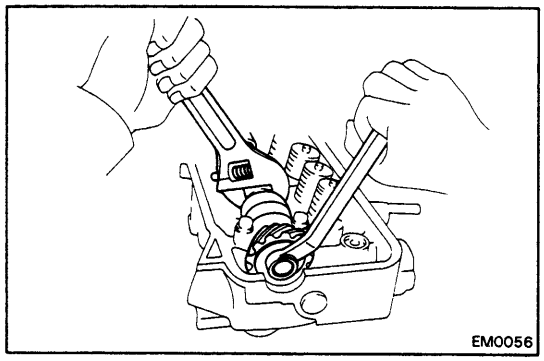
Torque: 130 kg-cm (9 ft-lb, 13 N·m)



(j) Check the camshaft thrust clearance.

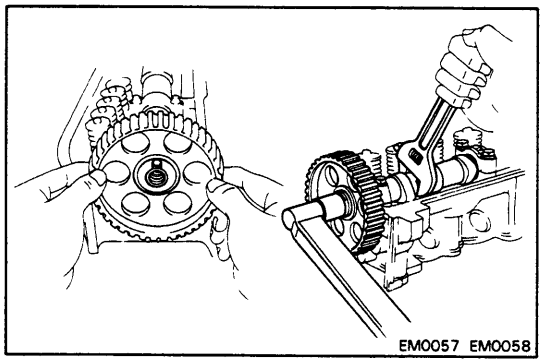
Standard clearance: 0.08 – 0.18 mm (0.0031 – 0.0071 in.)

Maximum clearance: 0.25 mm (0.0098 in.)


EM0056

(k) Secure the camshaft and tighten the IIA drive gear mount bolt.

Torque: 300 kg-cm (22 ft-lb, 29 N·m)

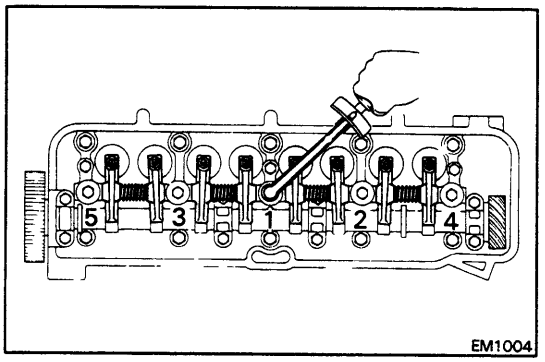

EM0057 EM0058

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.



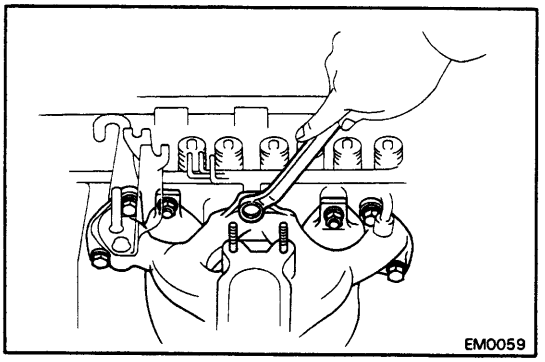
EM1004

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)

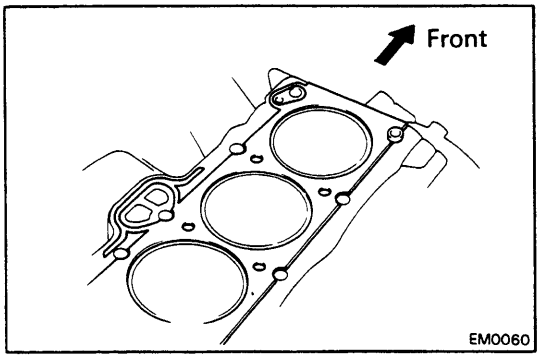

EM0059

5. INSTALL INTAKE AND EXHAUST MANIFOLDS WITH VACUUM PIPES

Torque: 250 kg-cm (18 ft-lb, 25 N·m)

6. INSTALL FUEL PUMP

7. INSTALL CARBURETOR (See page FU-23)

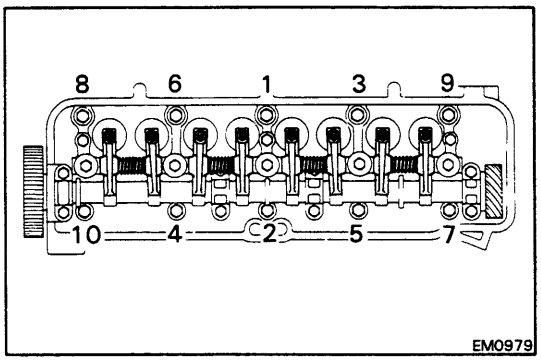


INSTALLATION OF CYLINDER HEAD

1. INSTALL CYLINDER HEAD

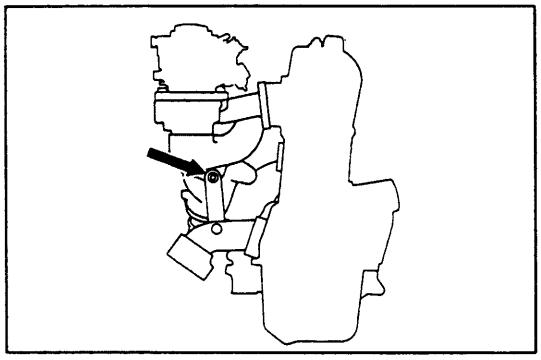
(a) Install a new cylinder head gasket.

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



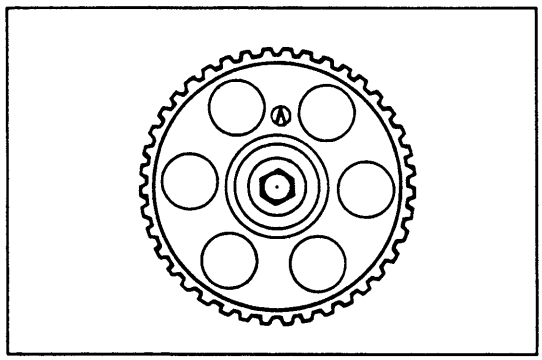
(b) Gradually install and tighten the head bolts in three passes and in the sequence shown. Torque the bolts on the final pass.

Torque: 600 kg-cm (43 ft-lb, 59 N·m)



2. INSTALL MANIFOLD STAY BOLT

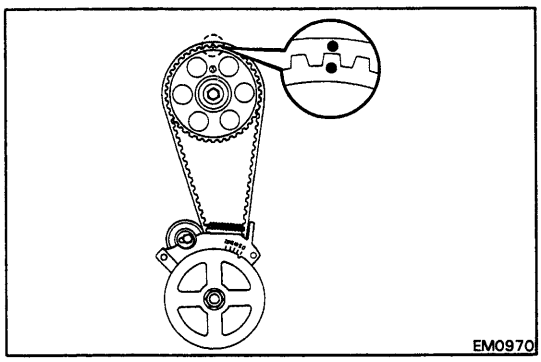
3. INSTALL WATER OUTLET OVER GASKET



4. INSTALL TIMING BELT

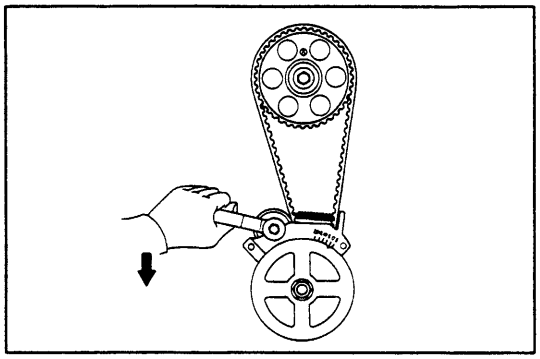
(a) Align the camshaft bearing cap mark and the center of the small hole on the camshaft timing pulley.

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

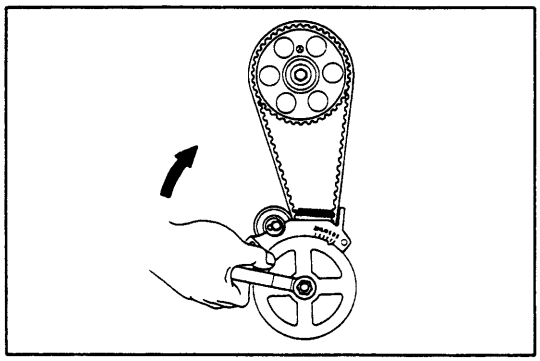


(b) Align the points marked during removal and install the timing pulley.

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



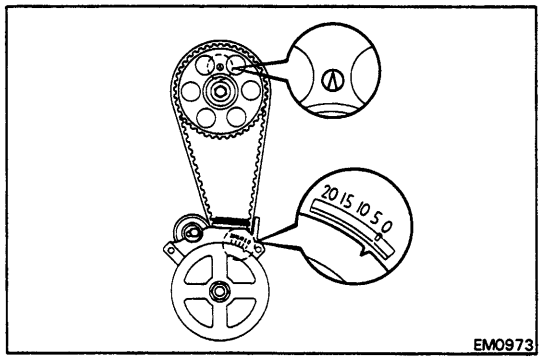
(c) Loosen the mount bolt of the timing belt idler pulley.



5. CHECK VALVE TIMING AND TIMING BELT TENSION

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

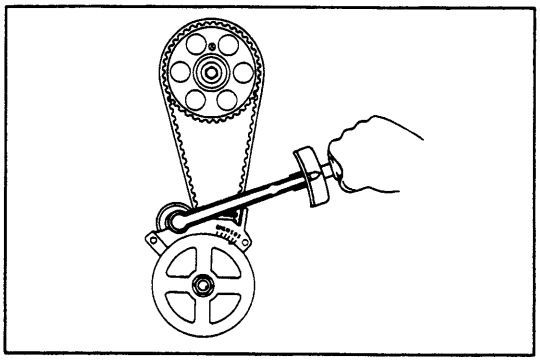
CAUTION: Always turn the crankshaft clockwise.



(b) Check the valve timing.

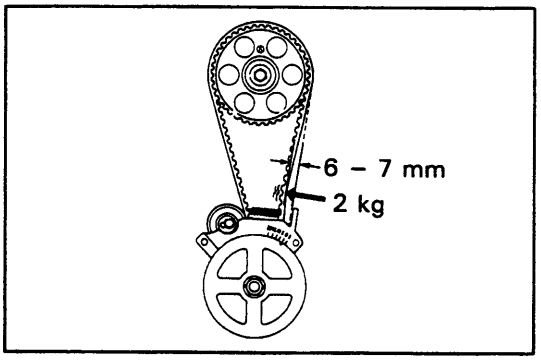
Insure that each pulley aligns with the mark as shown in the figure.

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).



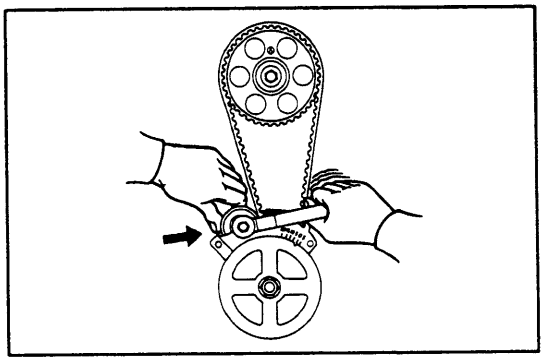
(c) Tighten the mount bolt of the idler pulley.

Torque: 375 kg-cm (27 ft-lb, 37 N·m)

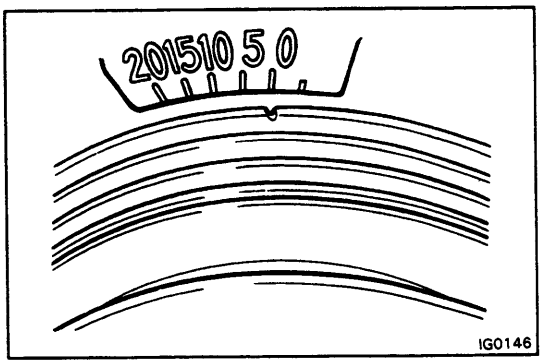


(d) Measure the timing belt tension as shown in the figure.

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



(e) If the measured value is not within standard, readjust with the idler pulley.

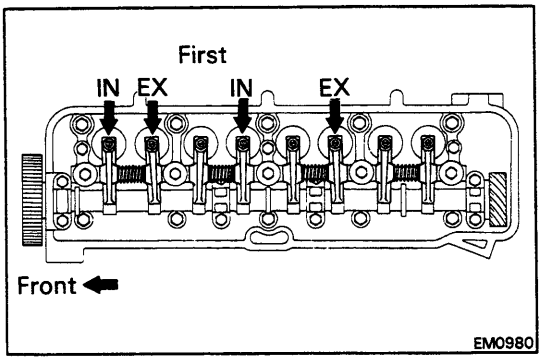


6. ADJUST VALVE CLEARANCE

(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 loose and the rockers on No. 4 are tight.

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

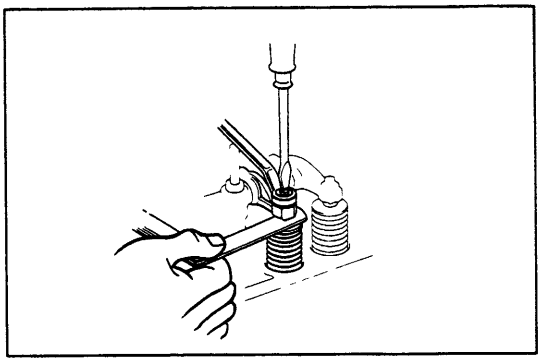


(b) Adjust the clearance of half of the valves.

- Adjust only those valves indicated by arrows.

Valve clearance (cold):

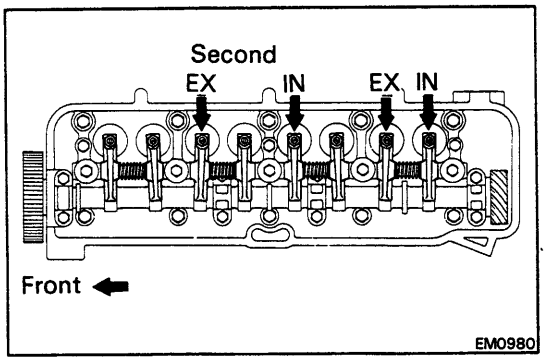
Intake	**0.18 mm (0.007 in.)**
Exhaust	**0.28 mm (0.011 in.)**



- 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)

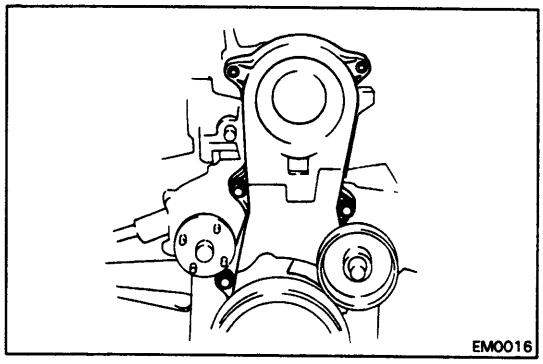
- Recheck clearance. The feeler gauge should move with a very slight drag.



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

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)


EM0016

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.

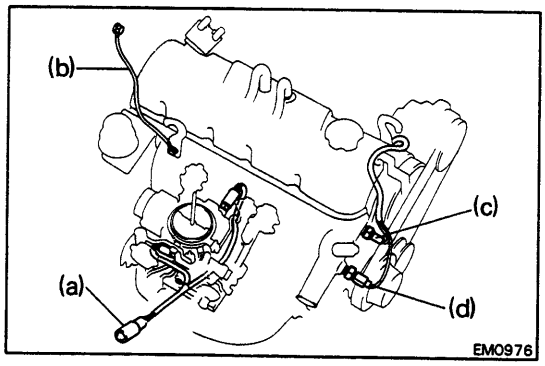
13. **CONNECT EXHAUST PIPE TO EXHAUST MANIFOLD**
Torque: 630 kg-cm (46 ft-lb, 62 N·m)

14. **[3A-C (ex. Canada Wagon 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



EM0976

18. **CONNECT FOLLOWING CONNECTORS AND WIRE:**
(a) Carburetor connector
(b) [3A-C (ex. Canada Wagon 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 plate

(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)

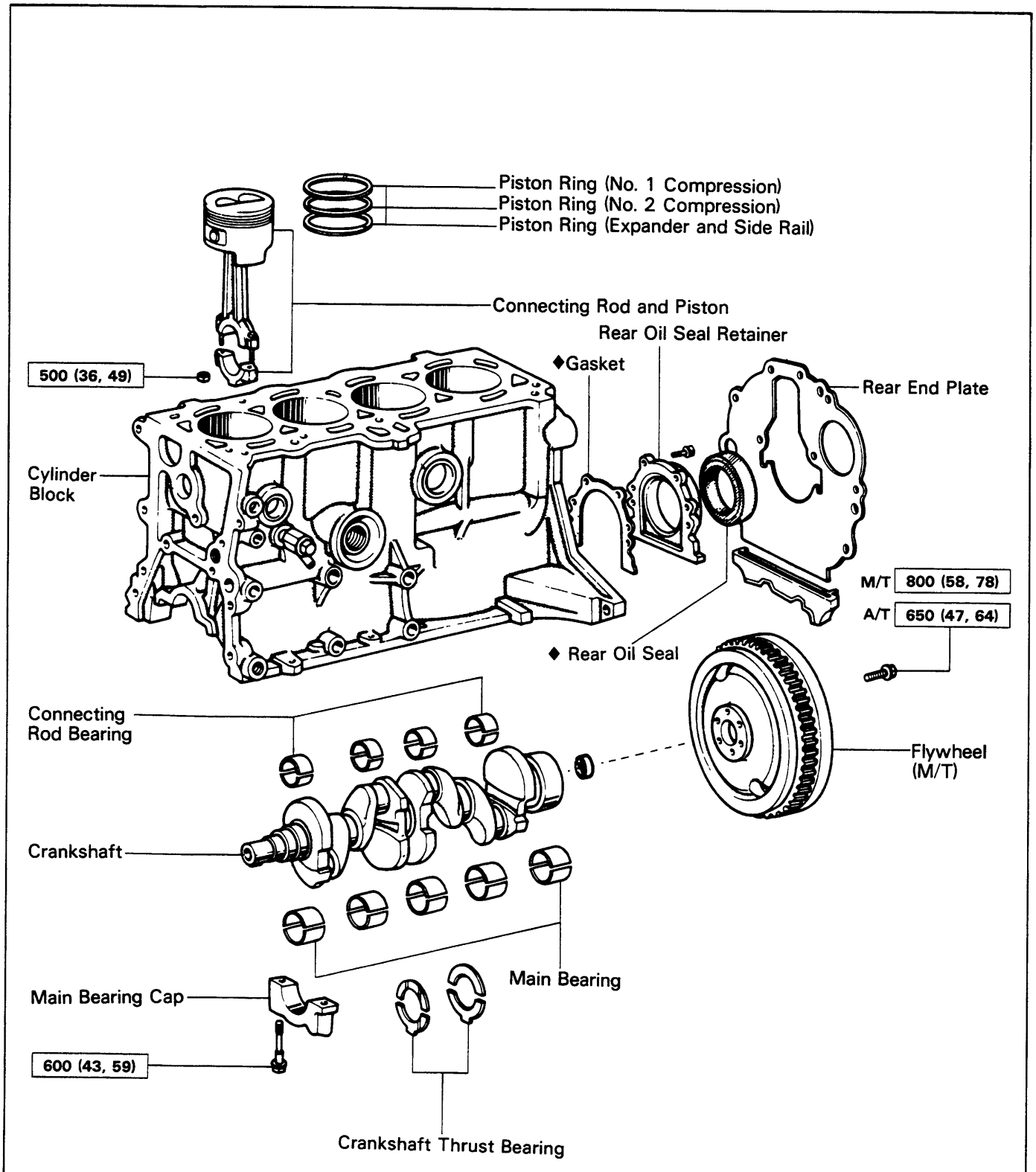
28. ROAD TEST

Perform a road test.

29. RECHECK COOLANT AND ENGINE OIL LEVEL

CYLINDER BLOCK

COMPONENTS



Kg-cm (ft-lb, N·m) : Tightening torque

◆: Non-reusable part

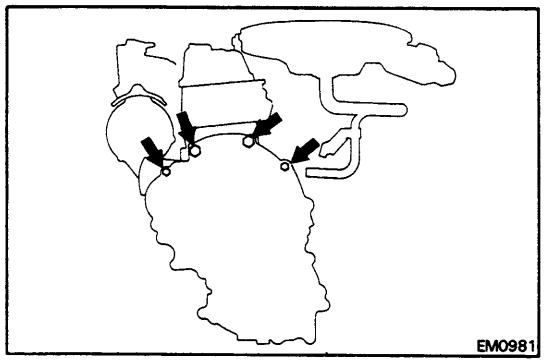
REMOVAL OF ENGINE

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. Canada Wagon 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

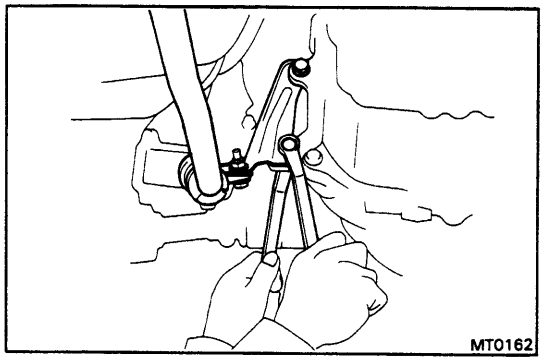
    NOTE: Before disconnecting the emission control hoses, use tags to indicatify how they should be reconnected.


EM0981

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.

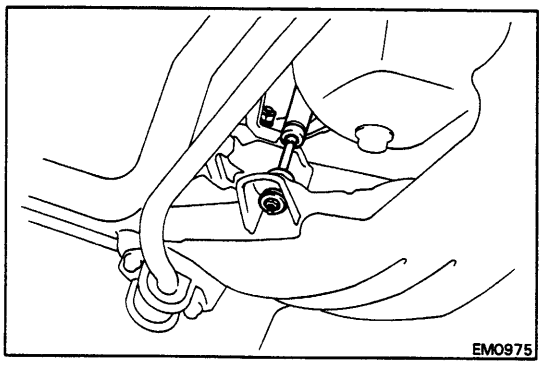

MT0162

18. **REMOVE EXHAUST FRONT PIPE**

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

20. **(w/ M/T)**
    DISCONNECT CLUTCH RELEASE CABLE

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

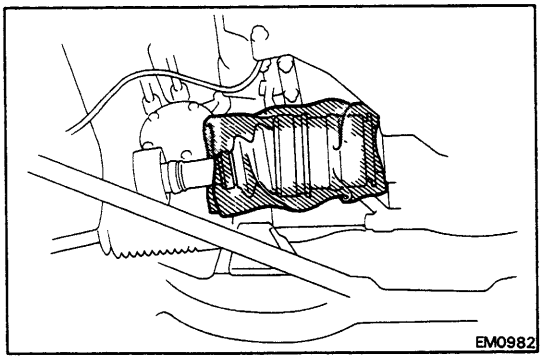

EM0975

22. **DISCONNECT ENGINE MOUNTING ABSORBER**
    Remove the nut holding the absorber to the crossmember.

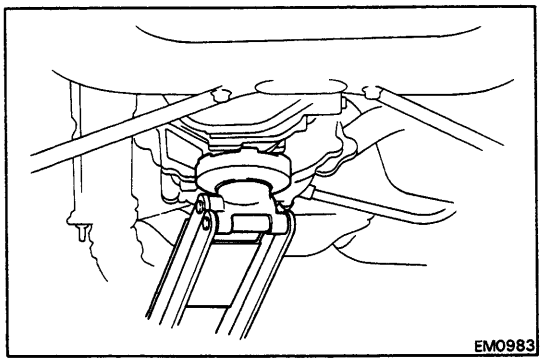
23. **REMOVE ENGINE MOUNT BOLTS**
    Remove the two bolts holding the mounting insulator to the crossmember.

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

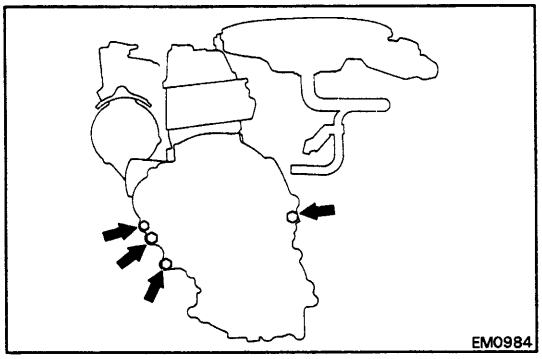
25. **REMOVE TORQUE CONVERTER MOUNT BOLTS (See page AT-25)**



26. WRAP BOTH DRIVE SHAFT BOOTS IN SHOP TOWEL

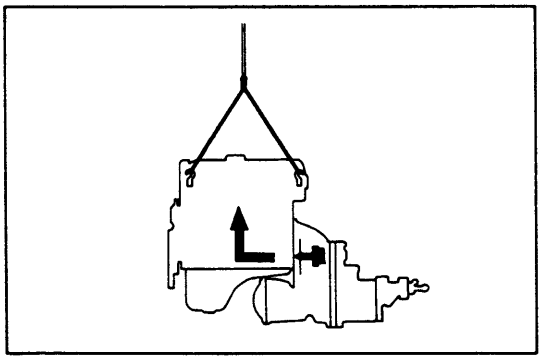


27. PLACE JACK UNDER TRANSAXLE



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

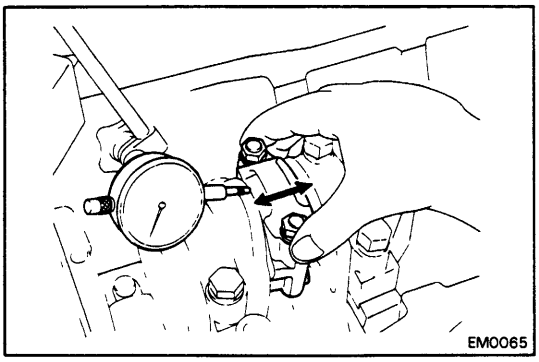
1. (w/ M/T)
   REMOVE CLUTCH COVER AND DISC
   (See page CL-8)
2. (w/ M/T)
   REMOVE FLYWHEEL
3. (w/ A/T)
   REMOVE DRIVE PLATE
4. REMOVE REAR END PLATE
5. INSTALL ENGINE STAND
6. REMOVE ALTERNATOR
7. REMOVE TIMING BELT
   (See steps 6 to 11 on pages EM-7 to 9)
8. REMOVE CYLINDER HEAD
   (See step 12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

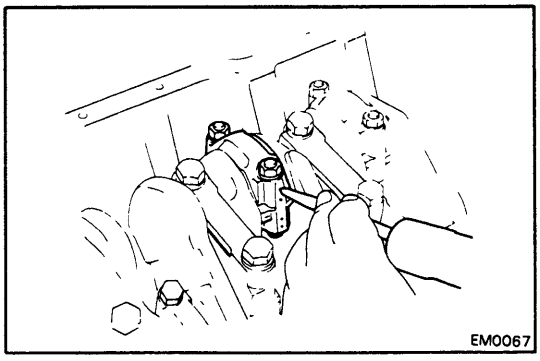

EM0065

2. CHECK CONNECTING ROD THRUST CLEARANCE

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

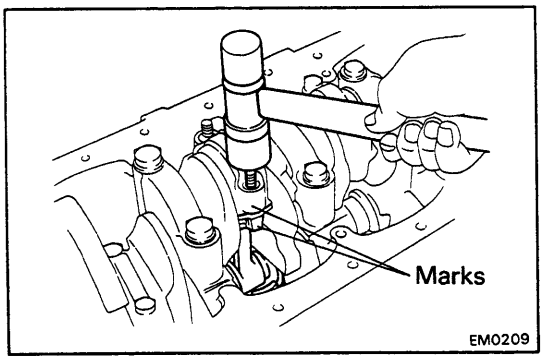
   Standard clearance: 0.15 – 0.25 mm (0.0059 – 0.0098 in.)
   Maximum clearance: 0.30 mm (0.0118 in.)

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


EM0067

3. REMOVE CONNECTING ROD CAPS AND CHECK OIL CLEARANCE

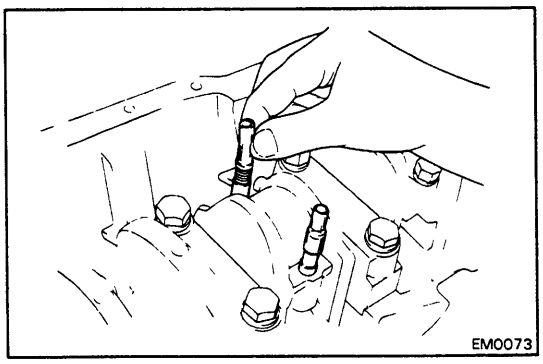
   (a) Using a punch or numbering stamp, place the connecting rods and caps to ensure correct reassembly.



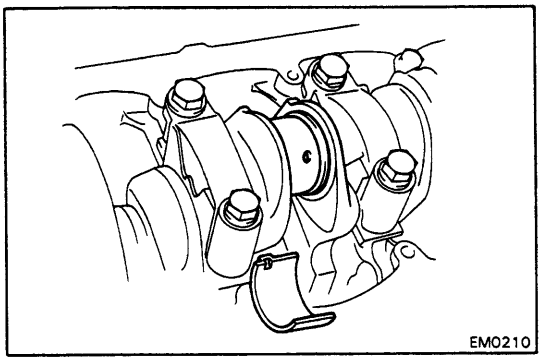
(b) Remove the connecting rod cap nuts.

(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.



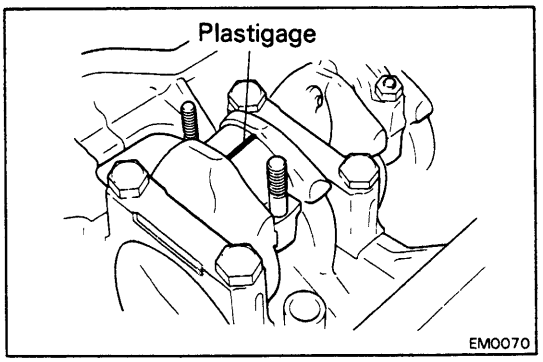
(d) Cover the connecting rod bolts with a short piece of hose to protect the crankshaft from damage.



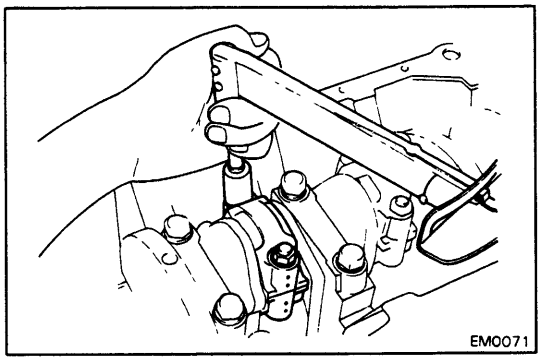
(e) Clean each crank pin and bearing.

(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.



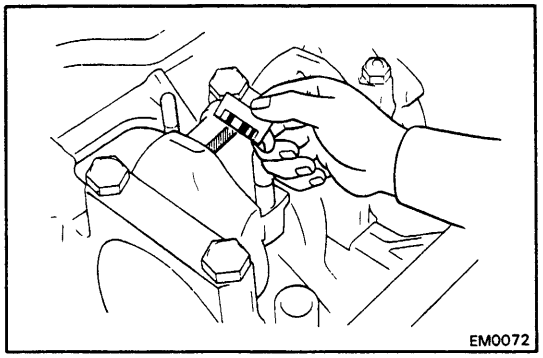
(g) Lay a strip of Plastigage across the crank pin.



(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.



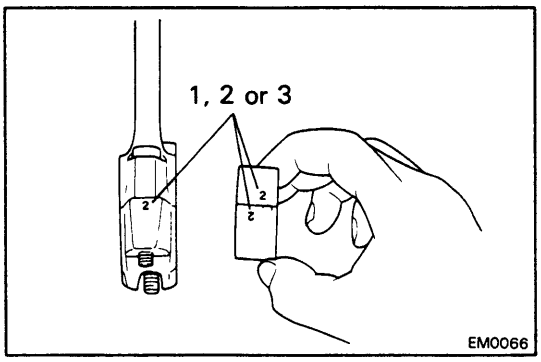
(i) Remove the connecting rod cap.

(j) Measure the Plastigage at its widest point.

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

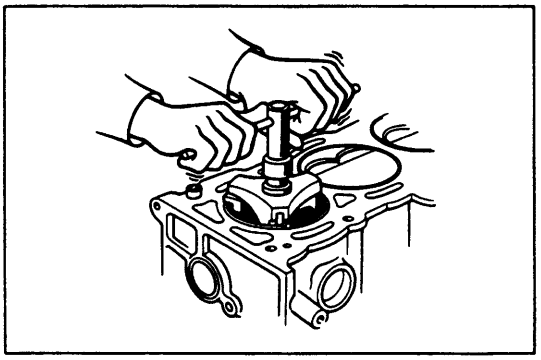
Maximum clearance: 0.08 mm (0.0031 in.)

If the clearance is greater than maximum, 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.

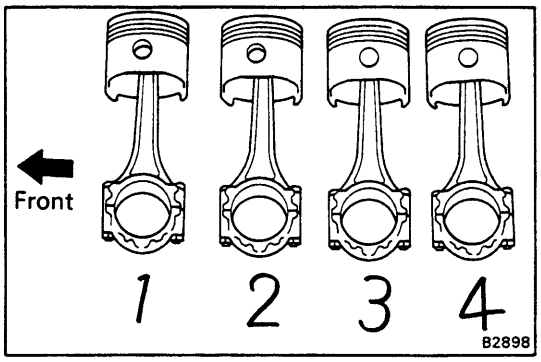


4. REMOVE PISTON AND CONNECTING ROD ASSEMBLIES

(a) Remove all the carbon from the piston ring ridge.

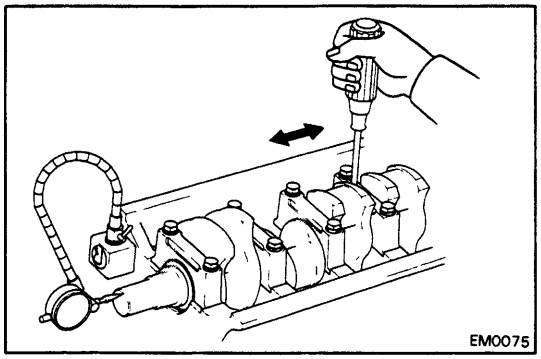
(b) Cover the connecting rod bolts (See page EM-41)

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



NOTE:

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



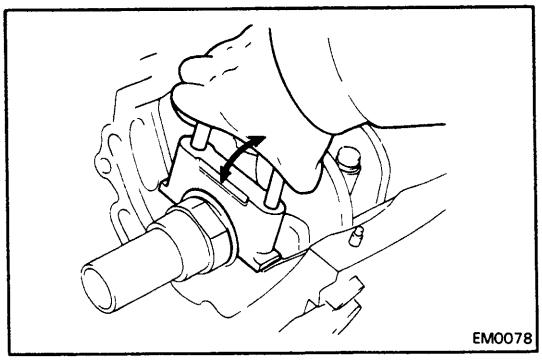
5. CHECK CRANKSHAFT THRUST CLEARANCE

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.)

Maximum thrust clearance: 0.30 mm (0.0118 in.)

If the clearance is exceeds maximum, replace the thrust washers as a set.



6. 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.

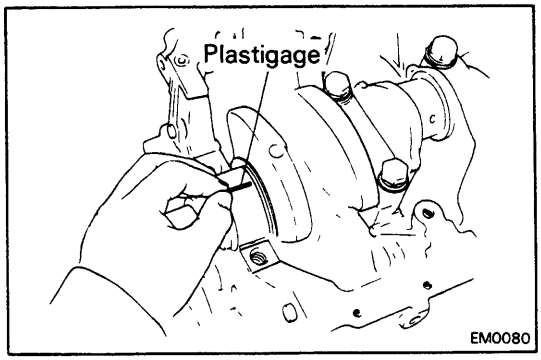
(c) Lift out the crankshaft.

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

(d) Clean each main journal and bearing.

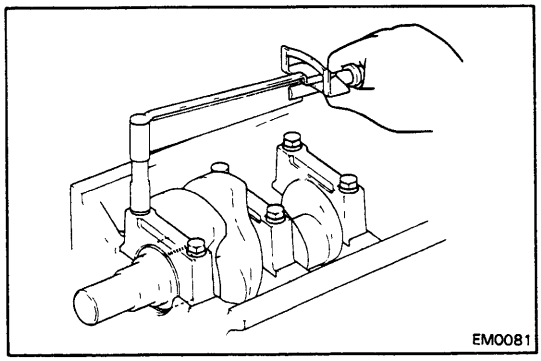
(e) Check each main journal and bearing for pitting and scratches.

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



(f) Place the crankshaft on the cylinder block.

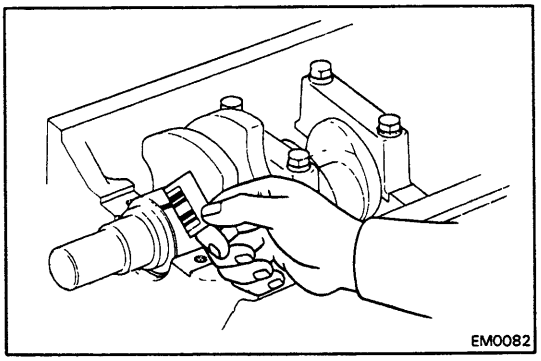
(g) Lay a strip of Plastigage across each main journals.



(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.



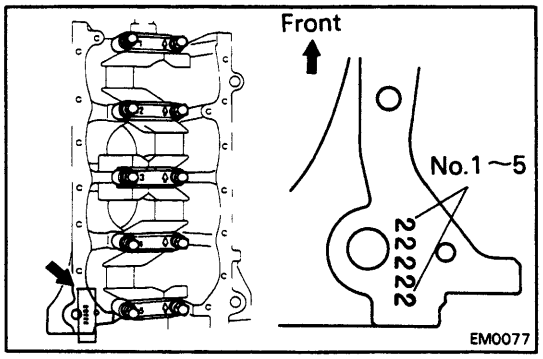
(i) Remove the main bearing caps.

(j) Measure the Plastigage at its widest point.

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

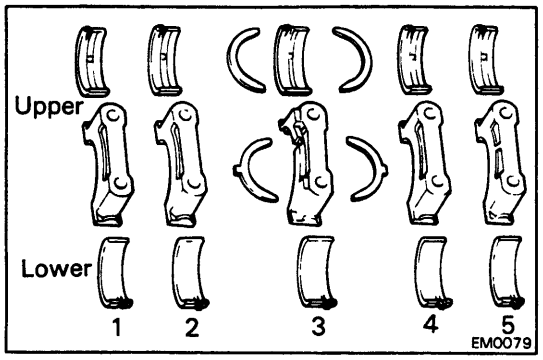
Maximum clearance: 0.08 mm (0.0031 in.)

If the clearance is exceeds maximum, 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.



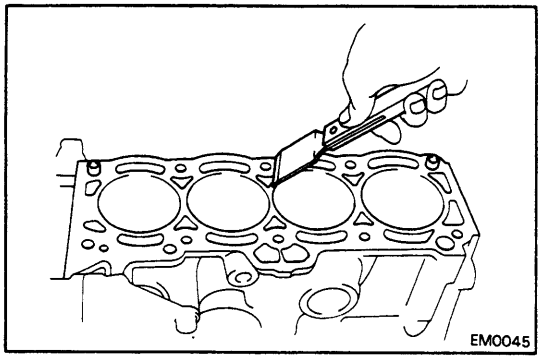
7. REMOVE CRANKSHAFT

(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

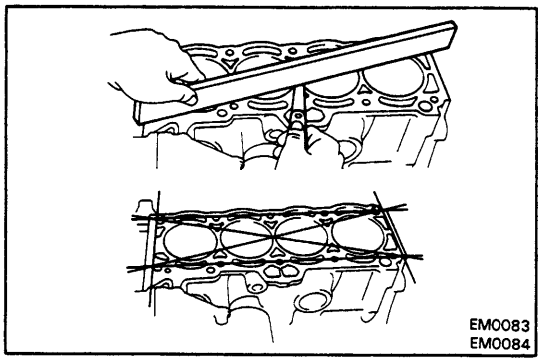


1. REMOVE GASKET MATERIAL

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.

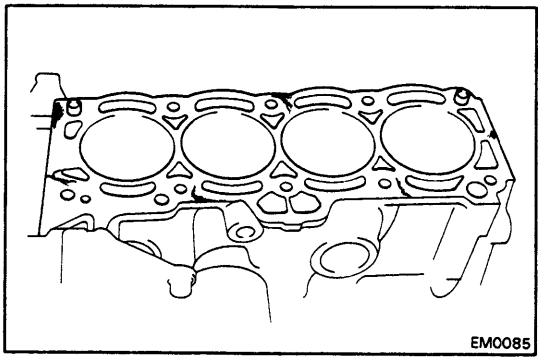


3. INSPECT TOP OF CYLINDER BLOCK FOR FLATNESS

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

Maximum warpage: 0.05 mm (0.0020 in.)

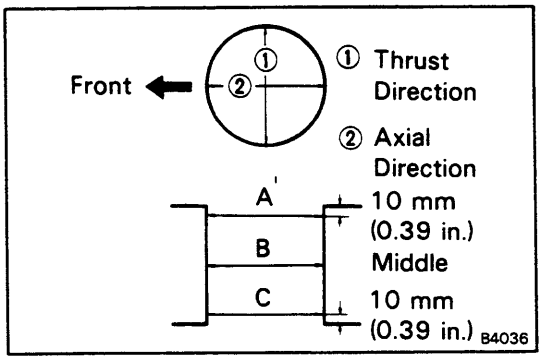
If warpage is exceeds maximum, replace the cylinder block.

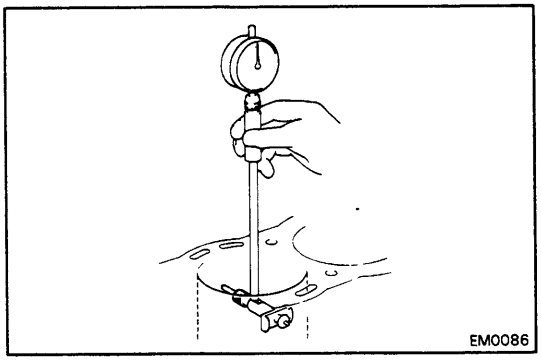


4. INSEPCT CYLINDERS FOR VERTICAL SCRATCHES

Visually check the cylinder for vertical scratches.

If deep scratches are present, rebore all four cylinders.





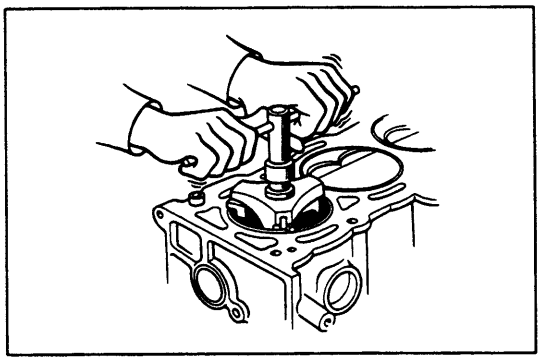
5. INSPECT CYLINDER BORE DIAMETER

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

Maximum diameter

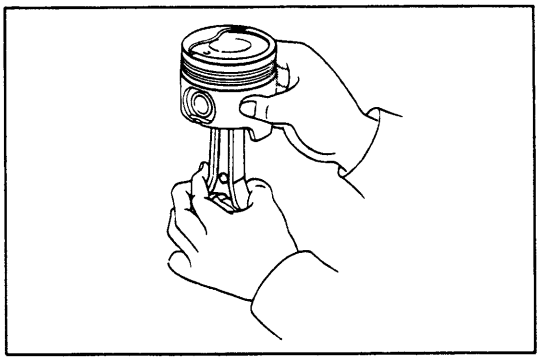
Piston size	Cylinder bore diameter mm (in.)
STD	77.73 (3.0602)
O/S 0.50	78.23 (3.0799)
O/S 0.75	78.48 (3.0898)
O/S 1.00	78.73 (3.0996)

If the diameter is exceeds maximum, 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 piston ring ridge at the top of the cylinder.

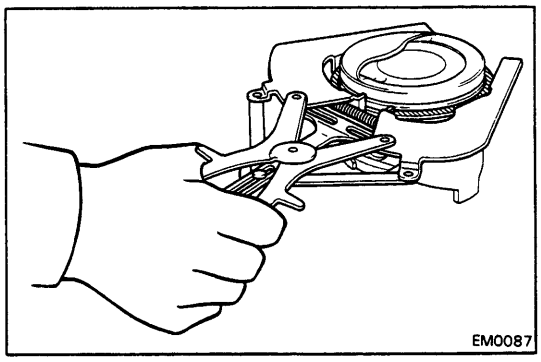


DISASSEMBLY OF PISTON AND CONNECTING ROD ASSEMBLIES

1. CHECK FIT BETWEEN PISTON AND PIN

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

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

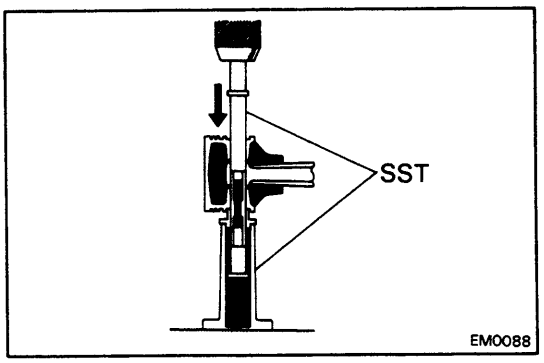


2. REMOVE PISTON RINGS

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

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

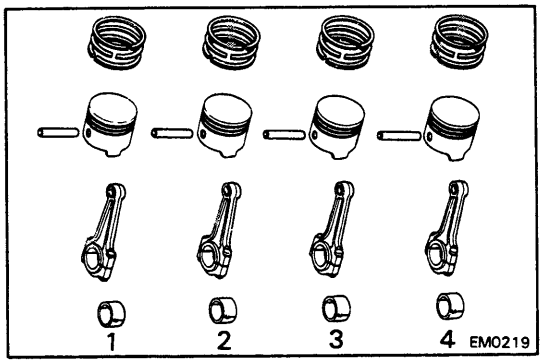
NOTE: Arrange the rings in correct order only.



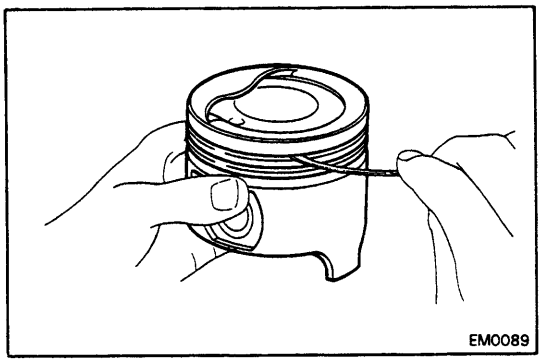
3. DISCONNECT CONNECTING ROD FROM PISTON

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

SST 09221-25018



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



INSPECTION OF PISTON AND CONNECTING ROD ASSEMBLIES

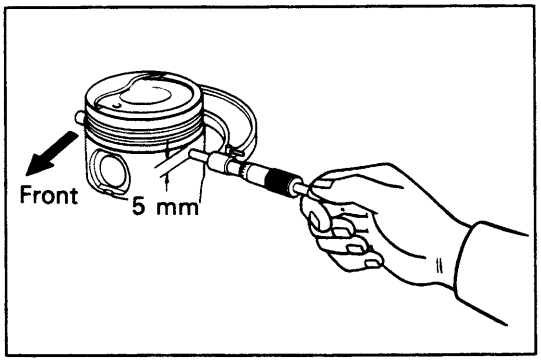
1. CLEAN PISTON

(a) Scrape carbon from the piston top.

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

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

CAUTION: Do not use a wire brush.



2. INSPECT PISTON DIAMETER AND OIL CLEARANCE

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

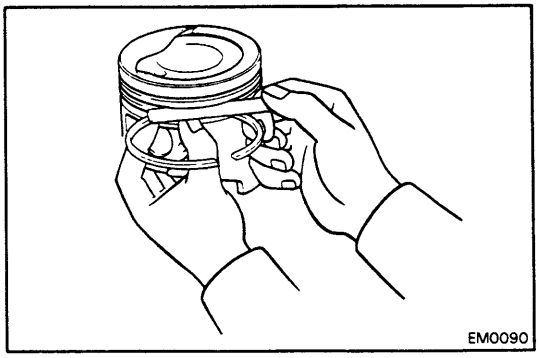
Standard diameter

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 piston 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.



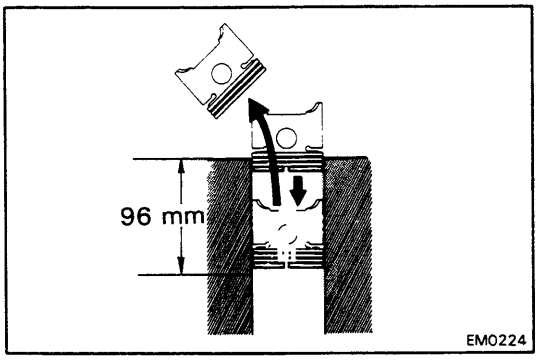
3. INSPECT CLEARANCE BETWEEN WALL OF PISTON RING GROOVE AND NEW PISTON RING

Using a feeler gauge, measure the clearance between new piston ring and the wall of the piston 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.)

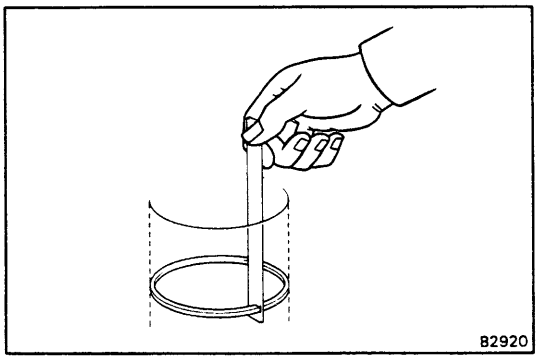
If the clearance is not within specification, replace the piston.



4. INSPECT PISTON RING END GAP

(a) Insert the piston ring into the cylinder bore.

(b) Using a piston, push the piston 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.

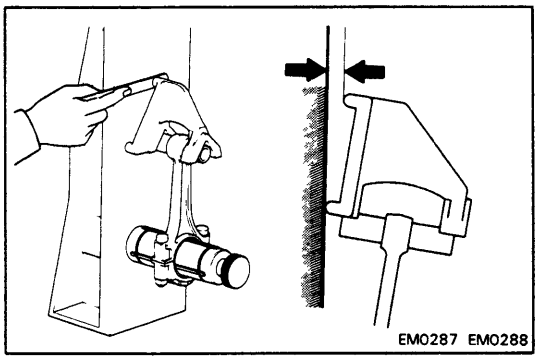
Standard end gap:

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.)

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



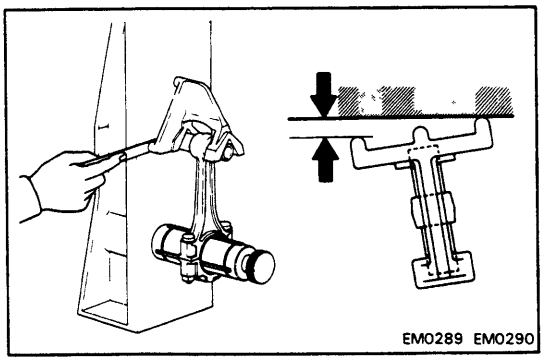
5. INSPECT CONNECTING RODS

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

- Check for bend.

Maximum bend:

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



- Check for twist.

Maximum 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.

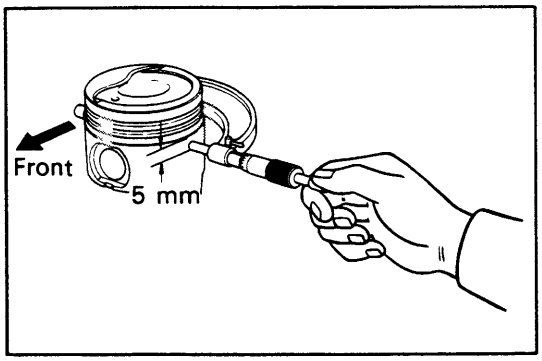
BORING OF CYLINDERS

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

1. SELECT OVERSIZED PISTON

Oversized piston 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. CALCULATE AMOUNT TO BORE CYLINDER

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

(b) Calculate the amount each cylinder is to be rebored as follows:

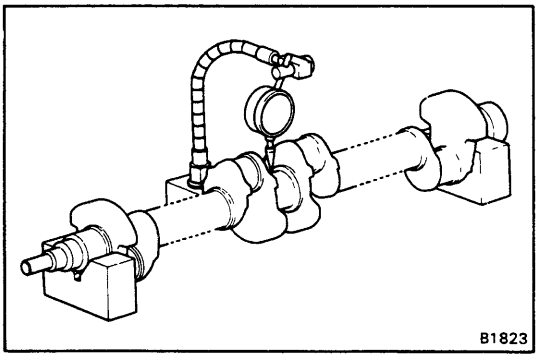
Size to be rebored = P + C – H

P = Piston diameter
C = Piston 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

Maximum honing: 0.02 mm (0.0008 in.)

CAUTION: Excess honing will destroy the finished roundness.



INSPECTION OF CRANKSHAFT

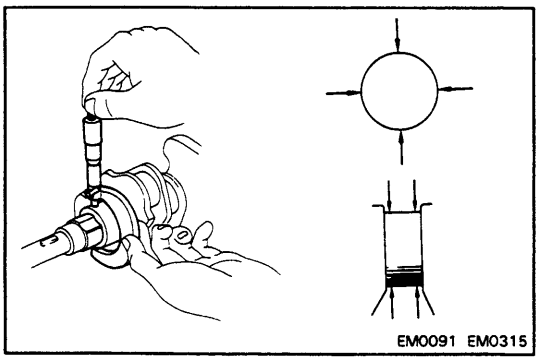
1. INSPECT CRANKSHAFT FOR RUNOUT

(a) Place the crankshaft on V-blocks.

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

Maximum circle runout: 0.06 mm (0.0024 in.)

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



2. INSPECT MAIN JOURNALS AND CRANK PINS

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

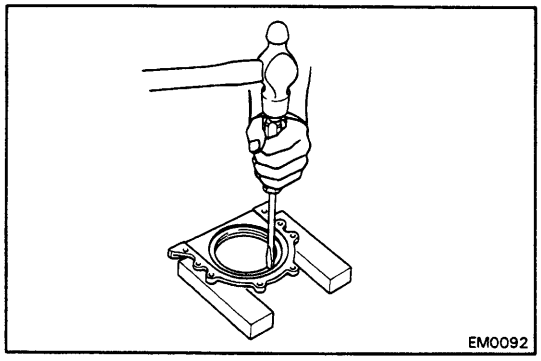
Main journal diameter:
47.985 – 48.000 mm (1.8892 – 1.8898 in.)
Crank pin diameter:
39.985 –40.000 mm (1.5742 – 1.5748 in.)

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.

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

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



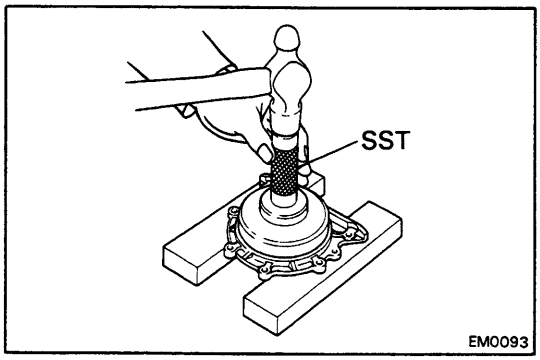
REPLACEMENT OF REAR OIL SEAL

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:

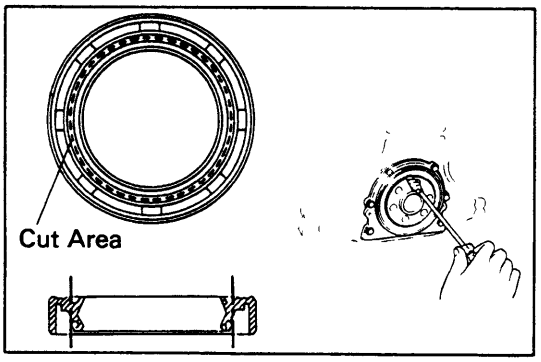
(a) Using a screwdriver and hammer, drive out the oil seal.



(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.

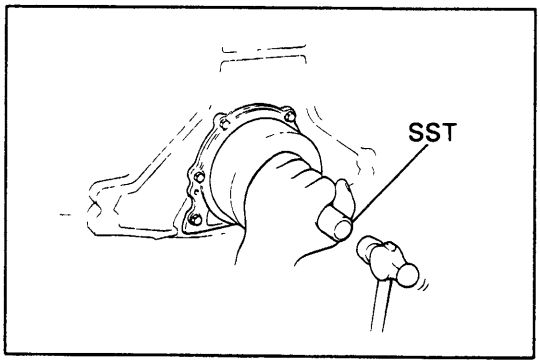


If rear oil seal retainer is installed in the cylinder block:

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

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

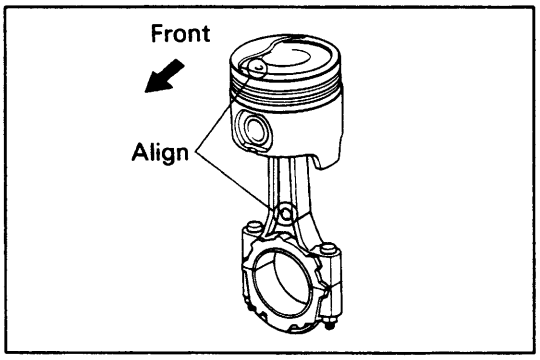
CAUTION: To prevent damage to the crankshaft, tape the screwdriver.



(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.

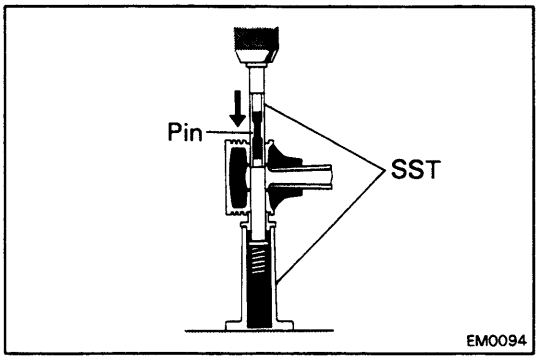
SST 09223-41020



ASSEMBLY OF PISTON AND CONNECTING ROD ASSEMBLIES

1. ASSEMBLE PISTON AND CONNECTING ROD

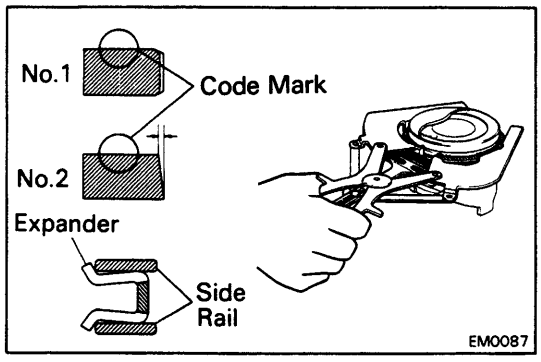
(a) Align the cavity on the piston with the protrusion on the connecting rod.



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

SST 09221-25018

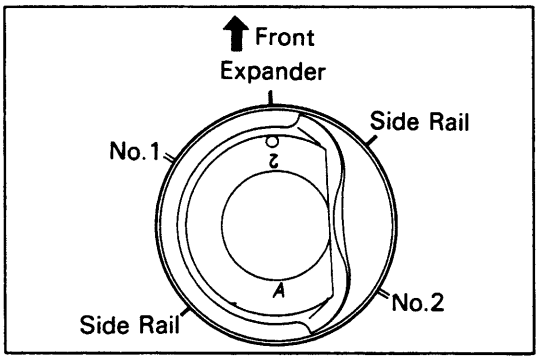
NOTE: Coat the piston pin and hole with engine oil.



2. INSTALL PISTON RINGS

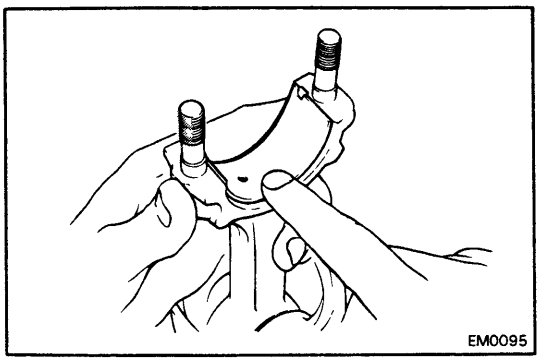
(a) Install the oil ring expander and two side rails by hand.

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



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

CAUTION: Do not align the end gaps.



3. INSTALL BEARINGS

Install the bearings in the connecting rods and rod caps.

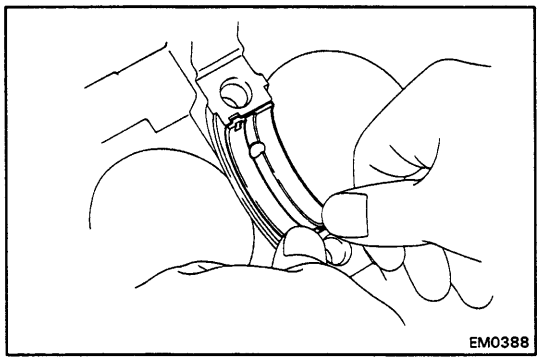
CAUTION: Install the bearing with the oil hole in the connecting rod.

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 seals with new parts.



1. INSTALL MAIN BEARINGS

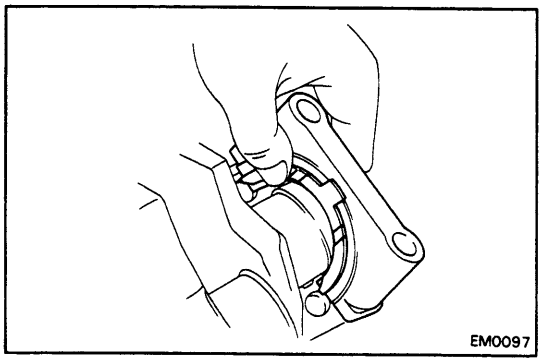
Install the bearing in the cylinder block and bearing caps.

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.

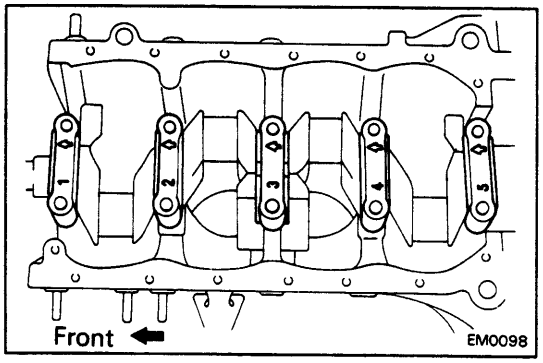
3. PLACE CRANKSHAFT ON CYLINDER BLOCK



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 order with the arrows facing forward.

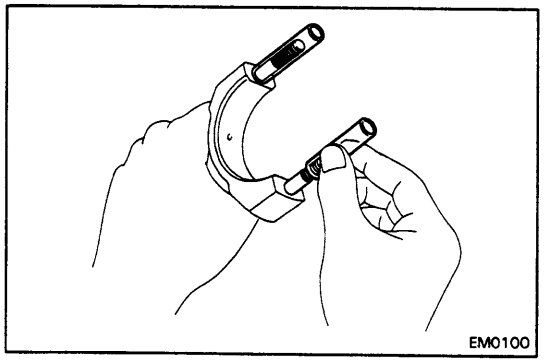
(c) Apply a light coating of engine oil on the threads and under the connecting rod cap bolt heads.

(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)

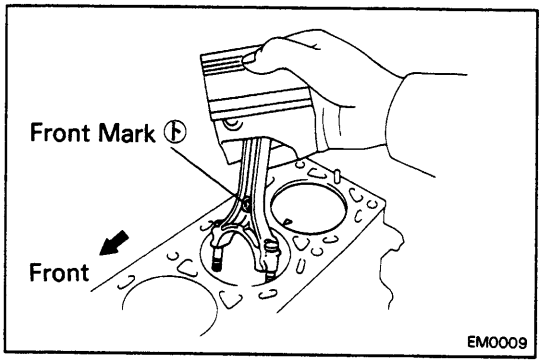
(e) Check that the crankshaft turns.

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

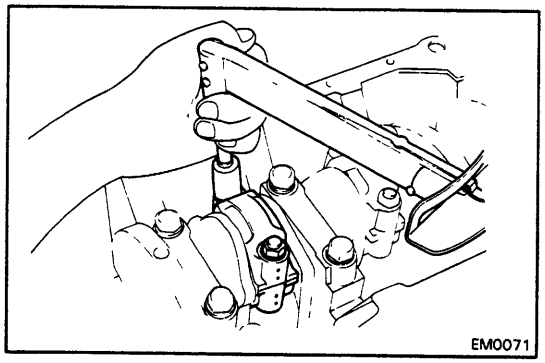


5. INSTALL PISTON AND CONNECTING ROD ASSEMBLIES

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



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

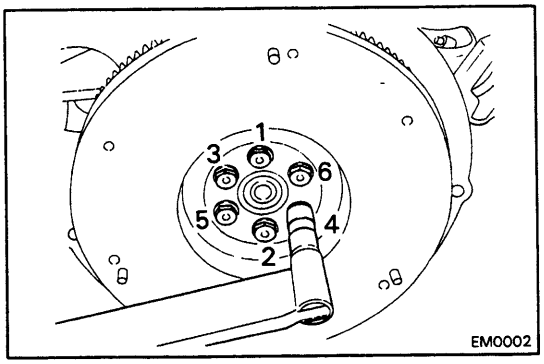
7. **INSTALL REAR OIL SEAL RETAINER**

Touque the six bolts.

Torque: 95 kg-cm (82 in.-lb, 9.3 N·m)

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 IIA (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**

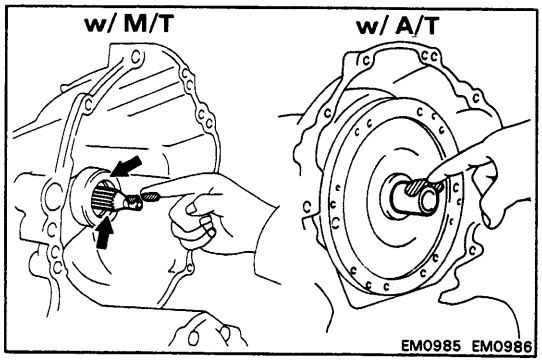
Torque: 800 kg-cm (58 ft-lb, 78 N·m)

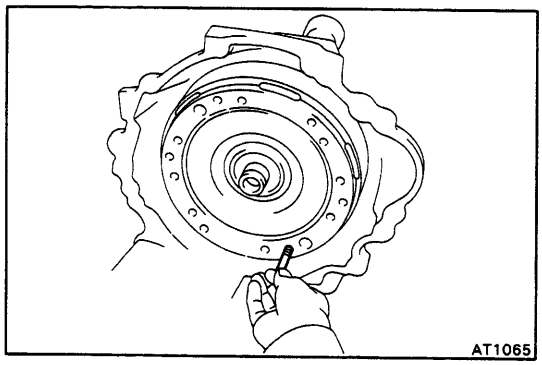
11. **(w/ A/T) INSTALL DRIVE PLATE**

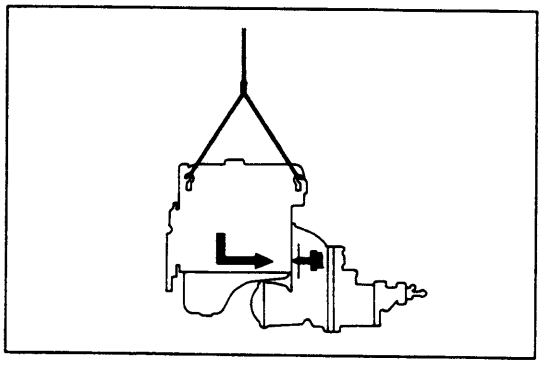
Torque: 650 kg-cm (47 ft-lb, 64 N·m)

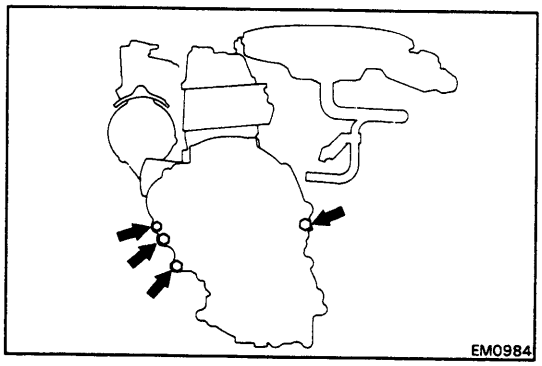
12. **(w/ M/T) INSTALL CLUTCH DISC AND CLUTCH COVER (See page CL-12)**

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 release 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 plate holes.
   (d) Connect the engine and transaxle.

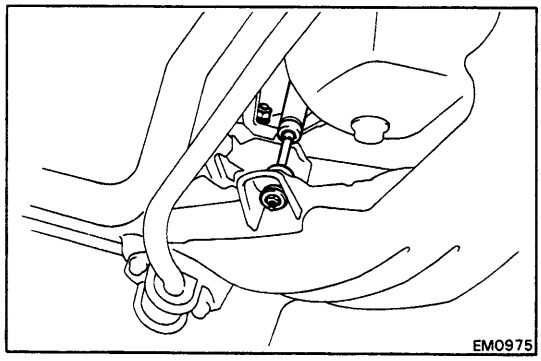
4. **INSTALL STARTER AND TRANSAXLE LOWER MOUNT BOLTS**
   (a) Place the starter in position.
   (b) Install and torque the lower mount bolts.
   Torque:
   14 mm bolt head 400 kg-cm (29 ft-lb, 39 N·m)
   17 mm bolt head 600 kg-cm (43 ft-lb, 59 N·m)
   (c) Remove the hoist chain.

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 N·m)

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

8. **TAKE OUT JACK FROM UNDER TRANSAXLE**



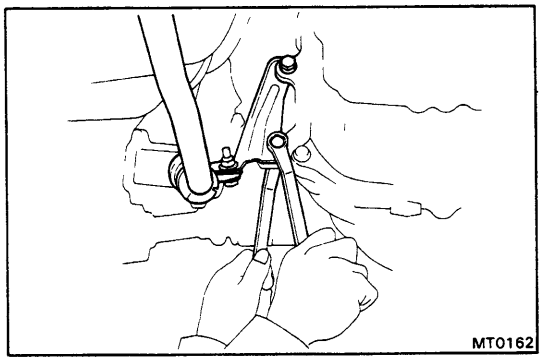
9. **INSTALL ENGINE MOUNT NUTS**
   Torque: 450 kg-cm (33 ft-lb, 44 N·m)

10. **CONNECT ENGINE MOUNTING ABSORBER**

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

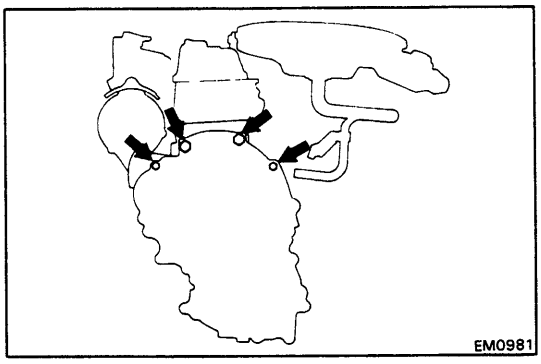
12. **(w/ M/T)**
    CONNECT CLUTCH RELEASE CABLE

13. **(w/ A/T)**
    INSTALL COOLER PIPES
    Torque the union 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. **LOWER VEHICLE**



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. Canada Wagon 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

22. **(w/ PS)**
    INSTALL POWER STEERING (PS) PUMP (See page SR-30)
    Torque: 375 kg-cm (27 ft-lb, 37 N·m)

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. **ROAD TEST**

    Perform a road test.

35. **RECHECK COOLANT AND ENGINE OIL LEVEL**

EMISSION CONTROL SYSTEMS

	Page
SYSTEM PURPOSE	EC-2
COMPONENT LAYOUT AND SCHEMATIC DRAWING	EC-3
POSITIVE CRANKCASE VENTILATION (PCV) SYSTEM	EC-7
FUEL EVAPORATIVE EMISSION CONTROL (EVAP) SYSTEM	EC-9
THROTTLE POSITIONER (TP) SYSTEM	EC-15
MIXTURE CONTROL (MC) SYSTEM	EC-18
EXHAUST GAS RECIRCULATION (EGR) SYSTEM	EC-20
AIR SUCTION (AS) SYSTEM	EC-27
CARBURETOR FEEDBACK SYSTEM	EC-32
THREE-WAY AND OXIDATION CATALYST (TWC-OC) SYSTEM	EC-36
THREE-WAY CATALYST (TWC) SYSTEM	EC-38
OXIDATION CATALYST (OC) SYSTEM	EC-38
HIGH ALTITUDE COMPENSATION (HAC) SYSTEM	EC-40
AUXILIARY SYSTEMS	EC-43
1. Automatic Hot Air Intake (HAI) System	EC-43
2. Hot Idle Compensation (HIC) System on Air Cleaner	EC-45
3. Automatic Choke System	EC-47
4. Choke Breaker (CB) System	EC-49
5. Choke Opener System	EC-51
6. Auxiliary Acceleration Pump (AAP) System	EC-54
7. Deceleration Fuel Cut System	EC-56
8. Heat Control Valve	EC-60
9. Cold Mixture Heater (CMH) System	EC-61

NOTE: TROUBLESHOOTING

See page EM-2

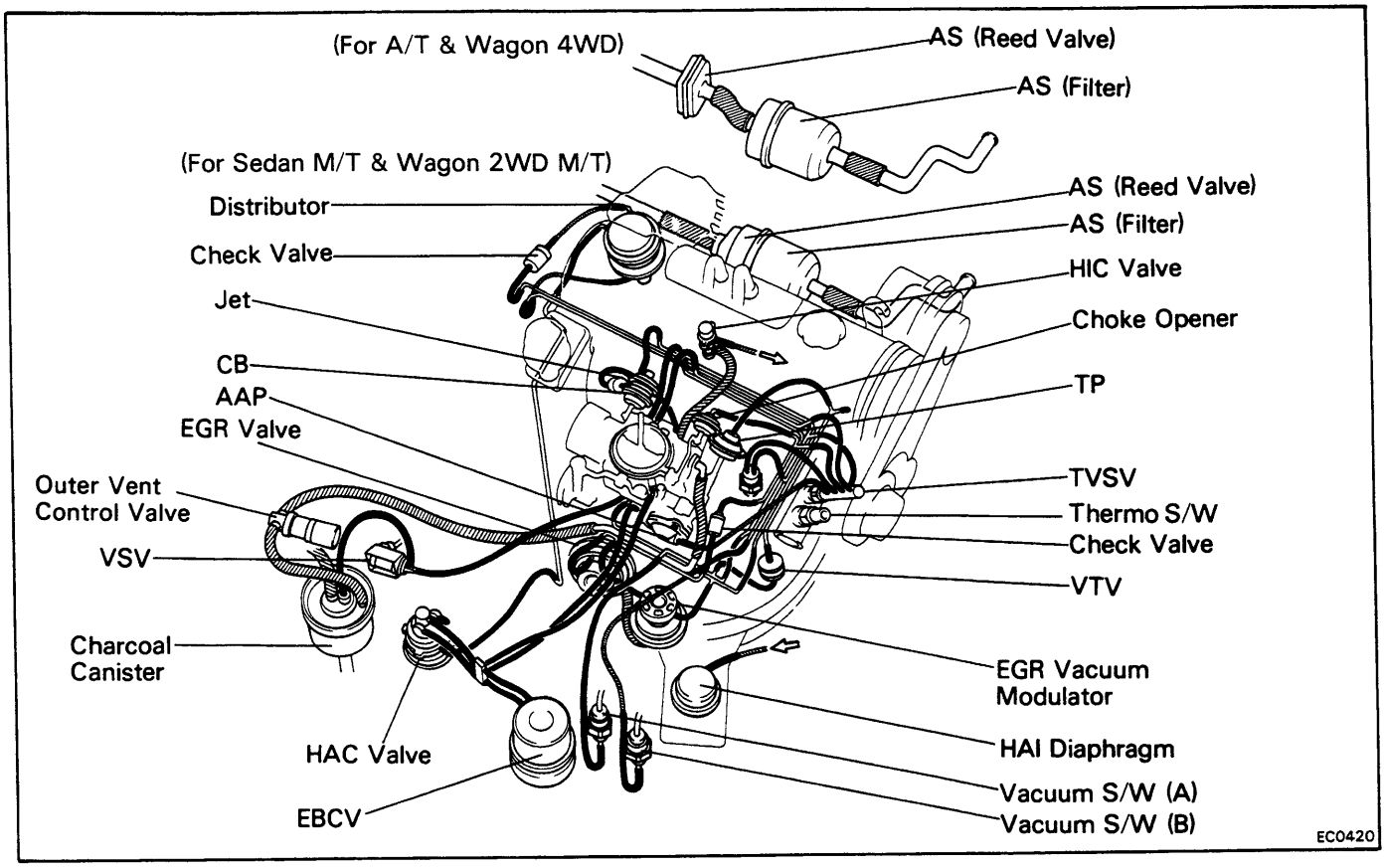
SYSTEM PURPOSE

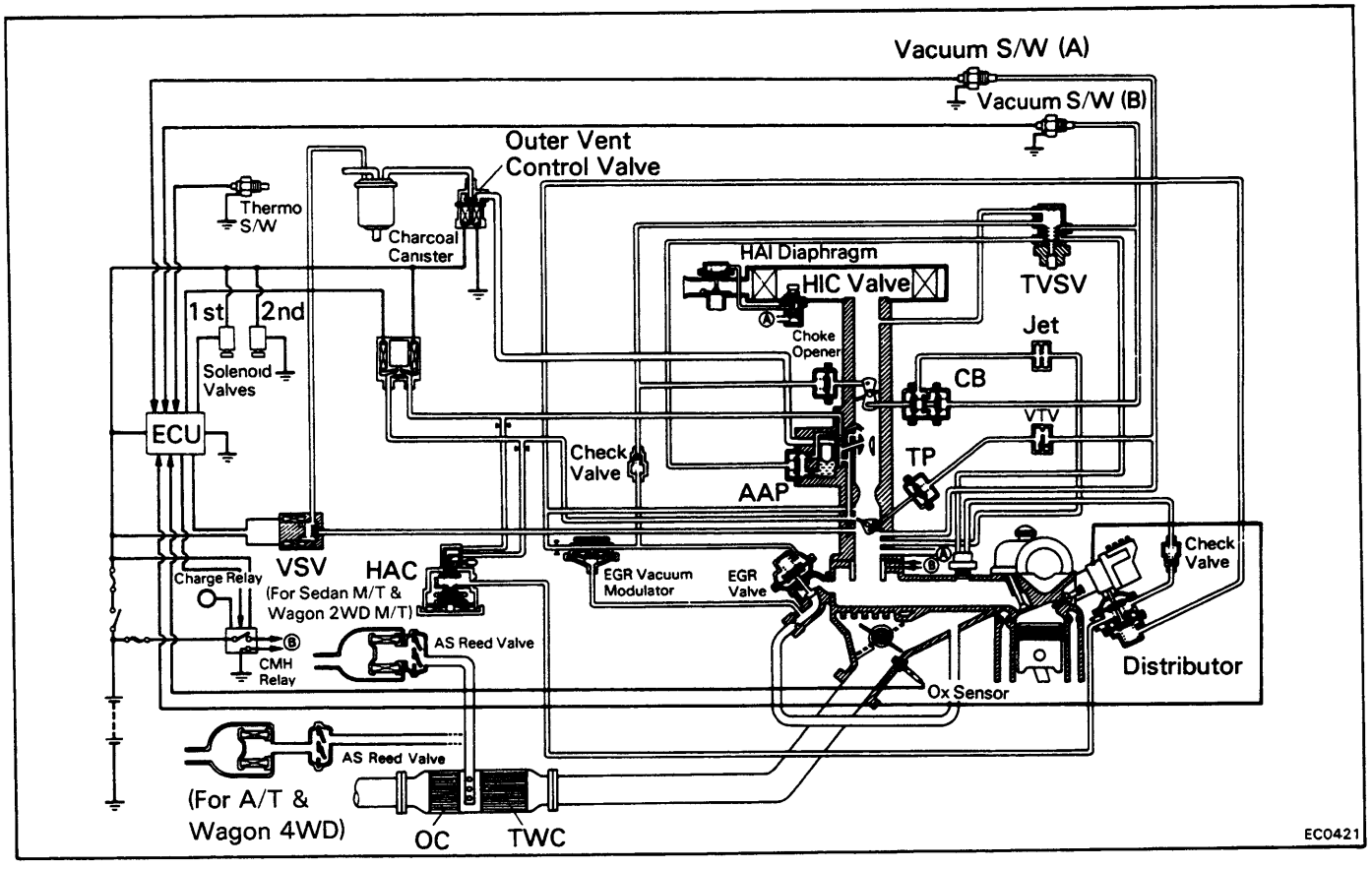
● : Installed

System	Abbreviation	Purpose	USA		Canada		
			Fed	Calif	* 3A-C 4-Speed Wagon A/T	3A-C Wagon M/T	3A
Positive crankcase ventilation	PCV	Reduces blow-by gas (HC)	●	●	●	●	●
Fuel evaporative emission control	EVAP	Reduces evaporative HC	●	●	●	●	●
Throttle 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	●	●	●	—	—

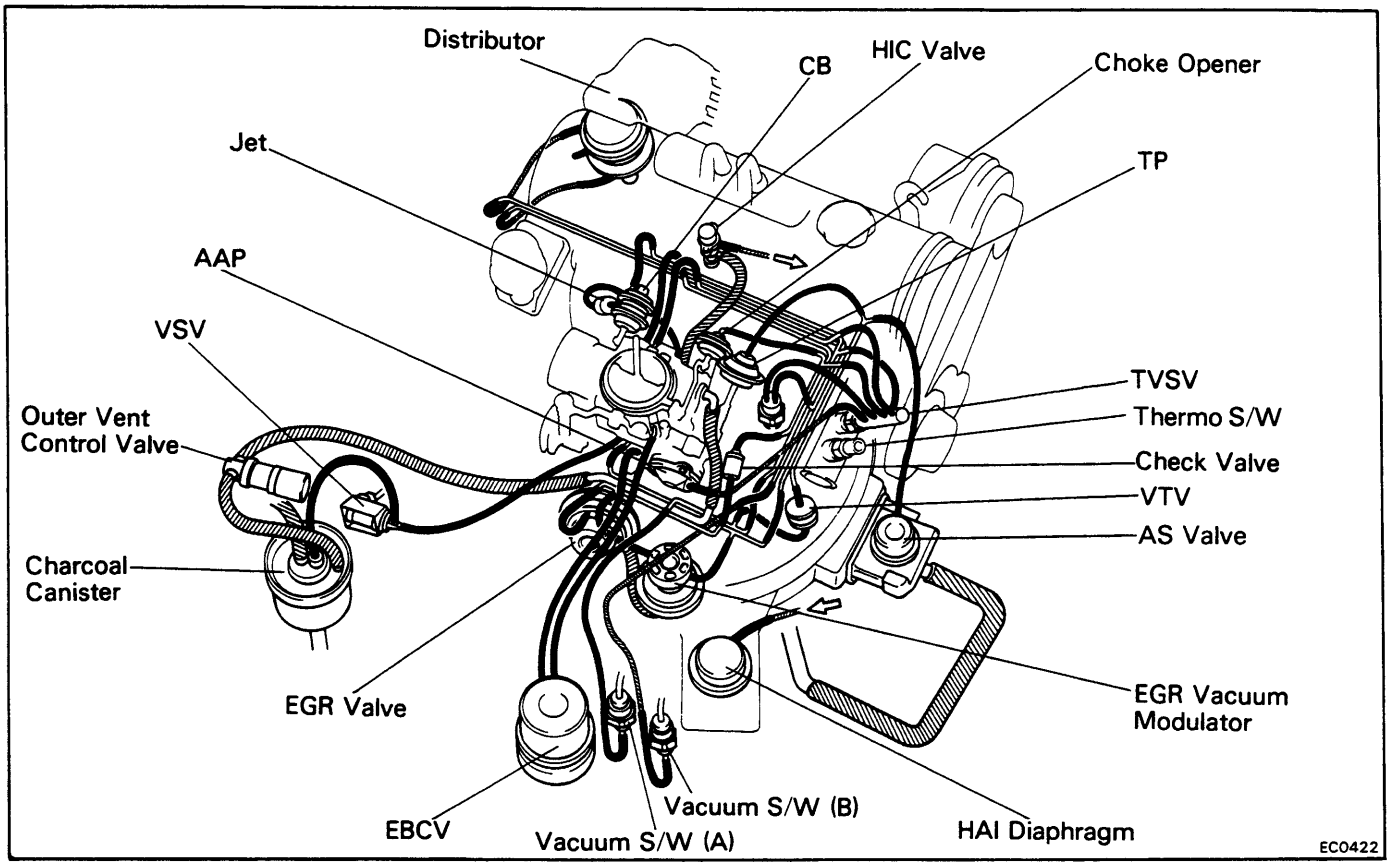
Remarks: * This system is the same for california USA.

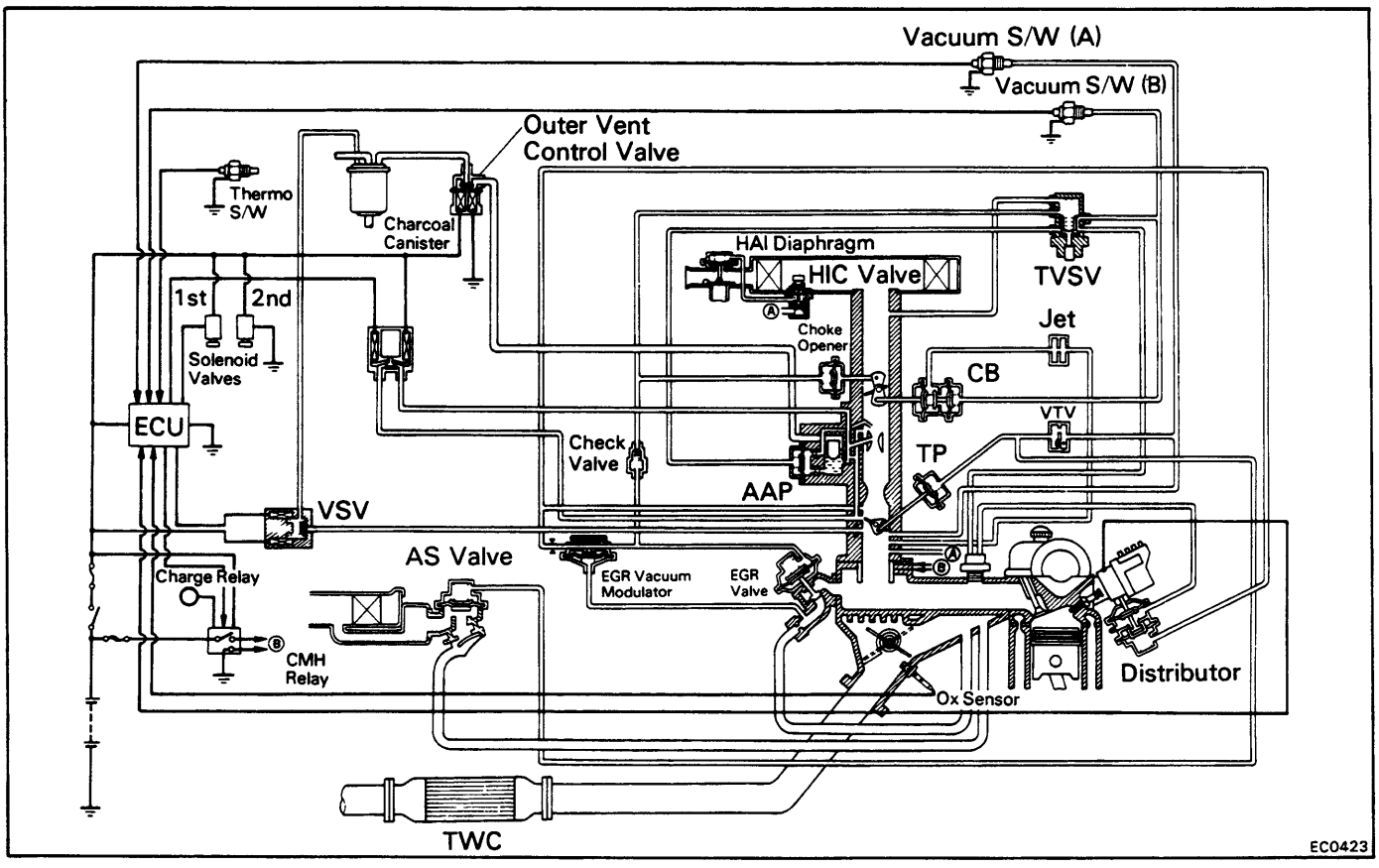
COMPONENT LAYOUT AND SCHEMATIC DRAWING (Federal Vehicles)



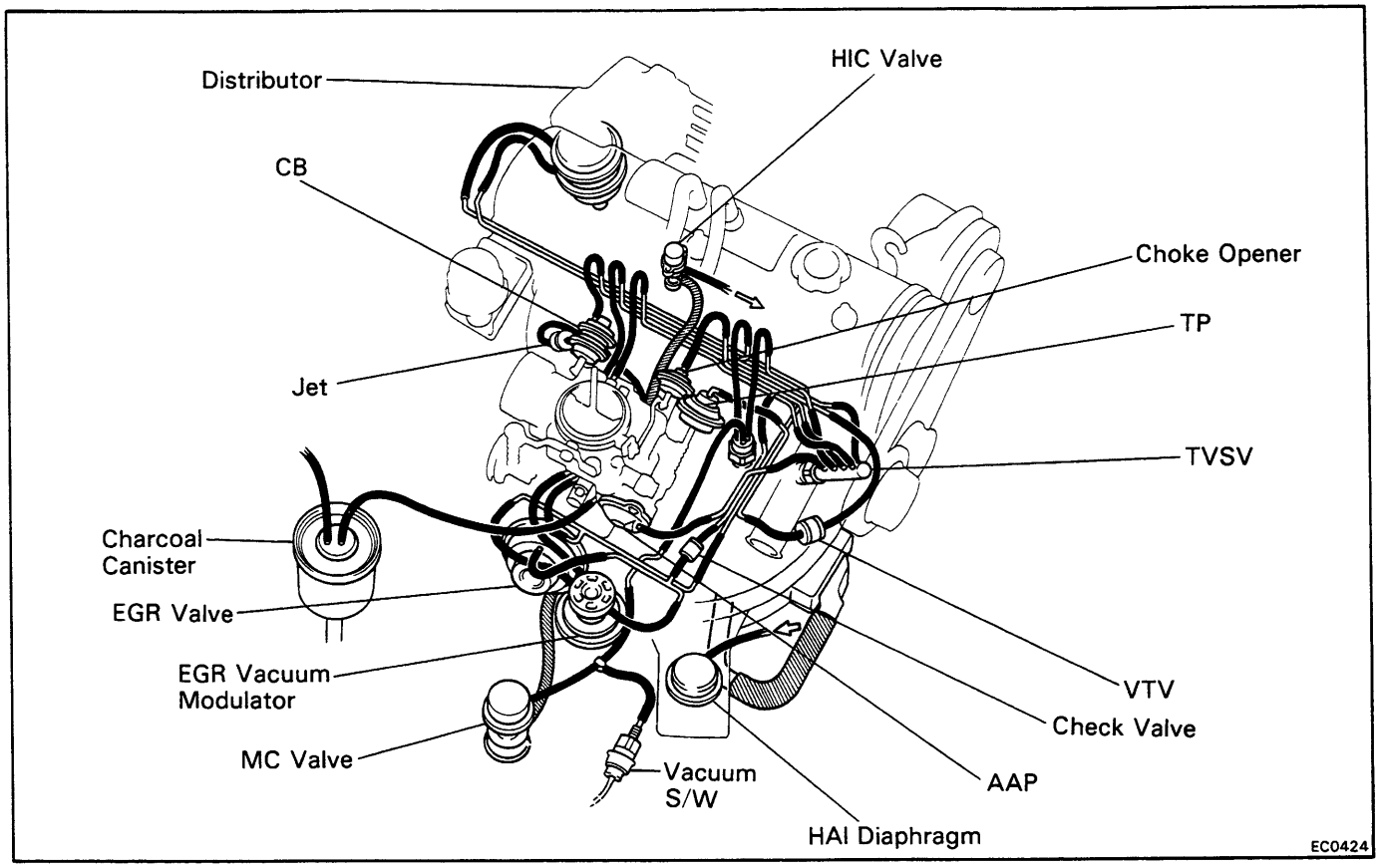


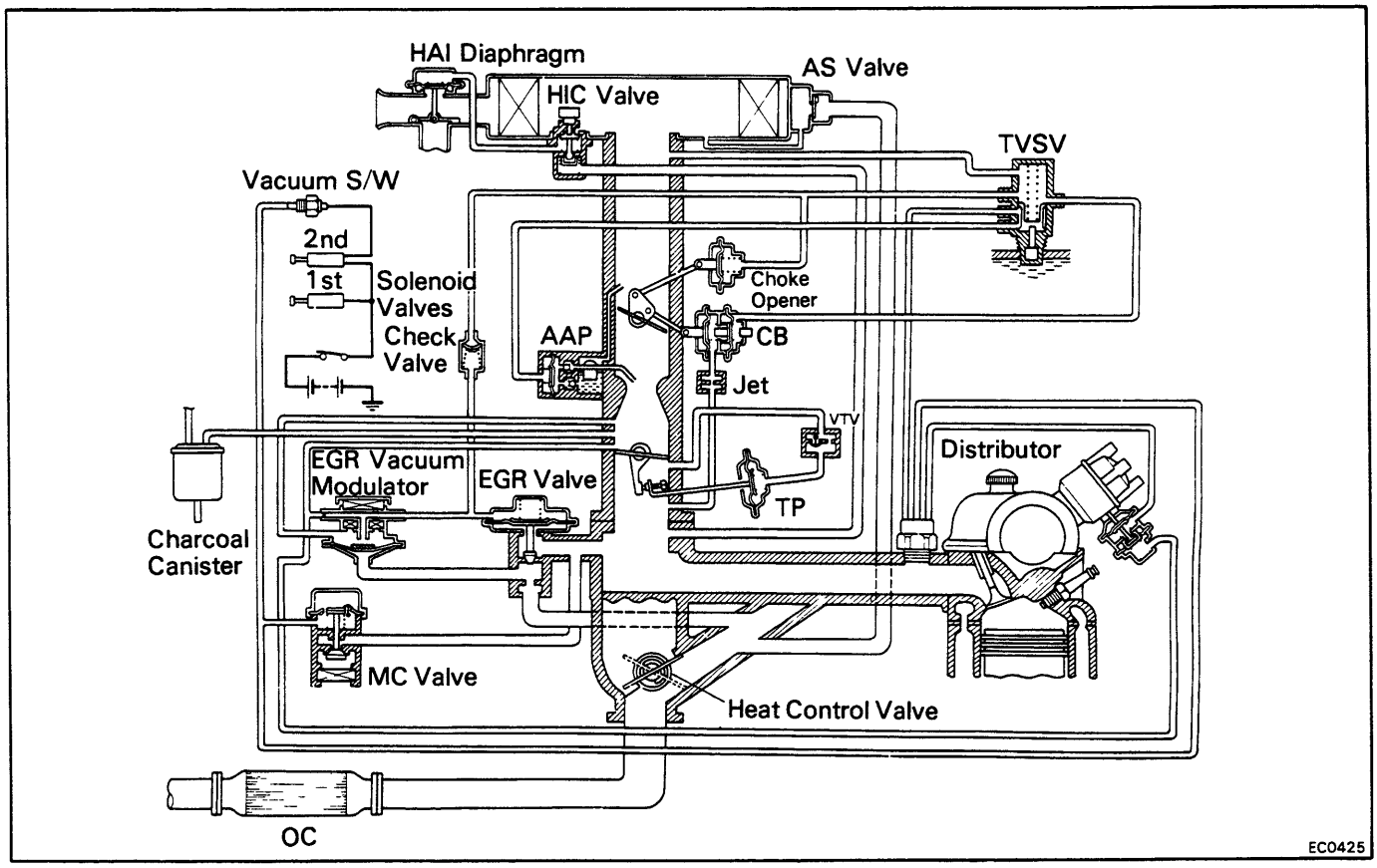
COMPONENT LAYOUT AND SCHEMATIC DRAWING (California Vehicles and Canada 3A-C Engine 4-Speed & Wagon A/T)



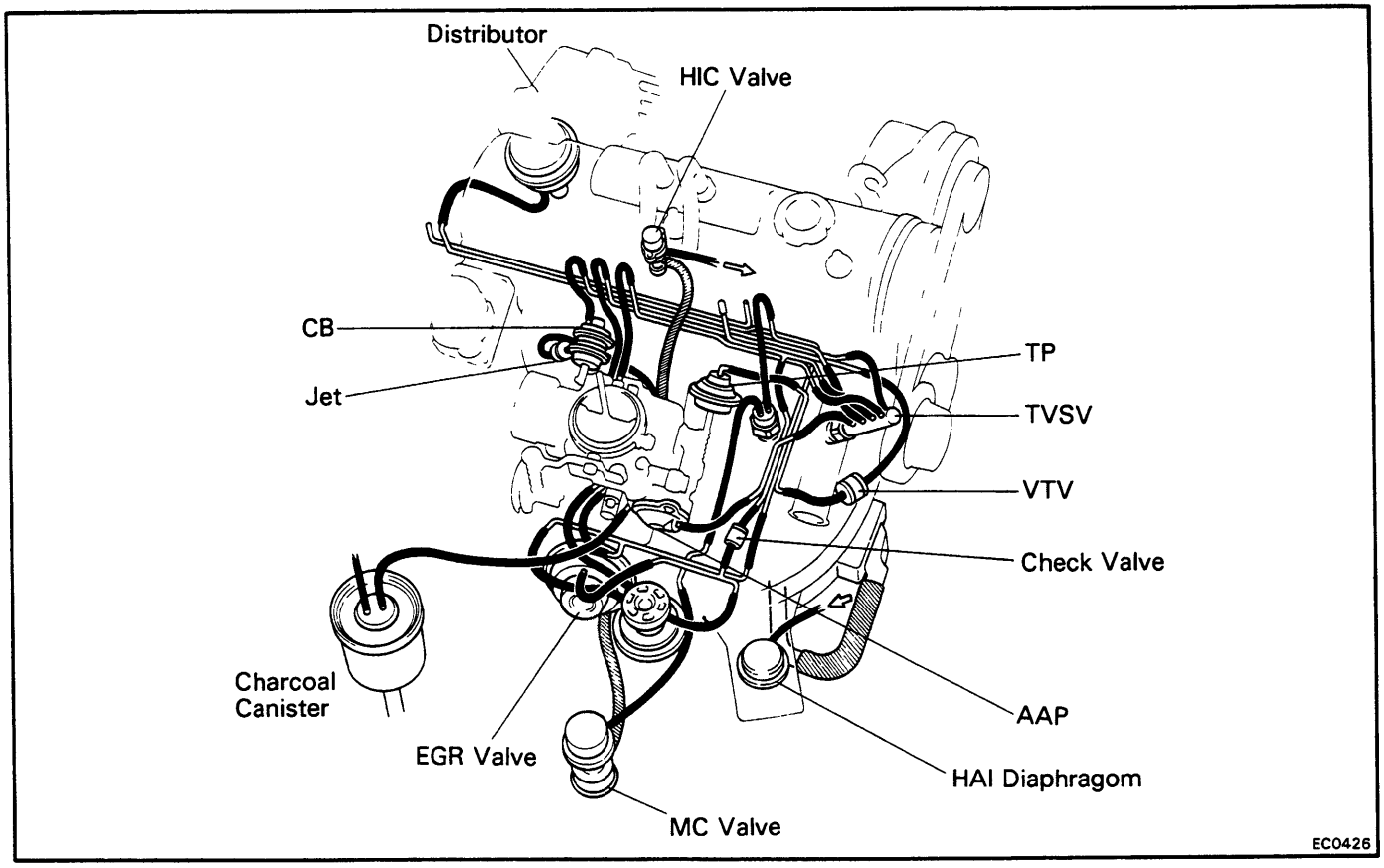


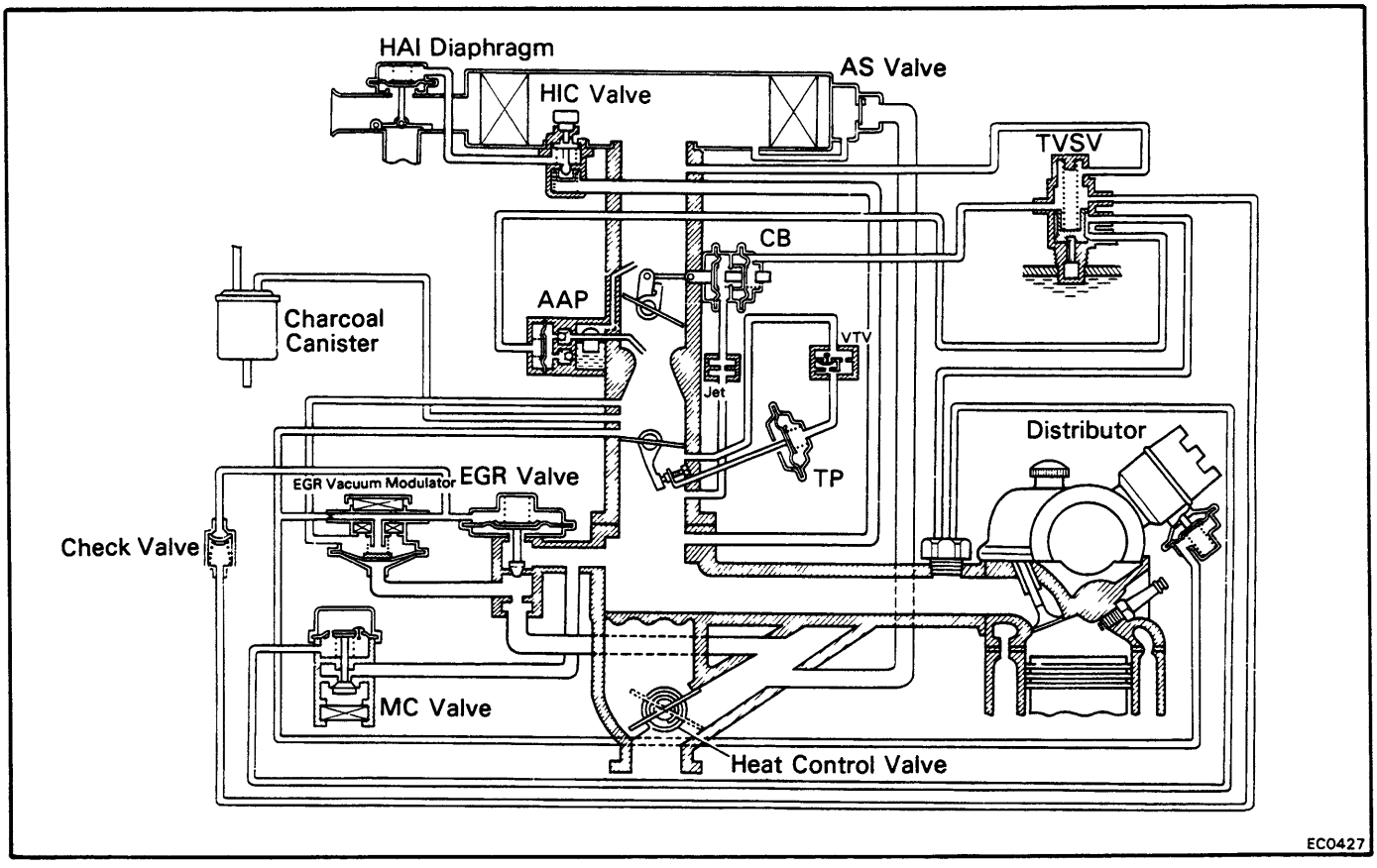
COMPONENT LAYOUT AND SCHEMATIC DRAWING (Canada Vehicles Wagon M/T)



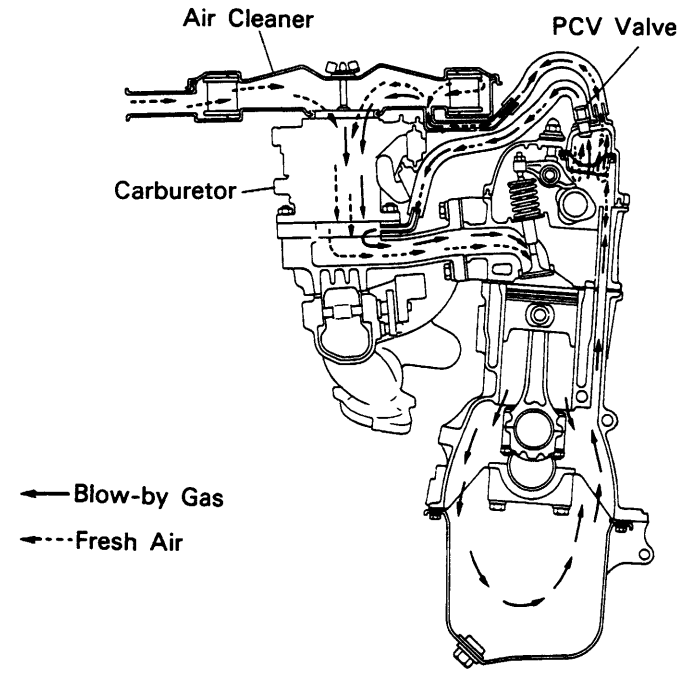


COMPONENT LAYOUT AND SCHEMATIC DRAWING (Canada Vehicles 3A Engine)





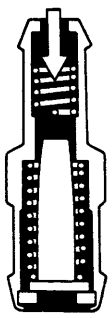
POSITIVE CRANKCASE VENTILATION (PCV) SYSTEM



EC1030

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

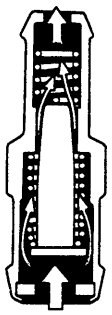
Engine not Running or if backfiring



○ PCV VALVE IS CLOSED.

EC1007

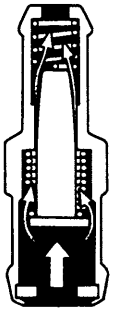
Normal Operation



○ PCV VALVE IS OPEN.
○ VACUUM PASSAGE IS LARGE.

EC1008

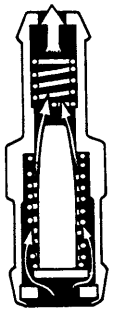
Idling or Decelerating



○ PCV VALVE IS OPEN.
○ VACUUM PASSAGE IS SMALL.

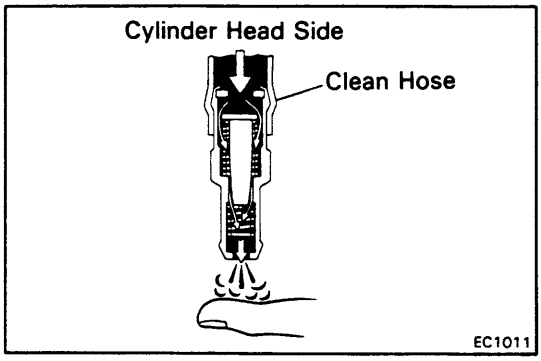
EC1009

Acceleration or High Load



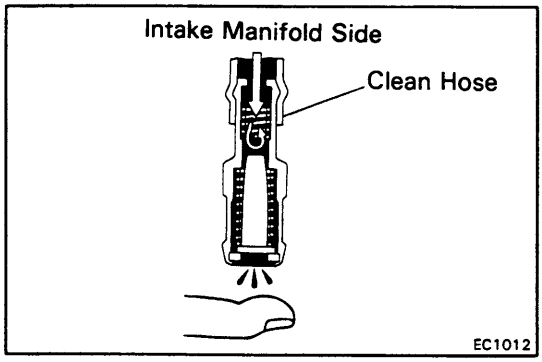
○ PCV VALVE IS FULLY OPEN.

EC1010

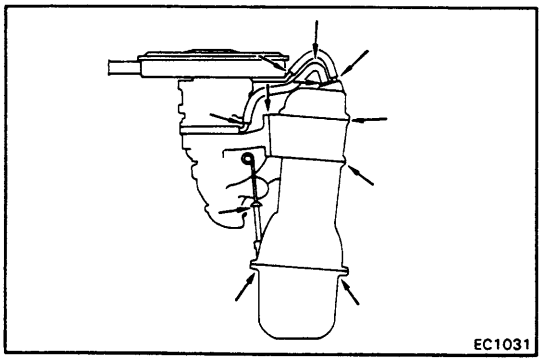


INSPECTION OF PCV VALVE

1. **REMOVE PCV VALVE**
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**

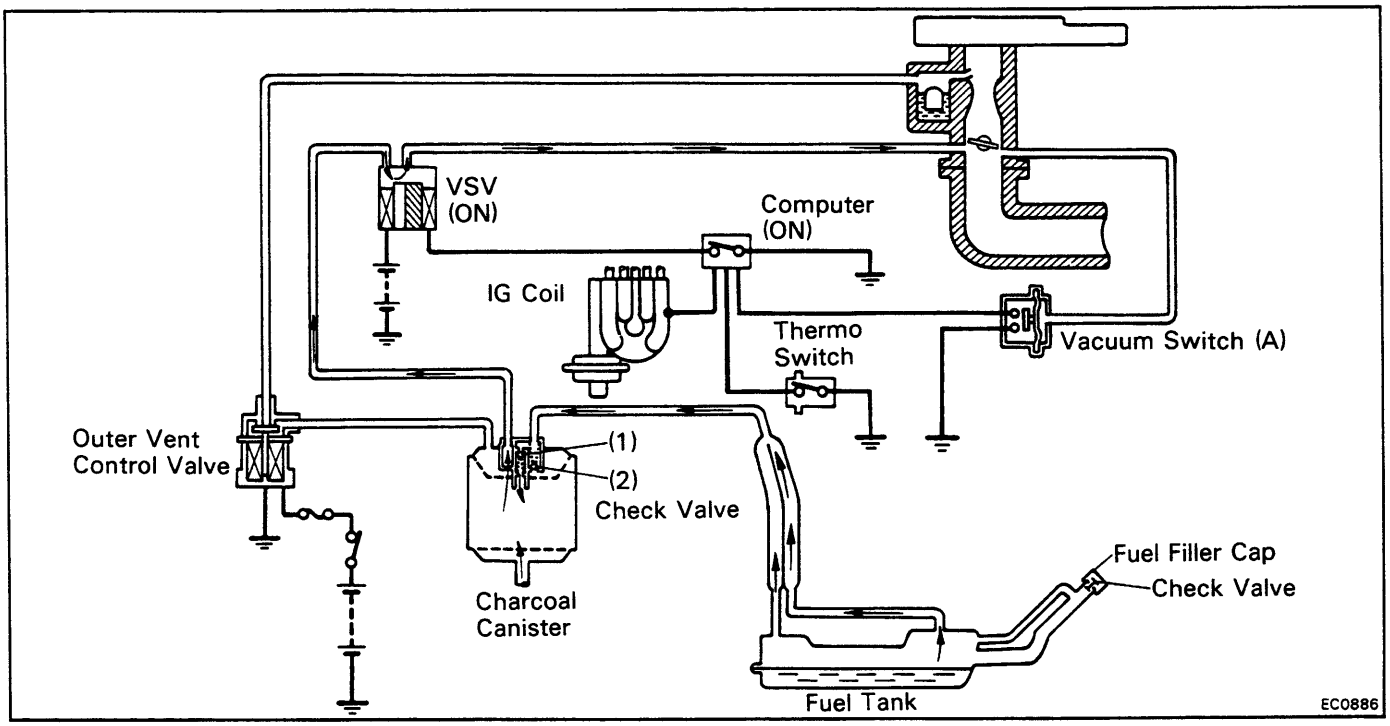


INSPECTION OF PCV HOSES AND CONNECTIONS

VISUALLY INSPECT HOSES, CONNECTIONS AND GASKETS

Check for cracks, leaks or damage.

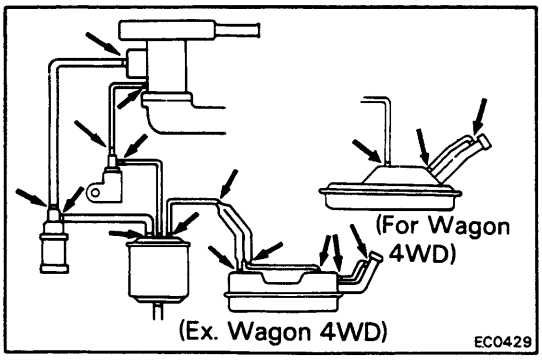
FUEL EVAPORATIVE EMISSION CONTROL (EVAP) SYSTEM (USA Vehicles and Canada Vehicle 3A-C Engine 4-Speed & Wagon A/T)



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

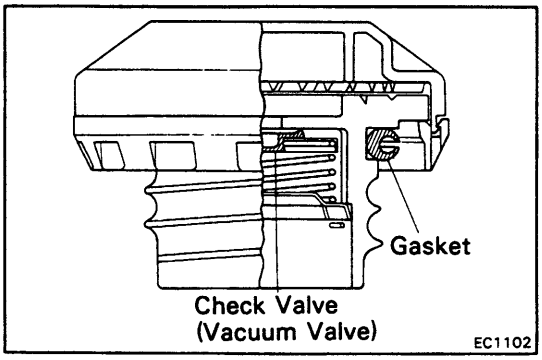
IG S/W	Outer Vent Control Valve	Coolant Temp.	Thermo Temp.	Engine RPM	Vacuum S/W (A)	VSV	Canister Check Valve (1)	Canister Check Valve (2)	Check Valve in Fuel Filler Cap	Evaporation Fuel (HC)
OFF	OPEN	—	—	—	—	—	—	—	—	HC from tank and float chamber is absorbed into the canister.
ON	CLOSED	Below 43°C (109°F)	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).

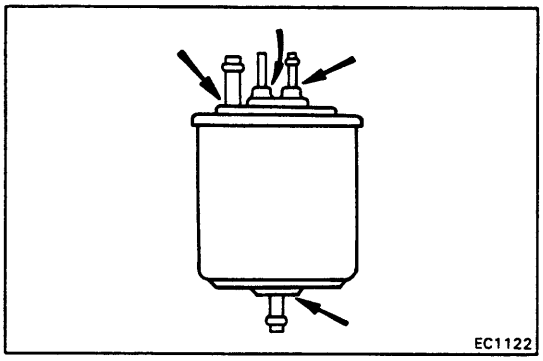


INSPECTION OF FUEL VAPOR LINES, FUEL TANK AND FUEL FILLER CAP

1. **VISUALLY INSPECT LINES AND CONNECTIONS**
   Look for loose connections, sharp bends or damage.
2. **VISUALLY INSPECT FUEL TANK**
   Look for deformation, cracks or fuel leakage.

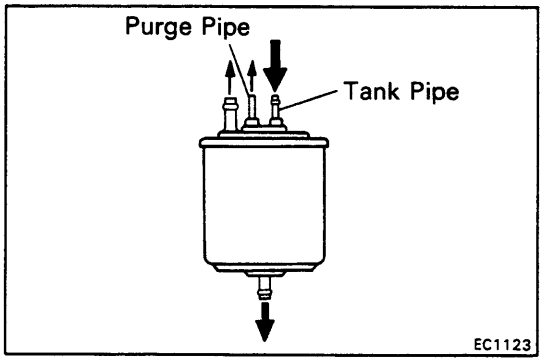


3. **VISUALLY INSPECT FUEL FILLER CAP**
   Look for damaged or deformed gasket and cap.
   If necessary, repair or replace the cap.

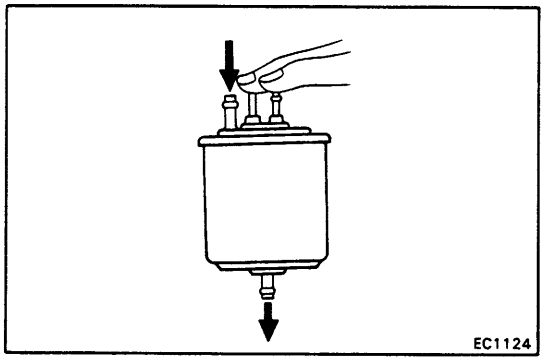


INSPECTION OF CHARCOAL CANISTER

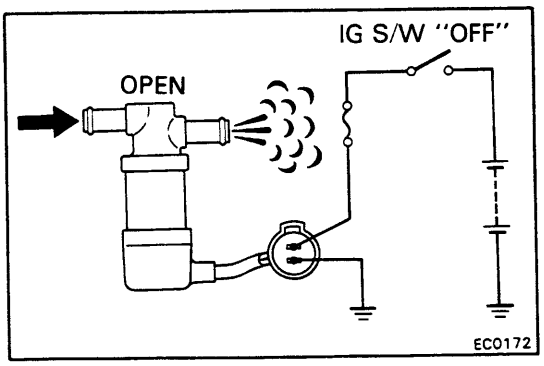
1. **REMOVE CHARCOAL CANISTER**
2. **VISUALLY INSPECT CHARCOAL CANISTER**
   Look for cracks or damage.



3. **CHECK FOR CLOGGED FILTER AND STUCK CHECK VALVE**
   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.



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 carbon should come out.
5. **INSTALL CHARCOAL CANISTER**

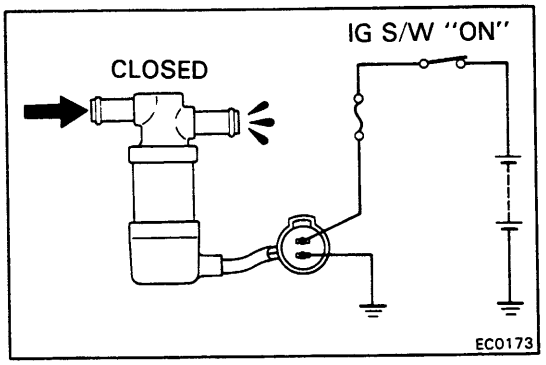


INSPECTION OF OUTER VENT CONTROL VALVE

CHECK OUTER VENT CONTROL VALVE OPERATION

(a) Disconnect the hoses from the valve.

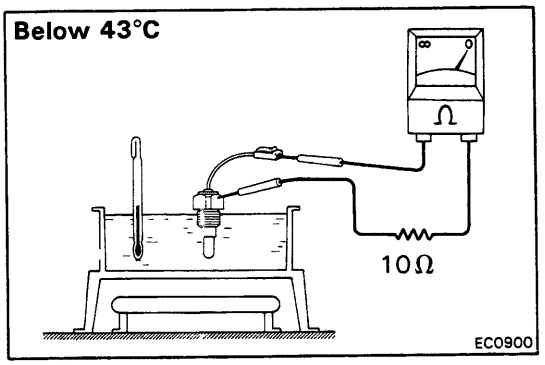
(b) Check that the valve is open when the ignition switch is OFF.



(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 operate, check the fuse and the wiring connections.



INSPECTION OF THERMO SWITCH

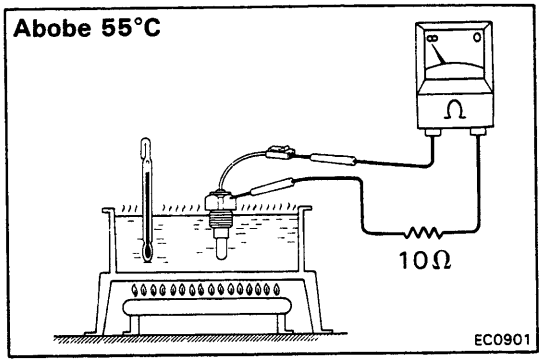
CHECK THERMO SWITCH BY USING OHMMETER

(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.

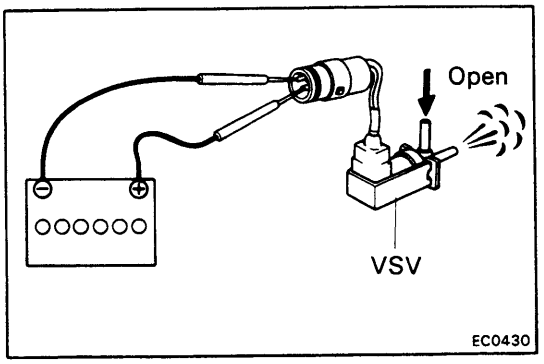


(e) Heat the switch to above 55°C (131°F) with hot water.

(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.

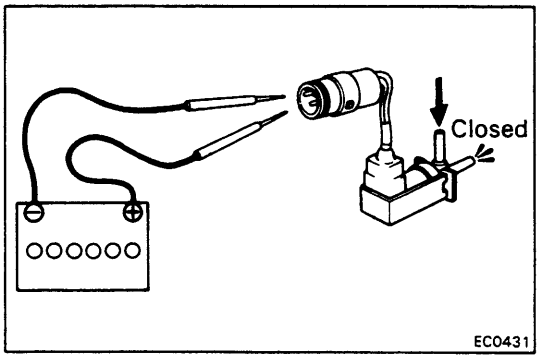


INSPECTION OF VSV

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

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

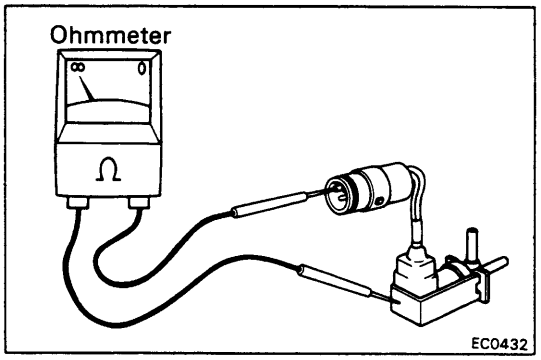
(b) Blow into the pipe, and check that the VSV is open.



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

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

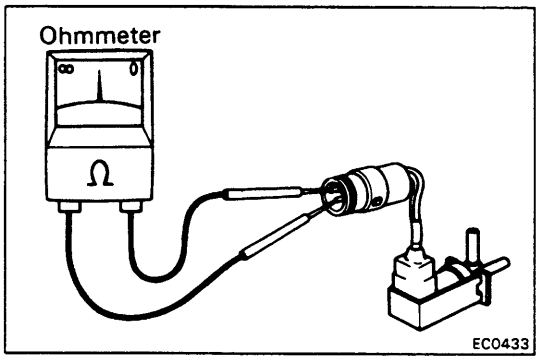
If a problem is found, replace the VSV.



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, replace the VSV.



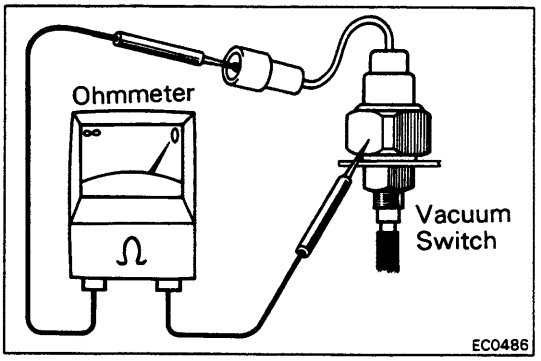
3. CHECK FOR OPEN CIRCUIT

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

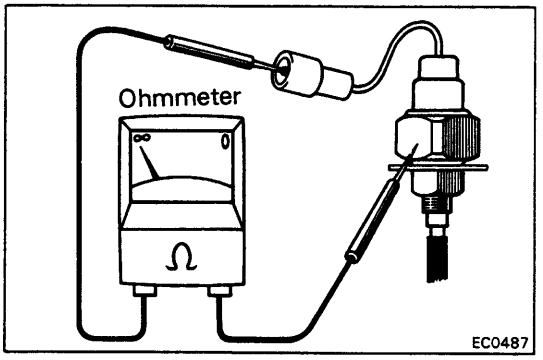
Specified resistance: 38 – 44 Ω at 20°C (68°F)

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

INSPECTION OF VACUUM SWITCH (A)



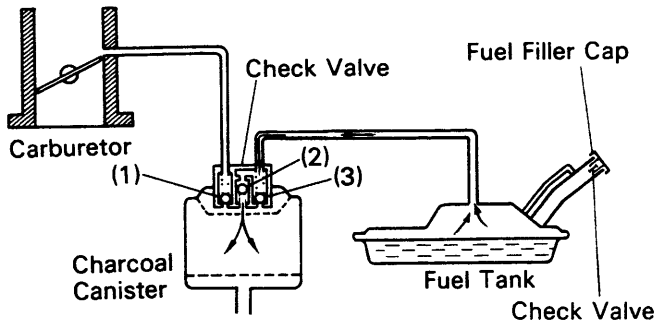
(a) Using an ohmmeter, check for continuity between the switch terminal and switch body.



(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.

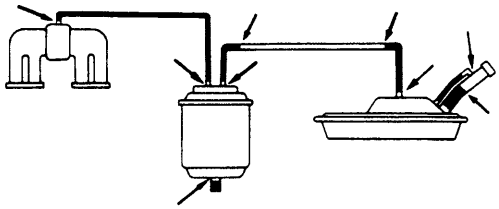
FUEL EVAPORATIVE EMISSION CONTROL (EVAP) SYSTEM (Canada Wagon M/T & 3A Engine)



EC0436

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

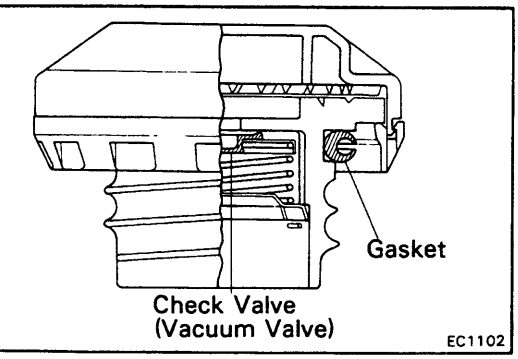
Condition	Canister Check Valve			Check Valve in Fuel Filler Cap	Evaporated Fuel (HC)
	(1)	(2)	(3)		
Parking, idling and low speed	CLOSED	—	—	—	HC from tank is absorbed in the canister.
Medium and high speed	OPEN	—	—	—	HC from canister is led into carburetor.
High pressure in tank	—	OPEN	CLOSED	CLOSED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



EC0437

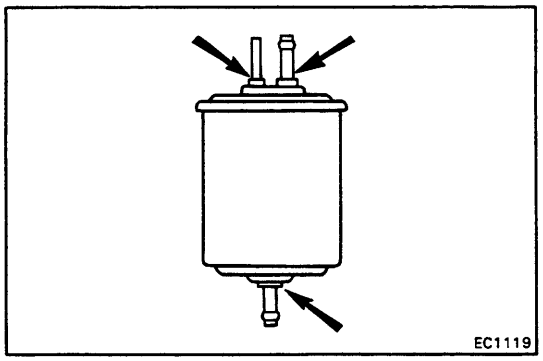
INSPECTION OF FUEL VAPOR LINES, FUEL TANK AND FUEL FILLER CAP

1. **VISUALLY INSPECT LINES AND CONNECTIONS**
   Look for loose connections, sharp bends or damage.
2. **VISUALLY INSPECT FUEL TANK**
   Look for deformation, cracks of fuel leakage.



EC1102

3. **VISUALLY INSPECT FUEL FILLER CAP**
   Look for a damaged or deformed gasket and cap.
   If necessary, repair or replace the cap.

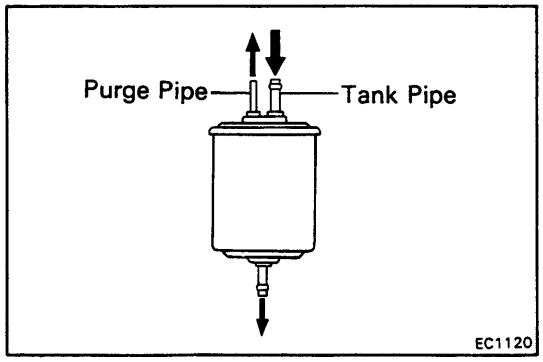


INSPECTION OF CHARCOAL CANISTER

1. REMOVE CHARCOAL CANISTER

2. VISUALLY INSPECT CHARCOAL CANISTER

Look for cracks or damage.

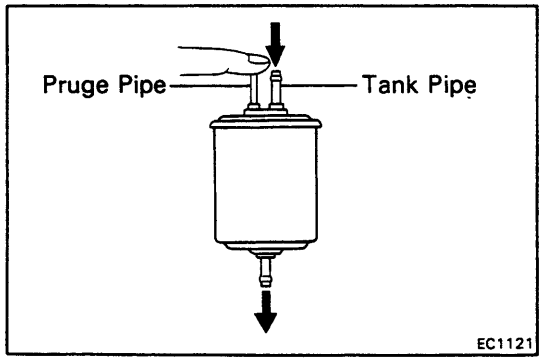


3. CHECK FOR CLOGGED FILTER AND STUCK CHECK VALVE

(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.



4. CLEAN FILTER IN CANISTER

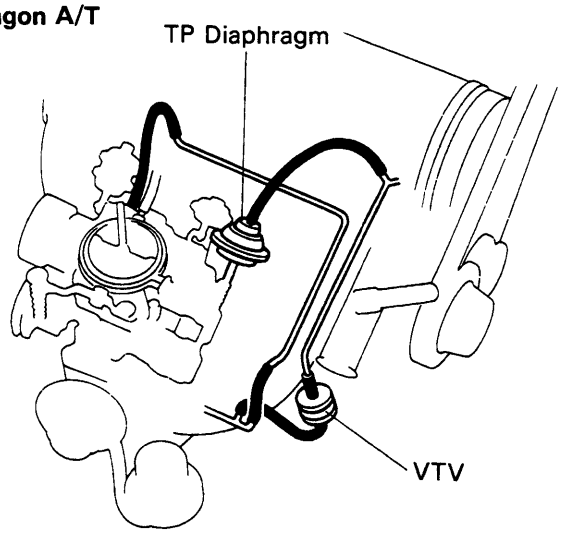
Clean the filter by blowing 3 kg/cm² (43 psi, 294 kPa) of compressed air into the tank pipe while holding the purge pipe closed.

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

5. INSTALL CHARCOAL CANISTER

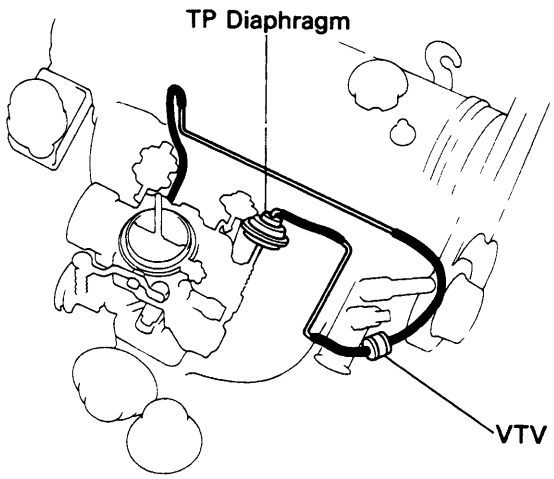
THROTTLE POSITIONER (TP) SYSTEM

USA and Canada 3A-C Engine, 4-Speed & Wagon A/T



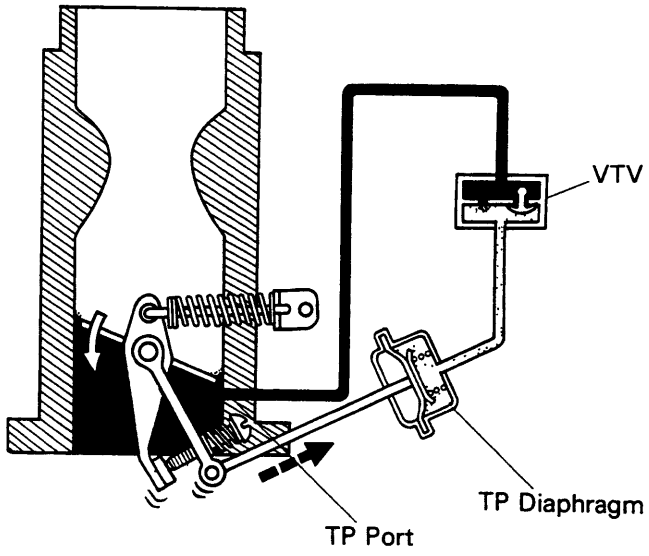
EC0438

Canada Wagon M/T & 3A Engine



EC0439

Deceleration

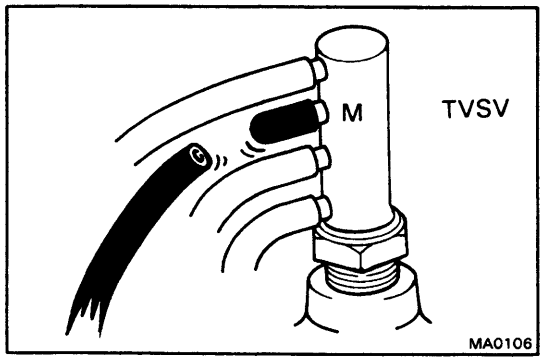


EC0440

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

Condition	TP Port Vacuum	TP Diaphragm	Throttle 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.



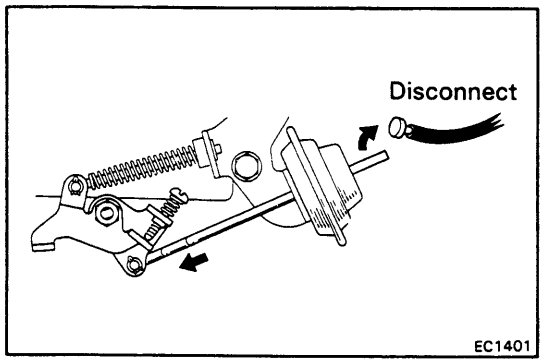
INSPECTION OF TP SYSTEM

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.

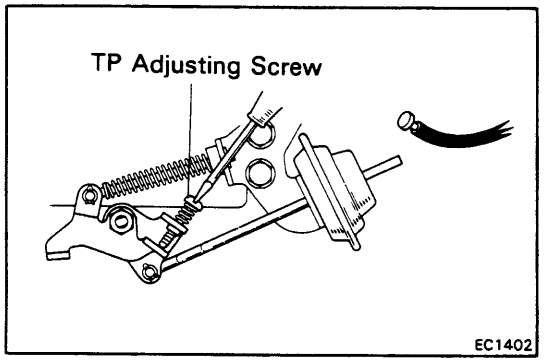


4. **CHECK TP SETTING SPEED AND OPERATION OF VTV (For 3A-C Engine)**

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

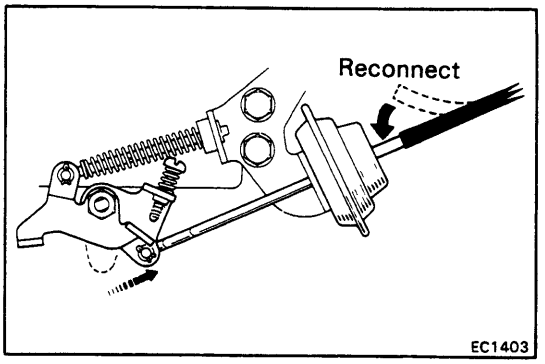
   (b) Check that the TP is set.

   TP setting speed: 1,400 rpm

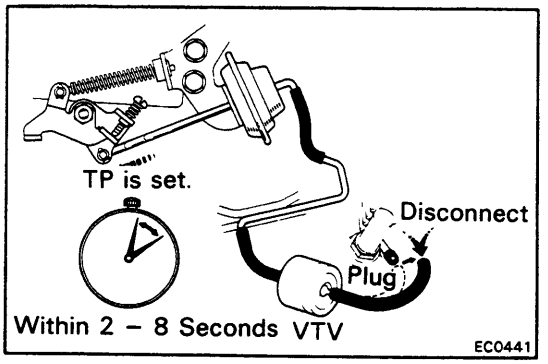


If not at specified speed, adjust with the TP adjusting screw.

NOTE: Make adjustment with the cooling fan OFF.



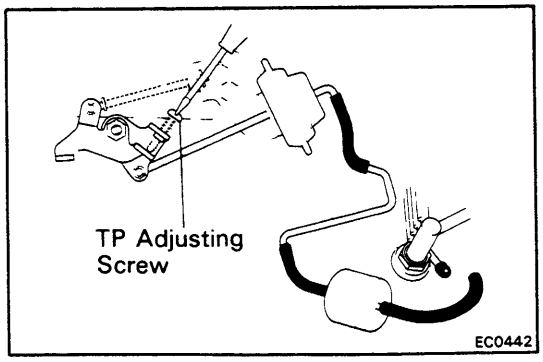
(c) Reconnect the vacuum hose to the TP diaphragm, and check that the engine returns to idle speed within 2-6 seconds.



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.

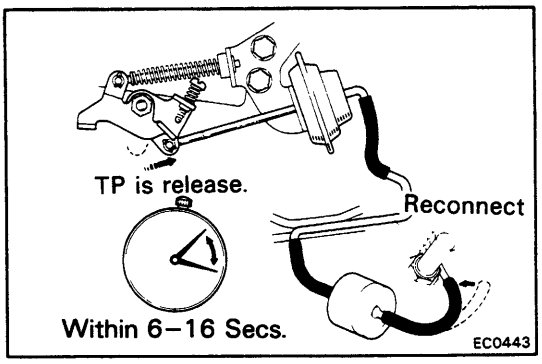


(c) Check that the engine rpm has increased to specification.

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

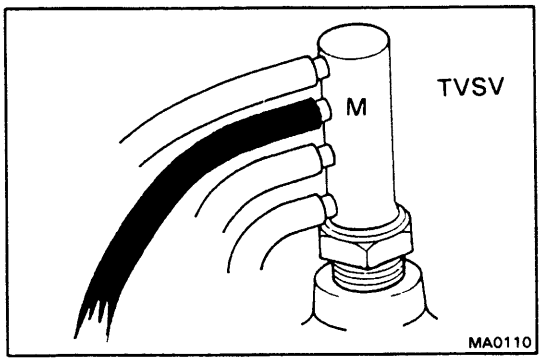
NOTE: Make adjustments with the engine cooling fan OFF.

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



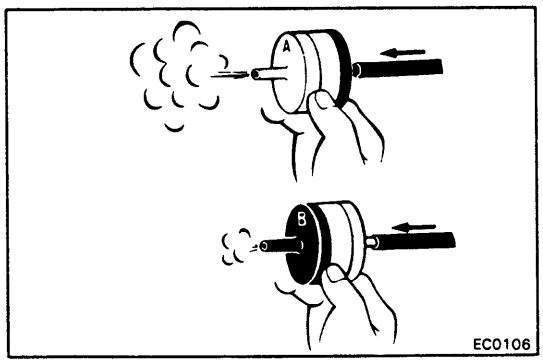
(d) Reconnect the vacuum hose to the vacuum pipe.

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



6. RECONNECT HOSE TO TVSV M PORT

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



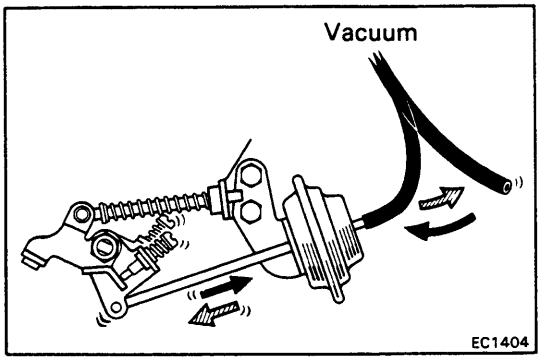
INSPECTION OF VTV

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.

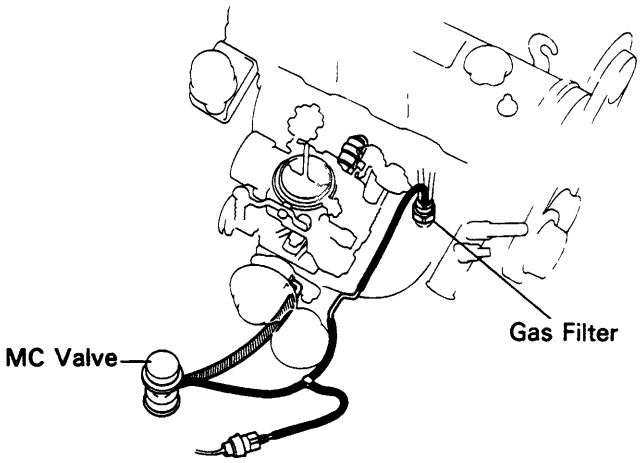


INSPECTION OF DIAPHRAGMS

Check that the linkage moves in accordance with applied vacuum.

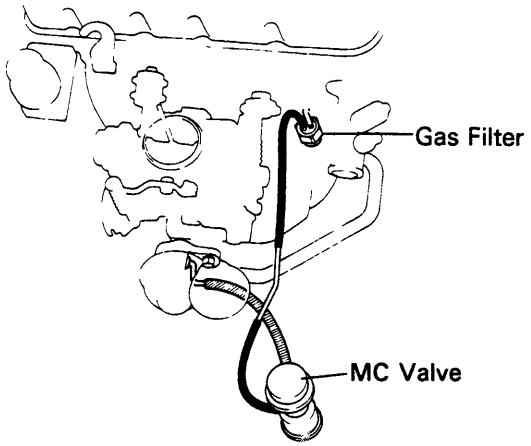
MIXTURE CONTROL (MC) SYSTEM (Canada Wagon M/T & 3A Engine)

Wagon M/T



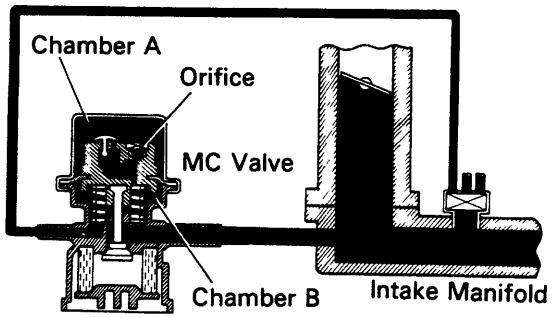
EC0444

3A Engine



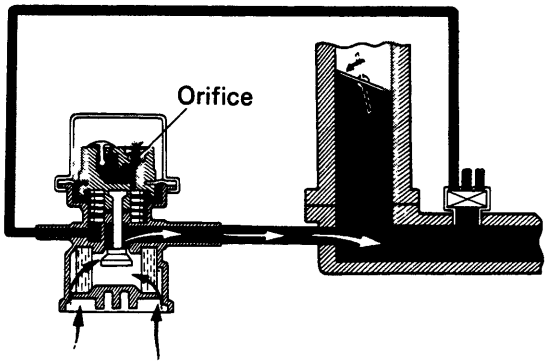
EC0445

CONSTANT RPM



EC0446

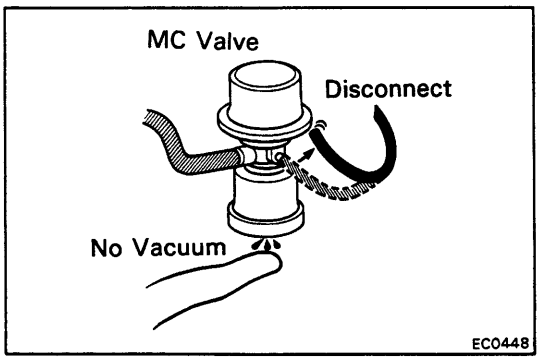
SUDDEN DECELERATION, STEP (1)

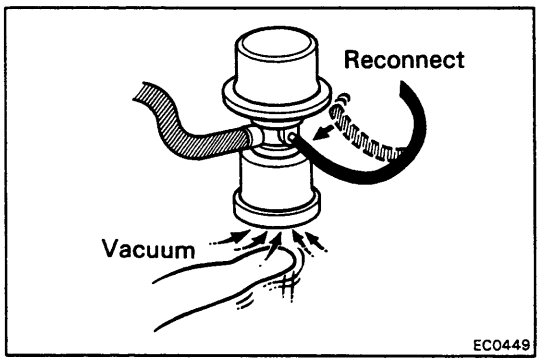


EC0447

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 orifice.	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.

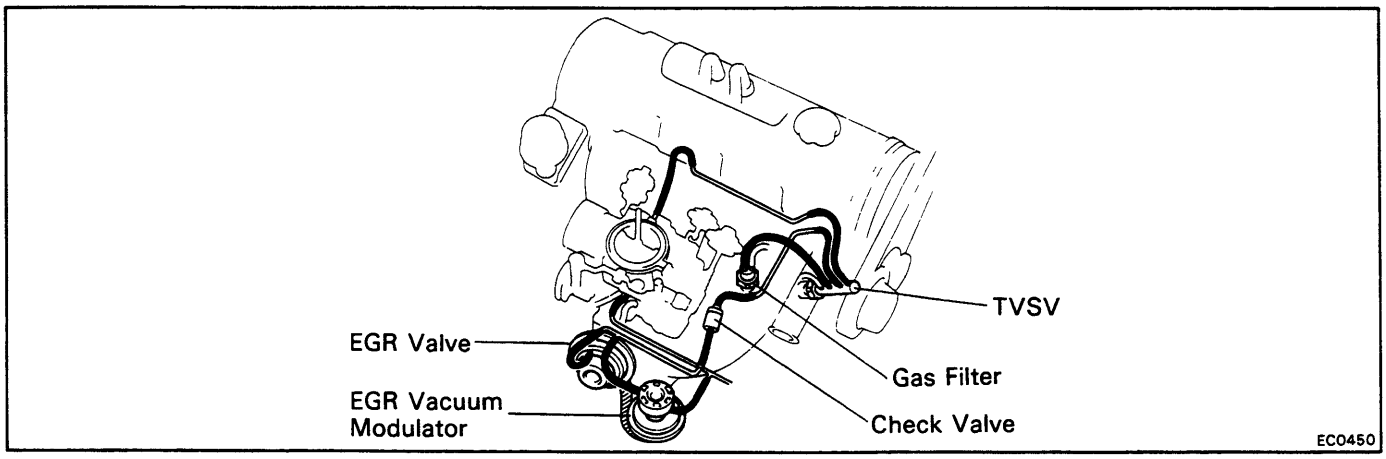
(c) Check that vacuum is not felt.

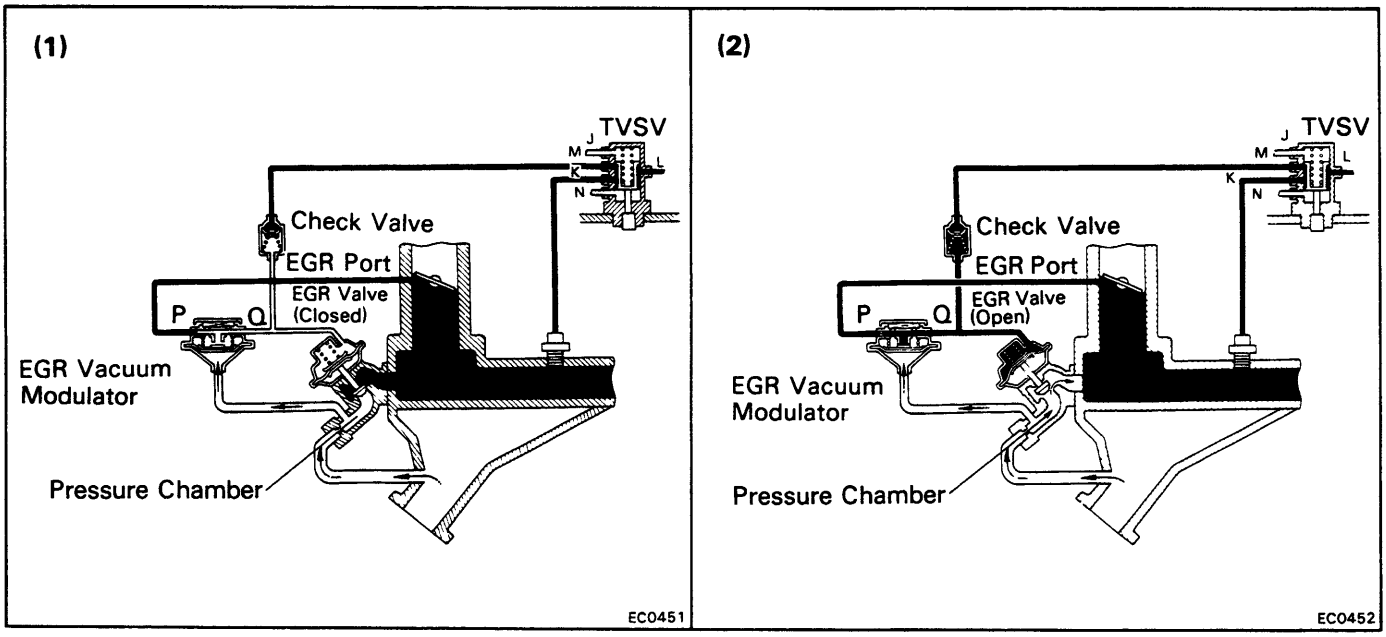
(d) Reconnect the vacuum hose and check that vacuum is felt momentarily.

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 Canada 3A-C Engine 4-Speed & Wagon A/T)

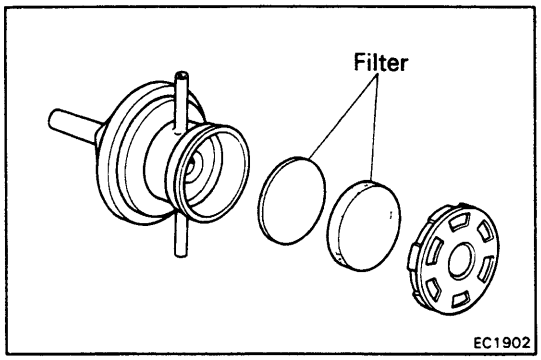




To reduce NOx emission, part of the exhaust gases is recirculated through the EGR valve to the intake manifold to lower the maximum combustion temperature.

Coolant 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

Remarks: * Pressure increases → Modulator closes → EGR valve opens → EGR valve closes ← Modulator opens ← Pressure drops

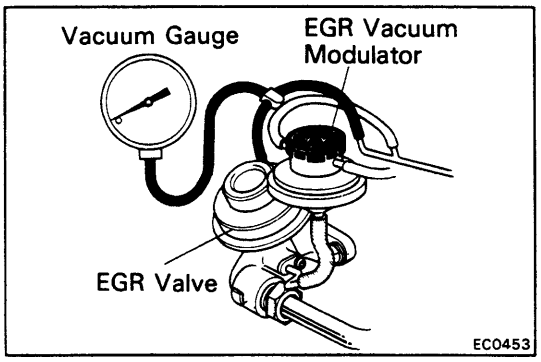


INSPECTION OF EGR SYSTEM

1. CHECK AND CLEAN FILTERS IN EGR VACUUM MODULATOR

(a) Check the filter for contamination or damage.

(b) Using compressed air, clean the filters.

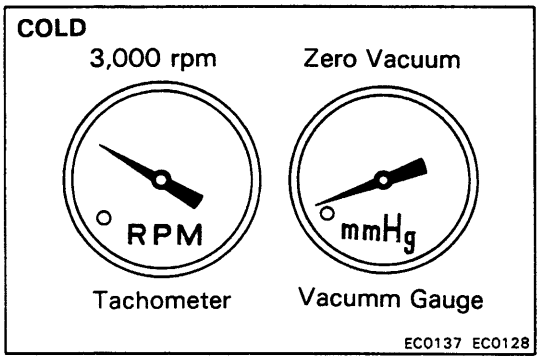


2. PREPARATION

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

3. CHECK SEATING OF EGR VALVE

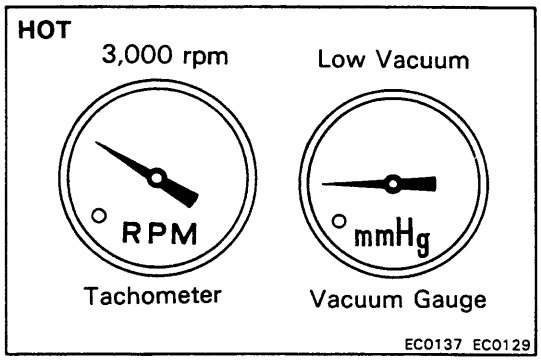
Start the engine and check that the engine starts and runs at idle.



4. CHECK TVSV WITH COLD ENGINE

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

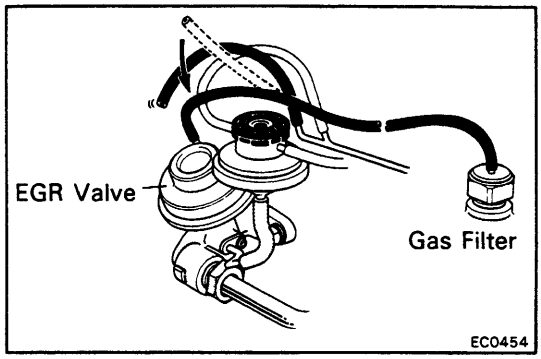
(b) Check that the vacuum gauge indicates zero at 3,000 rpm.



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.



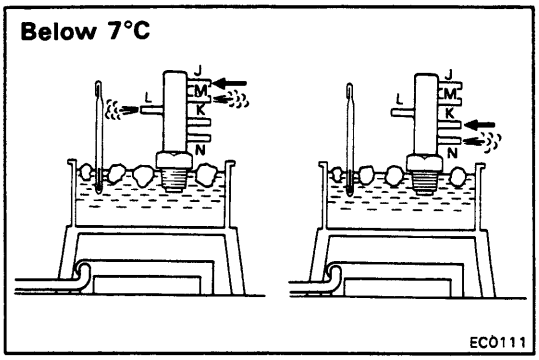
6. CHECK EGR VALVE

(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



INSPECTION OF TVSV

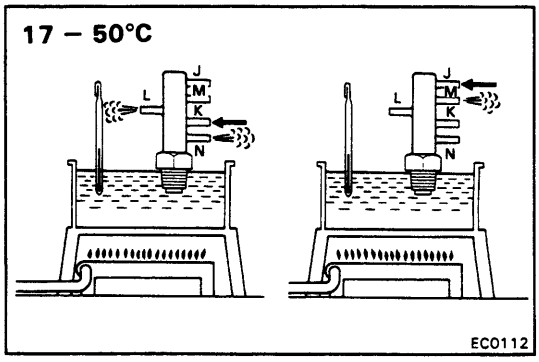
CHECK TVSV BY BLOWING AIR INTO PIPES

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

(b) Remove the TVSV.

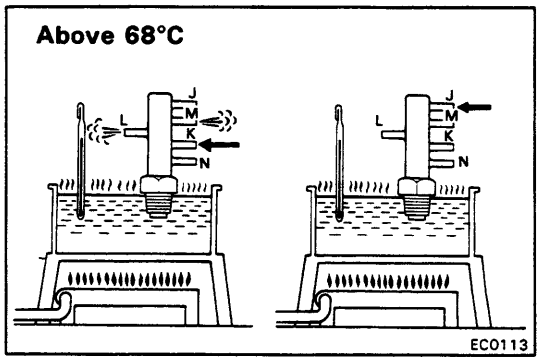
(c) Cool the TVSV to below 7°C (45°F).

(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.



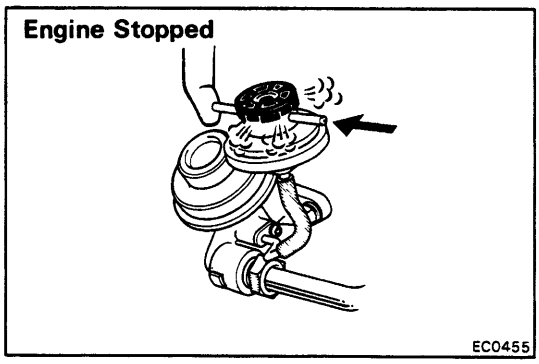
(g) Heat the TVSV to above 68°C (154°F).

(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.



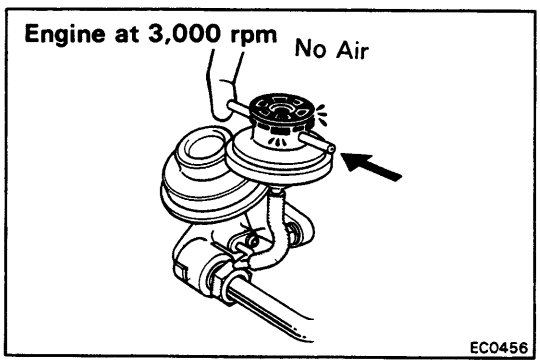
INSPECTION OF EGR VACUUM MODULATOR

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.

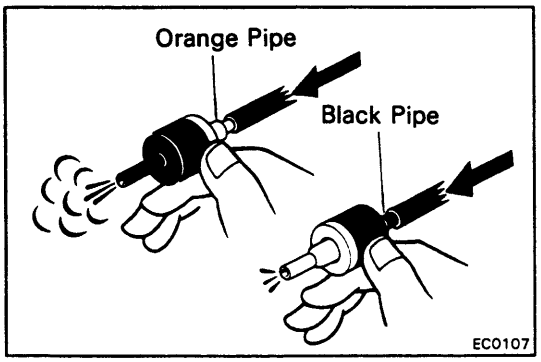
INSPECTION OF EGR VALVE

1. **REMOVE EGR VALVE**

   Check the valve for sticking and heavy carbon deposits.

   If a problem is found, replace it.

2. **REINSTALL EGR VALVE WITH NEW GASKET**



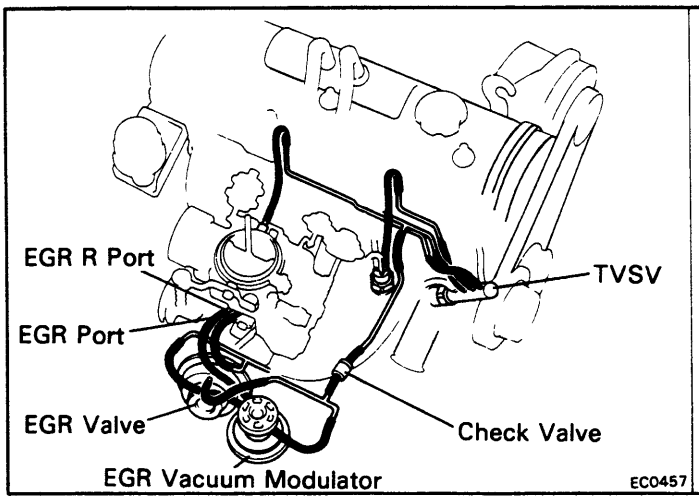
INSPECTION OF CHECK VALVE

CHECK VALVE BY BLOWING AIR INTO EACH PIPE

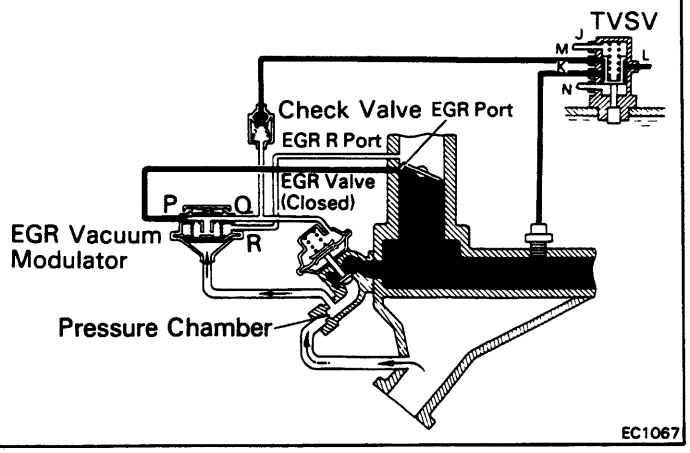
(a) Check that air flows from the orange pipe to the black pipe.

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

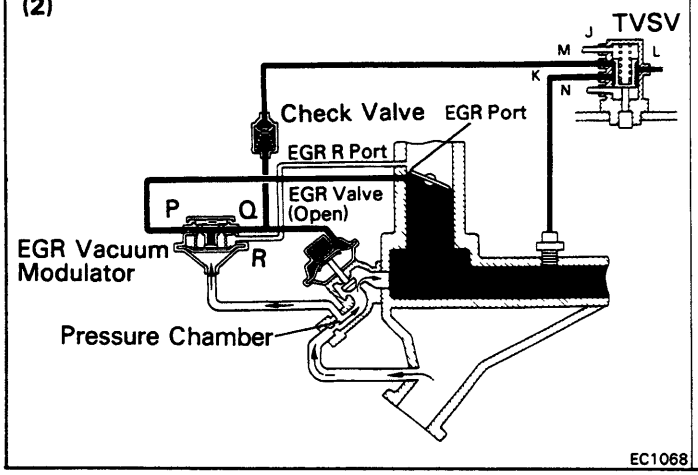
EXHAUST GAS RECIRCULATION (EGR) SYSTEM (Canada Vehicles Wagon M/T & 3A Engine)



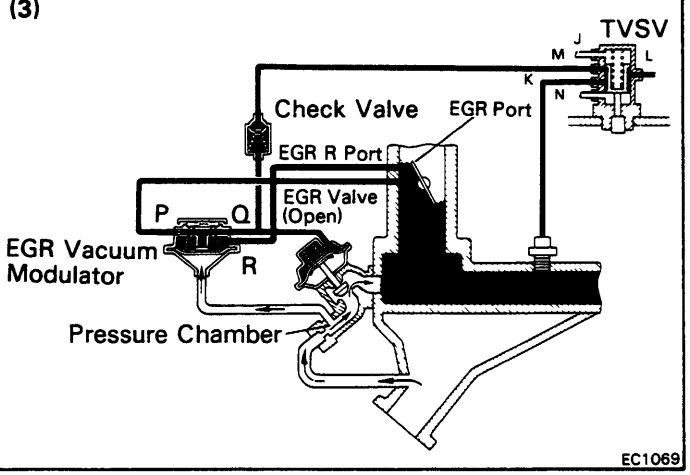
(1)



(2)



(3)

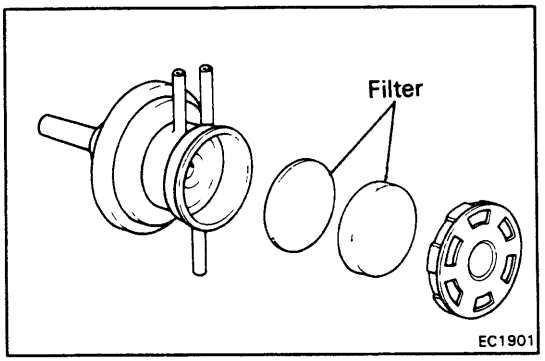


To reduce NOx emission, part of the exhaust gases is recirculated through the EGR valve to the intake manifold to lower the maximum combustion temperature.

Coolant Temp.	TVSV	Throttle 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
Above 68°C (154°F)	OPEN (M-K)	Positioned below EGR port	—		—	CLOSED	Not recirculated
		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←

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

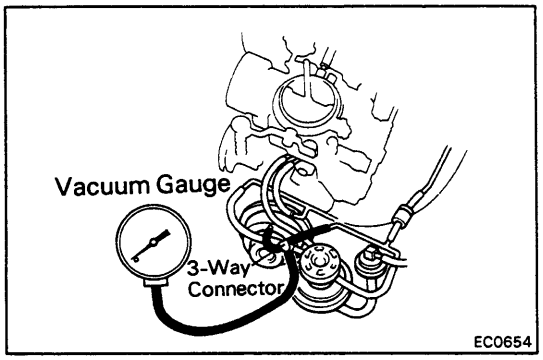


INSPECTION OF EGR SYSTEM

1. CHECK AND CLEAN FILTER IN EGR VACUUM MODULATOR

(a) Check the filters for contamination or damage.

(b) Using compressed air, clean the filters.

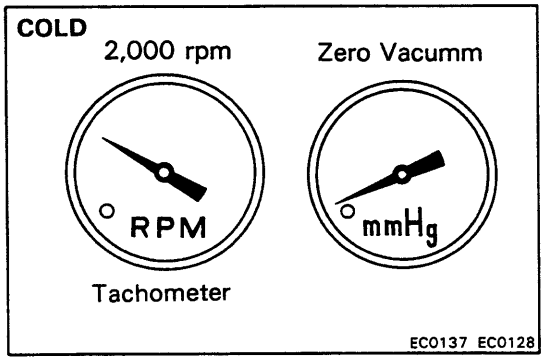


2. PREPARATION

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

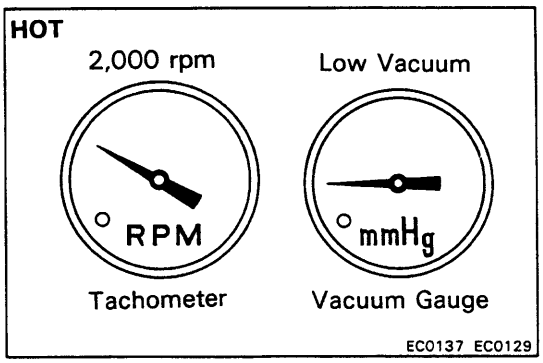
Check that the engine starts and runs at idle.



4. CHECK TVSV WITH COLD ENGINE

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

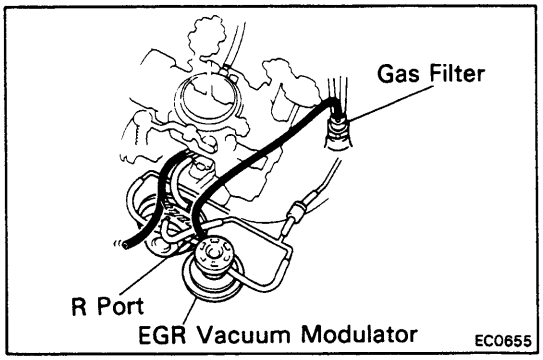
(b) Check that the vacuum gauge indicates zero at 2,000 rpm.



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.

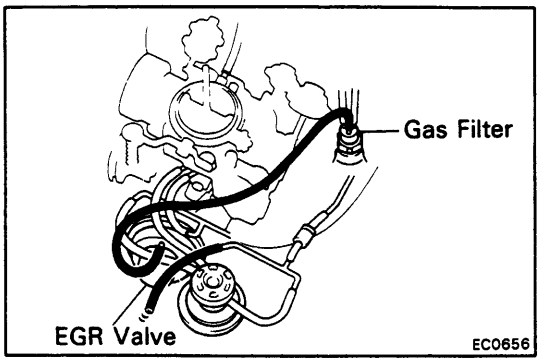


(c) Disconnect the vacuum hose from R port of the EGR vacuum modulator and connect R port directly to the intake manifold with another hose.

(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.

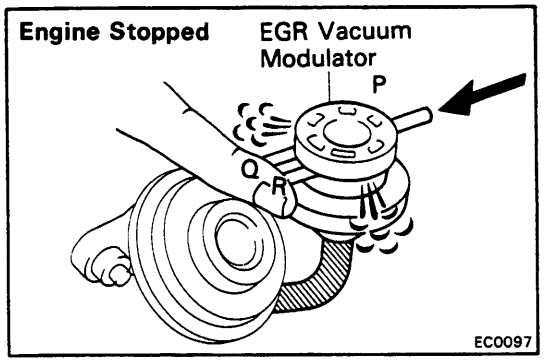
(b) Check that the engine dies.

(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)



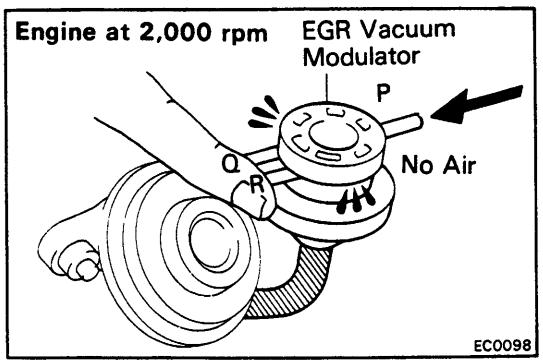
INSPECTION OF EGR VACUUM MODULATOR

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

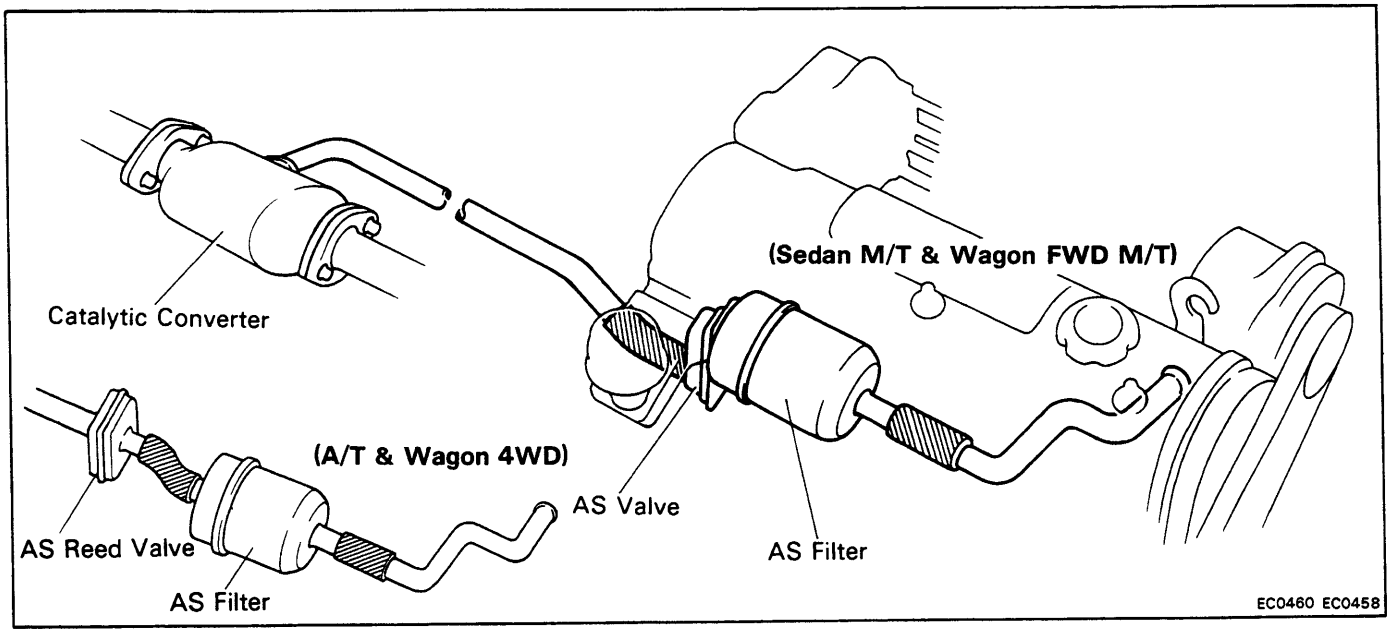
Check the valve for sticking and heavy carbon deposits. If a problem is found, replace it.

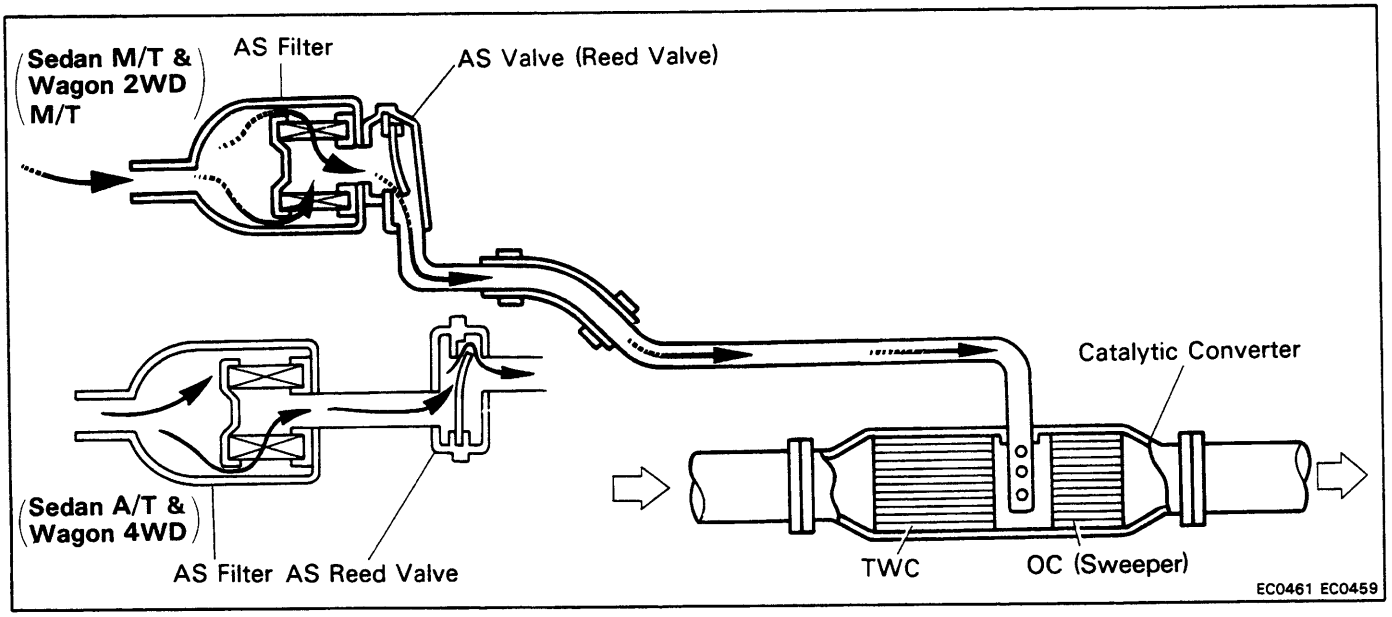
2. REINSTALL EGR VALVE WITH NEW GASKET

INSPECTION OF CHECK VALVE

(See page EC-23)

AIR SUCTION (AS) SYSTEM (Federal Vehicles)

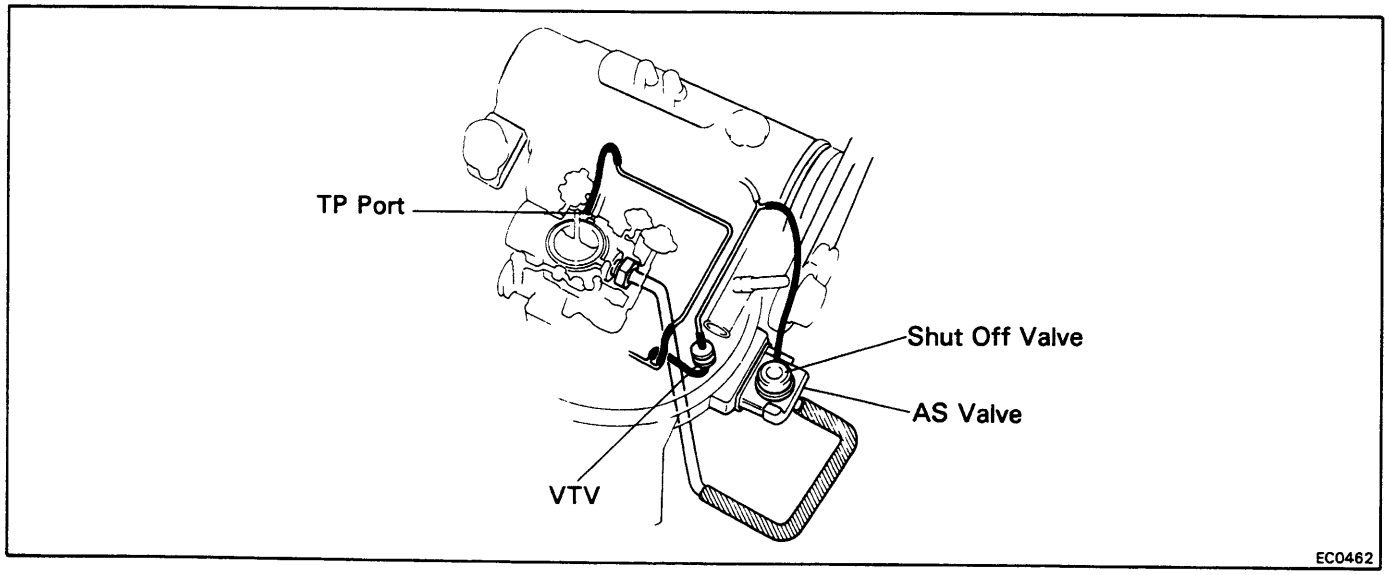


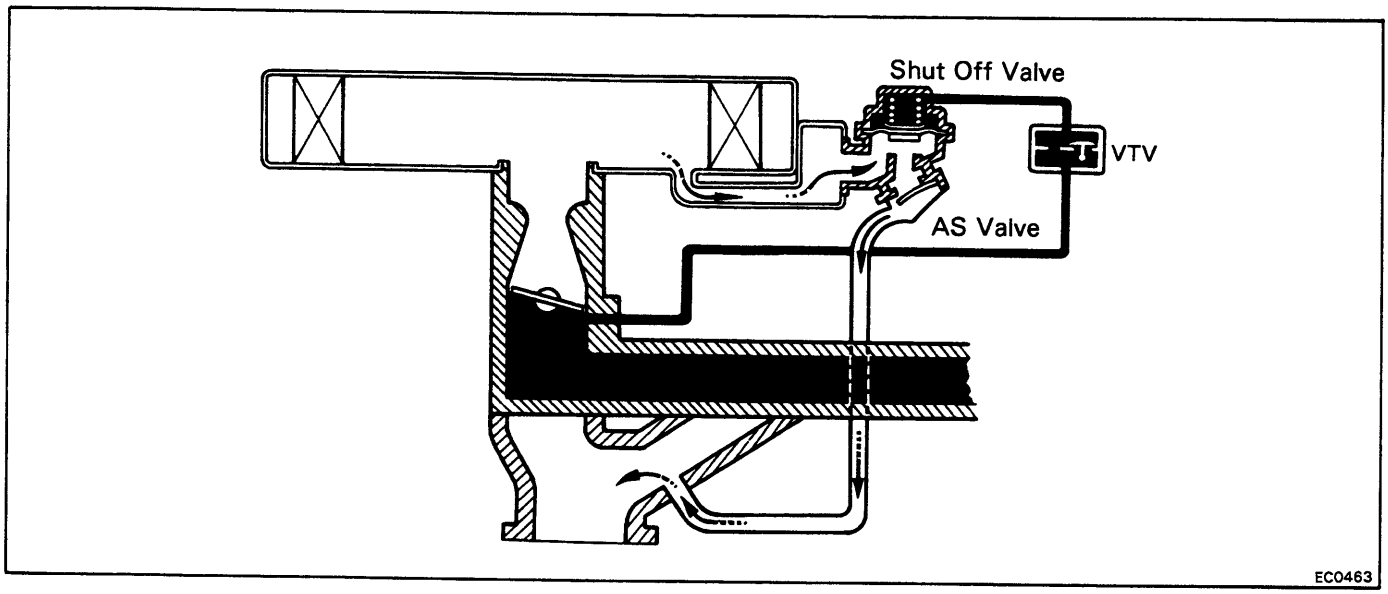


Air is drawn through the air filter and air suction valve into the catalytic converter to burn the HC and CO.

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 Vehicles and Canada 3A-C Engine 4 Speed & Wagon A/T)



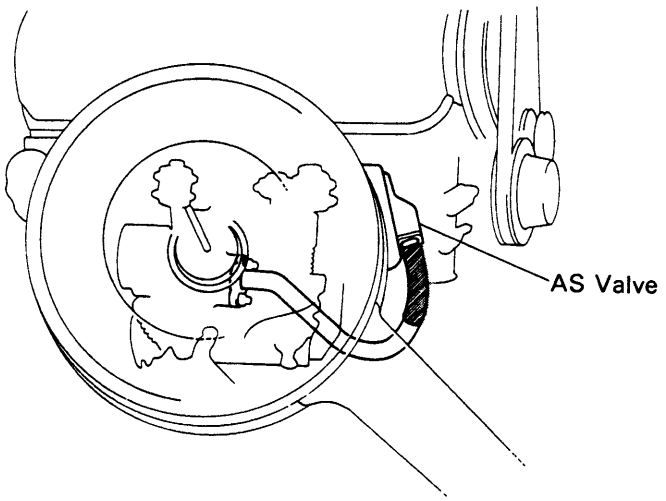


Air is drawn though the air filter and air suction valve into exhaust manifold No. 3 branch to burn the remaining HC and CO.

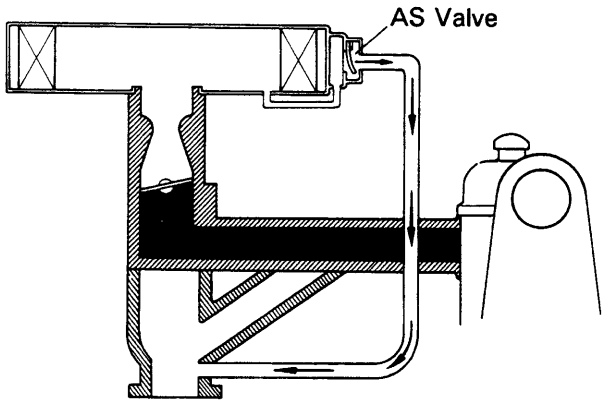
Condition	Shut Off Valve	Pulsation in the Exhaust Manifold	AS Valve	Fresh Air from Air Filter
Except idling and deceleration	CLOSED	—	CLOSED	Not drawn
Idling and deceleration	* OPEN	Vacuum	OPEN	Drawn into the exhaust manifold
		Pressure	CLOSED	Not drawn

Remarks: *This action is delayed by the VTV.

AIR SUCTION (AS) SYSTEM (Canada Wagon M/T & 3A Engine)

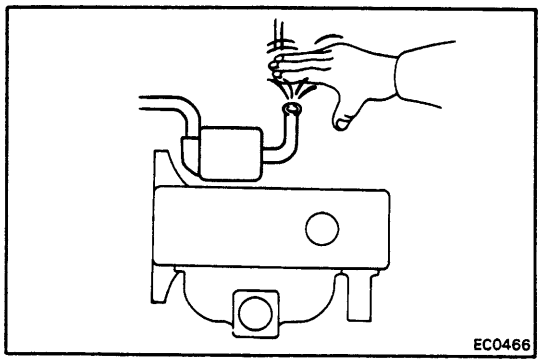


EC0464



EC0465

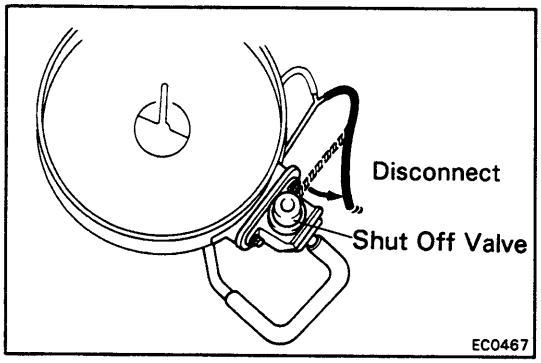
Air is drawn through the air filter and air suction valve into the exhaust manifold to burn the remaining HC and CO.		
Pulsation in the Exhaust Manifold	**AS Valve**	**Fresh Air from Air Filter**
Vacuum	OPEN	Drawn into the exhaust manifold
Pressure	CLOSED	Not drawn


EC0466

INSPECTION OF AS SYSTEM

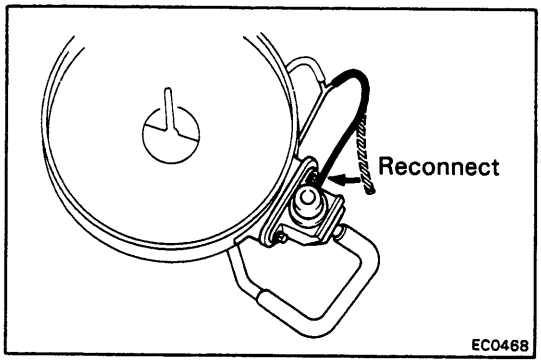
1. **VISUALLY CHECK HOSES AND TUBES FOR CRACKS, KINKS, DAMAGE OR LOOSE CONNECTIONS**

2. **CHECK AS VALVE (Fed. and Canada 3A-C Engine, 4-Speed)**
   (a) Start the engine.
   (b) With the engine idling, check that air is drawn into the inlet pipe.



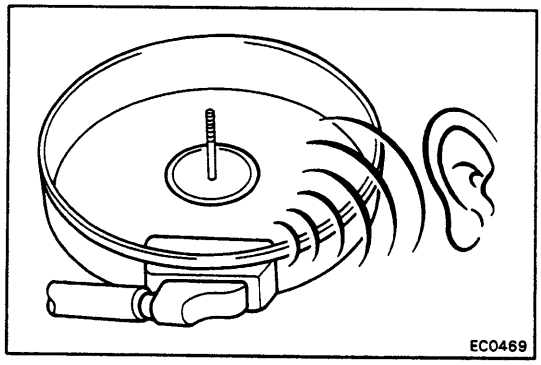
EC0467

3. **CHECK AS VALVE (Calif. and Canada 3A-C Engine 4-Speed & Wagon 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.

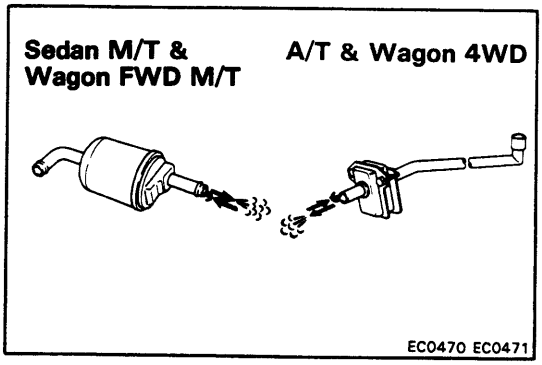


EC0468

   (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.


EC0469

4. **CHECK AS VALVE (Canada Wagon 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.



EC0470 EC0471

INSPECTION OF AS VALVE (Fed. only)

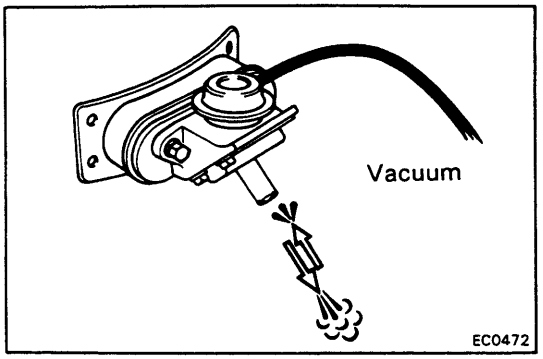
CHECK AS VALVE BY BLOWING AND SUCKING ON PIPE

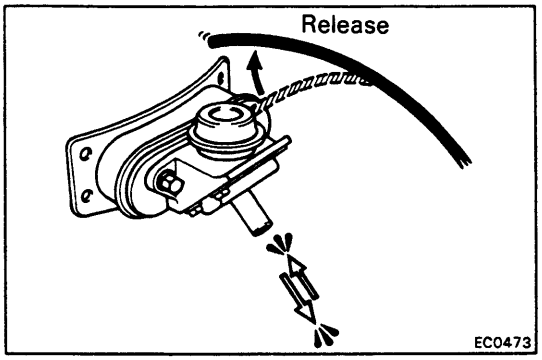
(Sedan M/T & Wagon 2WD M/T)

Check that there is no air passage when blown hard from the converter side, and air passage when sucked.

(A/T & Wagon 4WD)

Check that there is no air passage when sucked from the filter side, and air passage when blown hard.





INSPECTION OF AS VALVE (Calif. and Canada 3A-C Engine 4-Speed & Wagon A/T)

CHECK AS VALVE BY BLOWING AIR INTO PIPES

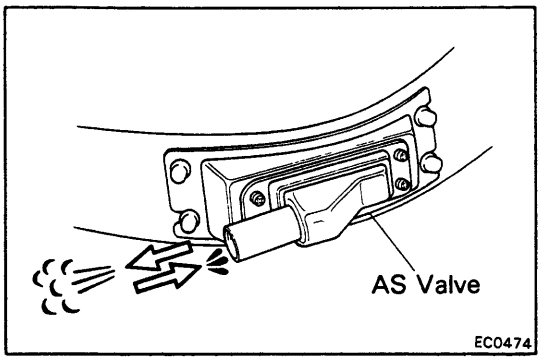
(a) Apply vacuum to the diaphragm.

(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) Release the vacuum.

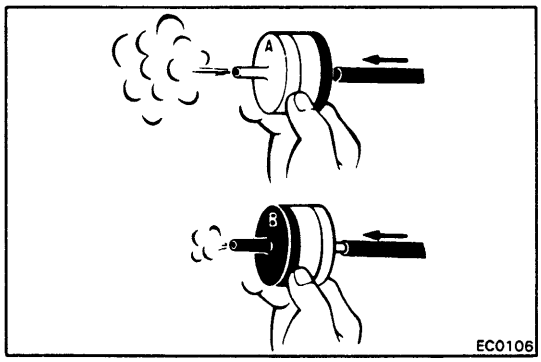
(e) Check that very little air flows from the filter side to the outlet pipe.



INSPECTION OF AS VALVE (Canada Wagon 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 Canada 3A-C Engine 4-Speed & Wogon A/T)

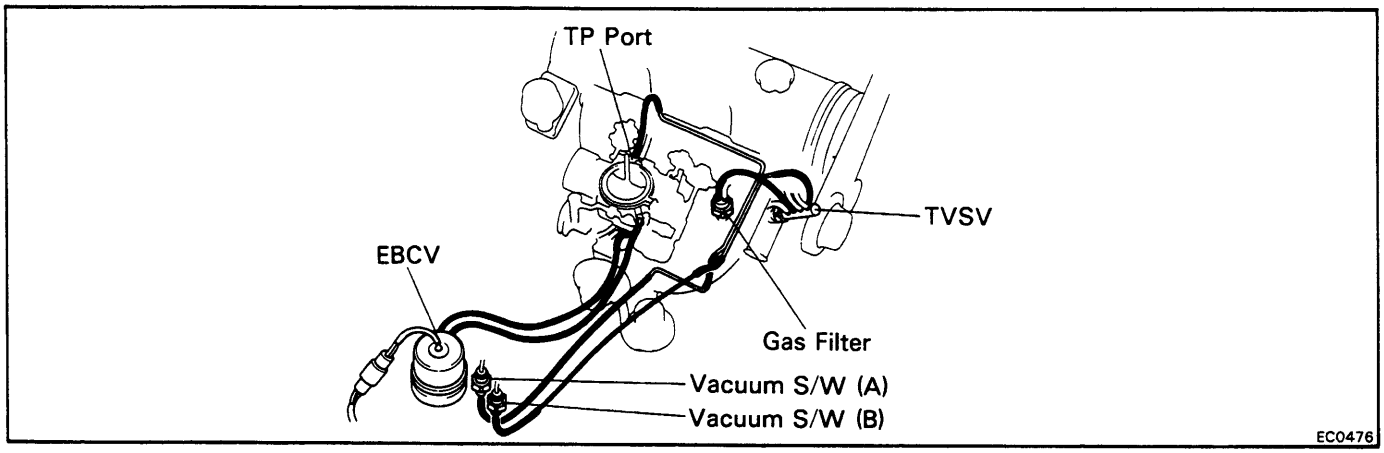
CHECK VTV BY BLOWING AIR INTO EACH SIDE

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

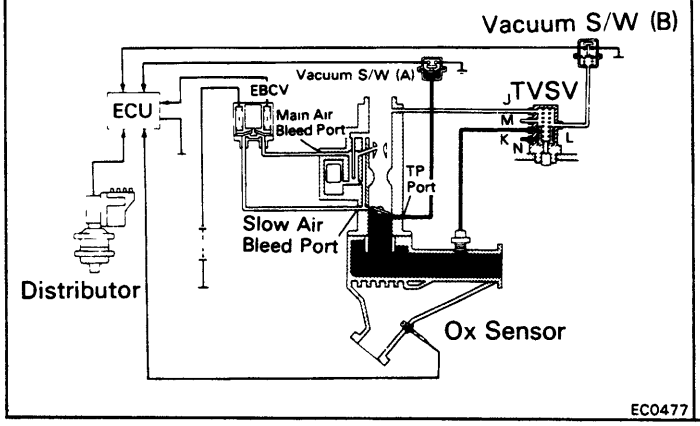
(b) Check that air with difficulty from A to B.

If a problem is found, replace the VTV.

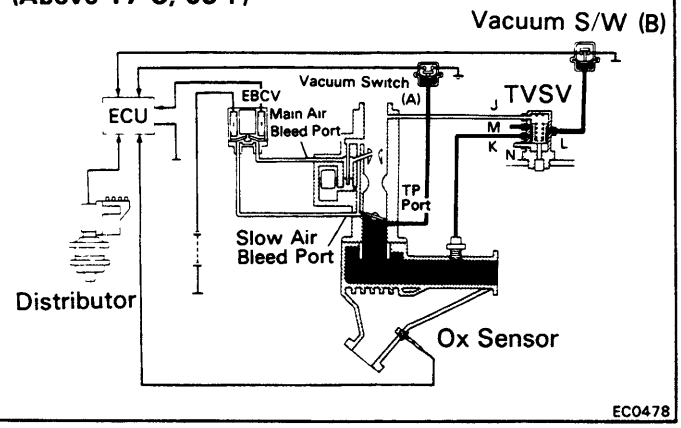
CARBURETOR FEEDBACK SYSTEM (USA Vehicles and Canada 3A-C Engine 4-Speed & Wagon A/T)



Cold
(Below 7°C, 45°F)



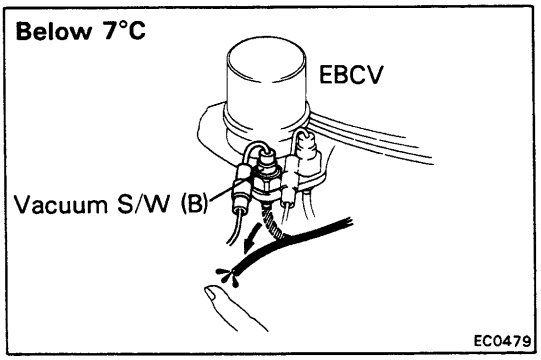
Hot
(Above 17°C, 63°F)

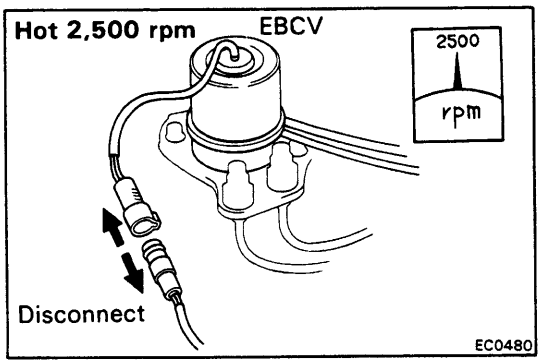


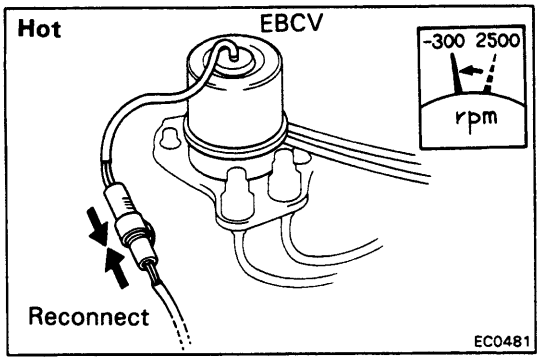
By means of a signal from the Ox sensor, carburetor primary side main air bleed and slow air bleed volume are controlled to maintain optimum air-fuel mixture in accordance with existing driving conditions, thereby cleaning HC, CO and NOx. In addition, driveability and fuel economy are improved.

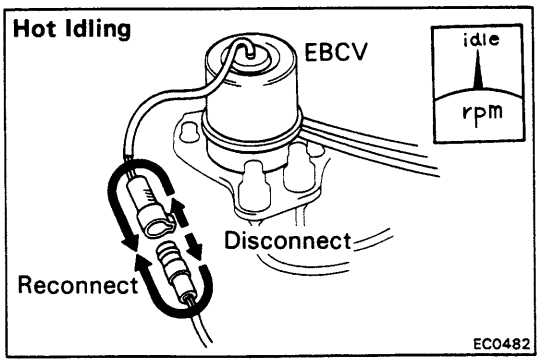
Coolant Temp.	TVSV	Condition	Engine rpm	Vacuum S/W A	Vacuum S/W B	Air-Fuel Ratio in the Exhaust Manifold	Ox Sensor Signal	Computer	EBCV	Air Bleed
Below 7°C (45°F)	OPEN (J–L)	—	—	—	OFF	—	—	OFF	CLOSED	OFF
Above 17°C (63°F)	OPEN (K–L)	Idling	Below 1,300 rpm	—	—	—	—	OFF	CLOSED	OFF
		Cruising	Between 1,500 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

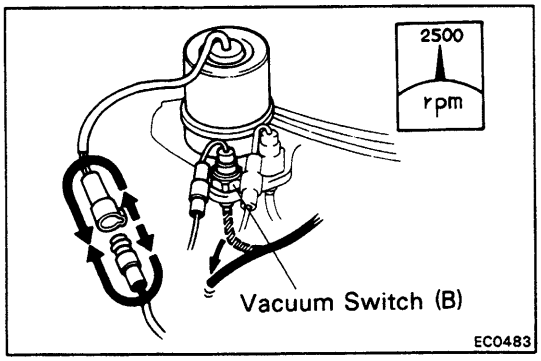
Remark : * Intake vacuum : below 85 mmHg (3.35 in.Hg, 11.3 kPa)











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.

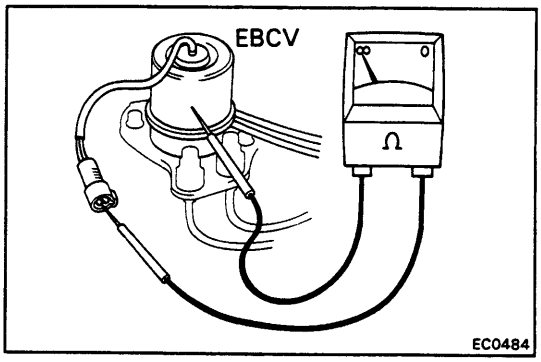
(e) With the engine idling repeat steps (b) and (d) above.

(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

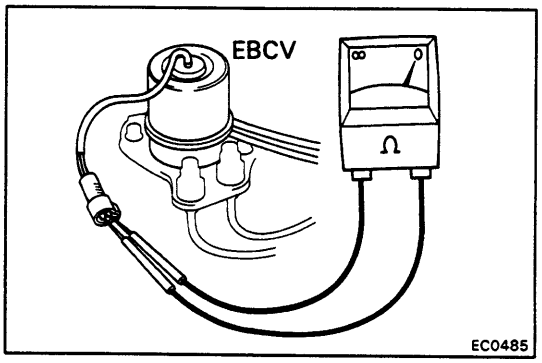


INSPECTION OF EBCV

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.

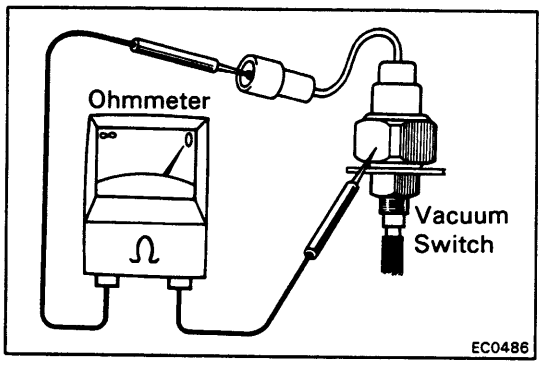


2. CHECK FOR OPEN CIRCUIT

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

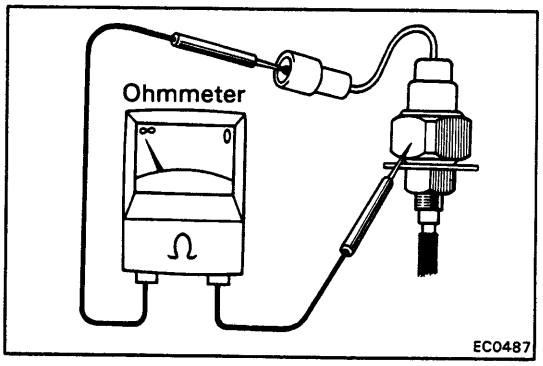
Specified resistance: 11 – 13 Ω at 20°C (68°F)

If the resistance is not within specification.
Replace the EBCV.



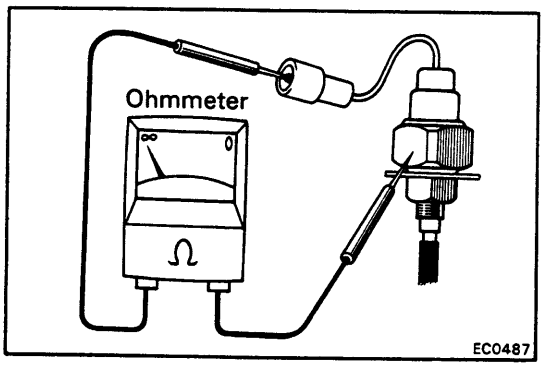
INSPECTION OF VACUUM SWITCH (A)

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



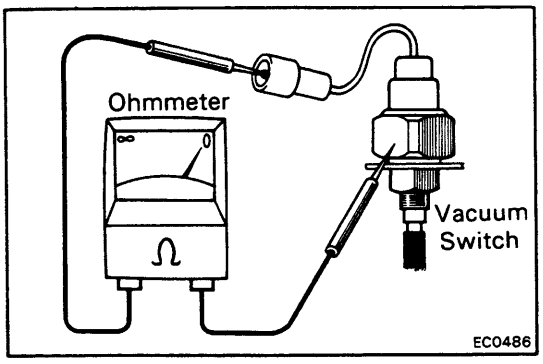
(b) Start the engine and warm up the engine to normal operating temperature.

(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.

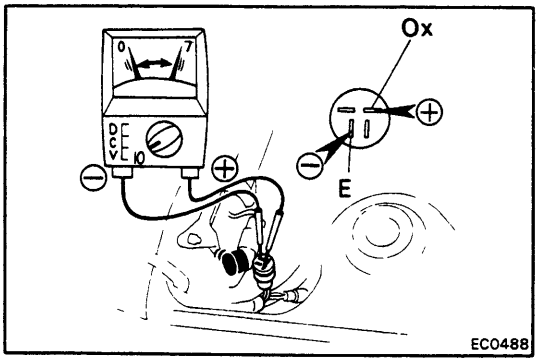


(b) Start the engine and warm up the engine normal operating temperature.

(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 fender apron below the wiper motor.

Connect the (+) testing probe to the Ox terminal and (–) testing probe to terminal E.

(c) Race engine at 2,500 rpm for about 90 seconds.

(d) Maintain the engine speed at 2,500 rpm.

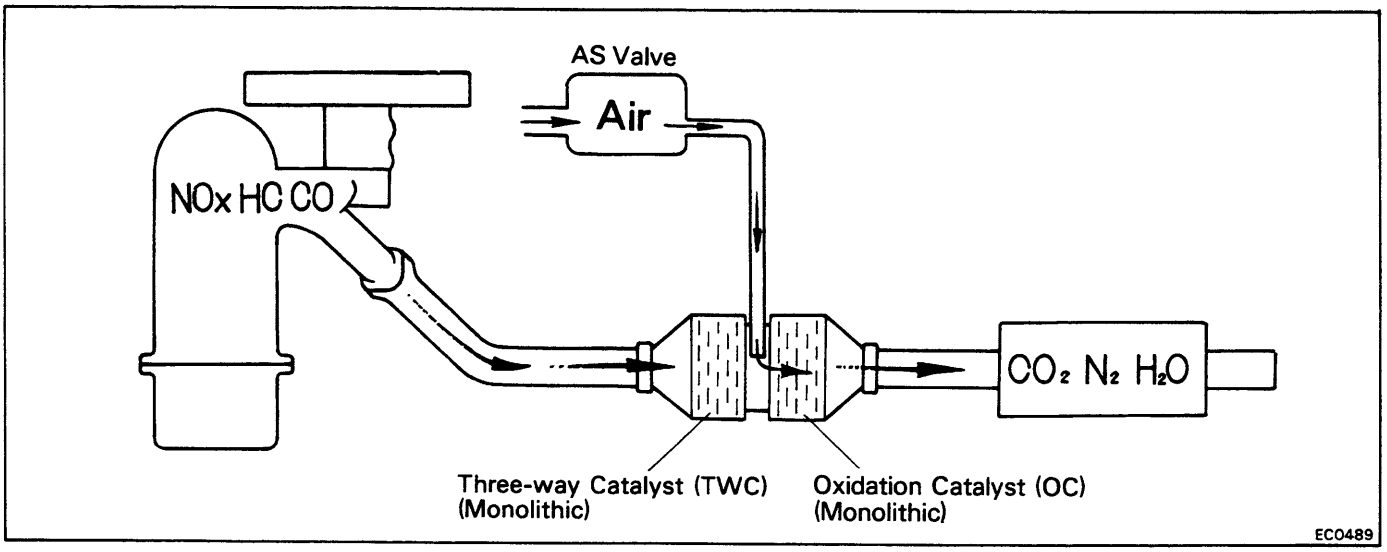
(e) Check that the needle of the voltmeter fluctuates within 0 – 7 volts 8 times or more in 10 seconds.

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)

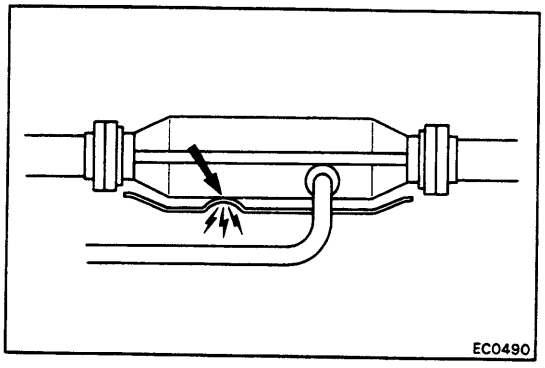


To reduce HC, CO and NOx emissions, they are oxidized, reduced and converted to nitrogen (N_2), carbon dioxide (CO_2) and water (H_2O) by the catalyst.

Exhaust Port		Three-way Catalyst	Air	Oxidation Catalyst (OC)		Exhaust Gas
HC, CO and NOx	⇒	Oxidation and reduction	⇒	Oxidation	⇒	CO_2 H_2O N_2

INSPECTION OF EXHAUST PIPE ASSEMBLY

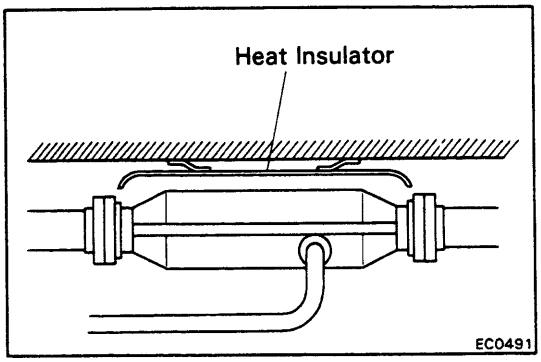
1. **CHECK CONNECTIONS FOR LOOSENESS OR DAMAGE**
2. **CHECK CLAMPS FOR WEAKNESS, CRACKS OR DAMAGE**



INSPECTION OF CATALYTIC CONVERTER

CHECK FOR DENTS OR DAMAGE

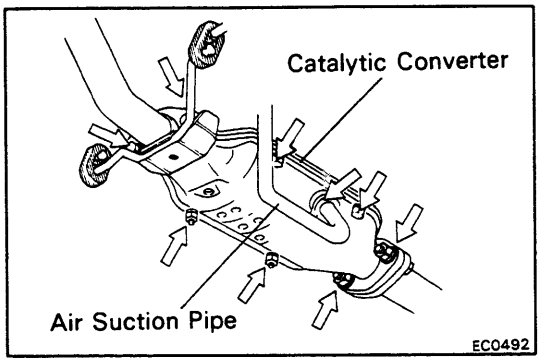
If any part of the protector is damaged or dented to the extent that it contacts the catalyst, repair or replace it.



INSPECTION OF HEAT INSULATOR

1. **CHECK HEAT INSULATOR FOR DAMAGE**

2. **CHECK FOR ADEQUATE CLEARANCE BETWEEN CATALYTIC CONVERTER AND HEAT INSULATOR**



REPLACEMENT OF CATALYTIC CONVERTER

1. **REMOVE CATALYTIC CONVERTER**
   (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 N·m)

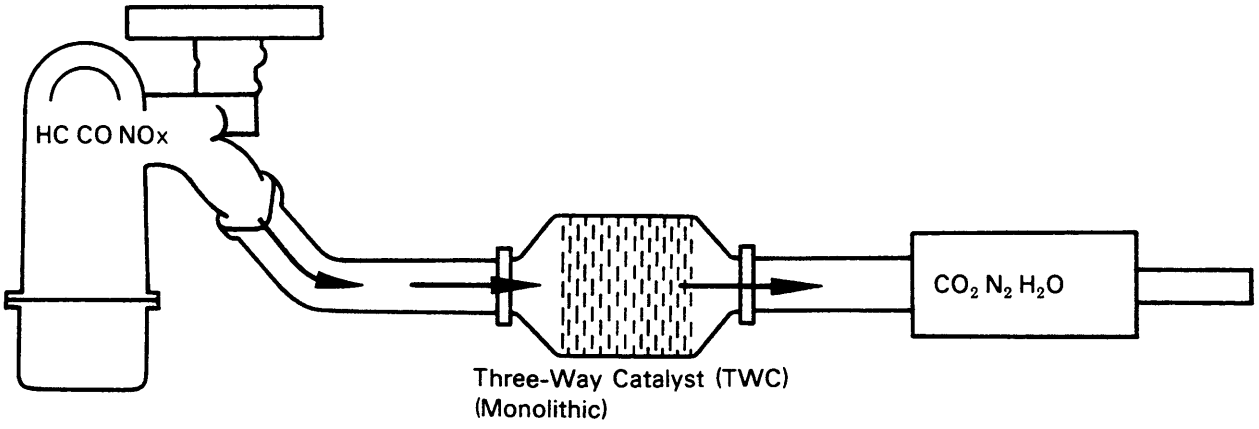
   (c) Reinstall the protector and tighten the bolts.

   Torque: Catalyst — Protector
   210 kg-cm (15 ft-lb, 21 N·m)

   (d) Reinstall the air suction pipe and tighten the bolts.

   Torque: Catalyst — Air suction pipe
   210 kg-cm (15 ft-lb, 20 N·m)

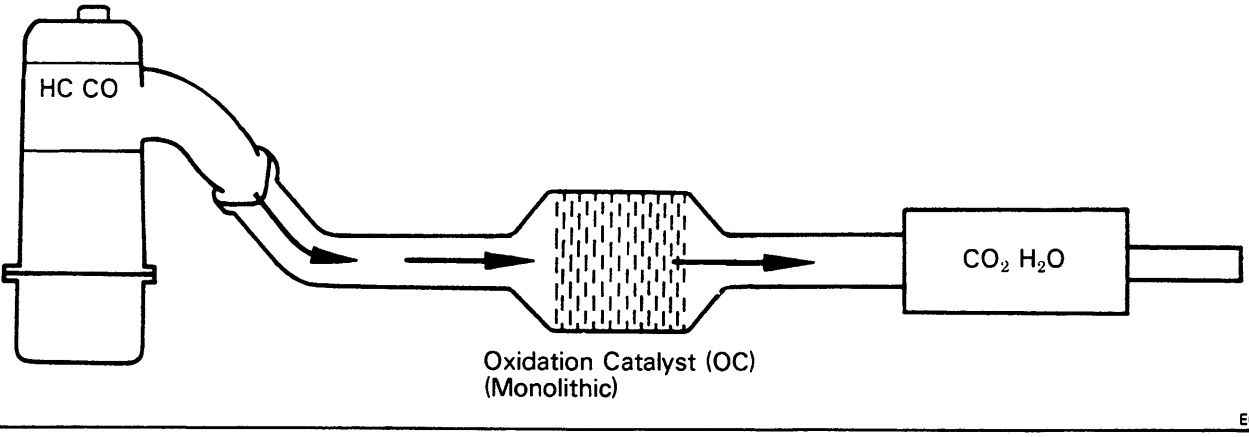
THREE-WAY CATALYST (TWC) SYSTEM
(California and Canada 3A-C Engine 4-Speed & Wagon A/T)



To reduce HC, CO and NOx emissions, they are oxidized, reduced and converted to nitrogen (N_2), carbon dioxide (CO_2) and water (H_2O) by the catalyst.

Exhaust Port		Three-Way Catalyst		Exhaust Gas
HC, CO and NOx	→	Oxidation and reduction	→	CO_2 H_2O N_2

OXIDATION CATALYST (OC) SYSTEM
(For Canada Wagon M/T)

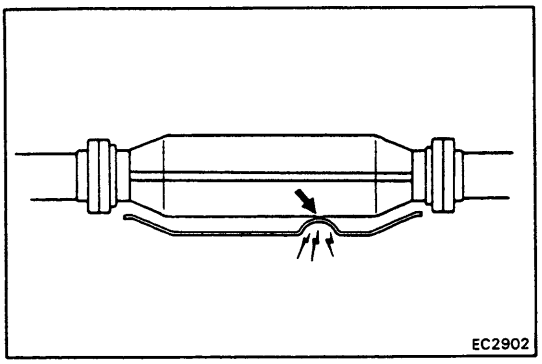


To reduce HC and CO emission, HC and CO are oxidized and converted to water (H_2O) and carbon dioxide (CO_2) by the catalyst.

Exhaust Port		Oxidation Catalyst (OC)		Exhaust Gas
Unburnt CO and HC	→	Oxidation	→	CO_2 H_2O

INSPECTION OF EXHAUST PIPE ASSEMBLY

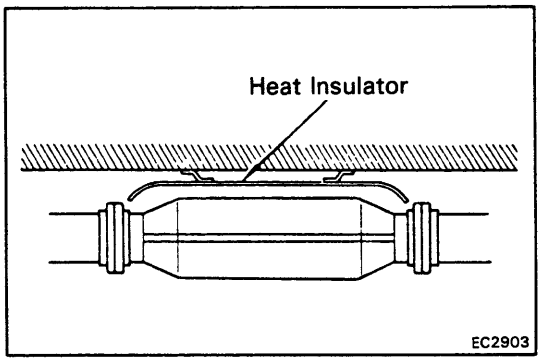
1. CHECK CONNECTIONS FOR LOOSENESS OR DAMAGE
2. CHECK CLAMPS FOR WEAKNESS, CRACKS OR DAMAGE



INSPECTION OF CATALYTIC CONVERTER

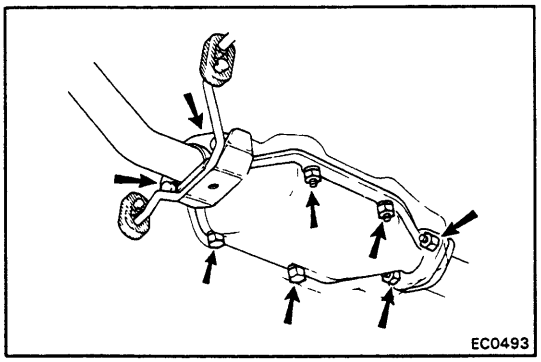
CHECK FOR DENTS OR DAMAGE

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

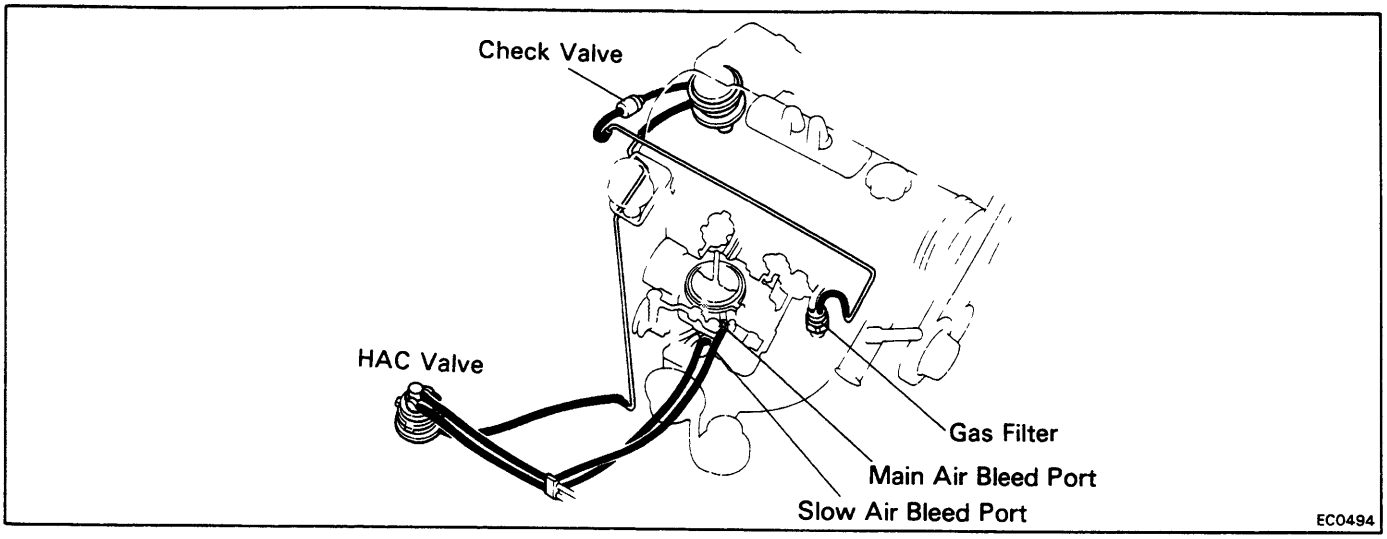
1. REMOVE CATALYTIC CONVERTER
   (a) Jack up the vehicle.
   (b) Check that the converter is cool.
   (c) Remove the protector bolts (4WD only).
   (d) Remove the bolts at the front and rear of the converter.
   (e) Remove the converter and gaskets.
2. INSTALL CATALYTIC CONVERTER
   (a) Place new gaskets on the converter front and rear pipes, and connect the converter to the exhaust pipes.
   (b) Tighten the bolts.

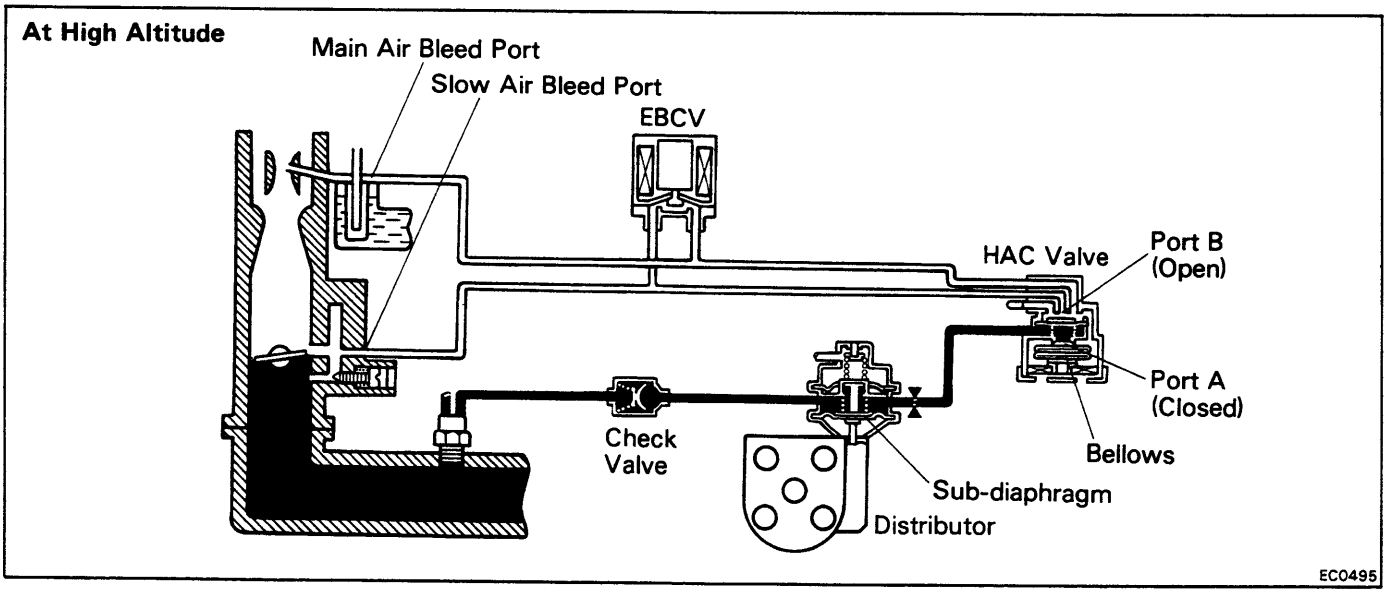
   Torque: Catalyst — Exhaust pipe
   440 kg-cm (32 ft-lb, 43 N·m)

   (c) Reinstall the protector and tighten the bolts (4WD only).

   Torque: Catalyst — Protector
   210 kg-cm (15 ft-lb, 21 N·m)

HIGH ALTITUDE COMPENSATION (HAC) SYSTEM (Federal Vehicles)

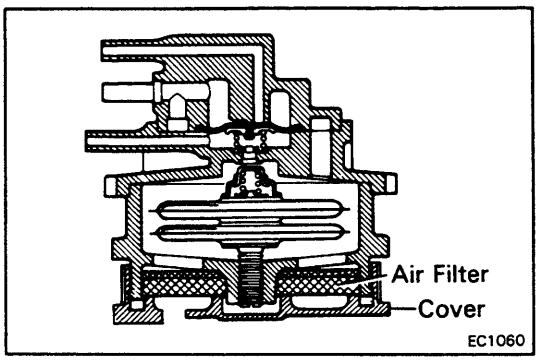




As altitude increases, the air-fuel mixture becomes richer. This system insures proper air-fuel mixture by suppying additional air to the primary low and high speed circuit of the carburetor and advances the ignition timing to improve driveability at high altitude above 1,198 m (3,929 ft).

Altitude	Bellows in HAC Valve	Port A in HAC Valve	Port B in HAC 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

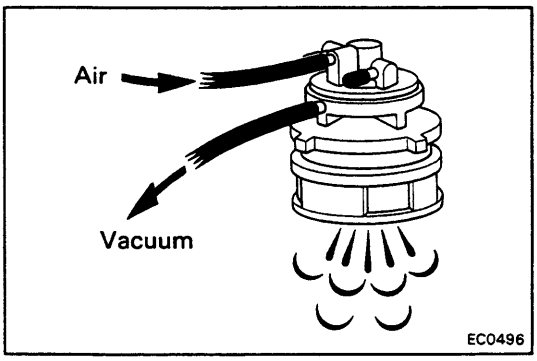
Remarks: * However, because of an orifice in the distributor sub-diaphragm pipe leading to the HAC valve, the sub-diaphragm is pulled only during high vacuum such as when idling.



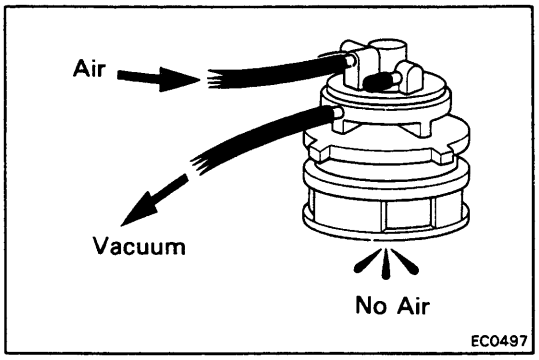
INSPECTION OF HAC SYSTEM

1. CHECK HAC VALVE

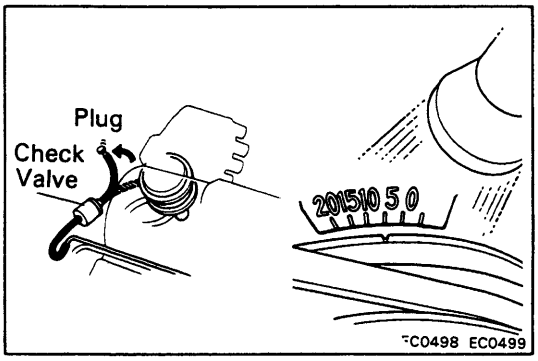
(a) Visually check and clean the air filter in the HAC valve.



(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 is open.



(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.

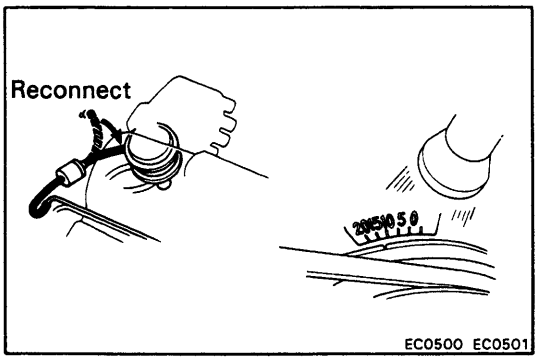


2. CHECK IGNITION TIMING

(a) Disconnect the vacuum hose from the distributor sub-diaphragm and plug the hose end.

(b) Check the ignition timing.

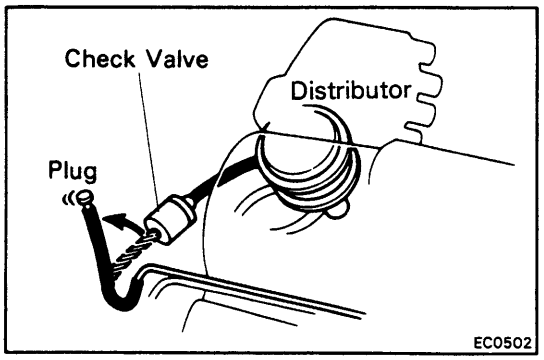
Ignition timing: 5° BTDC @ Max. 950 rpm



(c) Reconnect the hose to the distributor sub-diaphragm.

(d) Check the ignition timing advances.

Ignition timing: About 13° BTDC @ Max. 950 rpm

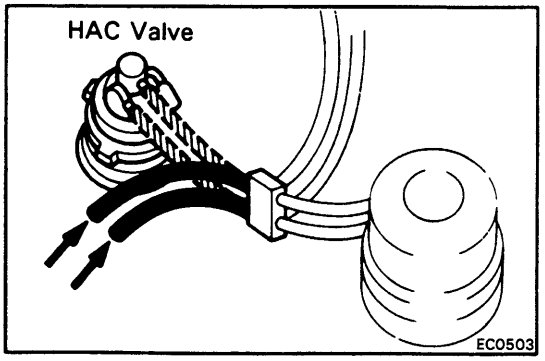


3. CHECK THE CHECK VALVE

(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.



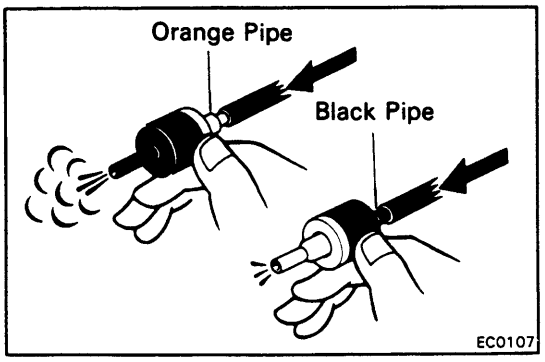
4. CHECK DISTRIBUTOR

(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

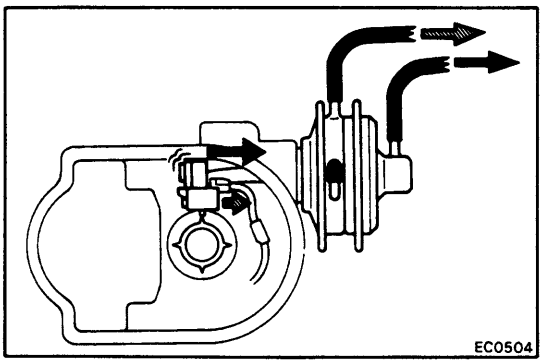


INSPECTION OF CHECK VALVE

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.

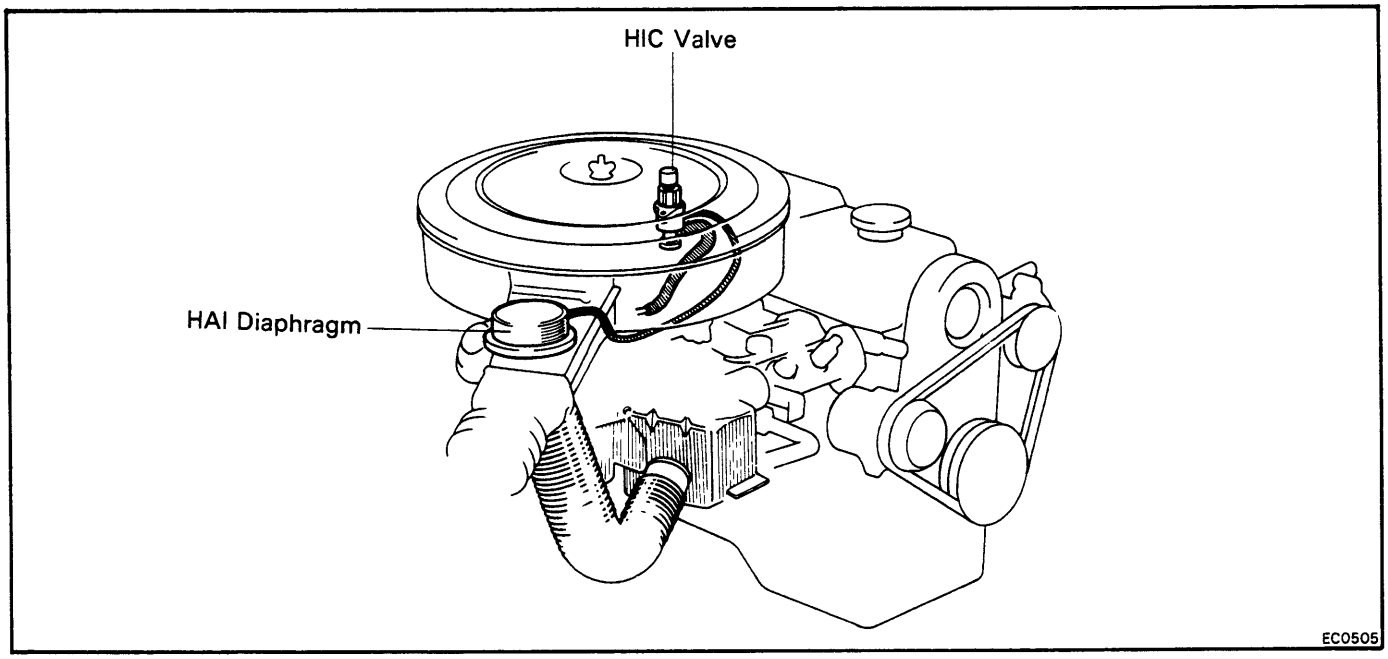
(b) Plug one port of the sub-diaphragm.

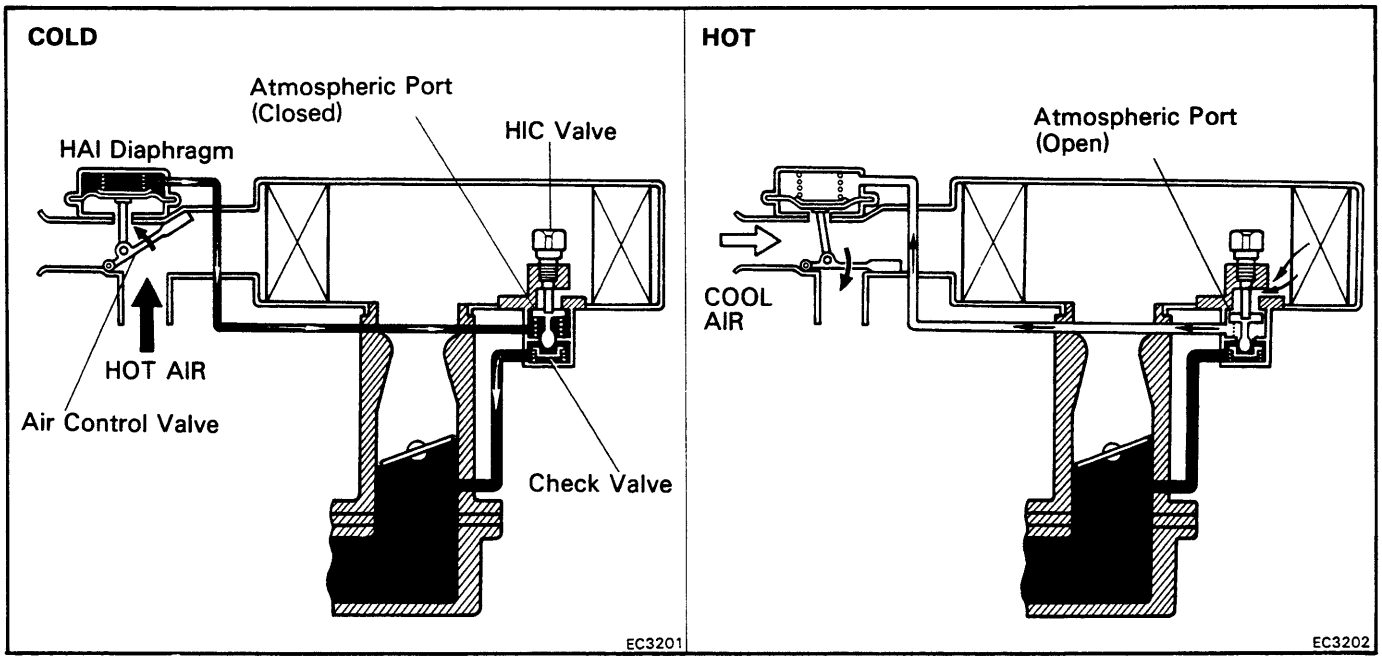
(c) Apply vacuum to the diaphragms, and check that the vacuum advancer moves in accordance with the vacuum.

(d) Reinstall the rotor and distributor cap, and remove the plug.

If a problem is found, repair or replace the distributor vacuum advancer.

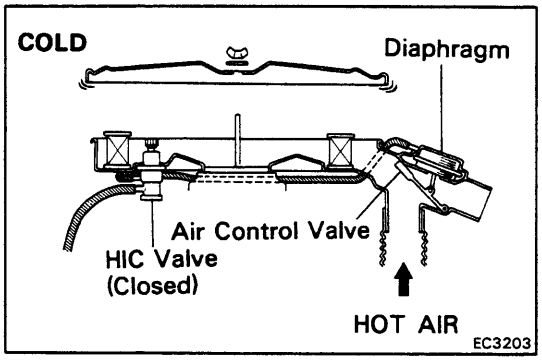
AUXILIARY SYSTEMS
1. Automatic Hot Air Intake (HAI) System

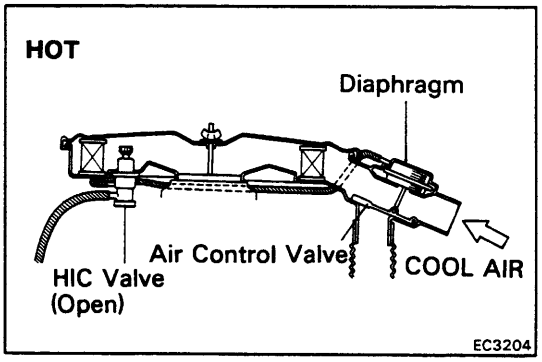




This system leads a hot air supply to the carburetor in cold weather to improve driveability and to prevent the carburetor from icing in extremely cold weather.

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.

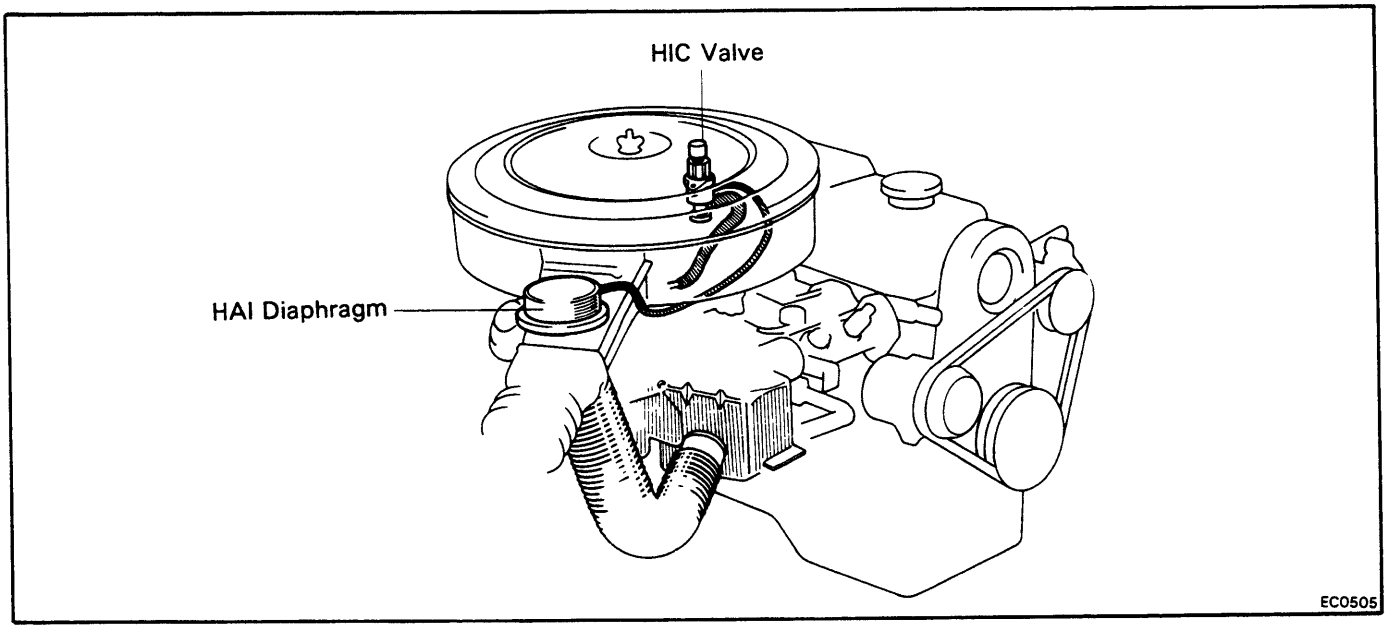
(d) Reinstall the air cleaner cover and warm up the engine.

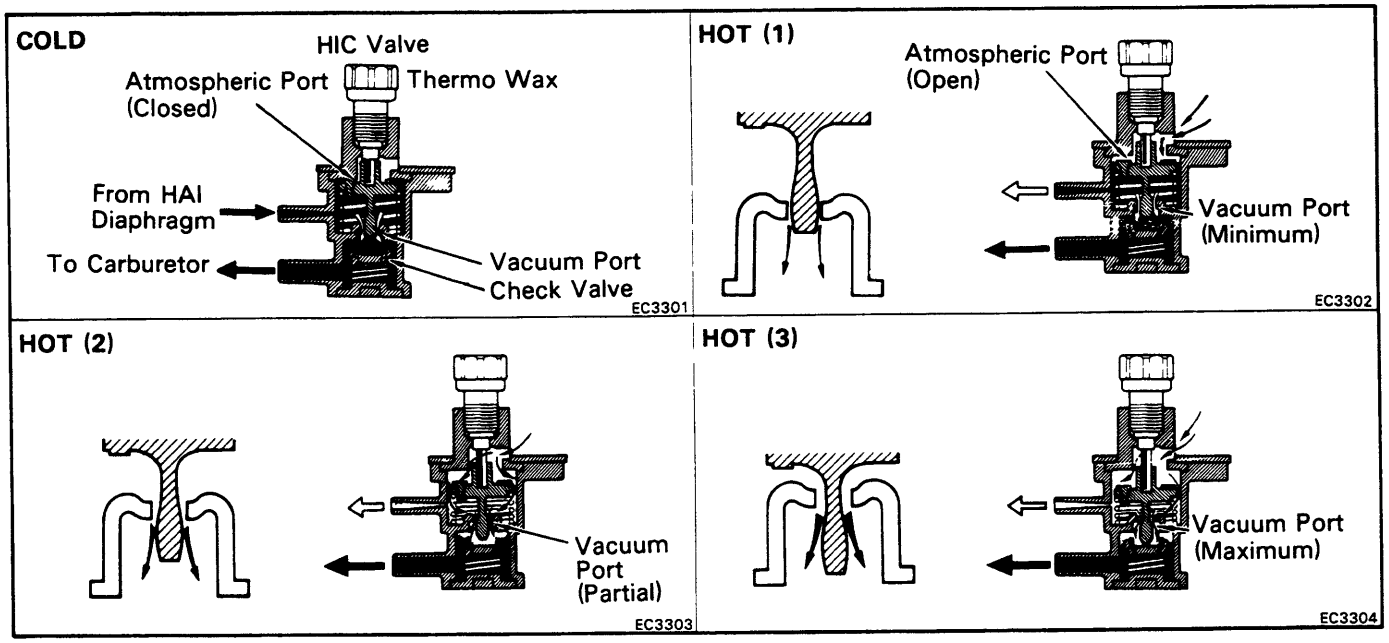
(e) Check that the air control valve opens the cool air passage at idle.

2. CHECK HOSES AND CONNECTIONS

Visually check the hoses and connections for cracks, leaks or damage.

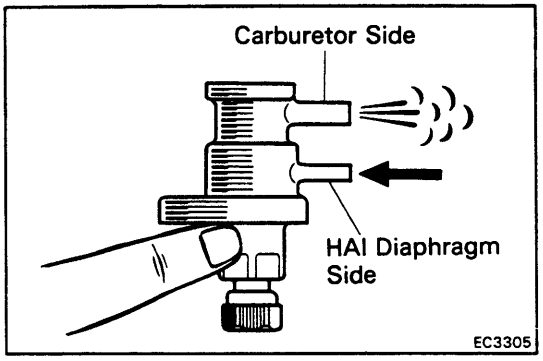
2. Hot Idle Compensation (HIC) System on Air Cleaner





This system allows the air controlled by the HIC valve to enter the intake manifold to maintain proper air-fuel mixture during high temperatures at idle.

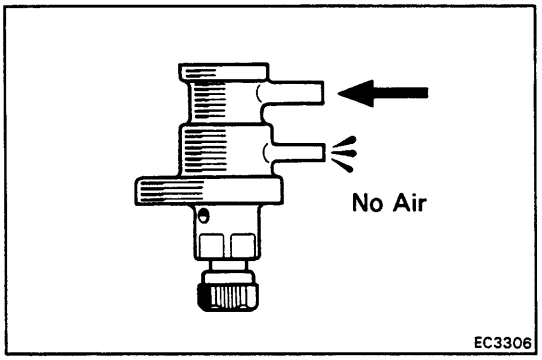
Temperature in Air Cleaner	HIC Valve Atmospheric Port	HIC Valve Vacuum Port Opening	HIC System
HOT (1) Between 29°C (84°F) and 52°C (126°F)	OPEN	MINIMUM	OFF
HOT (2) Between 59°C (138°F) and 82°C (180°F)	OPEN	PARTIAL	ON Air volume is controlled by HIC valve
HOT (3) Above 89°C (192°F)	OPEN	MAXIMUM	ON



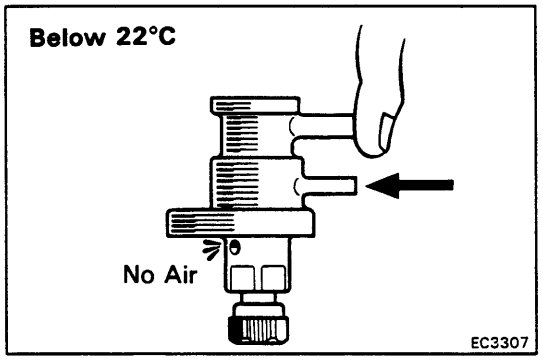
INSPECTION OF HIC SYSTEM

CHECK HIC VALVE BY BLOWING AIR

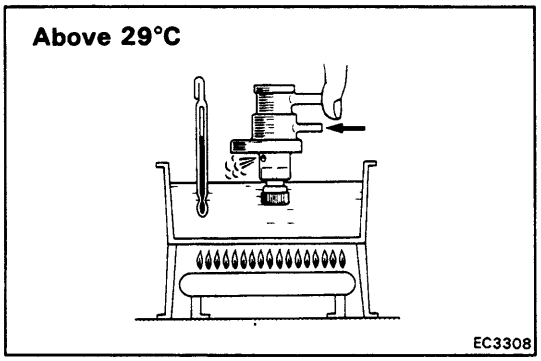
(a) Check that air flows from the HAI diaphragm side to the carburetor side while closing the atmospheric port.



(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.

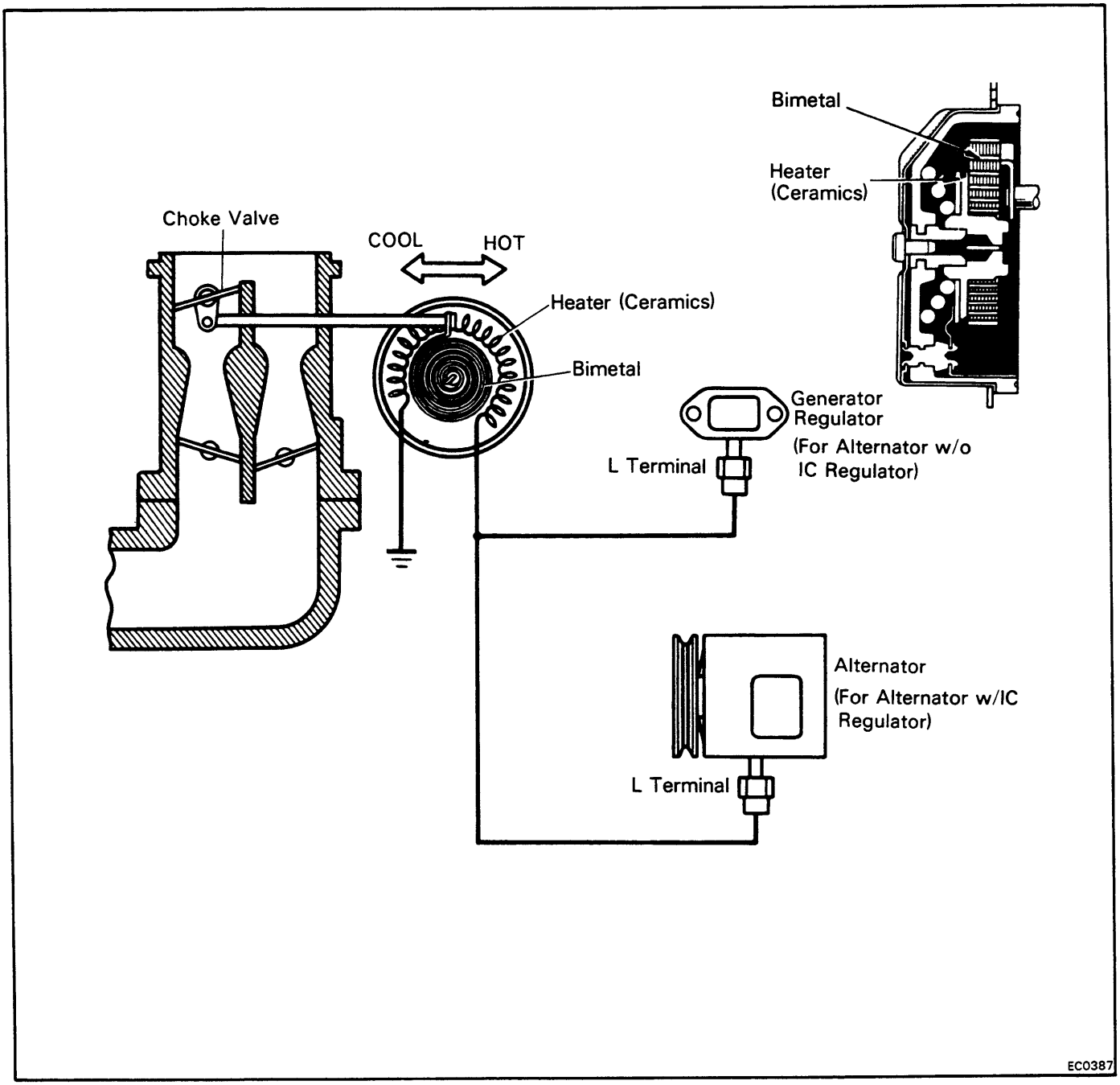


(d) Heat the HIC valve to above 29°C (84°F).

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.

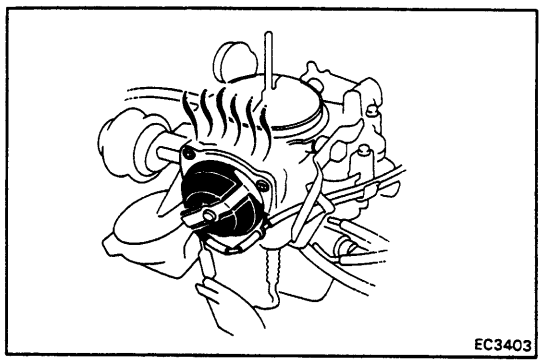
3. Automatic Choke System



This system temporarily supplies a rich mixture to the engine by closing the choke valve when the engine is cold.

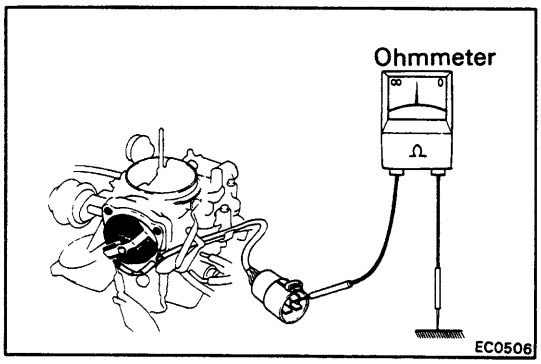
IG S/W	Engine	Current from L Terminal to Heater	Bimetal	Choke Valve
OFF	Not running	Not flowing	Expanded	CLOSED
ON	Not running	* Not flowing	Expanded	CLOSED
	Running	Flowing	Heated up and contracted	OPEN

Remarks: * On alternators 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

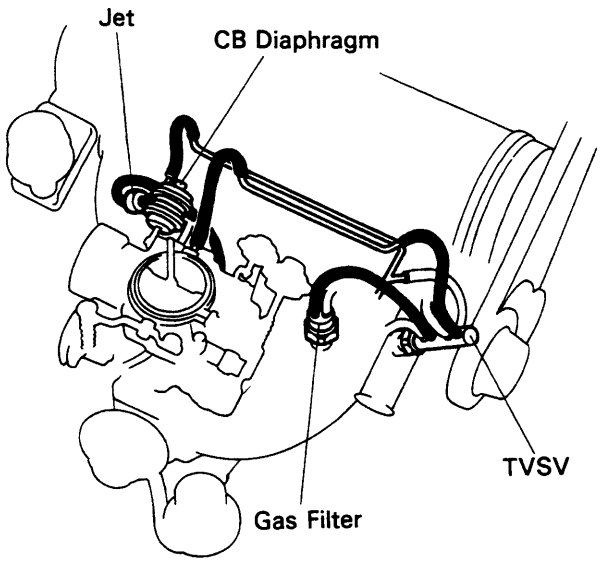
1. UNPLUG WIRING CONNECTOR
2. MEASURE RESISTANCE WITH OHMMETER

Resistance:

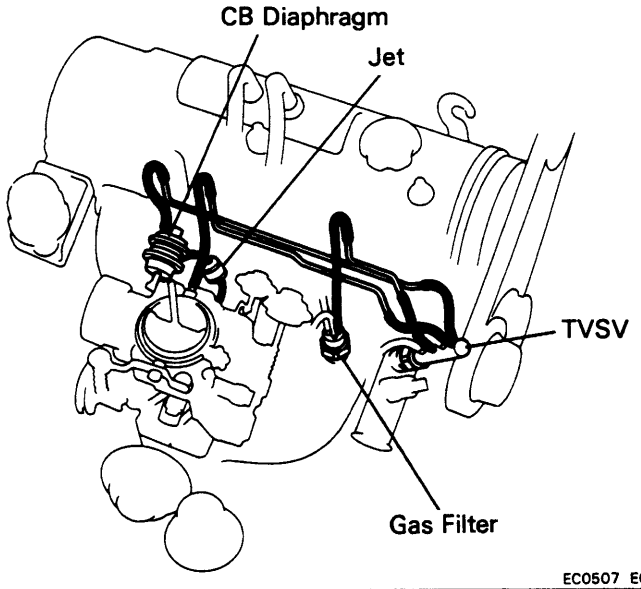
3A-C	(ex. Canada Wagon M/T) 17 – 19 Ω
Others	20 – 22 Ω

4. Choke Breaker (CB) System

USA and Canada 3A-C Engine 4-Speed & Wagon A/T

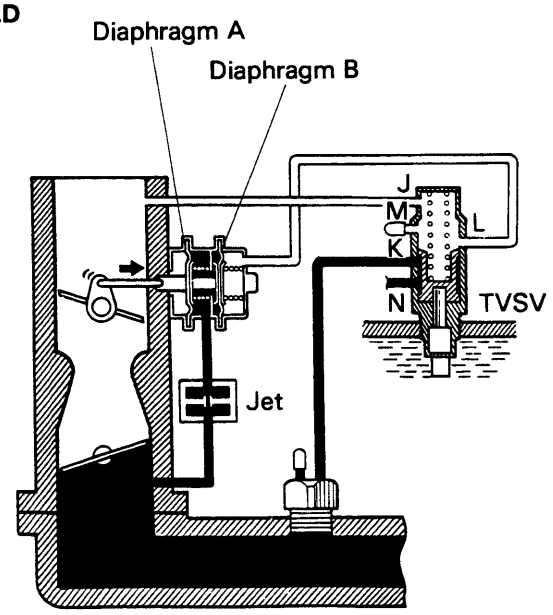


Canada Wagon M/T & 3A Engine



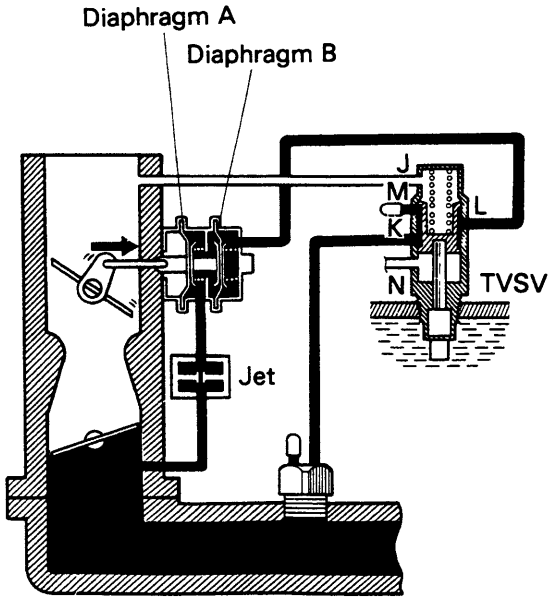
EC0507 EC0508

COLD



EC3505

HOT

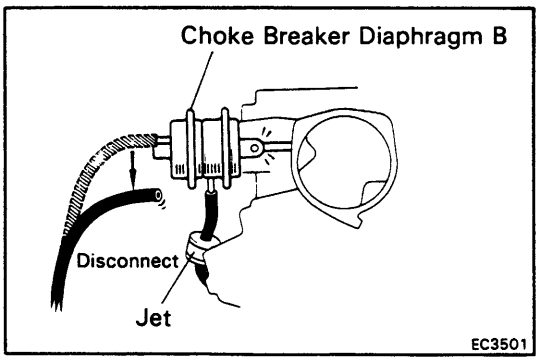


EC3506

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 Pull
Below 7°C (45°F)	OPEN (L-J)	* PULLED	NOT PULLED	SLIGHT
Above 17°C (63°F)	OPEN (K-L)	* PULLED	PULLED	MUCH

Remarks: * This action is delayed by the jet.



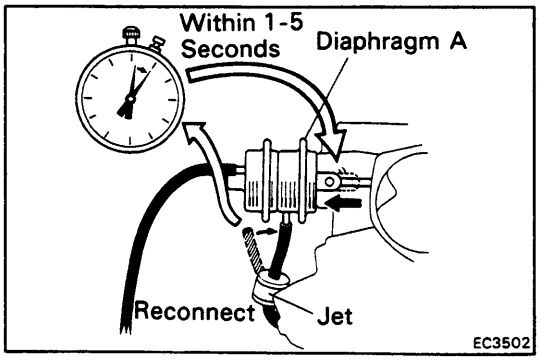
INSPECTION OF CB SYSTEM

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.

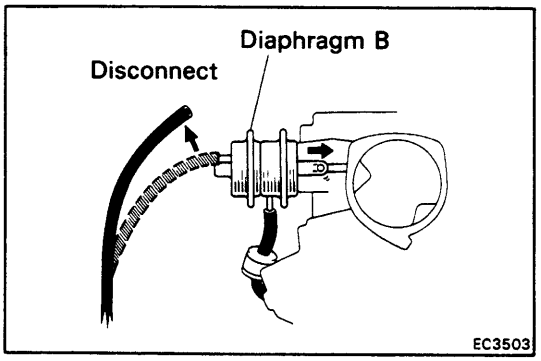


2. CHECK JET AND DIAPHRAGM A

(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.

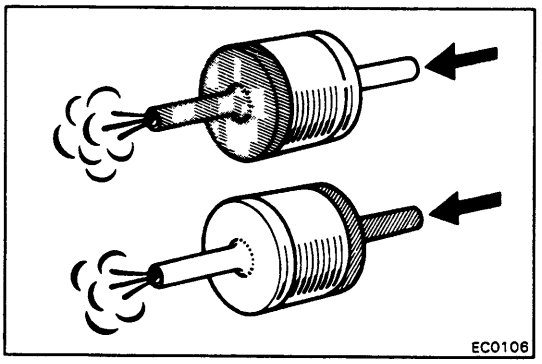
1 — 5 seconds



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 returns.

(b) Reconnect the vacuum hose to diaphragm B.



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

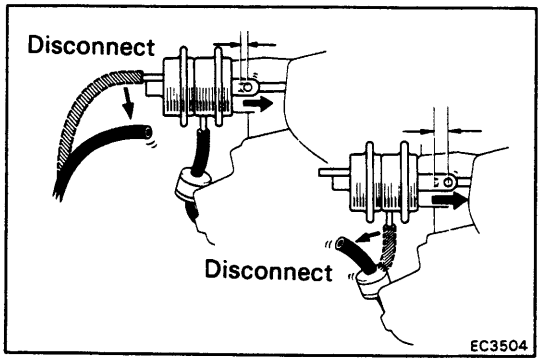
INSPECTION OF TVSV

(See page EC-22)

INSPECTION OF JET

CHECK JET BY BLOWING AIR FROM EACH SIDE

Check for stoppage.



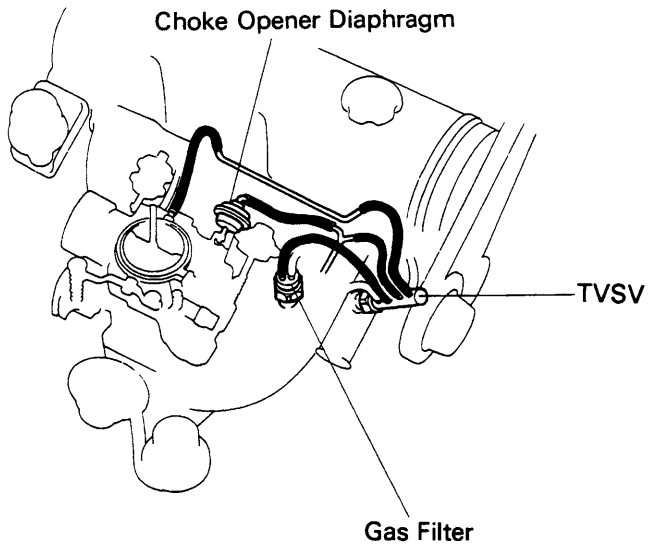
INSPECTION OF CB DIAPHRAGMS

CHECK THAT CHOKE LINKAGE MOVES IN ACCORDANCE WITH APPLIED VACUUM

If a problem is found, replace the diaphragm.

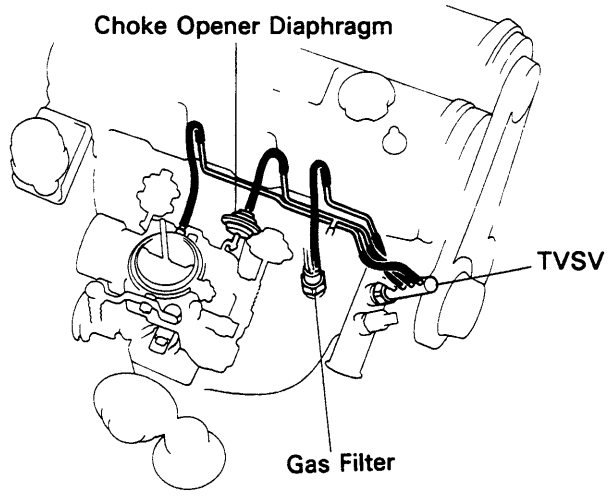
5. Choke Opener System

USA Vehicles and Canada 3A-C Engine 4-Speed & Wagon A/T



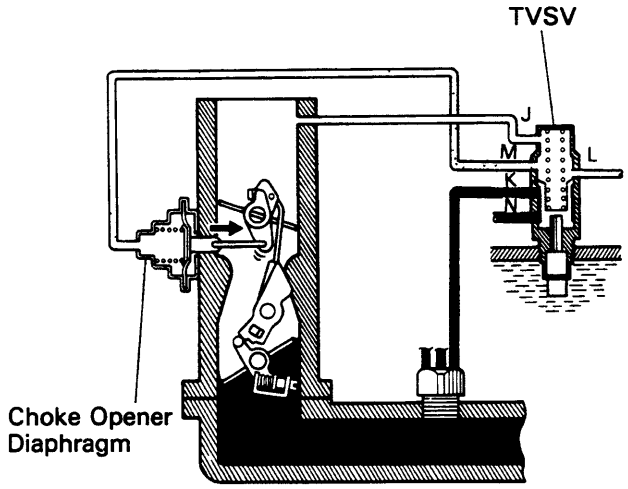
EC0509

Canada Wagon M/T



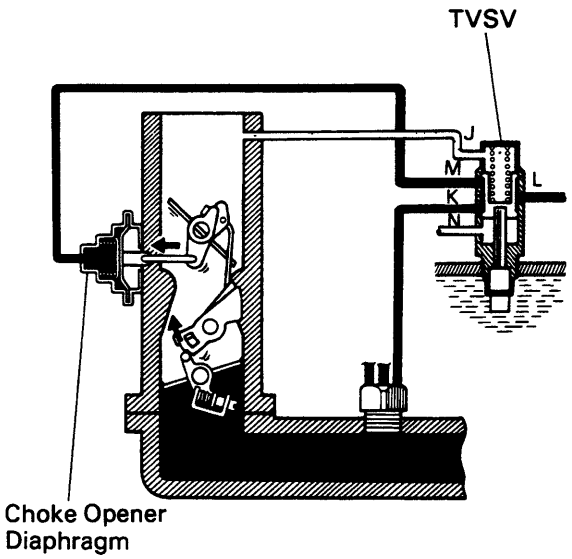
EC0510

COLD



EC1070

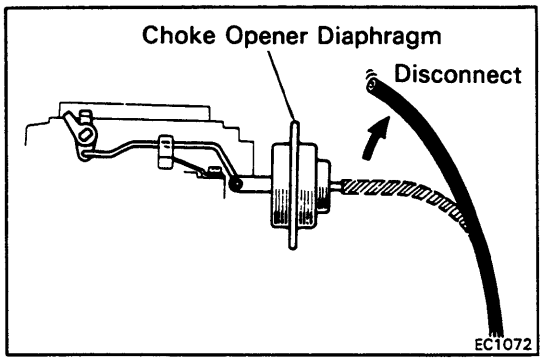
HOT



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 tension	Closed by automatic choke	Set at 1st or 2nd step	HIGH
Above 68°C (154°F)	OPEN (K-M)	Pulled by manifold vacuum	OPEN	Released to 3rd step	LOW



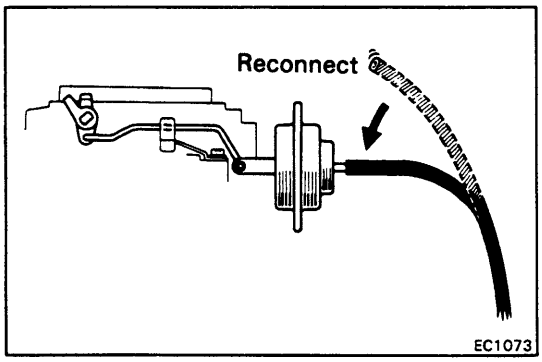
INSPECTION OF CHOKE OPENER SYSTEM

1. CHECK TVSV WITH COLD ENGINE

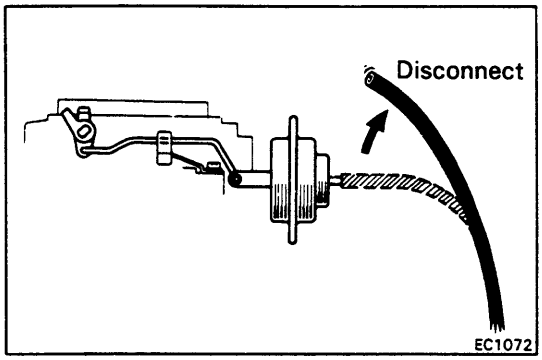
(a) Disconnect the vacuum hose from the choke opener diaphragm.

(b) With the coolant temperature below 50°C (122°F), step down on the accelerator pedal and release it.

(c) Start the engine.



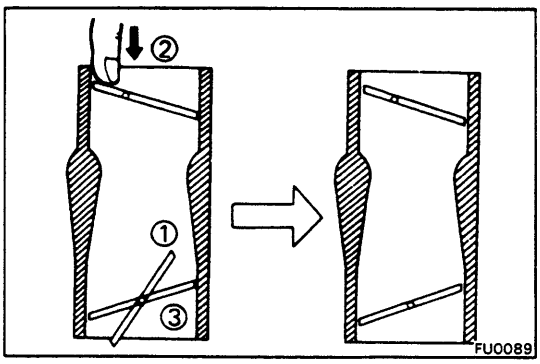
(d) Reconnect the vacuum hose and check that the choke linkage does not move.



2. CHECK TVSV, DIAPHRAGM AND LINKAGE WITH WARM ENGINE

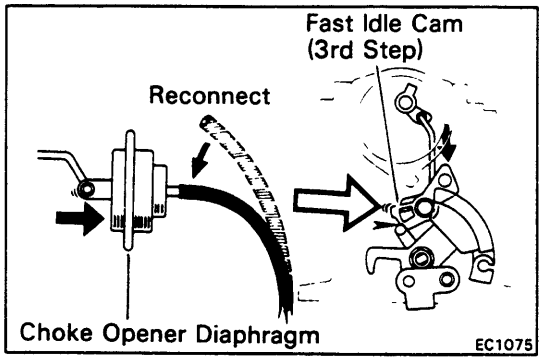
(a) Warm up the engine to normal operating temperature and stop the engine.

(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 release the throttle valve.

(d) Start the engine, but do not touch the accelerator pedal.

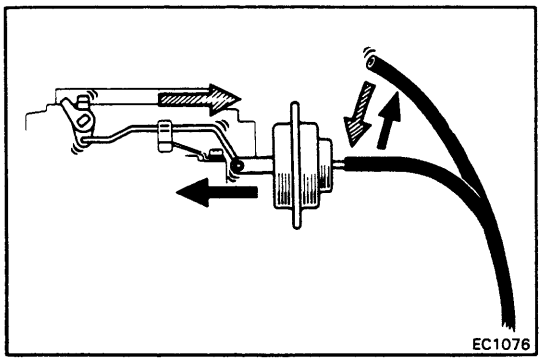


(e) Reconnect the vacuum hose, and check that the choke linkage moves, and that the fast idle cam is released to the 3rd step.

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

INSPECTION OF TVSV

(See page EC-22)



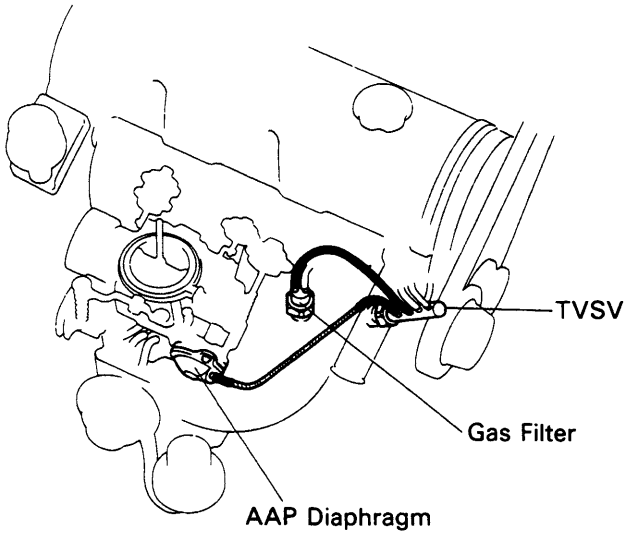
INSPECTION OF DIAPHRAGM

CHECK THAT CHOKE LINKAGE MOVES IN ACCORDANCE WITH APPLIED VACUUM

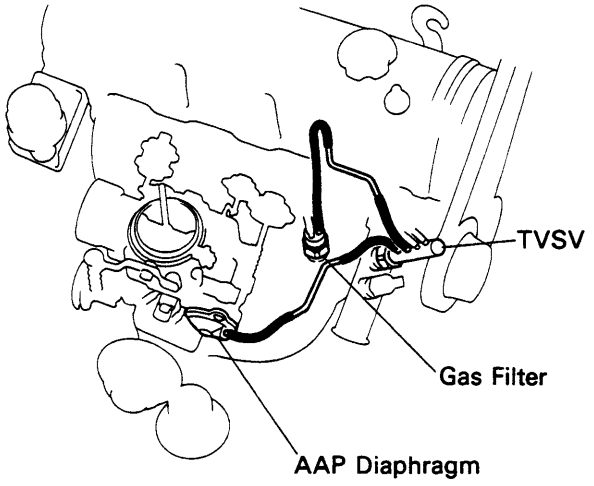
If a problem is found, replace the diaphragm.

6. Auxiliary Acceleration Pump (AAP) System

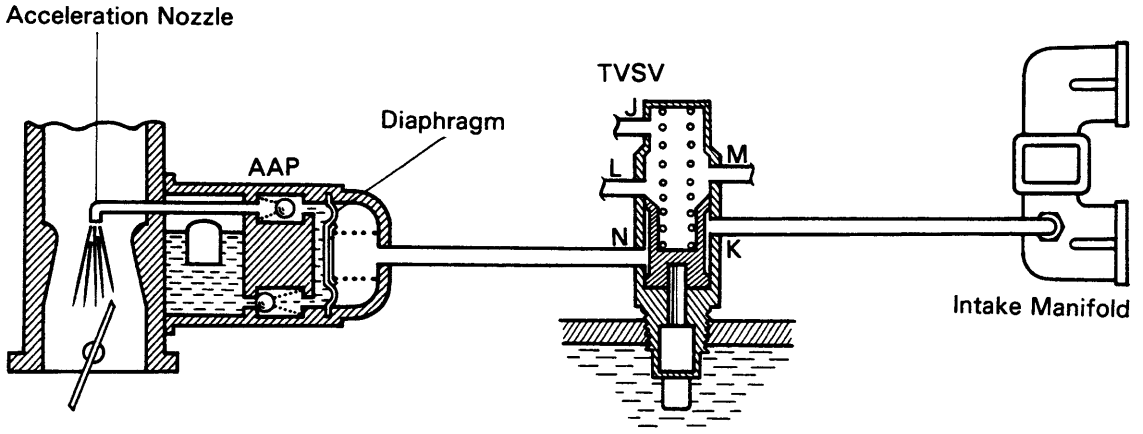
USA and Canada 3A-C, 4-Speed & Wagon A/T



Canada Wagon M/T & 3A Engine



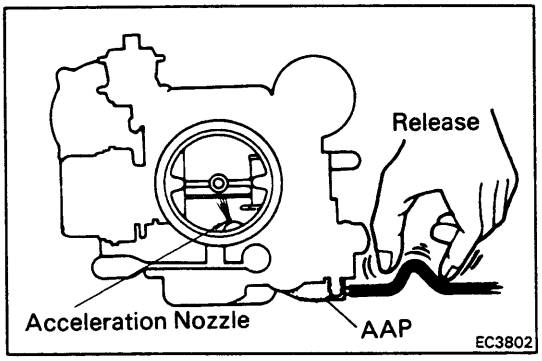
EC0511 EC0512



EC3801

When accelerating with a cold engine, the main acceleration pump capacity is insufficient 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	Returned by spring tension	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) Release the hose.

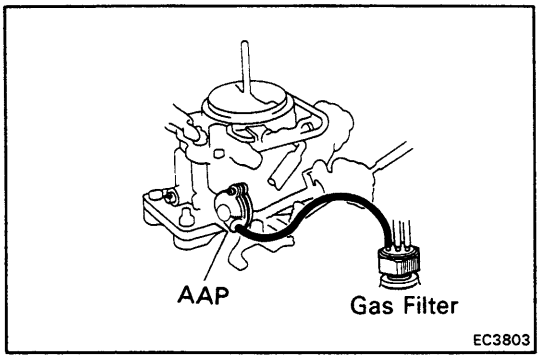
(f) Check that gasoline spurts out from the acceleration nozzle.

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 release the vacuum directly to the AAP diaphragm at idle.

(d) Check that the engine rpm changes by releasing vacuum.

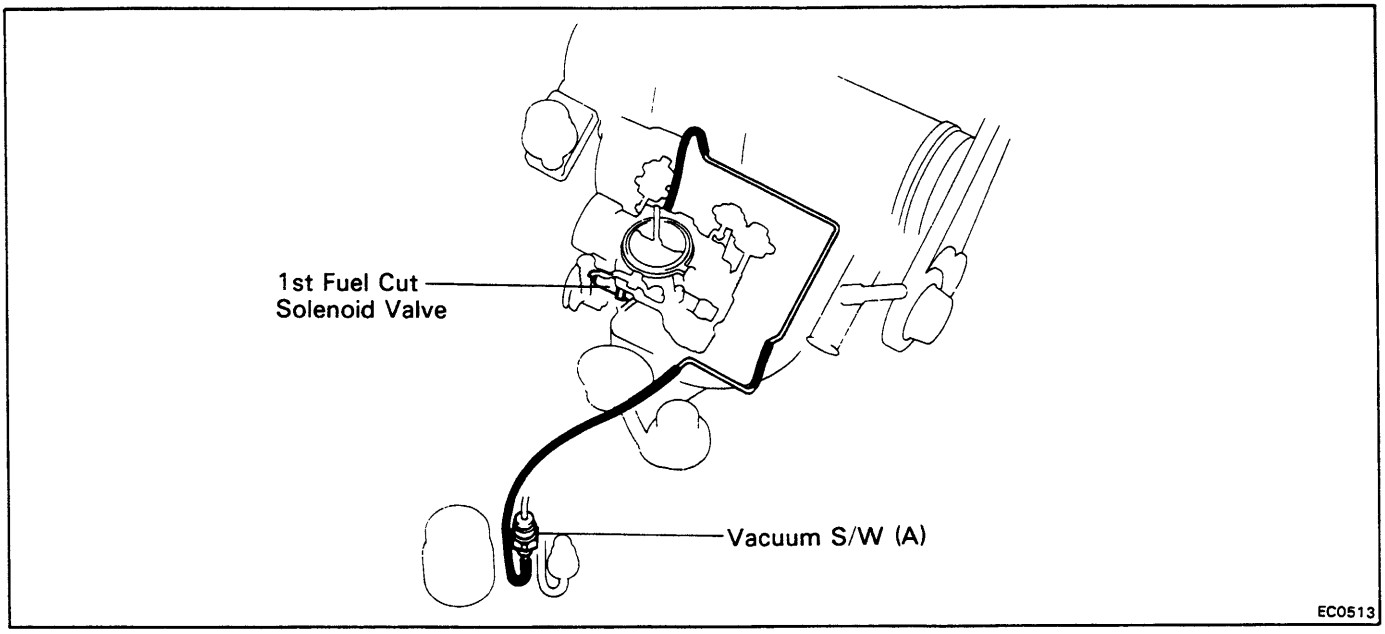
(e) Reconnect the AAP hose.

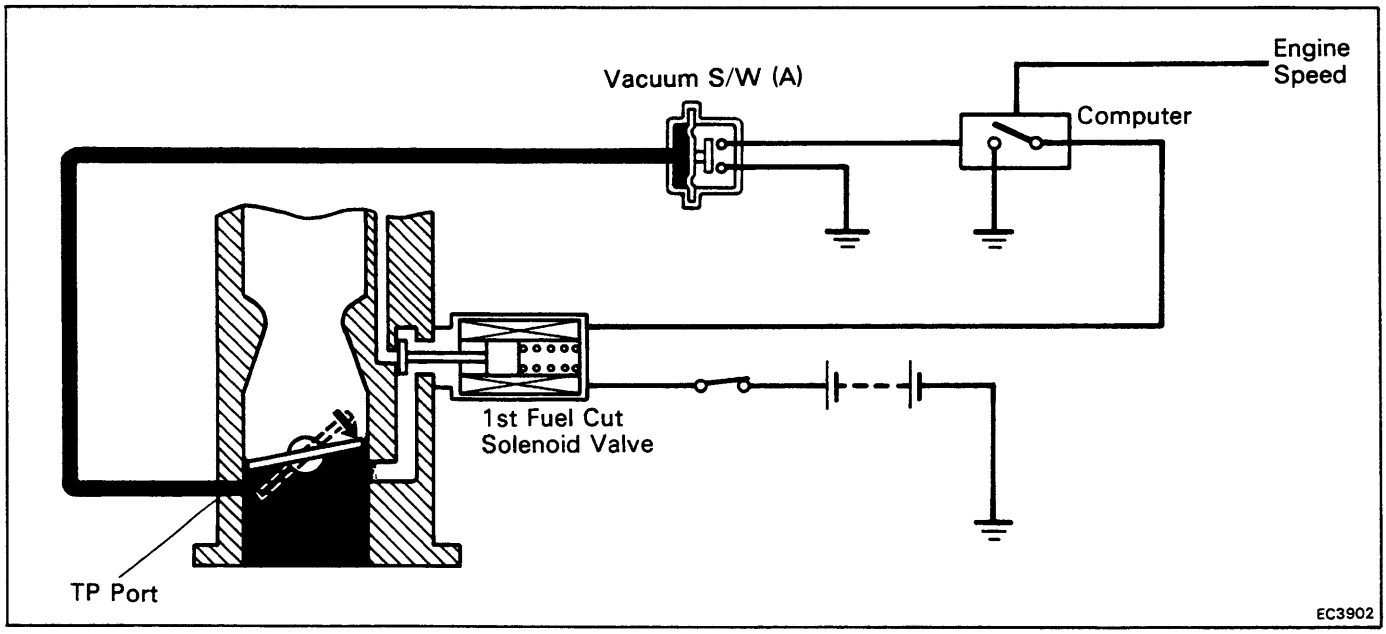
If a problem is found, replace the diaphragm.

INSPECTION OF TVSV

(See page EC-22)

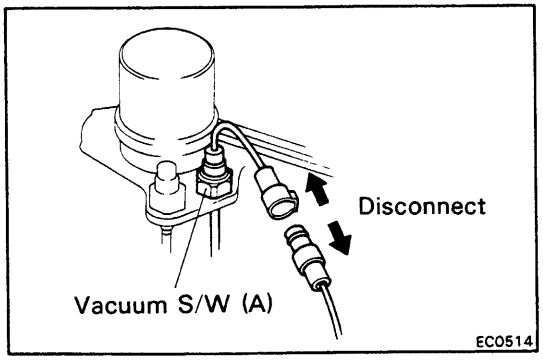
7. Deceleration Fuel Cut System (USA and Canada 3A-C Engine 4-Speed & Wagon A/T)





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	1st 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

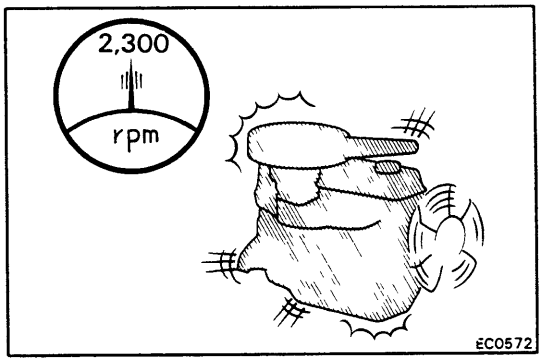
CHECK SYSTEM OPERATION

(a) Connect a tachometer to the engine.

(b) Start the engine.

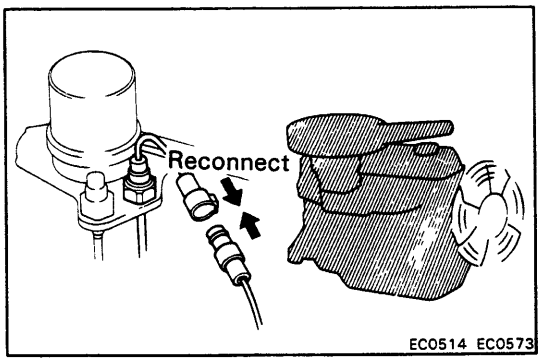
(c) Check that the engine runs normally.

(d) Disconnect the vacuum switch (A) connector.



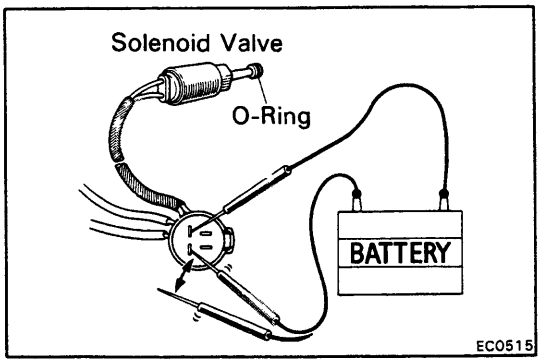
(e) Gradually increase engine speed to 2,300 rpm, and check that the engine rpm is fluctuating.

CAUTION: Perform this inspection quickly to avoid overheating the catalytic converter.



(f) Reconnect the vacuum switch connector. Again gradually increase the engine speed to 2,300 rpm and check that engine operation returns to normal.

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



INSPECTION OF FIRST FUEL CUT SOLENOID VALVE

(a) Remove the solenoid valve.

(b) Connect the two terminals and the battery terminals as shown.

(c) Check that you can feel the "click" from the solenoid valve when the battery is connected and disconnected.

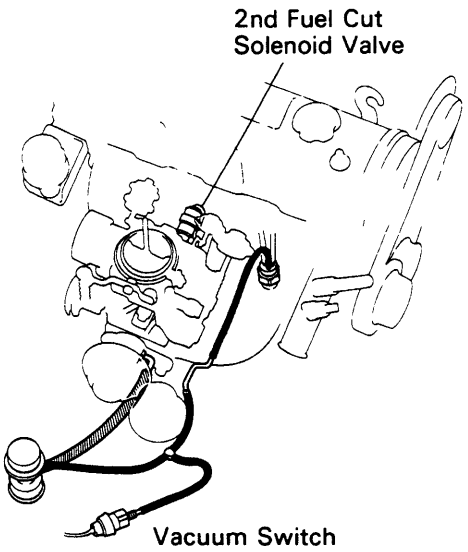
(d) Check the O-ring for damage.

(e) Reinstall the valve and reconnect the wiring connector.

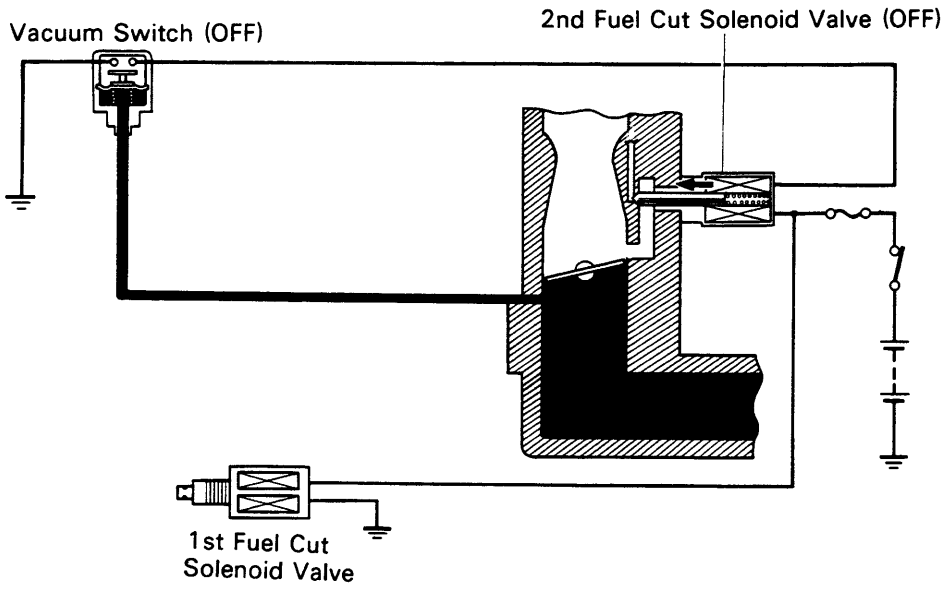
INSPECTION OF VACUUM SWITCH (A)

(See page EC-34)

7. Deceleration Fuel Cut System (Canada Wagon M/T)



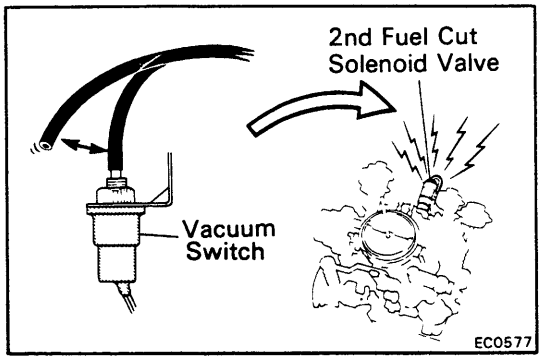
EC1078



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)	OFF	OFF	CLOSED



INSPECTION OF SYSTEM

CHECK SYSTEM OPERATION

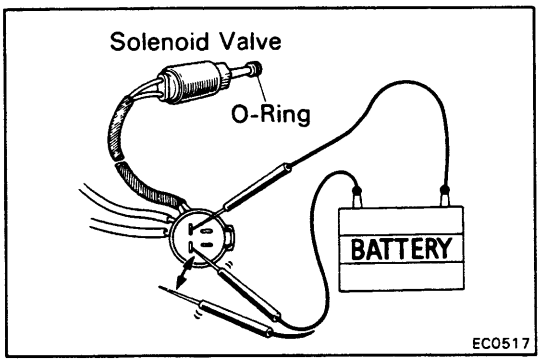
(a) Start the engine.

(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 terminals and the battery terminals as shown.

(c) Check that you can feel the "click" from the solenoid valve when the battery is connected and disconnected.

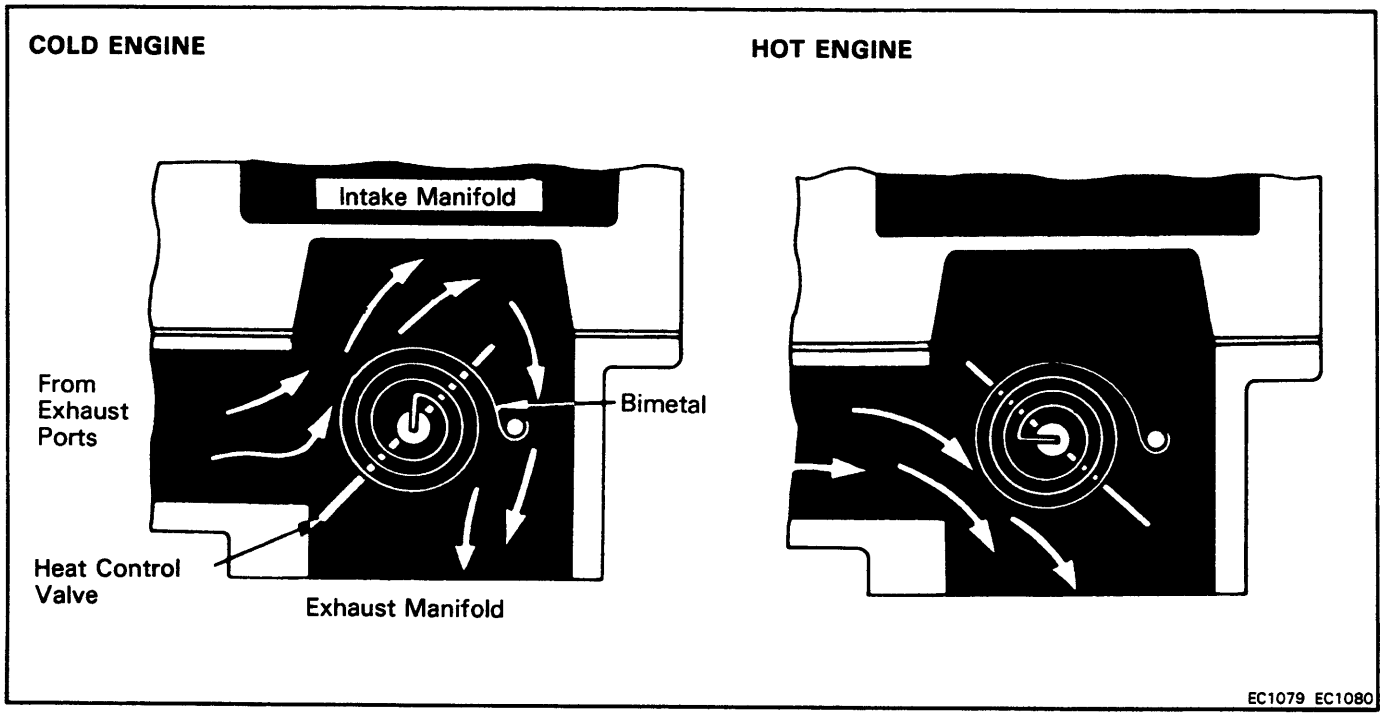
(d) Check the O-ring for damage.

(e) Reinstall the valve and reconnect the wiring connector.

INSPECTION OF VACUUM SWITCH (A)

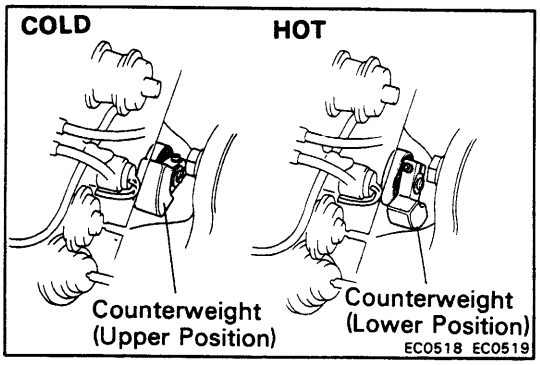
(See page EC-34)

8. Heat Control Valve



When cold, this device improves fuel vaporization for better driveability by quickly 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 quickly.
HOT	CONTRACTED	Under the heat control valve	Heated to a suitable temperature.



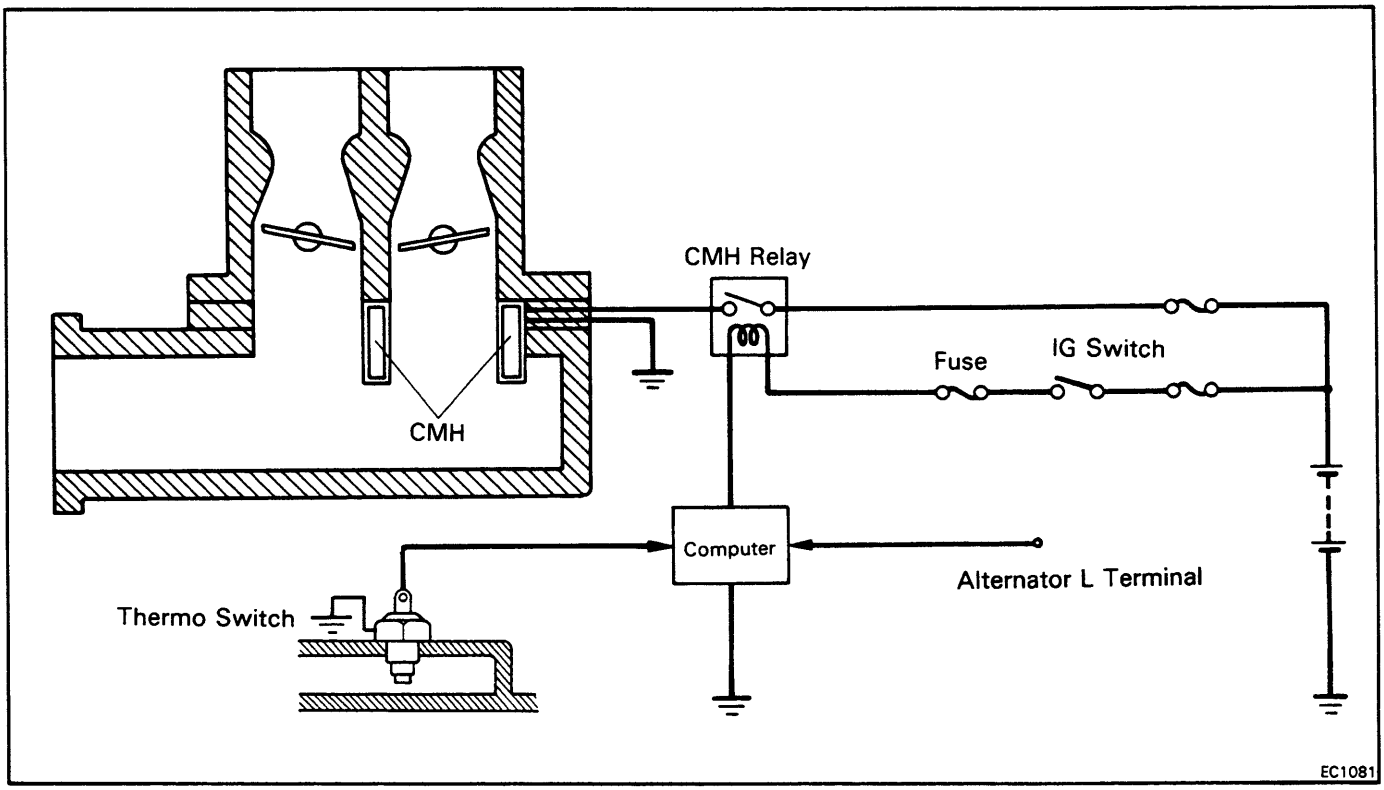
INSPECTION OF SYSTEM

CHECK OPERATION

(a) When the engine is cold, check that the counterweight of the heat control valve is at the upper position as shown.

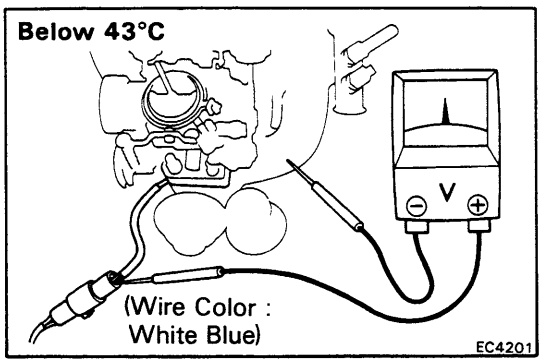
(b) After warm-up, check that the counterweight of the heat control valve is at the lower position as shown.

9. Cold Mixture Heater (CMH) System (USA and Canada 3A-C Engine 4-Speed & Wagon A/T)



To reduce cold engine emission and improve driveability, the intake manifold is heated during cold engine operation to accelerate vaporization of the liquid fuel.

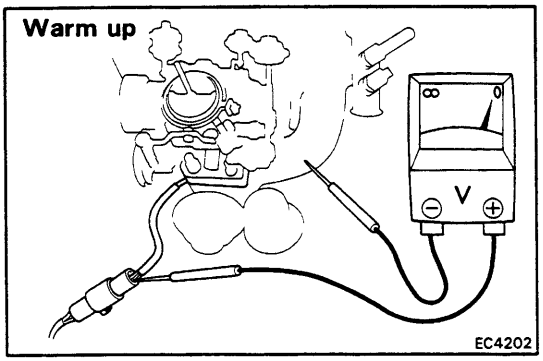
IG S/W	Engine	Coolant Temp.	Thermo S/W	Computer	CMH Relay	CMH
OFF	Not running	—	—	—	OFF	OFF
ON	Not running	—	—	OFF	OFF	OFF
	Running	Below 43°C (109°F)	ON	ON	ON	ON (Heated)
		Above 55°C (131°F)	OFF	OFF	OFF	OFF



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 probe should be inserted from the rear side of the connector.

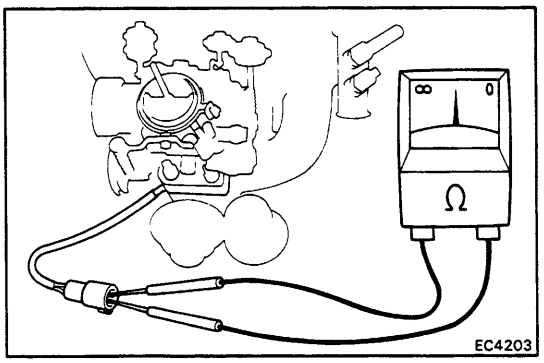


3. CHECK CMH WITH WARM ENGINE

(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

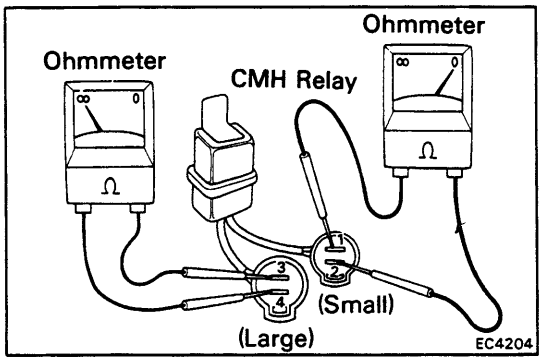
MEASURE RESISTANCE

(a) Unplug the wiring connector.

(b) Using an ohmmeter, measure the resistance between the terminals.

Resistance: 0.5 — 2.0 Ω (20°C, 68°F)

(c) Plug in the wiring connector.



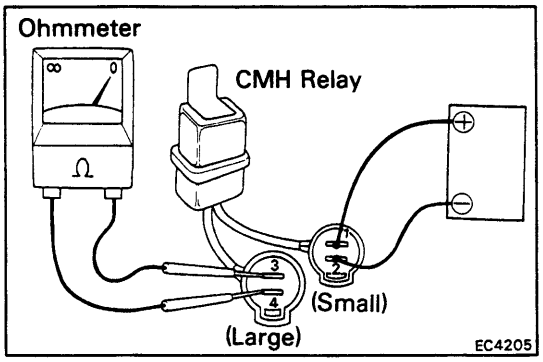
INSPECTION OF CMH RELAY

1. INSPECT RELAY CONTINUITY

Check that there is continuity between terminals 1 and 2.

Check that there is no continuity between terminals 3 and 4.

Relay location: Right fender apron



2. INSPECT RELAY OPERATION

Check the continuity between terminals 3 and 4 with battery voltage applied between terminals 1 and 2.

INSPECTION OF THERMO SWITCH

(See page EC-11)

FUEL SYSTEM

	Page
PRECAUTIONS	FU-2
TROUBLESHOOTING	FU-2
ON-VEHICLE INSPECTION	FU-3
CARBURETOR	FU-4
FUEL PUMP	FU-31
FUEL TANK AND LINES	FU-33

PRECAUTIONS

1. **Before working on the fuel 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 confusion between similar looking parts.**
5. **Keep work area clean to avoid contamination of the carburetor and components.**
6. **Be careful not to mix up or lose clips or springs.**

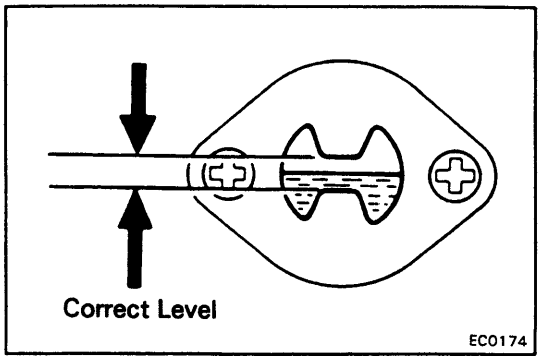
TROUBLESHOOTING

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 FU-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 piston 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 ● Deceleration 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 union 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.

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)**

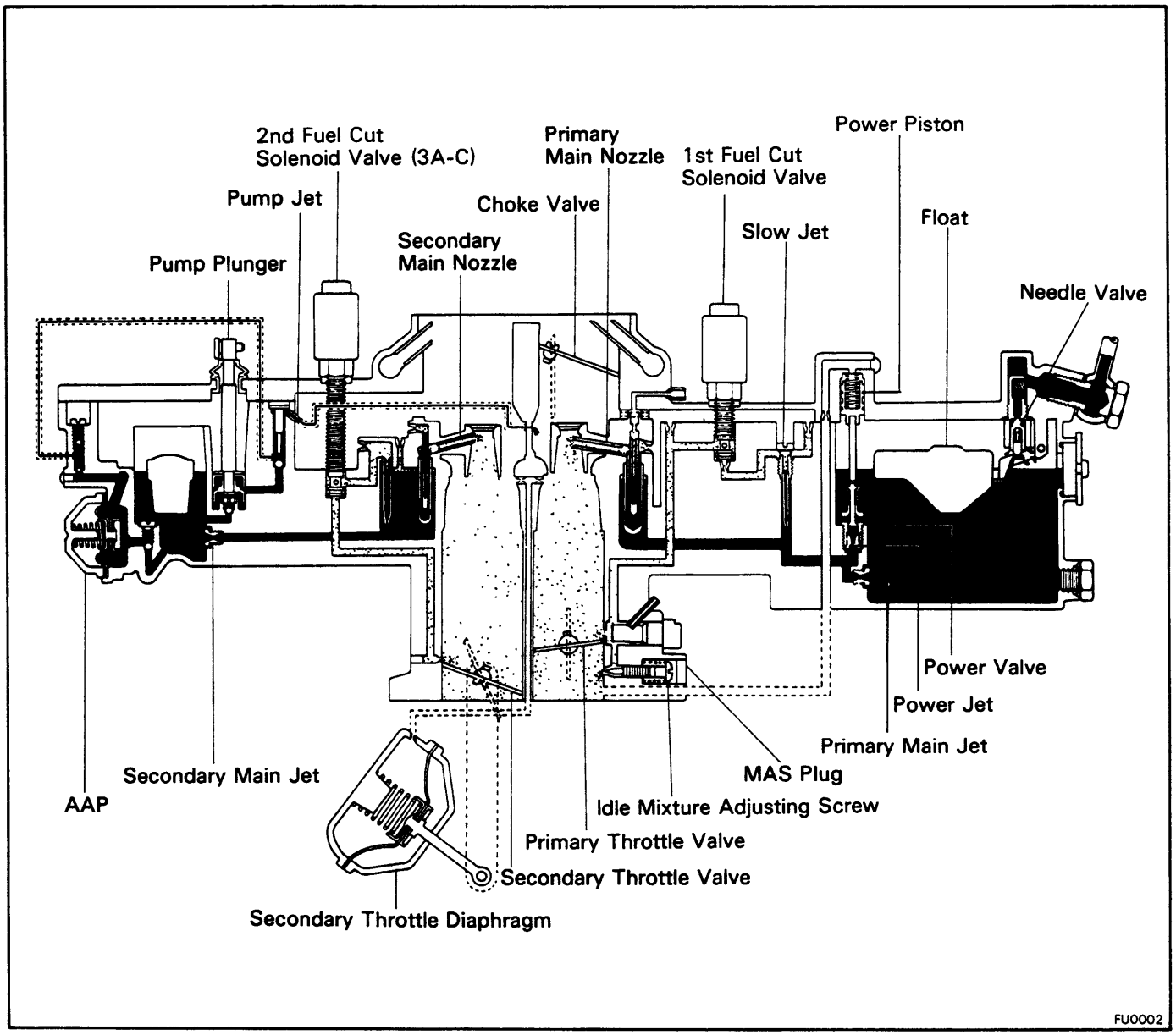
16. **INSTALL AIR CLEANER ASSEMBLY (See page FU-24)**

17. **CHECK AND ADJUST IDLE SPEED (See page FU-25)**

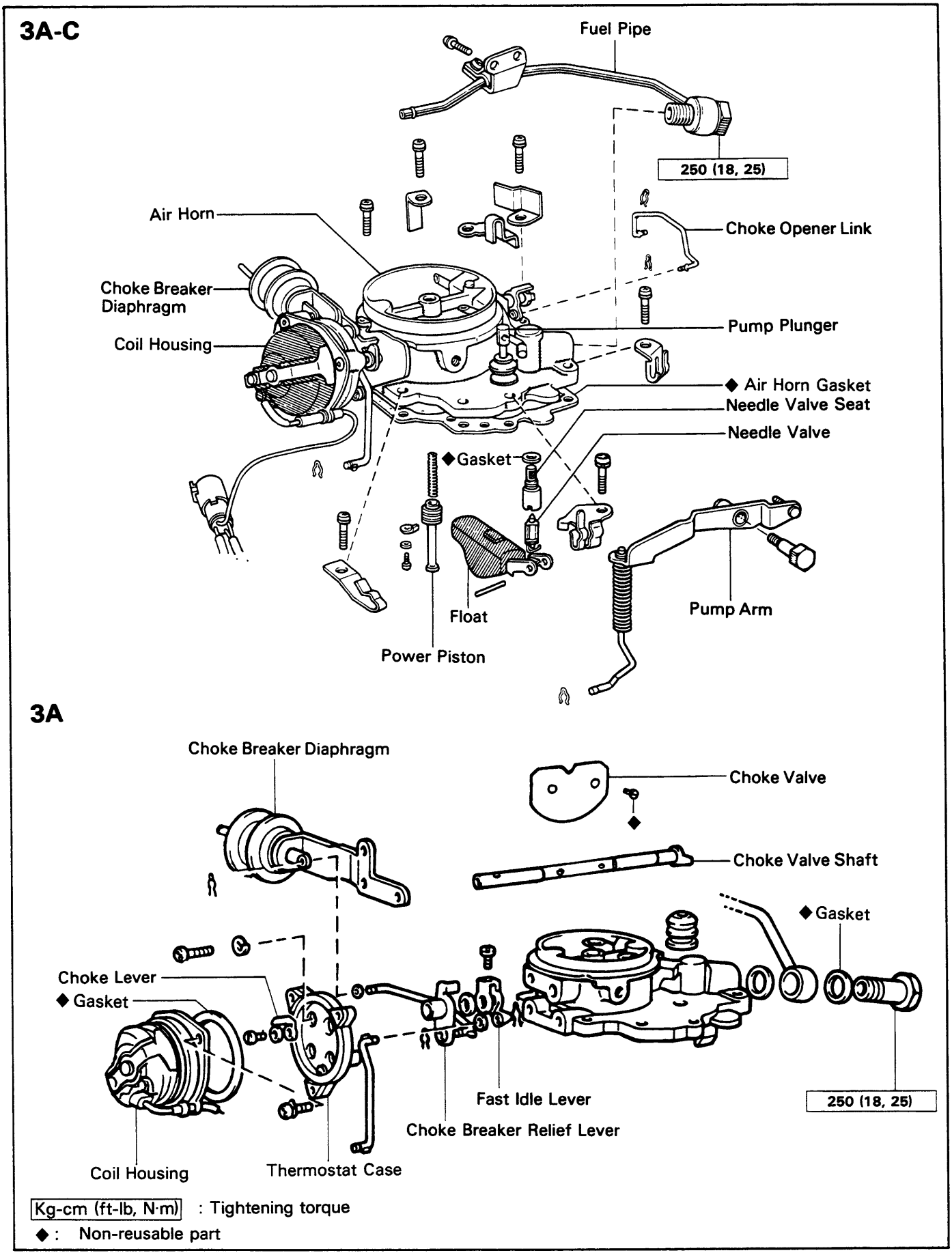
18. **IF NECCESARY, ADJUST IDLE MIXTURE (See page FU-28)**

CARBURETOR

CARBURETOR CIRCUIT



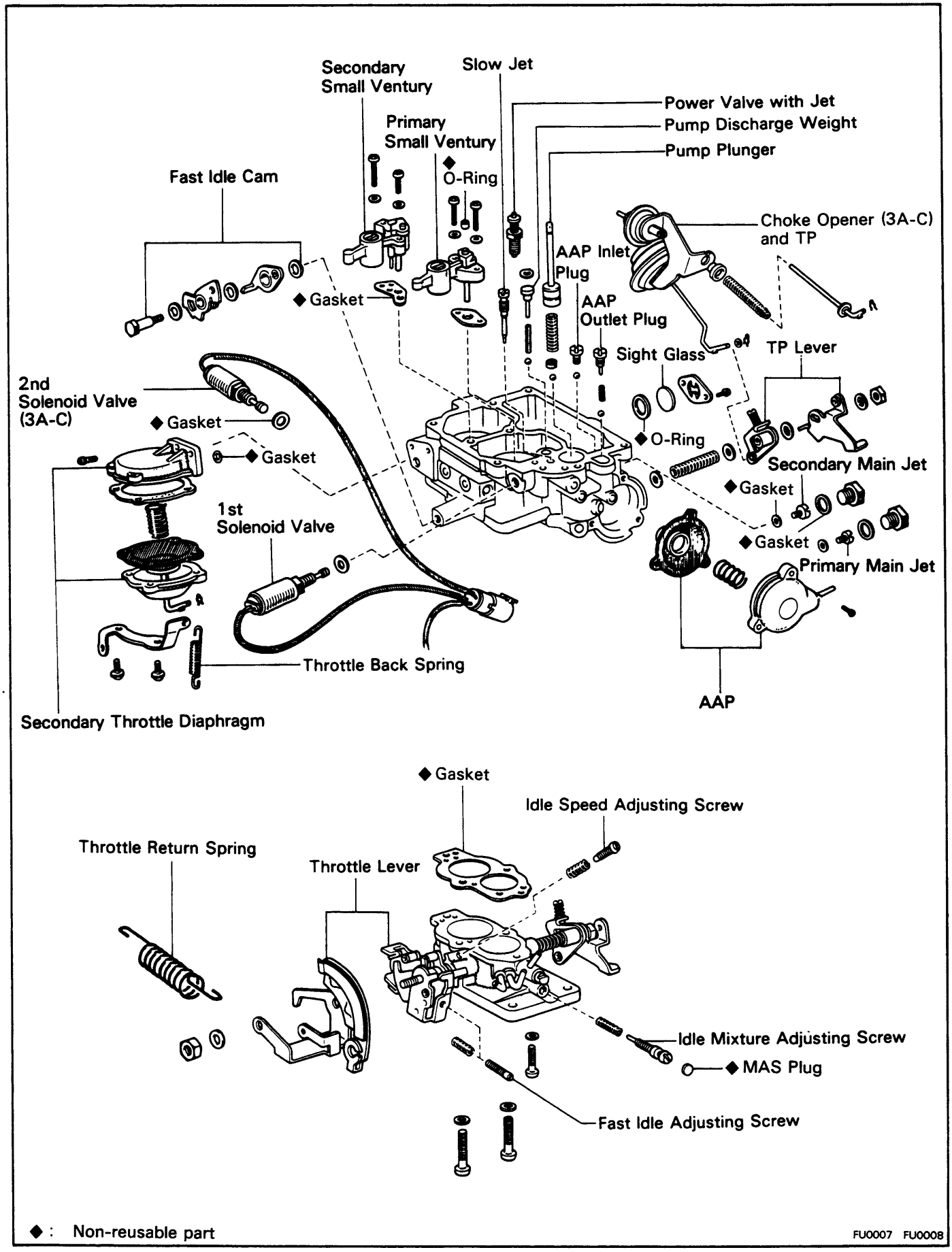
COMPONENTS



Kg-cm (ft-lb, N·m) : Tightening torque

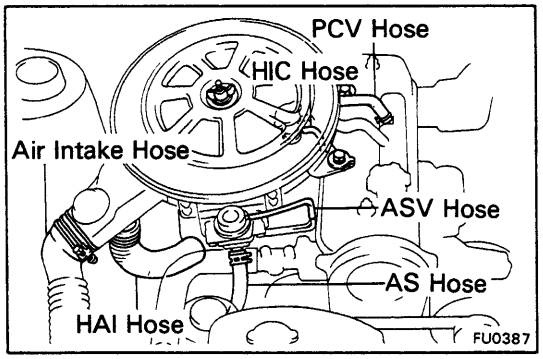
◆ : Non-reusable part

COMPONENTS (Cont'd)



◆ : Non-reusable part

FU0007 FU0008



REMOVAL OF CARBURETOR

1. REMOVE AIR CLEANER ASSEMBLY

(a) Disconnect the air intake hoses.

(b) Disconnect the emission control following hoses from the air cleaner:

(1) HAI hose

(2) (Calf. and Canada 3A-C) ASV hose

(3) (ex. Fed.) AS hose

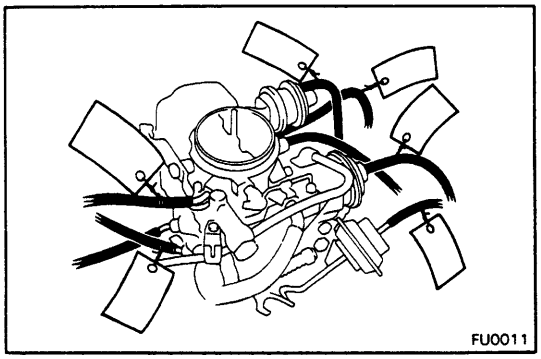
(4) PCV hose

(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



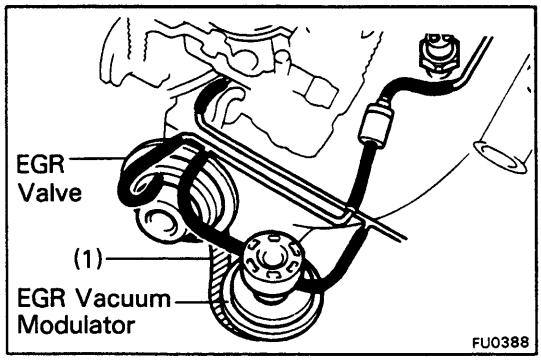
4. DISCONNECT CARBURETOR CONNECTOR

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

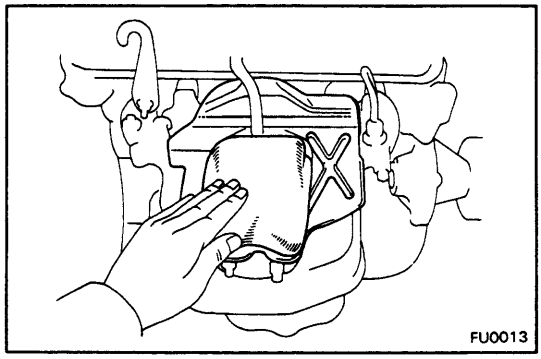


6. REMOVE CARBURETOR

(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 steel 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 confusion between similar-looking parts from different subassemblies being on your workbench at the same time.

(a) To facilitate reassembly, arrange parts in order.

(b) Be careful not to mix up or lose balls, clips or springs.

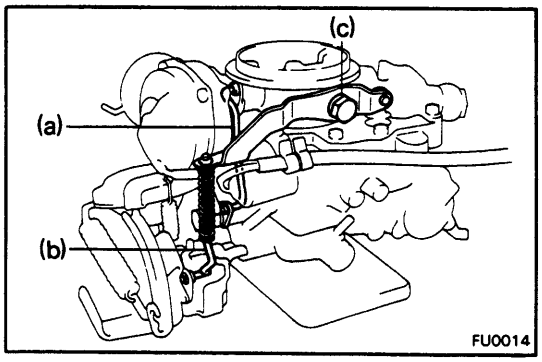
(c) Use SST (carburetor driver set).

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

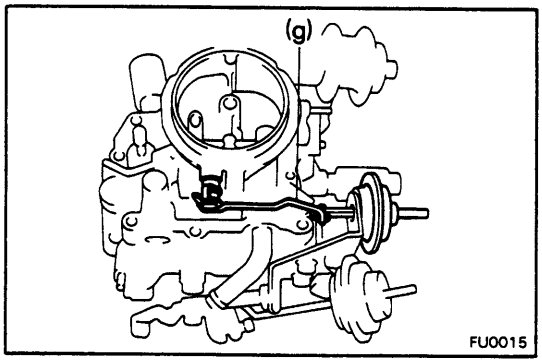


2. REMOVE AIR HORN ASSEMBLY

(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 union bolt, gaskets and fuel pipe.

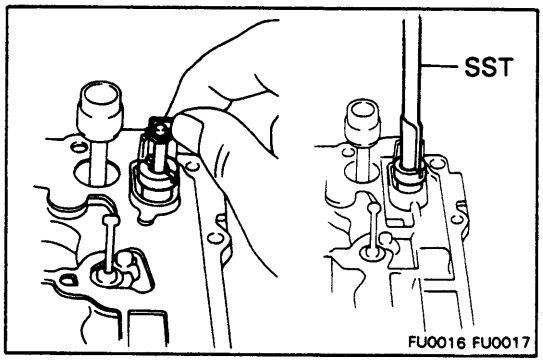
(f) Remove the eight air horn screws.

(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

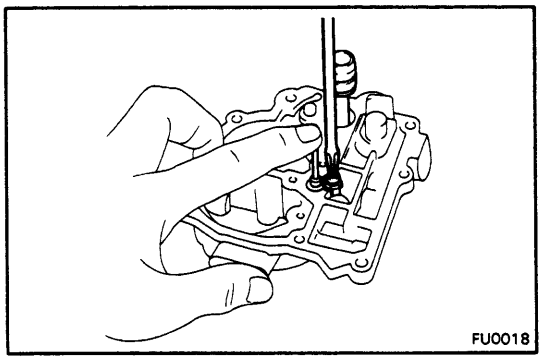


(a) Remove the float pivot pin and float.

(b) Remove the needle valve assembly.

(c) Remove air horn gasket.

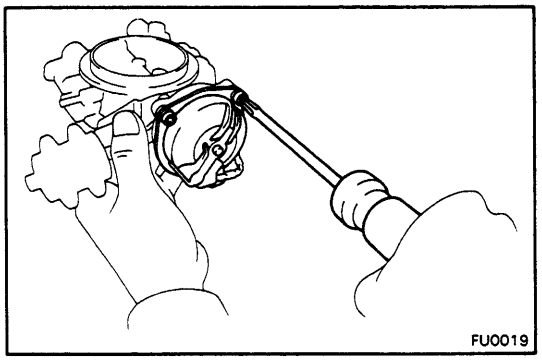
(d) Remove the needle valve seat and gasket.



4. REMOVE POWER PISTON AND PUMP PLUNGER

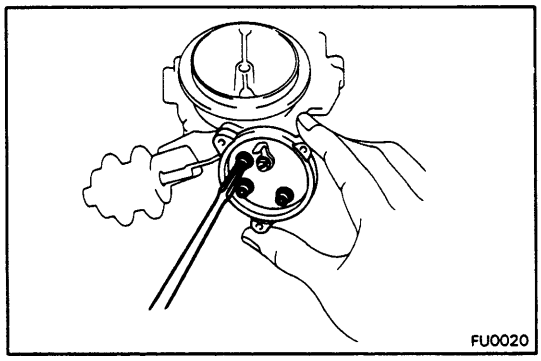
(a) Remove the power piston retainer, power piston and spring.

(b) Pull out the pump plunger and remove the boot.



5. (3A)
DISASSEMBLE CHOKE VALVE

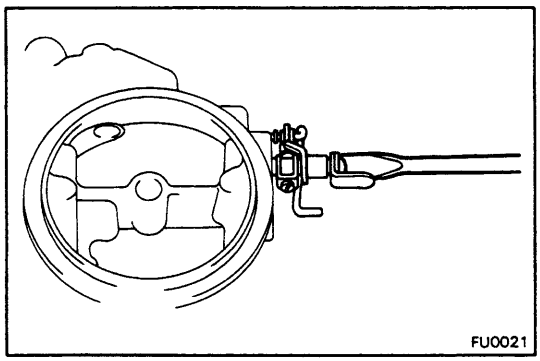
(a) Remove the three screws, coil housing and gasket.



NOTE: Remove the following parts only if it is necessary to replace the choke shaft or choke breaker.

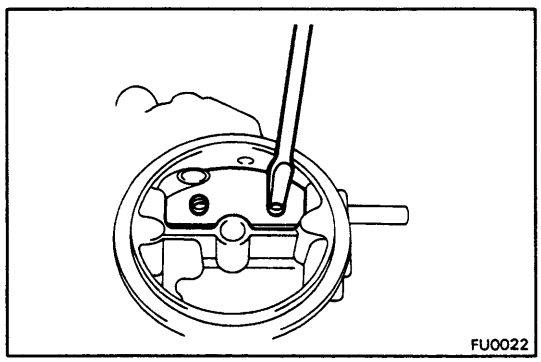
(b) Remove the three screws and thermostat case.

(c) Disconnect the choke breaker link and remove the choke breaker diaphragm.

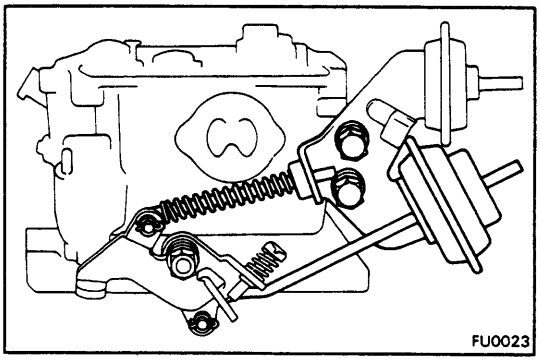


(d) Remove the choke lever screw, choke lever, choke breaker relief lever and washers.

(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.



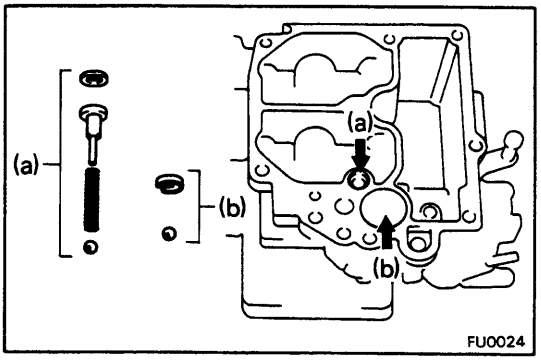
Disassembly of Carburetor Body

(See page FU-6)

1. REMOVE CHOKE OPENER (3A-C) AND THROTTLE POSITIONER (TP)

(a) Disconnect the opener and TP links.

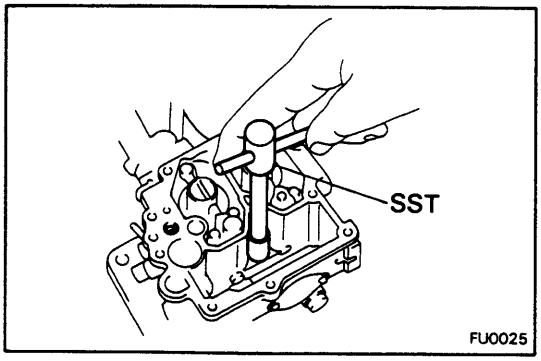
(b) Remove the two bolts.



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.

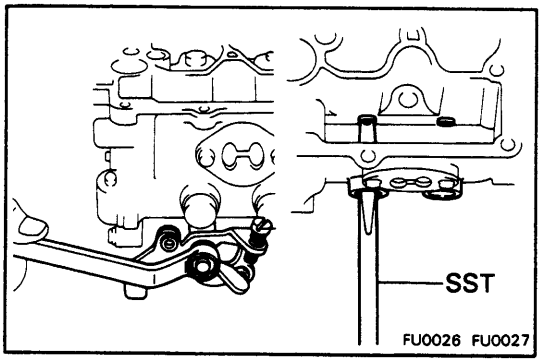


3. REMOVE JETS AND POWER VALVE

(a) Remove the slow jet.

(b) Remove the power valve and jet assembly.

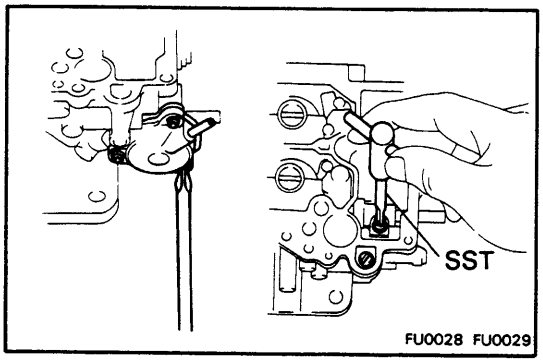
(c) Disassemble the power valve and jet.



(d) Remove the TP levers.

(e) 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.

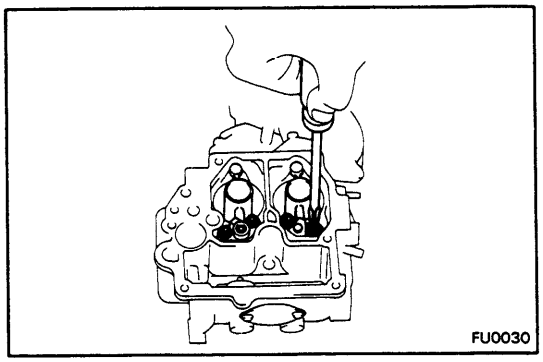


4. DISASSEMBLE AUXILIARY ACCELERATION PUMP (AAP)

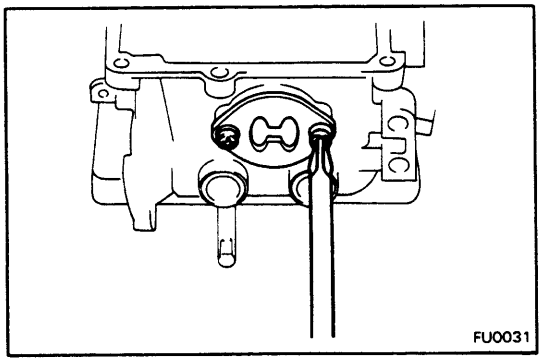
(a) Remove the AAP housing, spring and diaphragm.

(b) Remove the AAP inlet plug and small ball.

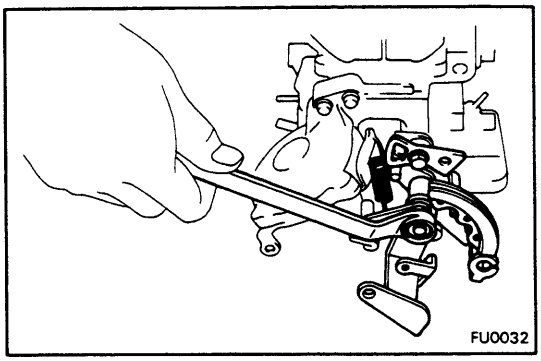
(c) Remove the outlet plug, short spring and small ball.



5. REMOVE SMALL VENTURIES

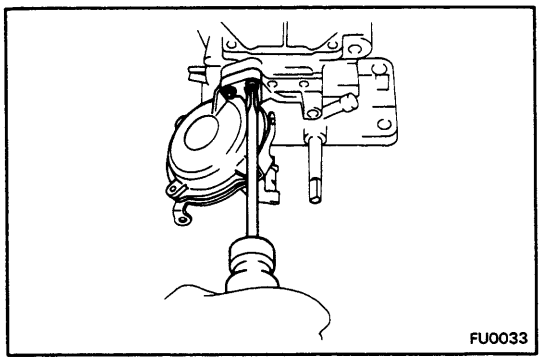


6. IF NECESSARY, REMOVE SIGHT GLASS



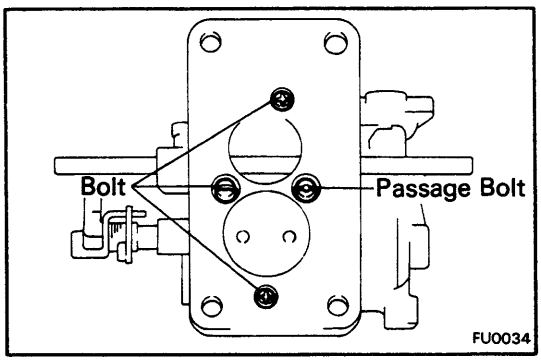
7. REMOVE THROTTLE LEVER AND FAST IDLE CAM ASSEMBLY

(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. SEPARATE BODY AND FLANGE

Remove the three bolts and vacuum passage bolt. Separate the body and flange.

GENERAL CLEANING PROCEDURE

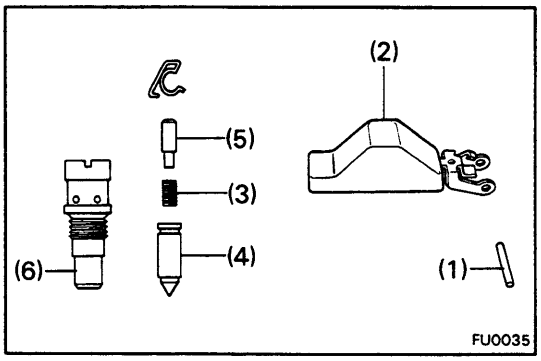
CLEAN DISASSEMBLED PARTS BEFORE INSPECTION

(a) Wash and clean the cast parts with a soft brush in carburetor cleaner.

(b) Clean off any carbon 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

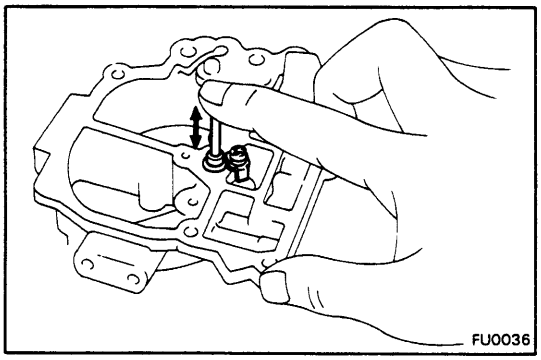
(a) Inspect the pivot pin (1) for scratches and excessive wear.

(b) Inspect the float (2) for broken lips and wear in the pivot pin holes.

(c) Inspect the spring (3) for breaks and deformation.

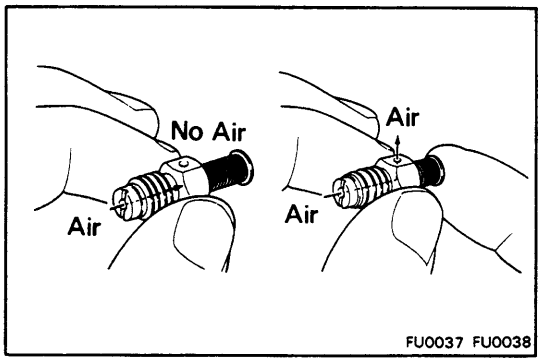
(d) Inspect the needle valve (4) and plunger (5) for wear or damage.

(e) Inspect the strainer (6) for rust and breaks.



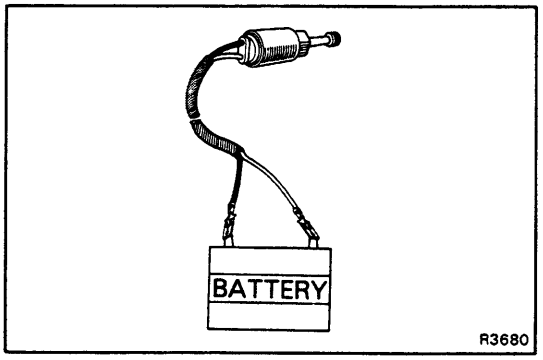
2. INSPECT POWER PISTON

Make sure that power piston moves smoothly.



3. INSPECT POWER VALVE

Check for faulty opening and closing action.



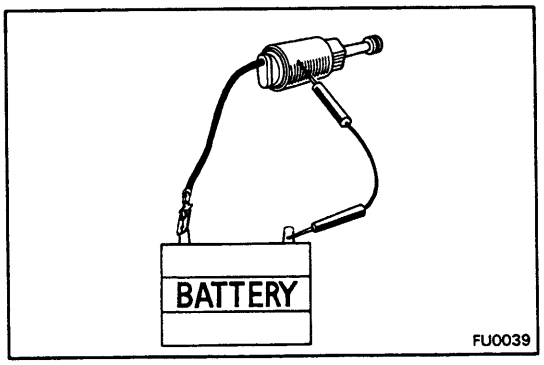
4. INSPECT FIRST FUEL CUT SOLENOID VALVE

(a) Connect the solenoid valve terminals to the battery terminals.

(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 it.

(c) Replace the O-ring.



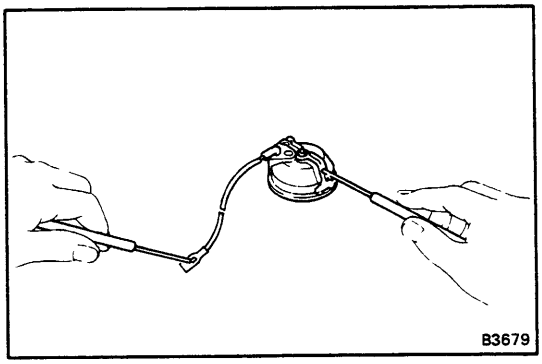
5. (3A-C)
INSPECT SECOND FUEL CUT SOLENOID VALVE

(a) Connect the solenoid valve body and terminal to the battery terminals.

(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.



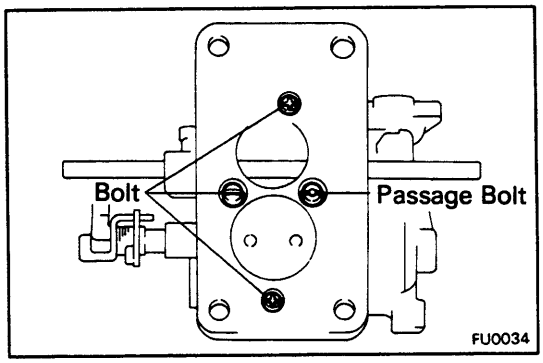
6. **INSPECT CHOKE HEATER (COIL HOUSING)**

Using an ohmmeter, measure the resistance between the terminals.

Resistance (Cold):
3A-C (ex. Canada Wagon M/T)
17 – 19 Ω
Others 20 – 22 Ω

If problem is found, replace the choke heater.

However for a 3A-C engine, replace the air horn assembly.



ASSEMBLY OF CARBURETOR

(See pages FU-5 and 6)

NOTE: Use new gaskets and O-rings throughout.

Assembly of Carburetor Body

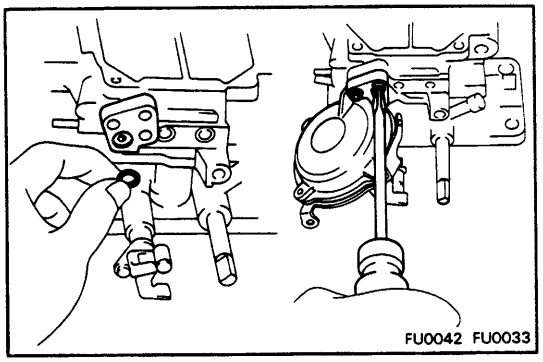
(See page FU-6)

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.

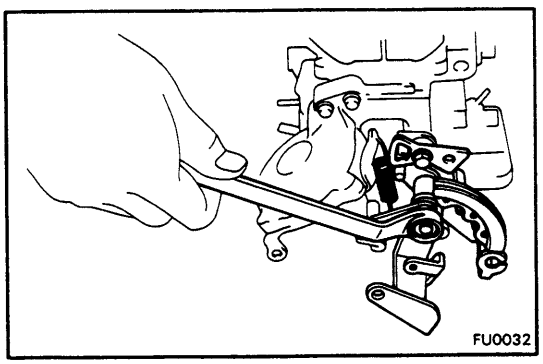


2. **INSTALL SECONDARY THROTTLE VALVE DIAPHRAGM**

(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.



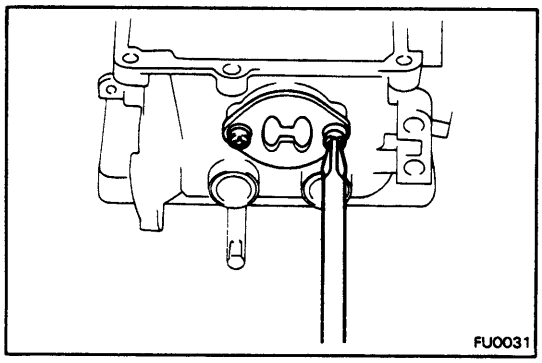
3. **INSTALL FAST IDLE CAM AND THROTTLE LEVER**

(a) Install the fast idle cam with the bolt.

(b) Install the throttle lever with the nut.

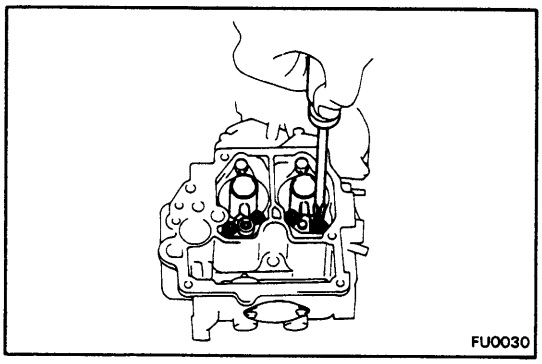
(c) Install the throttle back spring.

(d) Install the throttle return spring.



4. INSTALL SIGHT GLASS

Install a new O-ring, the sight glass and retainer with the two screws.

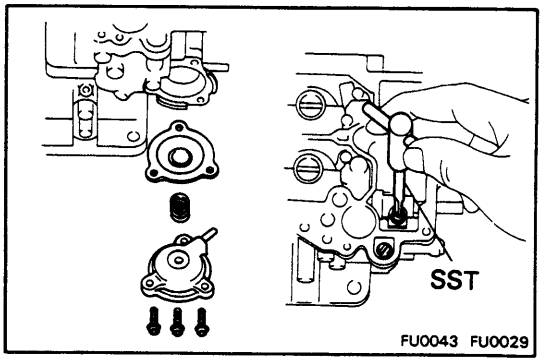


5. INSTALL SMALL VENTURIES

(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.

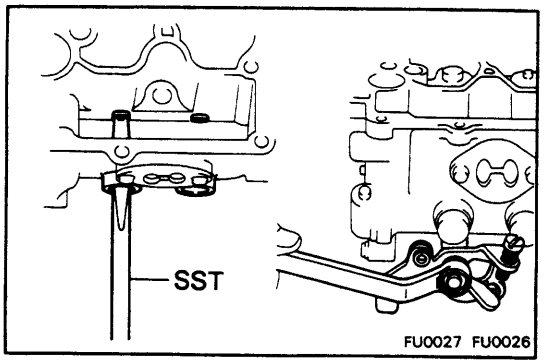


6. INSTALL AUXILIARY ACCELERATION PUMP (AAP)

(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.

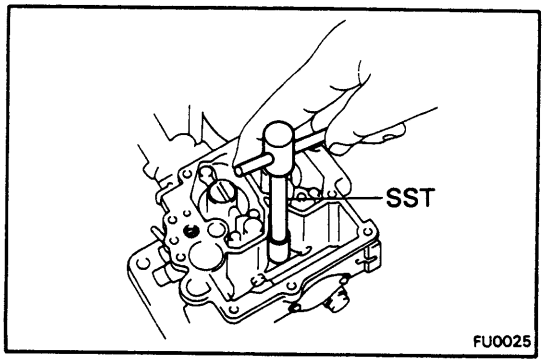


7. INSTALL JETS AND POWER VALVE

(a) Install a new gasket and the primary main jet. Install a new gasket and the passage plug.

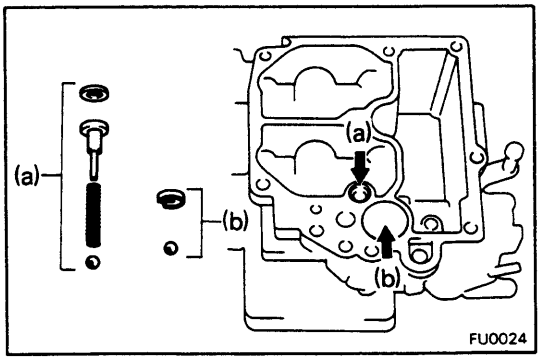
(b) Install a new gasket and the secondary main jet. Install a new gasket and the passage plug.

(c) Install the TP levers.



(d) Install the slow jet.

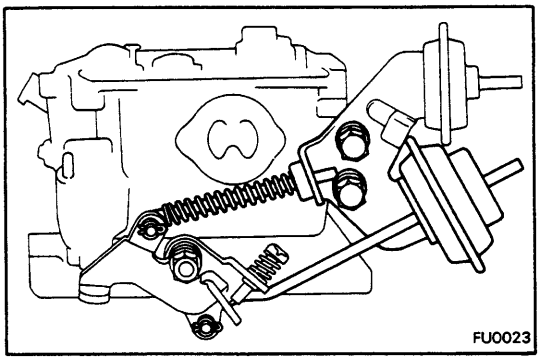
(e) Assemble the power valve and jet, and install them.



8. INSTALL CHECK BALLS FOR ACCELERATION

(a) Install the discharge large ball, long spring, pump discharge weight and stopper gasket.

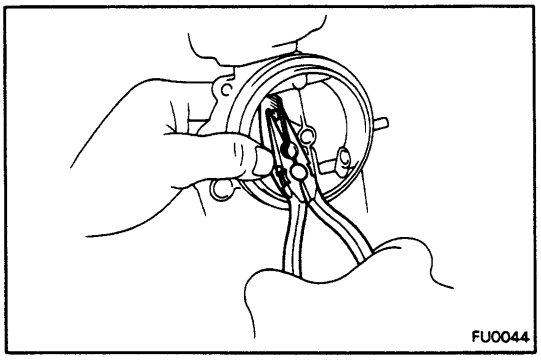
(b) Using tweezers, insert the plunger small ball and retainer.



9. INSTALL CHOKE OPENER (3A-C) AND THROTTLE POSITIONER

Assembly of Air Horn

(See page FU-5)

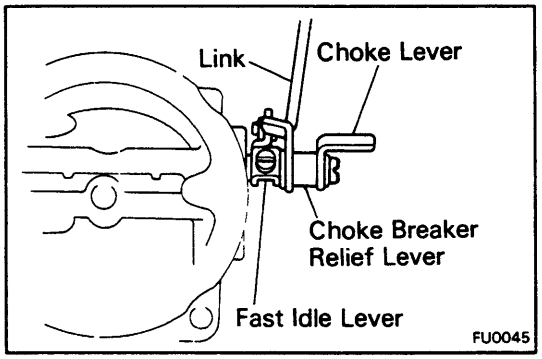


1. (3A)
INSTALL CHOKE SHAFT

(a) Install the choke shaft.

(b) Install the choke valve with new screws.

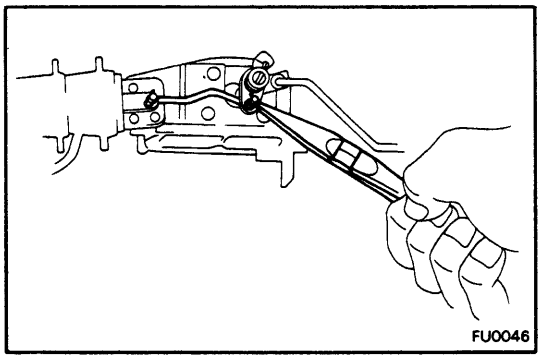
NOTE: Peen the screw.



(c) Install the fast idle lever with the screw.

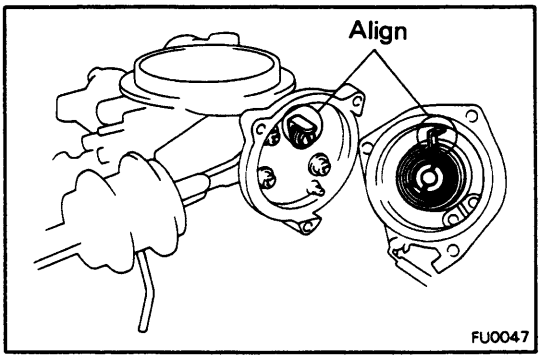
(d) Install the washer and choke breaker relief lever.

(e) Install the choke lever and washer with the screw.



(f) Connect the choke breaker link to the choke breaker relief lever.

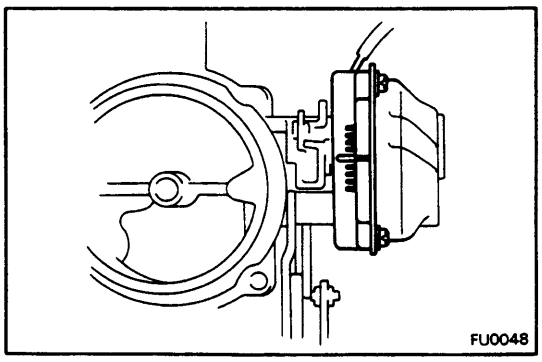
(g) Install the thermostat case over the choke breaker diaphragm bracket with the three screws.



2. (3A)
INSTALL COIL HOUSING

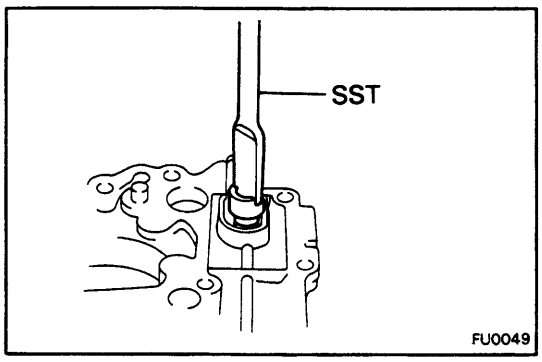
(a) Install a new gasket.

(b) Align the bi-metal spring and the choke lever, and install the coil housing.



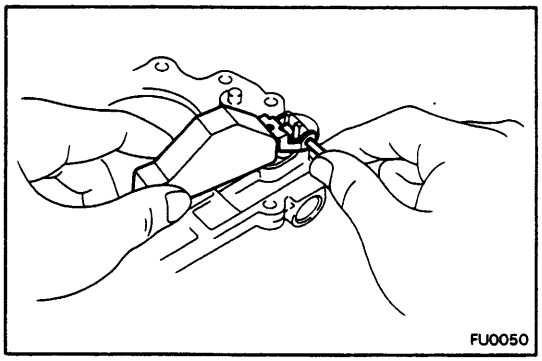
(c) Align the scale center of the thermostat case with the coil housing line, and install the three screws.

(d) Check the choke valve action.



3. **INSTALL VALVE SEAT**

Install a new gasket and the valve seat into the fuel inlet.

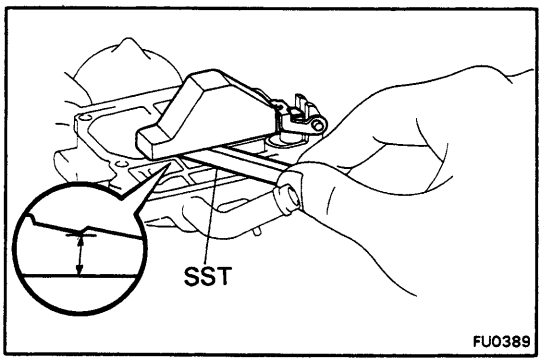


4. **ADJUST FLOAT LEVEL**

(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.

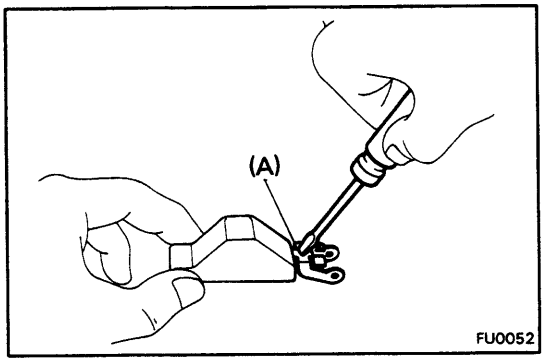


(c) Allow the float to hang down by its own weight. Using SST, check the clearance between the float tip and air horn.

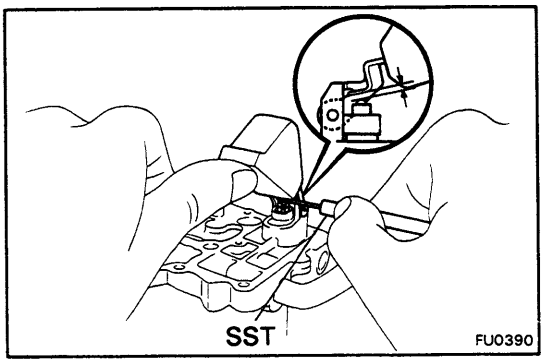
SST 09240-00014

NOTE: This measurement should be made without a gasket on the air horn.

Float level (raised position): 7.2 mm (0.283 in.)



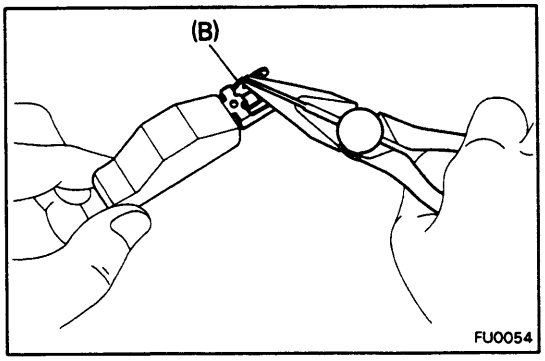
(d) Adjust by bending the portion of the float lip marked (A).



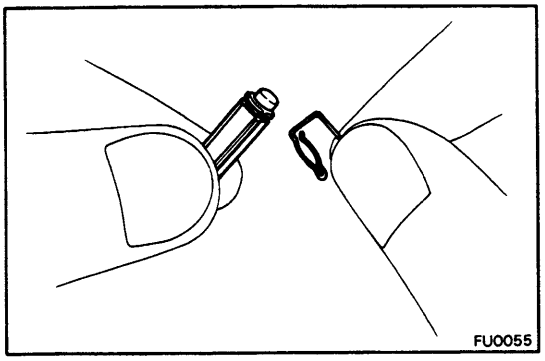
(e) Lift up the float and, using SST, check the clearance between the needle valve plunger and float lip.

SST 09240-00014

Float level (lowered position): 1.67 — 1.99 mm (0.0657 — 0.0783 in.)

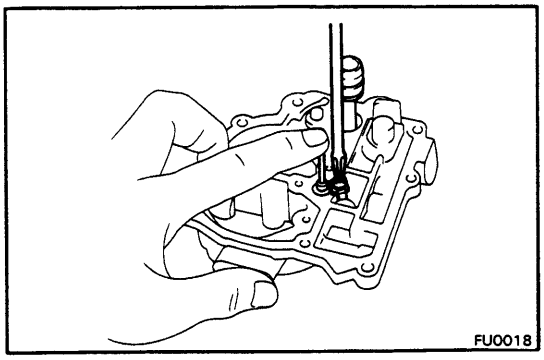


(f) Adjust by bending the portion of the float lip marked (B).



(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.



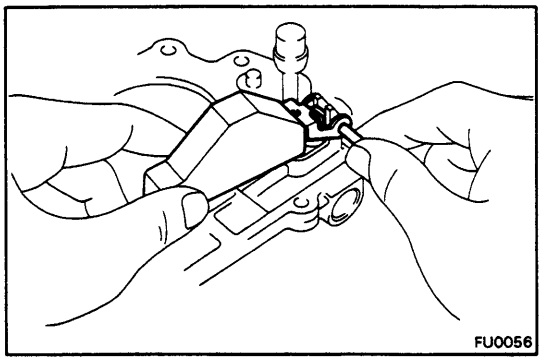
5. INSTALL POWER PISTON

(a) Install the power piston spring and piston into the bore.

(b) Install the retainer with the screw.

6. INSTALL ACCELERATION PUMP PLUNGER AND BOOT

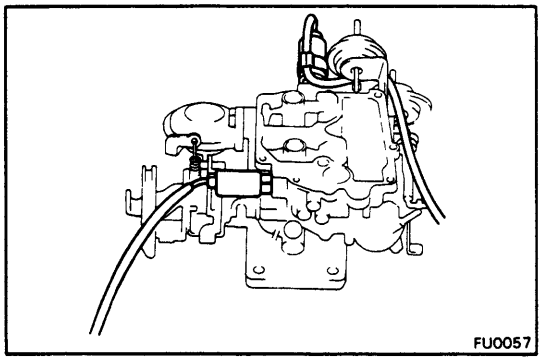
7. INSTALL AIR HORN GASKET ONTO AIR HORN



8. INSTALL NEEDLE VALVE AND FLOAT

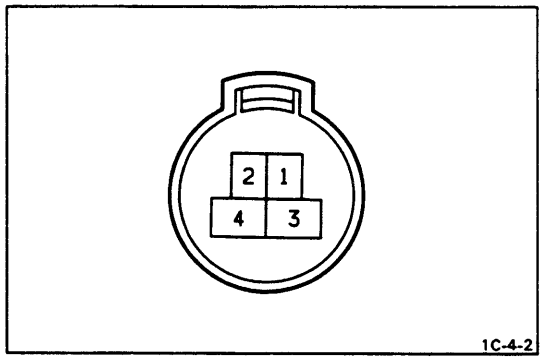
(a) Install the needle valve into the seat.

(b) Insert the float lip between the plunger and clip, and install the float with the pivot pin.



9. ASSEMBLE AIR HORN AND BODY

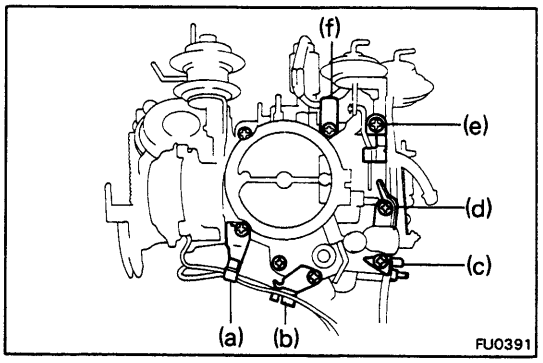
Install the solenoid valves with new gaskets into the carburetor body. Clamp the wire for the secondary solenoid valve (3A-C) to the throttle positioner bracket.



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) 1st fuel cut solenoid valve(Black)
(4) 2nd fuel cut solenoid valve (Black)

Canada
(1) 2nd fuel cut solenoid valve (White and black)
(2) Coil housing (Red)
(3) 2nd fuel cut solenoid valve (Black)
(4) 1st 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

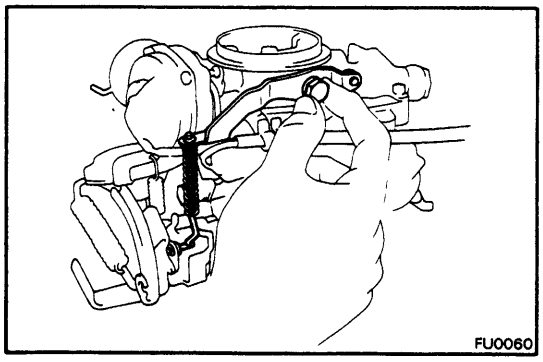
(b) Choke and solenoid wire clamp

(c) Solenoid wire clamp (3A-C)

(d) Choke opener link guide

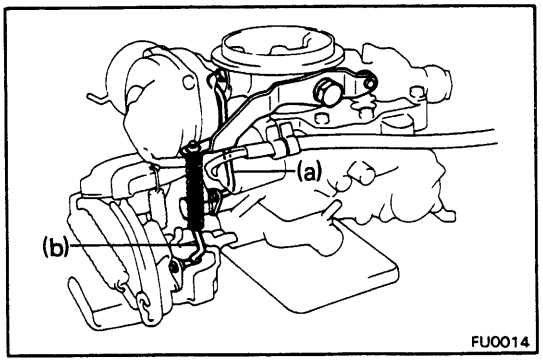
(e) ● Choke opener link cover (3A-C)
● Number plate (3A)

(f) Number plate (3A-C)

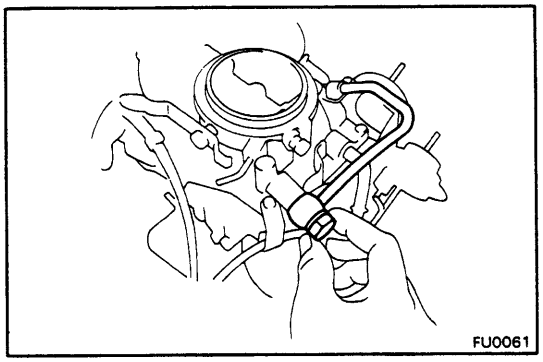


13. INSTALL ACCERELATOR PUMP ARM

Install the pump arm to the air horn 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
    Install the vacuum hoses and the jet.

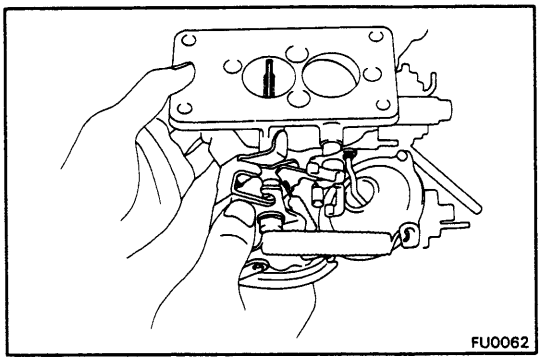
16. **INSTALL FUEL PIPE**
    Install the fuel pipe with new gaskets and the union bolt. Torque the union bolt.
    Torque: 250 kg-cm (18 ft-lb, 25 N·m)

17. **CHECK FOR SMOOTH OPERATION OF EACH PART**

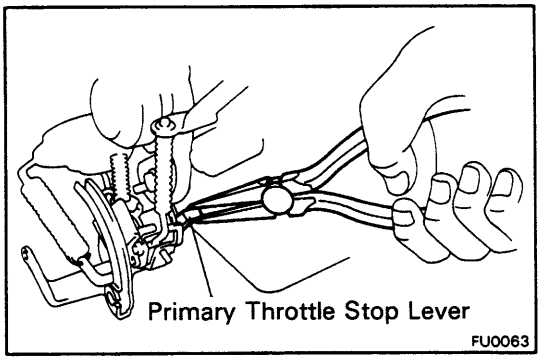
ADJUSTMENT OF CARBURETOR

NOTE: Use SST 09240-00014 and 09240-00020 to make adjustment.

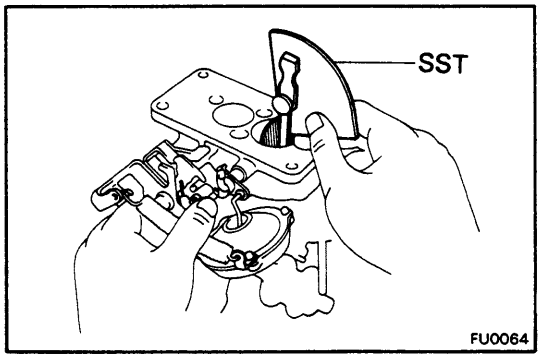
1. **CHECK AND ADJUST THROTTLE VALVE OPENING**
    (a) Check the full opening angle of the primary throttle valve.
    Standard angle: 90° from horizontal

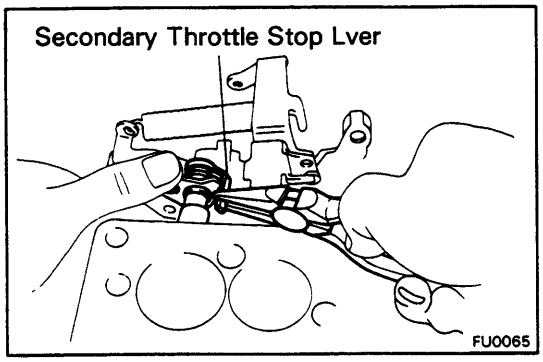


    (b) Adjust by bending the primary throttle stop lever.

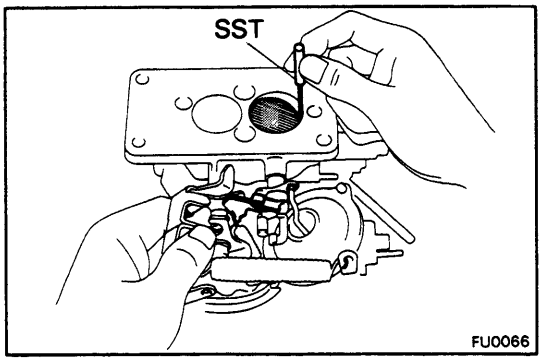


    (c) Check the full opening angle of the secondary throttle valve.
    Standard angle: 75° from horizontal





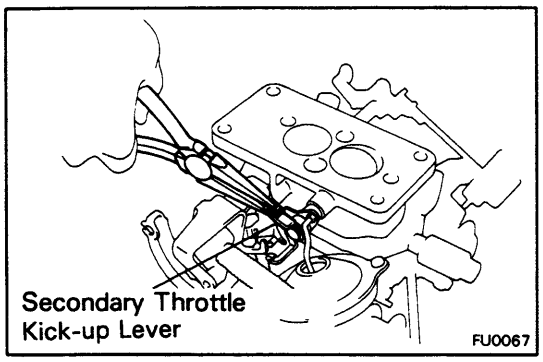
(d) Adjust by bending the secondary throttle stop lever.



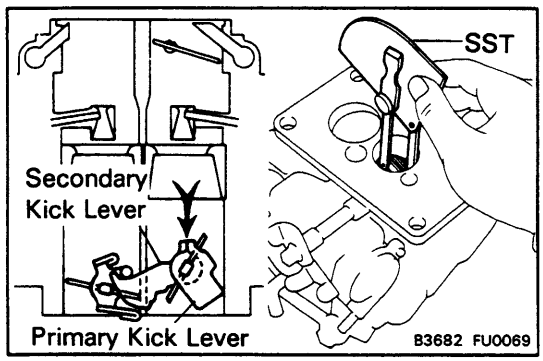
2. CHECK AND ADJUST KICK-UP SETTING

(a) With the primary throttle valve fully opened, check the clearance between the secondary throttle valve and body.

Kick-up clearance:
3A-C (ex. Canada Wagon M/T)
0.16 mm (0.0063 in.)
Others 0.23 mm (0.0091 in.)



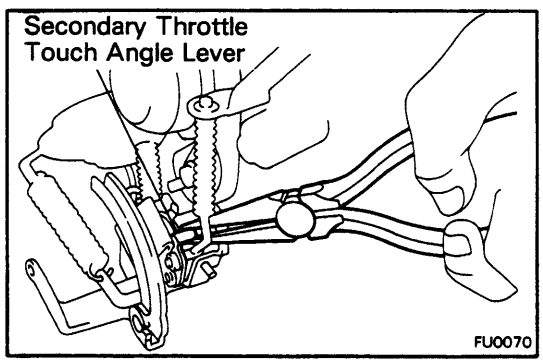
(b) Adjust by bending the secondary throttle kick-up lever.



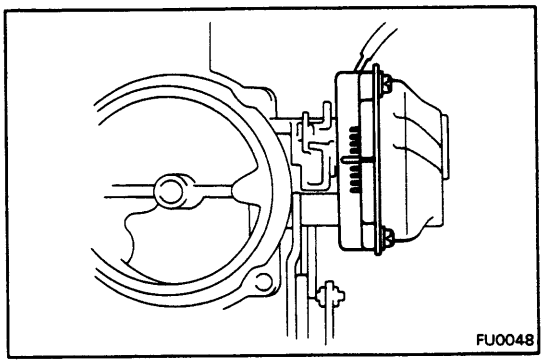
3. CHECK AND ADJUST SECONDARY TOUCH ANGLE

(a) Check the primary throttle valve opening angle at the same time the primary kick lever just touches the secondary kick lever.

Standard angle: 45° from horizontal



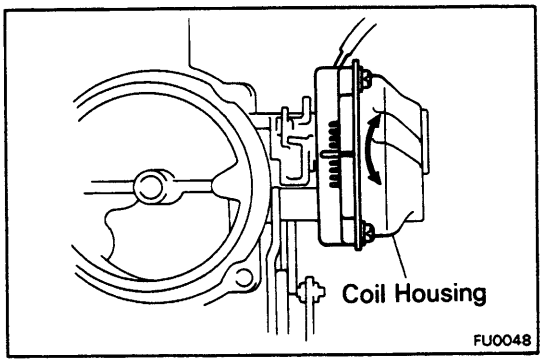
(b) Adjust by bending the secondary throttle touch angle lever.



4. (3A)
SET AUTOMATIC CHOKE

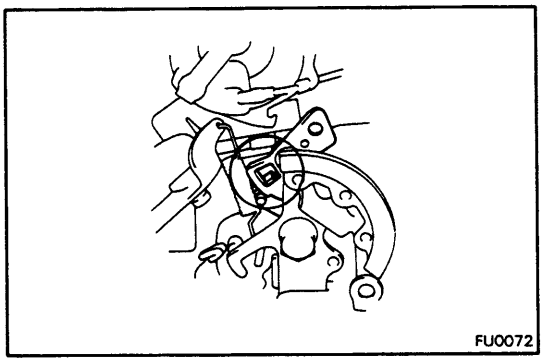
(a) Set the coil housing line so that it is aligned with the scale center line of the thermostat case.

NOTE: The choke valve becomes fully closed when the atmospheric temperature reaches 30°C (86°F).



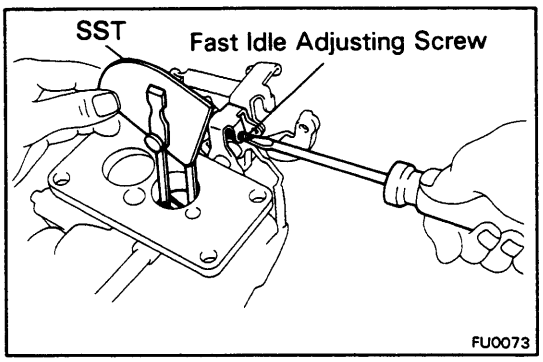
(b) Depending on vehicle operating conditions, turn the coil housing and adjust the engine starting mixture.

If too rich . . . . . Turn clockwise
If too lean . . . . . Turn counterclockwise



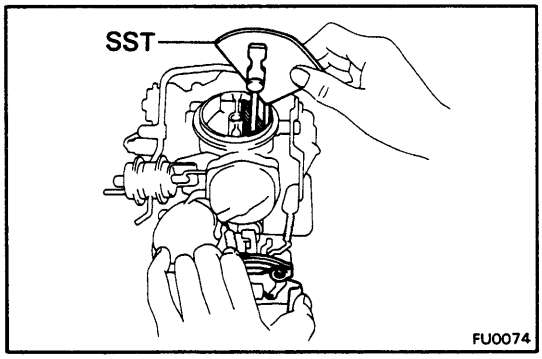
5. **CHECK AND ADJUST FAST IDLE SETTING**

(a) Set the throttle shaft lever to the 1st step of the fast idle cam as shown.



(b) With the choke valve fully closed, check the primary throttle valve angle.
Adjust by turning the fast idle adjusting screw.

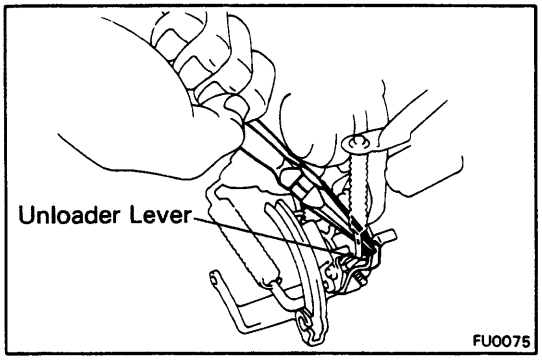
Standard angle:
3A-C (ex. Canada Wagon M/T)
20° from horizontal
Others 21° from horizontal



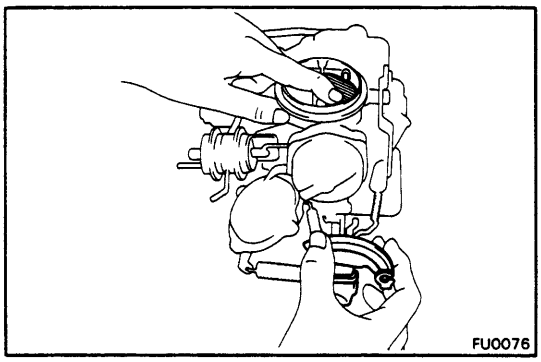
6. **CHECK AND ADJUST UNLOADER**

(a) With the primary throttle valve fully opened, check the choke valve angle.

Standard angle:
3A-C (ex. Canada Wagon M/T)
41° from horizontal
Others 47° from horizontal

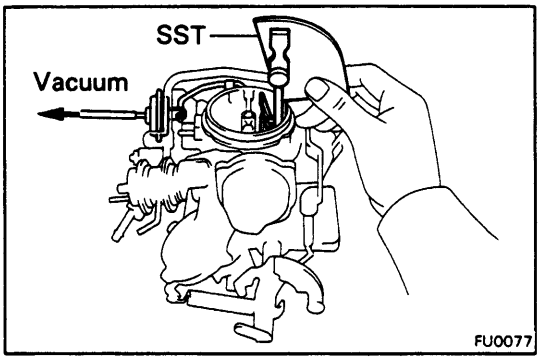


(b) Adjust by bending the unloader lever.



7. (3A-C)
CHECK AND ADJUST CHOKE OPENER

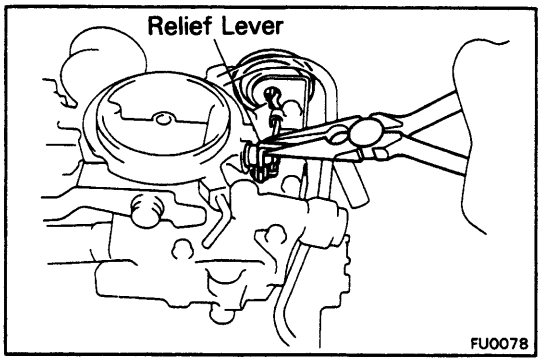
(a) Set the fast idle cam.
While holding the throttle slightly open, push the choke valve closed, and hold it closed as you release the throttle valve.



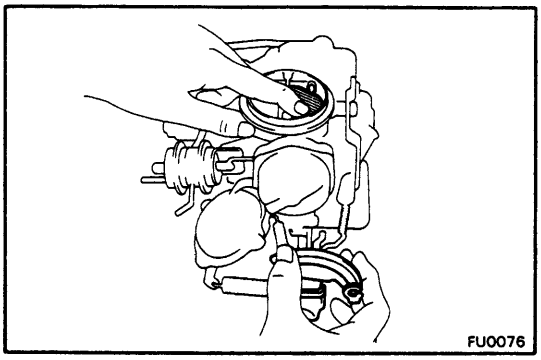
(b) Apply vacuum to choke breaker diaphragm.

(c) Check the choke valve angle.

Standard angle: 77° from horizontal

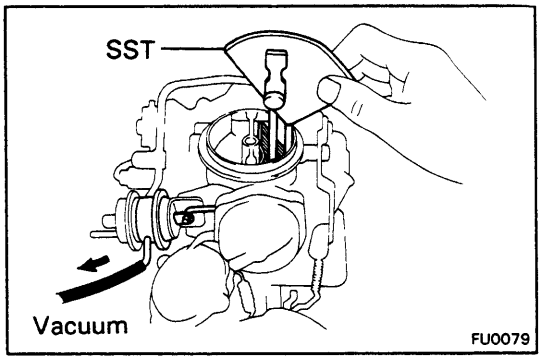


(d) Adjust by bending the relief lever.



8. CHECK CHOKE BREAKER

NOTE: Fully close the choke valve and check the opening angle.

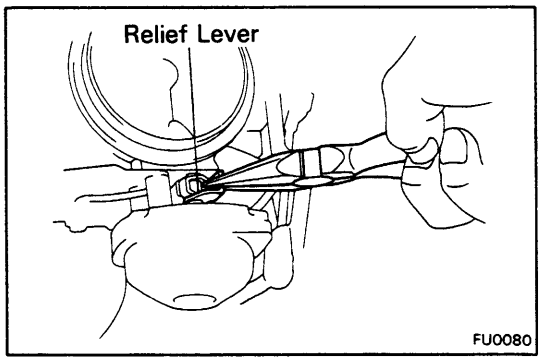


(a) Apply vacuum to choke breaker diaphragm A.

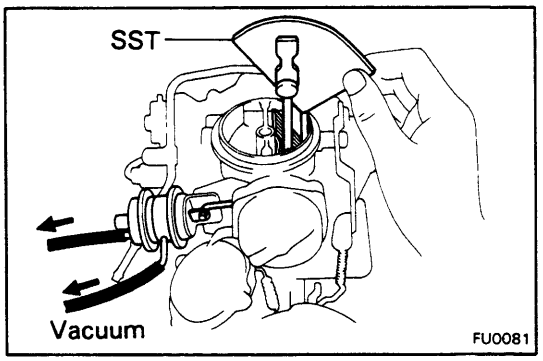
(b) Check the choke valve angle.

Standard angle:

3A-C (ex. Canada Wagon M/T)
38° from horizontal
Others 39° from horizontal



(c) Adjust by bending the relief lever.

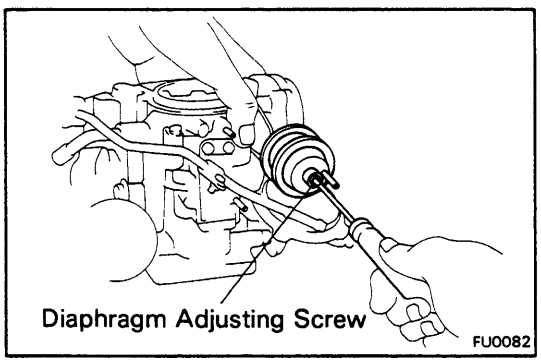


(d) Apply vacuum to choke breaker diaphragms A and B.

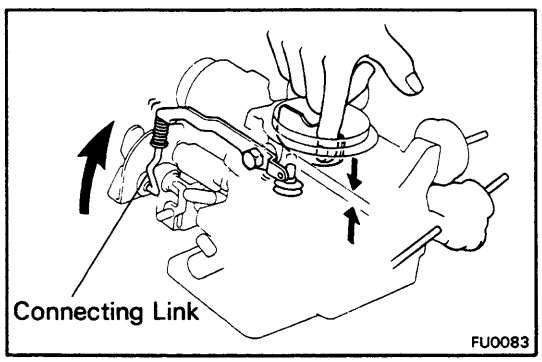
(e) Check the choke valve angle.

Standard angle:

3A-C (ex. Canada Wagon M/T)
55° from horizontal
Others 50° from horizontal



(f) Adjust by turning the diaphragm adjusting screw.



9. CHECK AND ADJUST PUMP STROKE

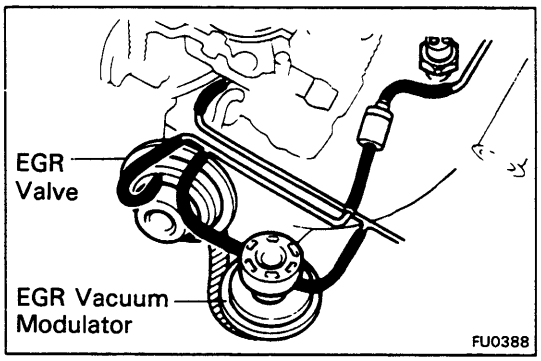
(a) With the choke valve fully opened, check the length of the stroke.

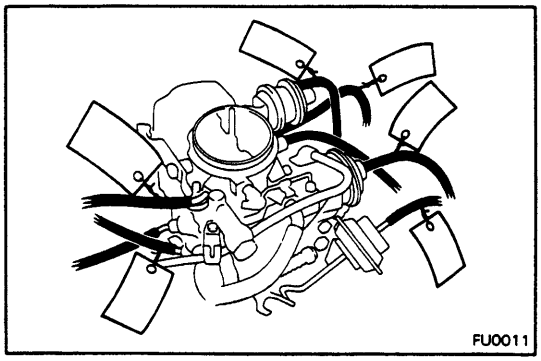
Standard stroke:

3A-C (ex. Canada Wagon 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:

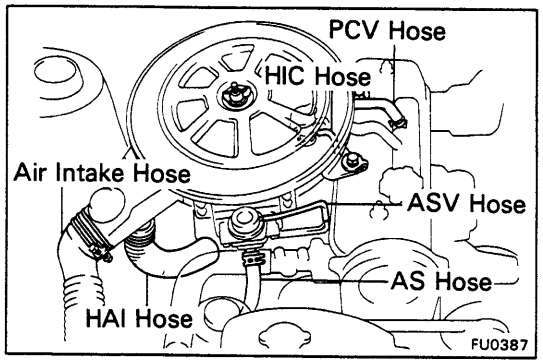
(a) Fuel inlet hose

(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 clearner 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 Canada 3A-C)
ASV hose

(3) (ex. Fed.)
AS hose

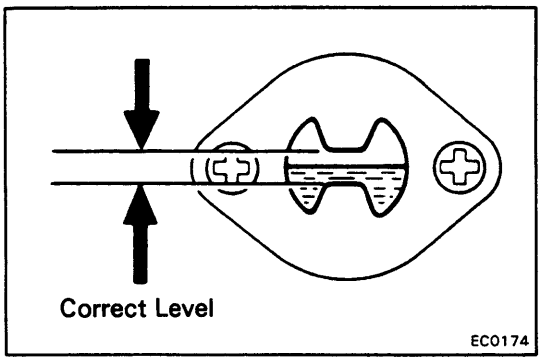
(4) PCV hose

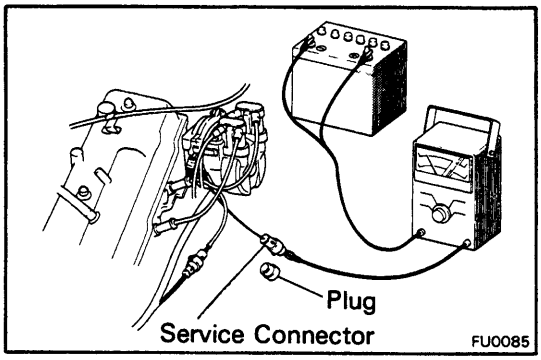
(d) Connect the air intake hose.

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.





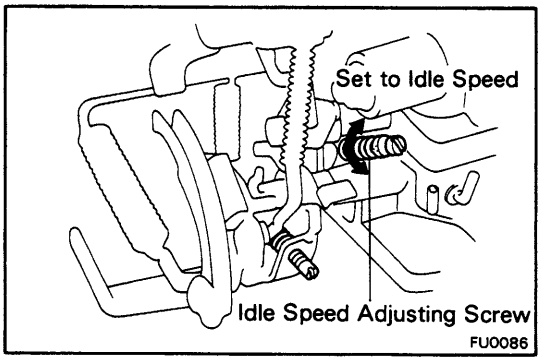
2. CONNECT TACHOMETER

Remove the rubber cap and connect the tachometer positive (+) terminal to the service connector at the IIA.

CAUTION:

(a) NEVER allow the ignition coil terminals 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.



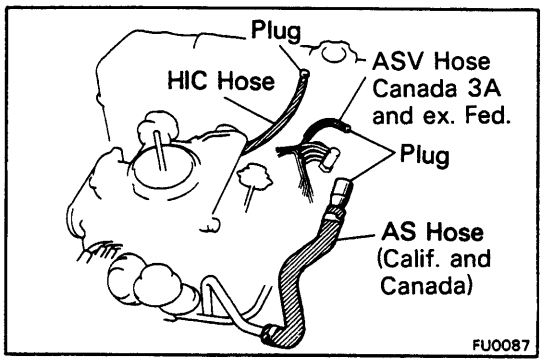
3. ADJUST IDLE SPEED

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

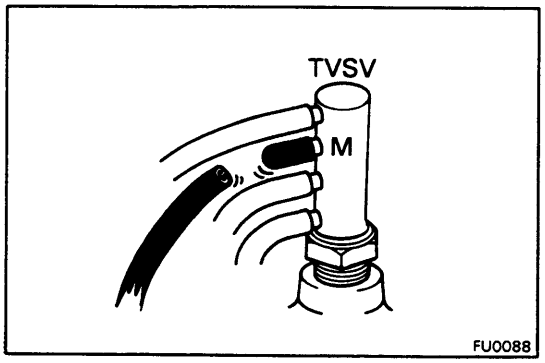
NOTE:
- Make adjustments with the engine cooling fan OFF.
- Leave tachometer connected for further adjustments.



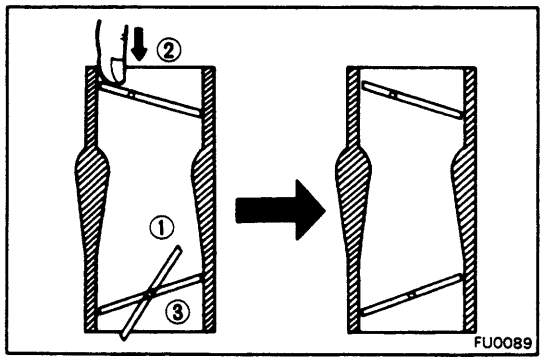
4. ADJUST FAST IDLE SPEED

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

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

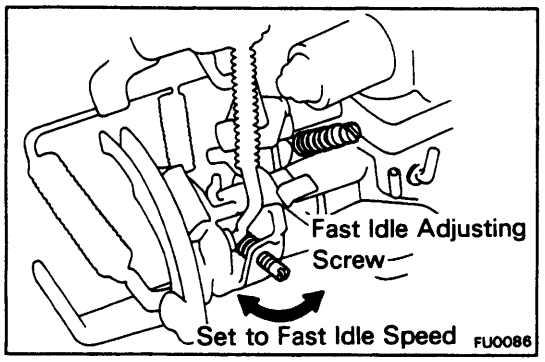


(c) Disconnect the hose from the TVSV M port and plug the M port.
This will shut off the choke opener and EGR systems.



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

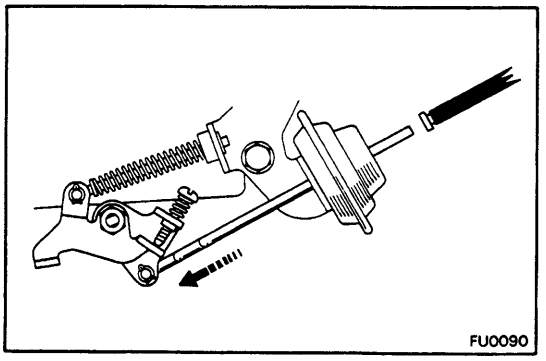
(e) Start the engine, but do NOT depress the accelerator pedal.



(f) Set the fast idle speed by turning the FAST IDLE ADJUSTING SCREW.

Fast idle speed: 3,000 rpm

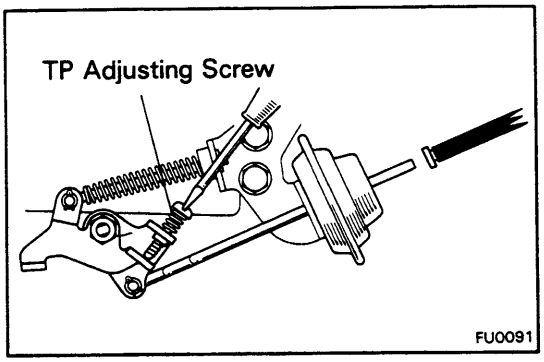
NOTE: Leave the tachometer connected for further adjustments.



5. ADJUST THROTTLE POSITIONER (TP) SETTING SPEED

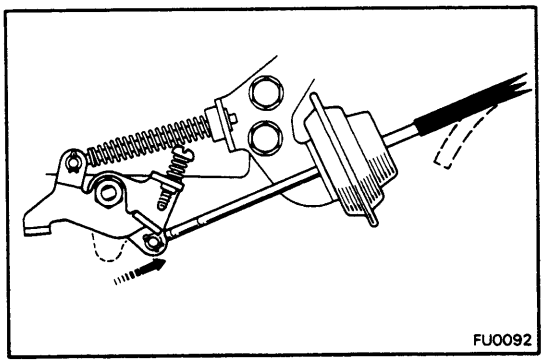
(a) Preparation
- Choke opener and EGR system OFF
- Air cleaner removed

(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.

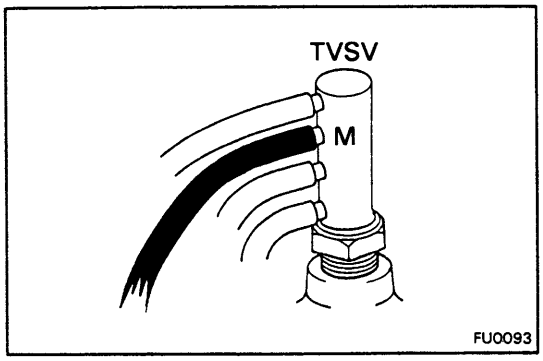
TP setting speed: 3A-C 1,400 rpm
3A 1,400 rpm A/T
1,700 rpm M/T



(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)

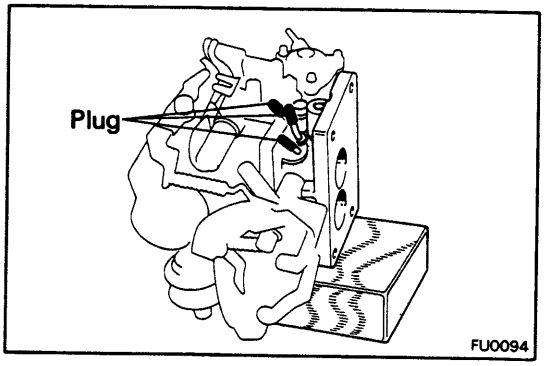
9. **REMOVE TACHOMETER**

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.

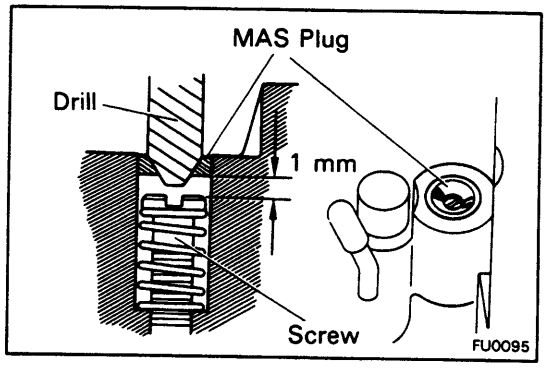


1. **REMOVE CARBURETOR (See page FU-7)**

2. **REMOVE MIXTURE ADJUSTING SCREW PLUG (MAS PLUG)**

   (a) Plug each carburetor vacuum port to prevent entry of steel particles when drilling.

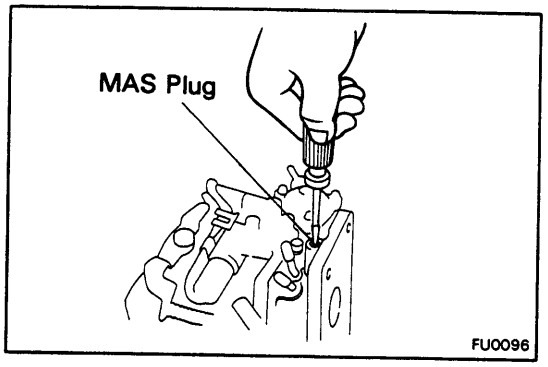
   (b) Mark the center of the plug with a punch.



   (c) Drill a 6.5 mm ϕ (0.256 in. ϕ) hole in the center of the plug.

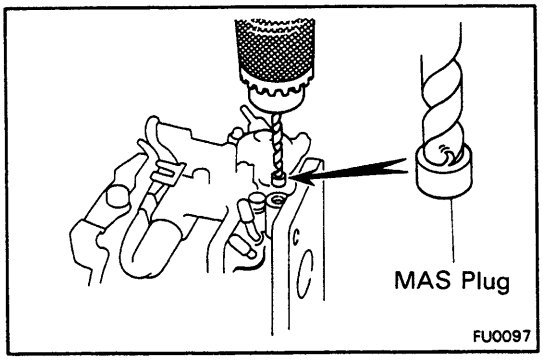
NOTE:

- As there is only 1 mm (0.04 in.) clearance between the plug and screw, drill carefully and slowly to avoid drilling onto the screw.
- The drill may force the plug off at this time.

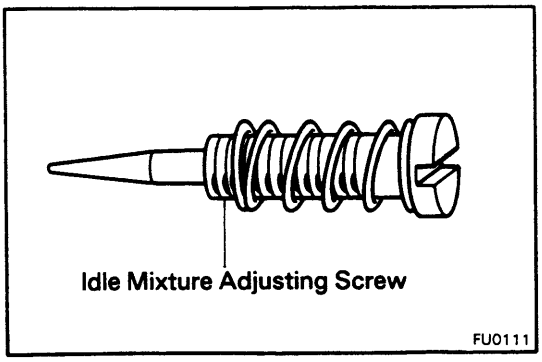


   (d) Through the hole in the plug, fully screw in the mixture adjusting screw with a screwdriver.

NOTE: Be careful not to damage the screw tip by tightening the screw too tight.



(e) Use a 7.5 mm ϕ (0.295 in. ϕ) drill to force the plug off.

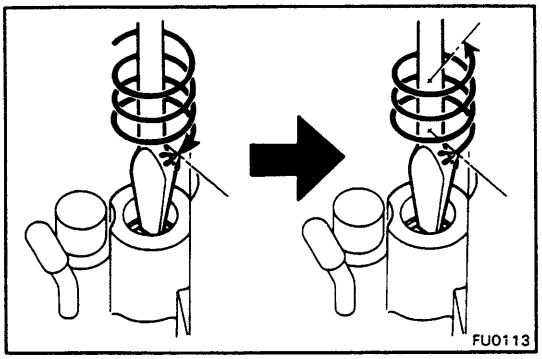


3. INSPECT MIXTURE ADJUSTING SCREW

(a) Blow off any steel particles 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.



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. Canada Wagon M/T)
3 1/4 revolutions
Others 2 1/2 revolutions

NOTE: Be careful not to damage the screw tip by tightening the screw too tight.

5. REINSTALL CARBURETOR (See page FU-24)

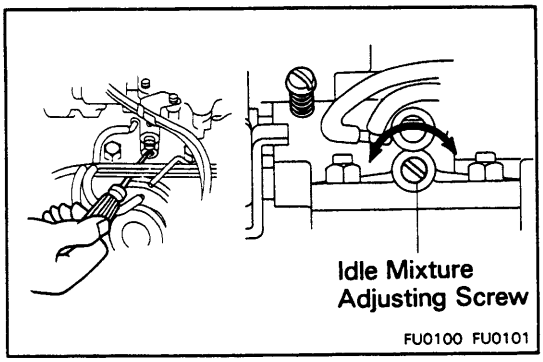
6. ADJUST IDLE SPEED AND IDLE MIXTURE

(a) Initial conditions (See page FU-25)

(b) Start the engine.

(c) Set to the maximum speed by turning the IDLE MIXTURE ADJUSTING SCREW.

NOTE: Insert a small screwdriver between EGR valve and EGR vacuum modulator bracket.

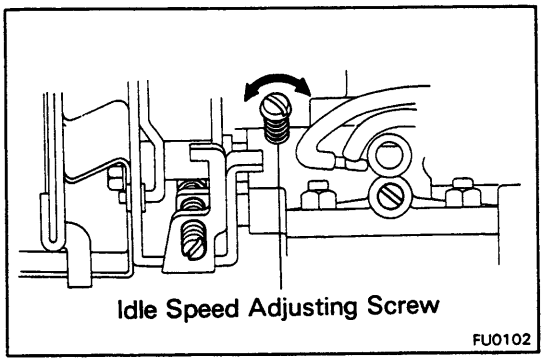


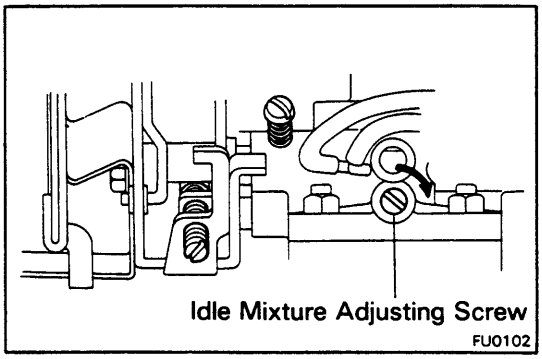
(d) Set to the idle mixture speed by turning the IDLE SPEED ADJUSTING SCREW.

Idle mixture speed: 700 rpm

NOTE: Make adjustment with the cooling fan OFF.

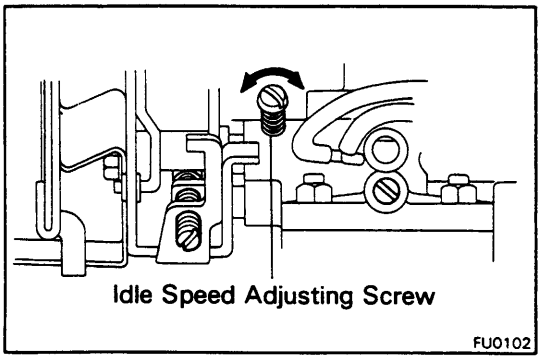
(e) Before moving to the next step, continue adjustments (c) and (d) until the maximum speed will not rise any further no matter how much the IDLE MIXTURE ADJUSTING SCREW is adjusted.





(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.

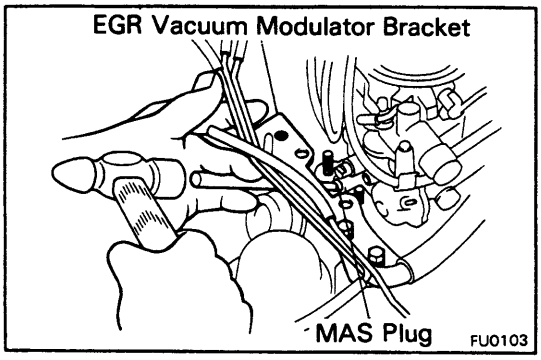


(g) Set to the idle speed by screwing in the IDLE SPEED ADJUSTING SCREW.

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 adjusting with the cooling fan OFF.



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) Reinstall 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

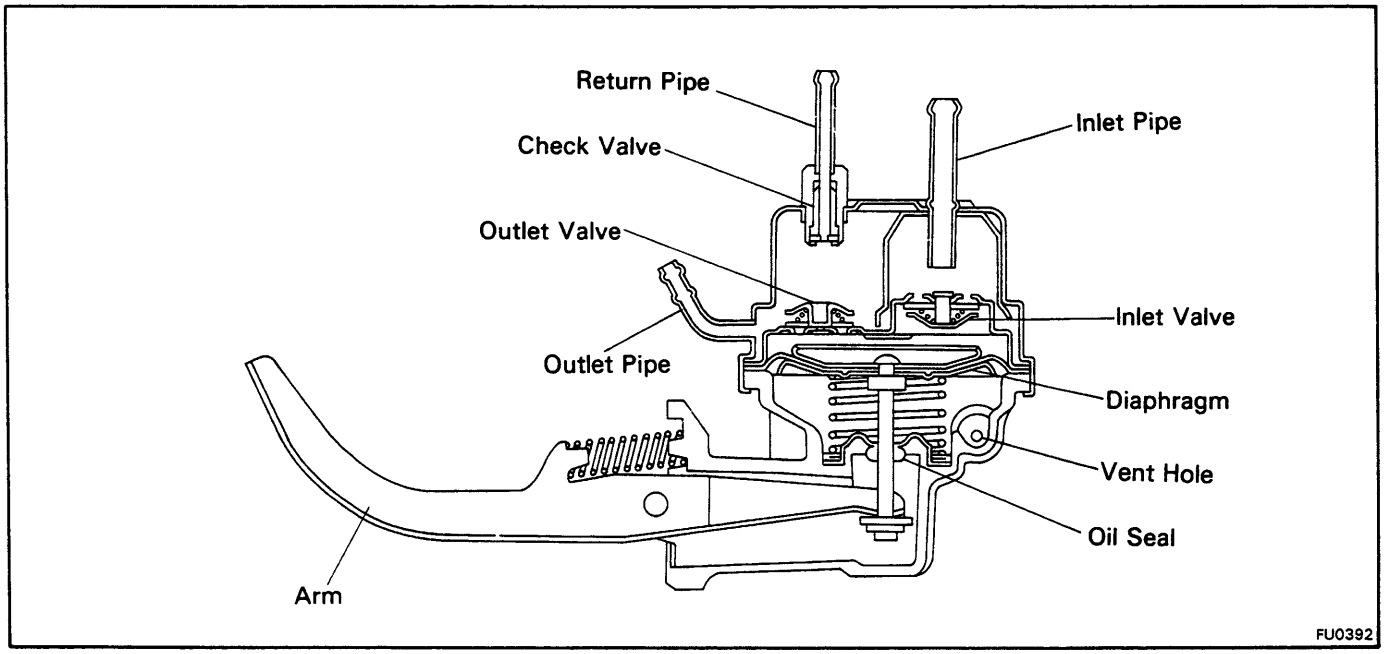
1. DISCONNECT FUEL HOSES FROM FUEL PUMP

2. REMOVE FUEL PUMP

Remove two bolts, fuel pump and gasket.

INSPECTION OF FUEL PUMP (Airtight Test)

Cutaway View

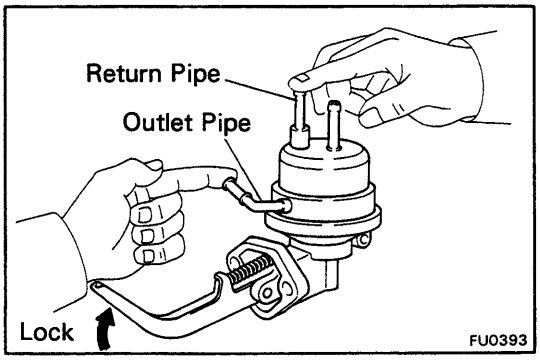


Prechecks

Before performing the following checks on the fuel pump.

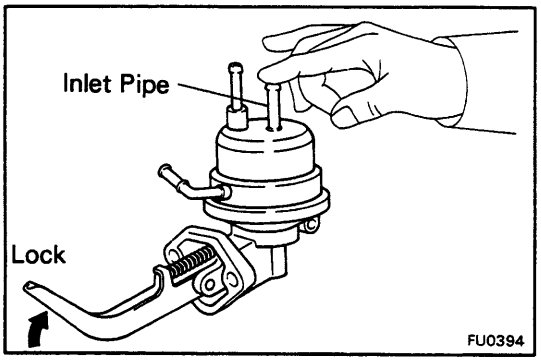
(a) Run some fuel through the pump to insure that the check valves seal tightly (a dry check valve may not seal properly).

(b) Without blocking off any pipes, operate the pump lever and check the amount of force necessary for operation and the amount of arm play. This same amount of force should be used in the checks.



1. CHECK INLET VALVE

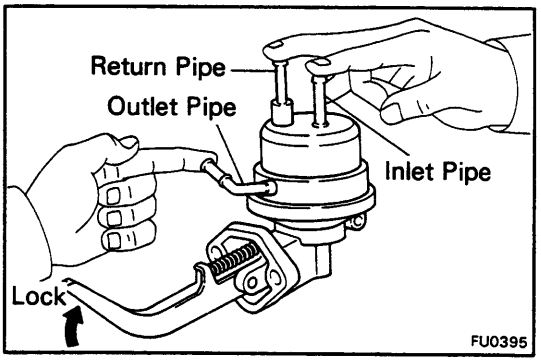
Block off the outlet and return pipes with your finger and check that there is an increase in lever arm play and that the lever arm moves freely (no reaction force).



2. CHECK OUTLET VALVE

Block off the inlet pipe with your finger and check that the arm locks (does not operate with same amount of force used in the precheck above).

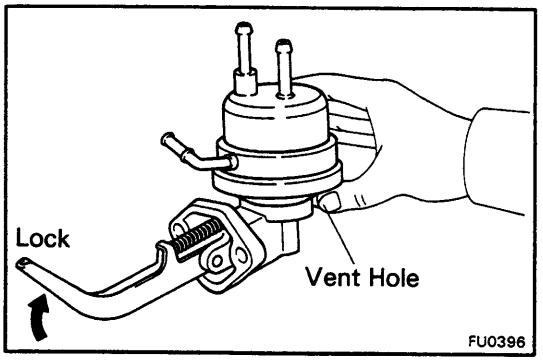
NOTE: Never use more force than that used in the precheck. This applies to checks 3 and 4 also.



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 N·m)

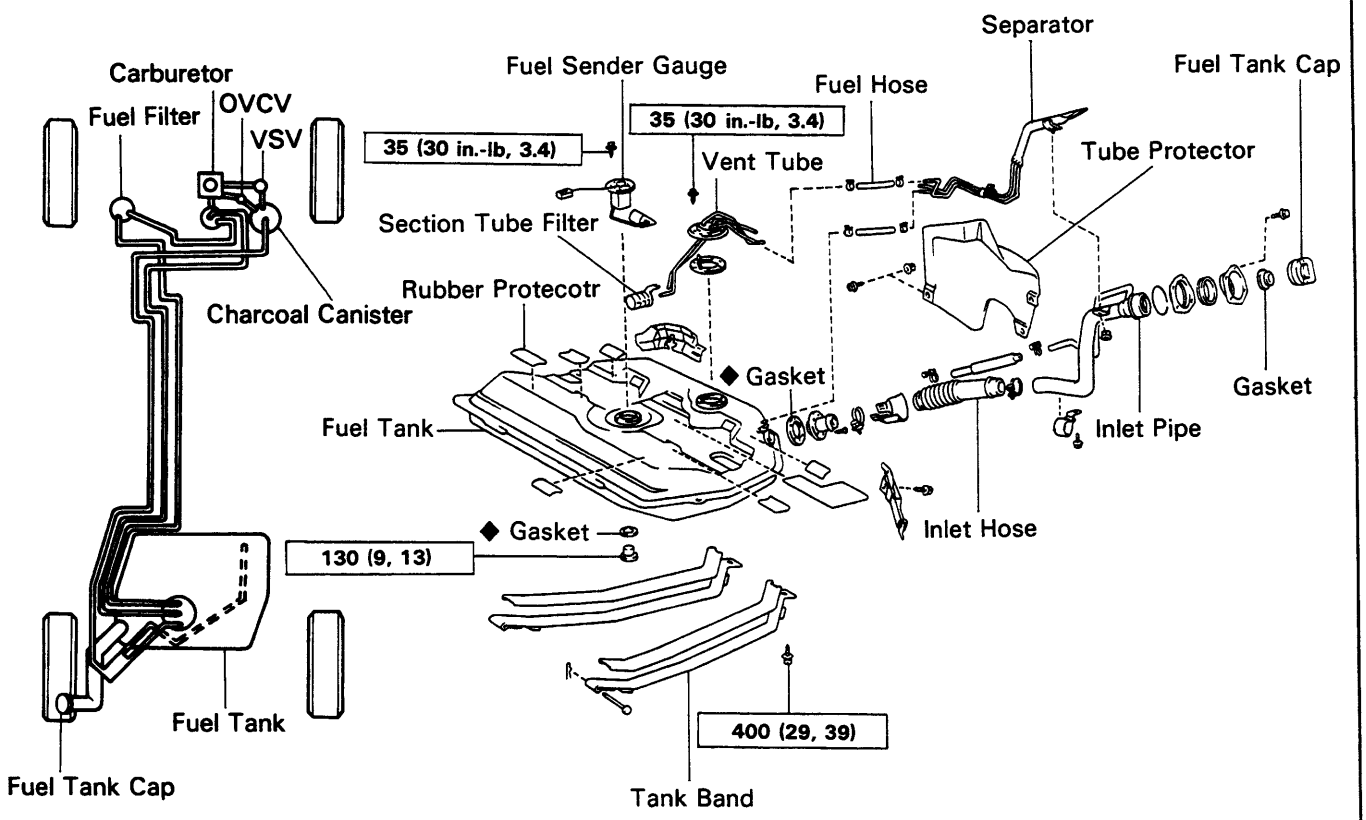
2. CONNECT FUEL HOSES TO FUEL PUMP

3. START ENGINE AND CHECK FOR LEAKS

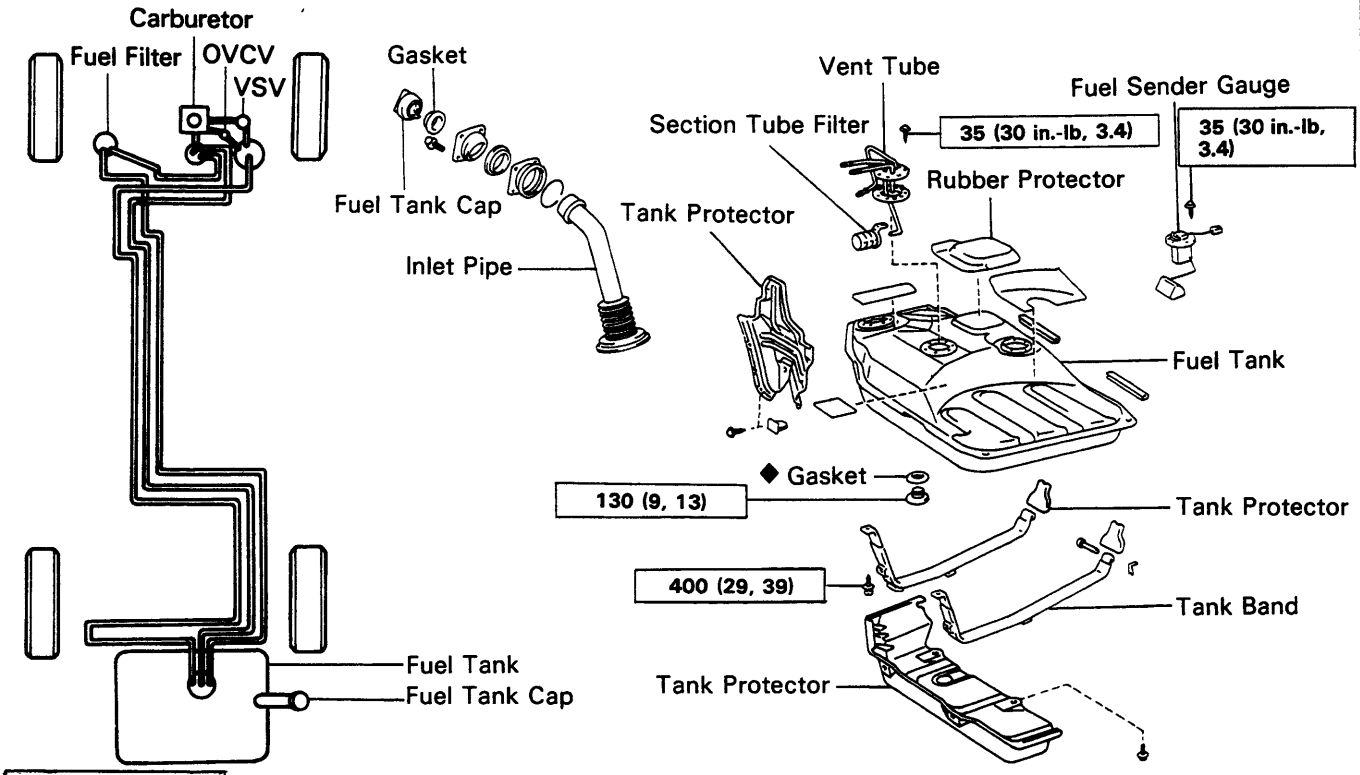
FUEL TANK AND LINES

COMPONENTS

Sedan and Wagon FWD



Wagon 4WD



Kg-cm (ft-lb, N·m) : 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.**

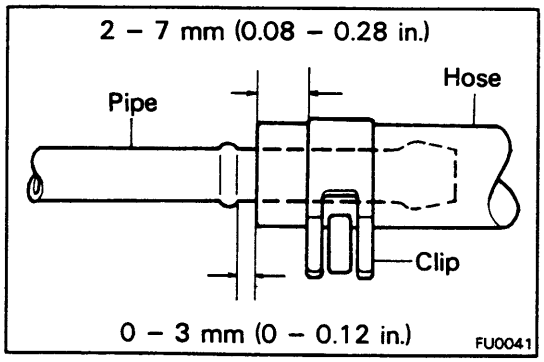
INSPECT FUEL LINES AND CONNECTIONS

(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.

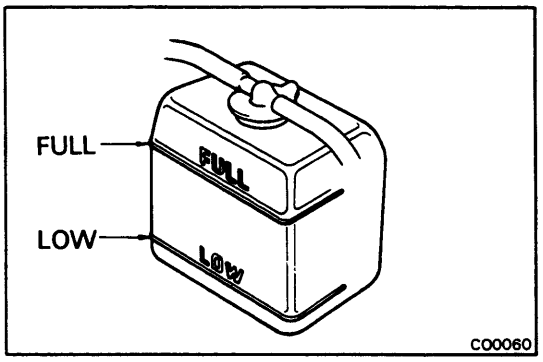
COOLING SYSTEM

	Page
TROUBLESHOOTING	CO-2
CHECK AND REPLACEMENT OF ENGINE COOLANT	CO-3
WATER PUMP	CO-4
THERMOSTAT	CO-11
RADIATOR	CO-12
ELECTRIC COOLING FAN	CO-18

TROUBLESHOOTING

Problem	Possible cause	Remedy	Page
Engine overheats	Water pump drive belt loose 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.

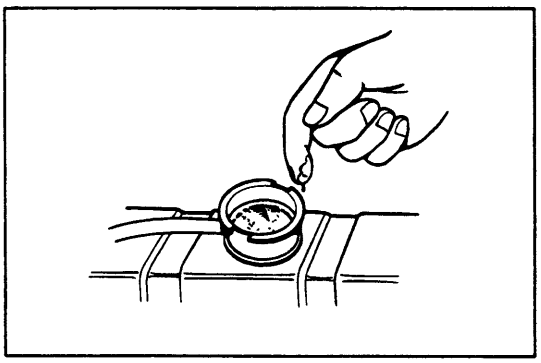


CHECK AND REPLACEMENT OF ENGINE COOLANT

1. CHECK ENGINE COOLANT LEVEL AT RESERVE TANK

The coolant level should be between the "LOW" and "FULL" lines.

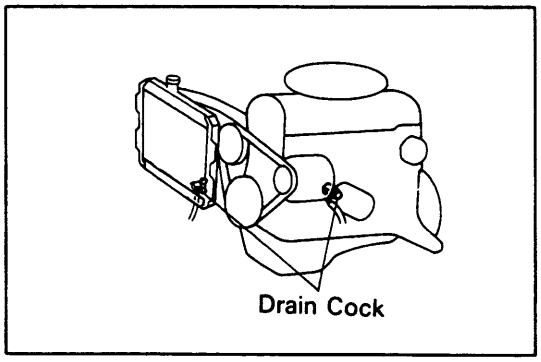
If low, check for leaks and add coolant up to the "FULL" line.



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) Close the drain cocks.

(d) Fill the system with coolant.
Use a good brand of ethylene-glycol base coolant, mixed according to the manufacturer's directions.

Capacity (w/ Heater or air conditioner):
5.3 liters (5.6 US qts, 4.7 Imp.qts)

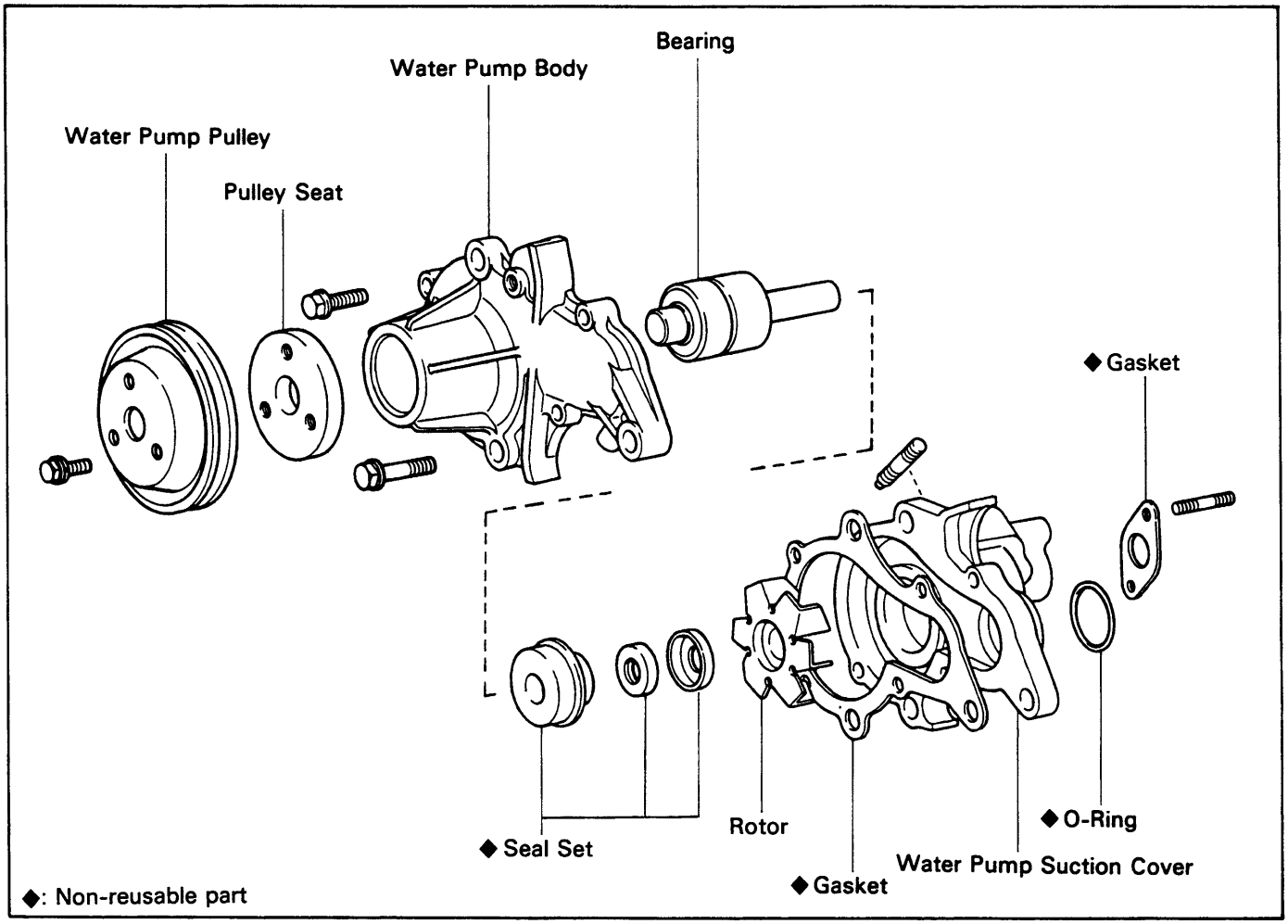
(e) Install the radiator cap.

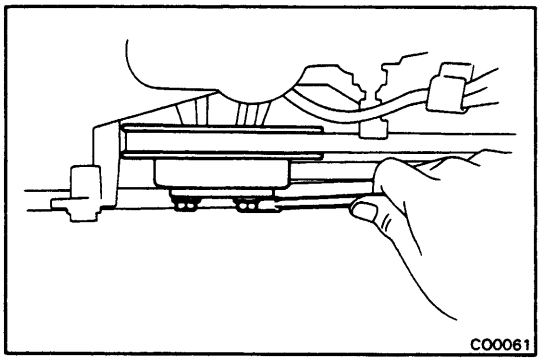
(f) Start the engine and check for leaks.

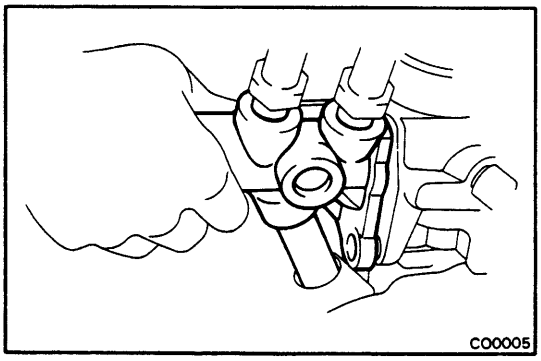
(g) Recheck the coolant level and refill as necessary.

WATER PUMP

COMPONENTS

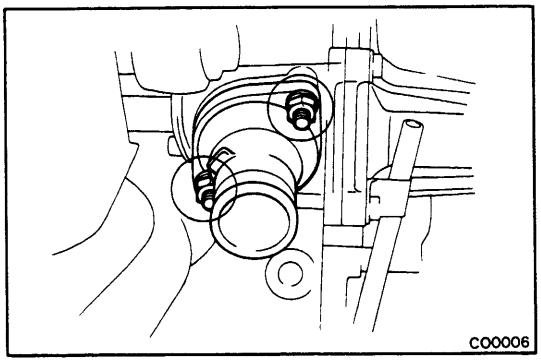






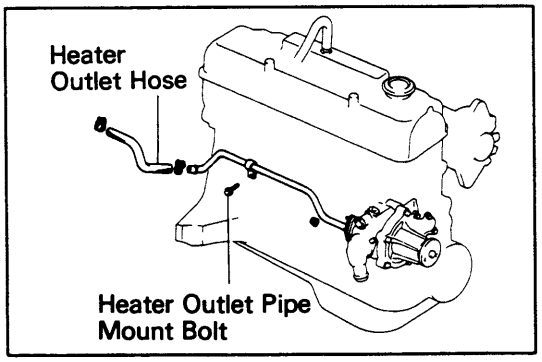
REMOVAL OF WATER PUMP

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.



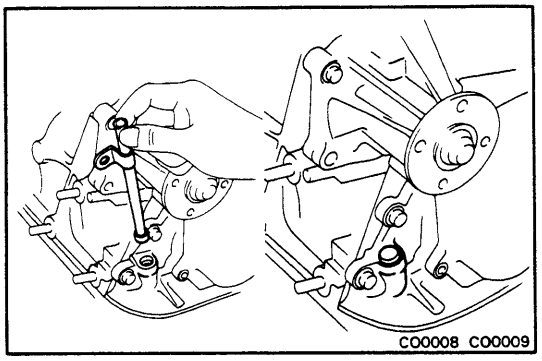
5. **REMOVE WATER INLET HOUSING AND THERMOSTAT**

6. **REMOVE TIMING BELT UPPER COVER**



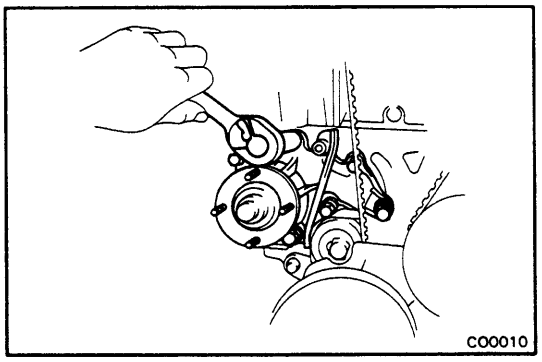
7. **DISCONNECT HEATER OUTLET HOSE FROM OUTLET PIPE**

8. **REMOVE HEATER OUTLET PIPE MOUNT BOLT**



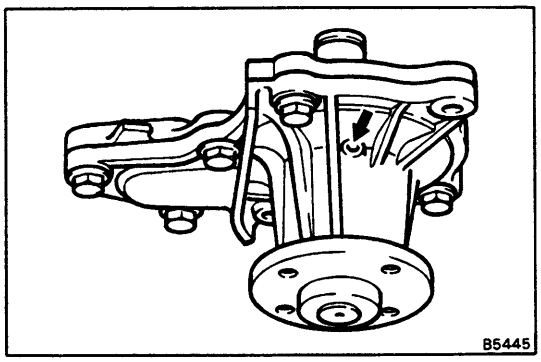
9. **REMOVE OIL LEVEL GAUGE AND GUIDE**
   (a) Remove the oil level gauge.
   (b) Remove the mount bolt, and pull out the oil level gauge guide.

   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 careful not to get coolant on the timing belt.



INSPECTION OF WATER PUMP

1. **INSPECT WATER PUMP SEAL**

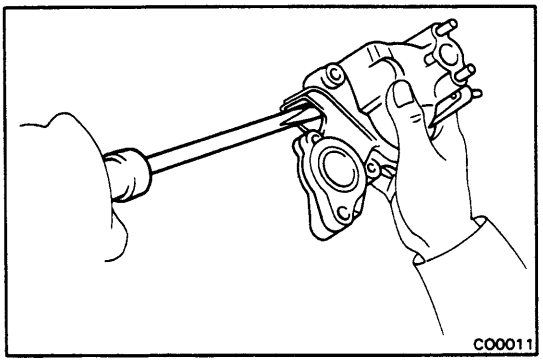
   Make sure that there are no traces of coolant leakage from the drain hole.

   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.

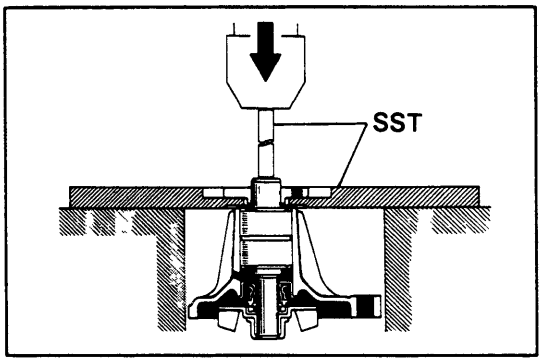


DISASSEMBLY OF WATER PUMP

(See page CO-4)

1. REMOVE WATER PUMP SUCTION COVER

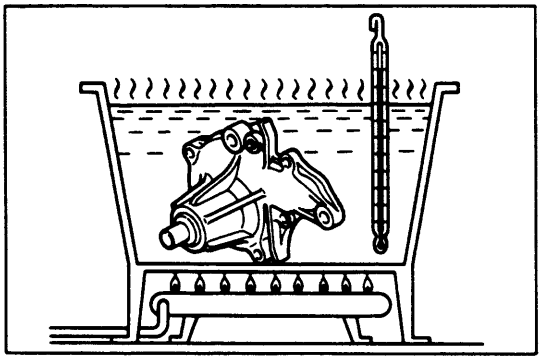
Using a screwdriver, pry off the water pump suction cover.



2. REMOVE PULLEY SEAT

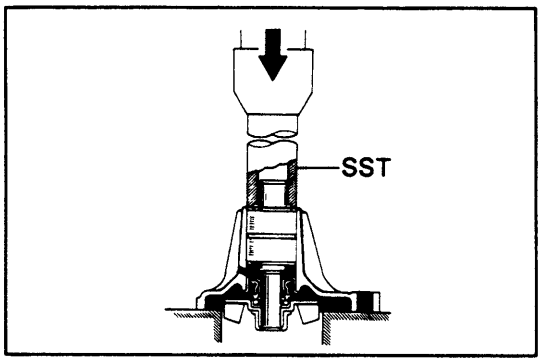
Using a press and SST, remove the pulley seat from the water pump bearing shaft.

SST 09236-00101



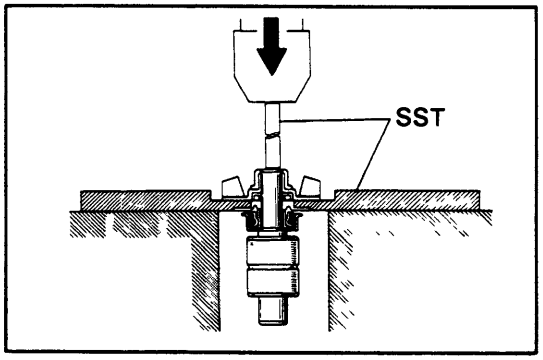
3. REMOVE WATER PUMP BEARING

(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

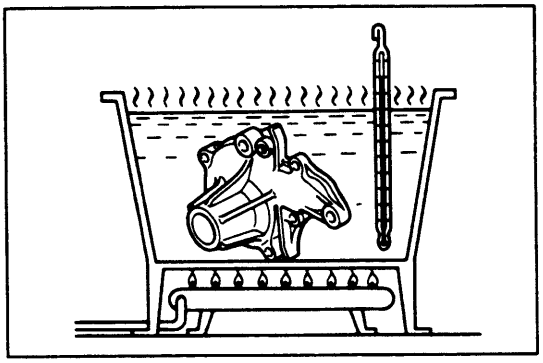


4. REMOVE ROTOR

(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.



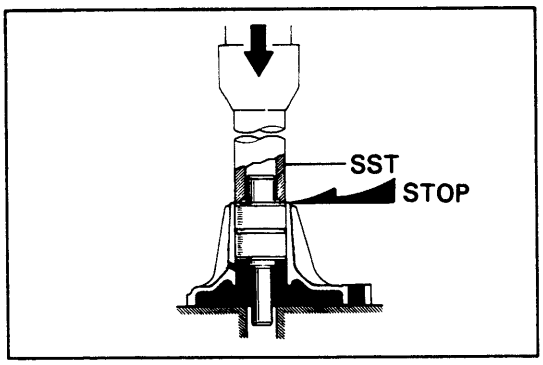
ASSEMBLY OF WATER PUMP

(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).



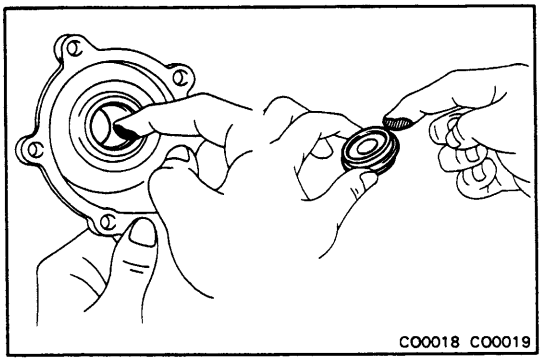
(b) Using a press and SST, install the water pump bearing into the water pump body.

SST 09236-00101

NOTE: The bearing and face should be flush with the body top surface.

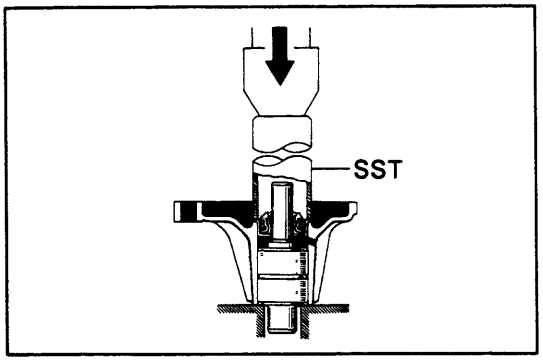
2. INSTALL SEAL

(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



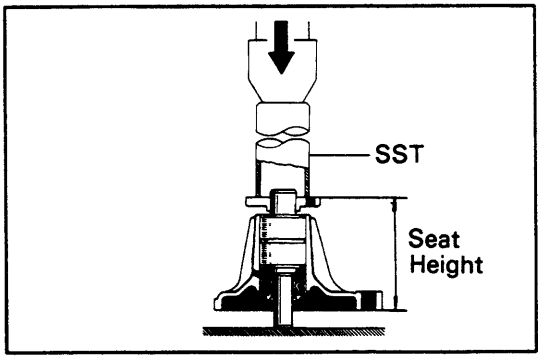
3. INSTALL PULLEY SEAT

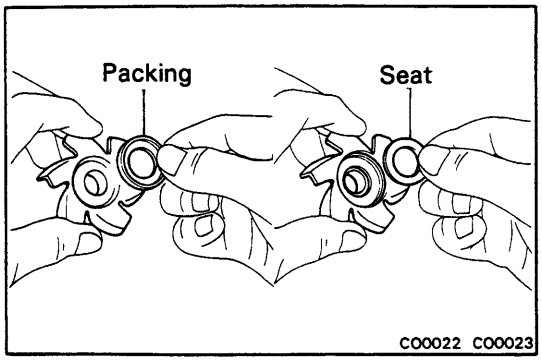
Using a press and SST, install the pulley seat on the water pump bearing shaft.

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.

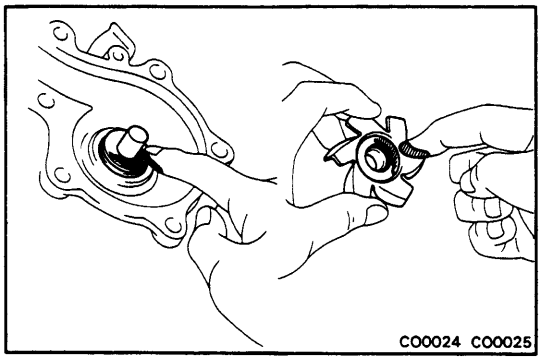
Seat height: 76 mm (2.99 in.)



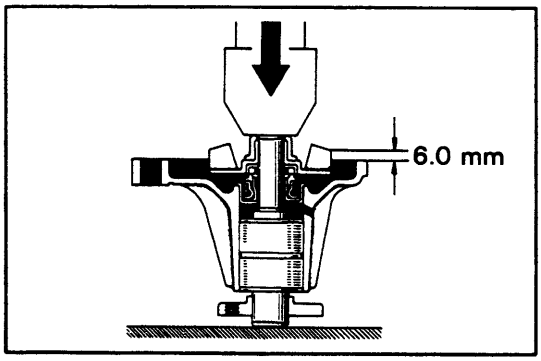


4. INSTALL ROTOR

(a) Install a new packing and seat into the rotor.



(b) Apply a little engine oil to the seal and rotor contact surface.

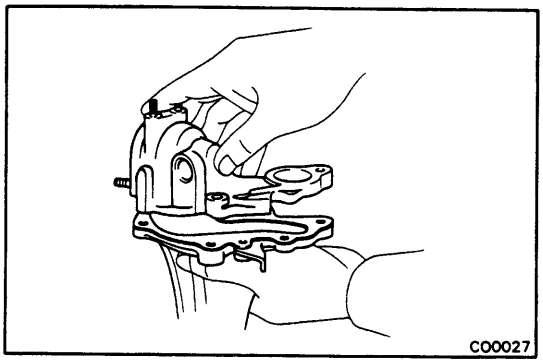


(c) Using a press, install the rotor on the water pump bearing shaft.

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.

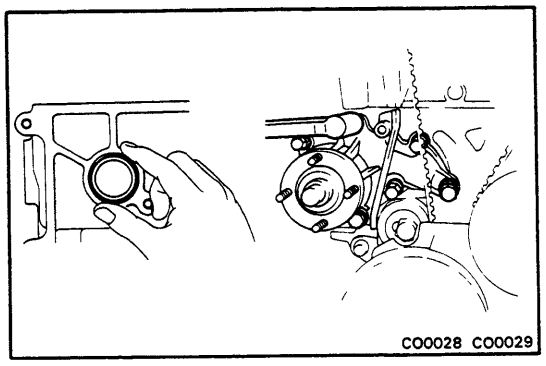


6. INSTALL WATER PUMP SUCTION COVER

Install a new gasket and water pump suction cover with three bolts. Torque the bolts.

Torque: 95 kg-cm (82 in.-lb, 9.3 N·m)

NOTE: After installing, make sure that the rotor is not in contact with the water pump suction cover.



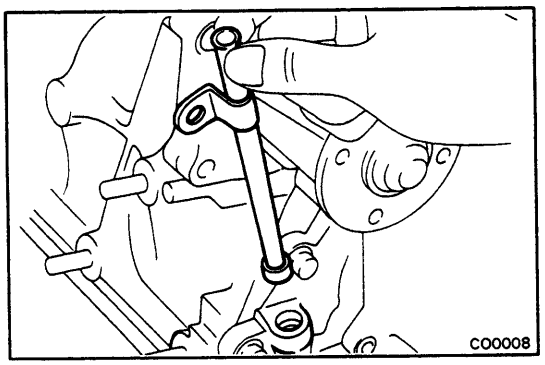
INSTALLATION OF WATER PUMP

1. INSTALL WATER PUMP

(a) Install the heater outlet pipe together with a new gasket to the water pump with the two nuts.

(b) Install a new O-ring to the block and install the pump with the three bolts.
Torque the bolts.

Torque: 150 kg-cm (11 ft-lb, 15 N·m)

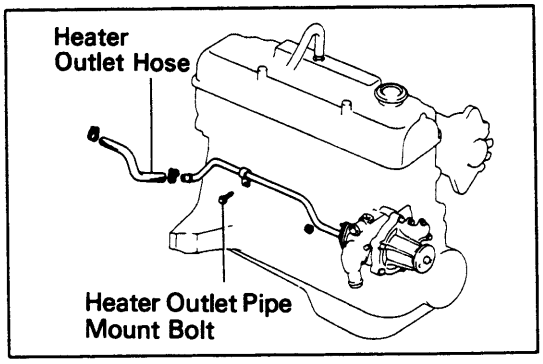


2. INSTALL OIL LEVEL GAUGE GUIDE AND GAUGE

(a) Install a new O-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.

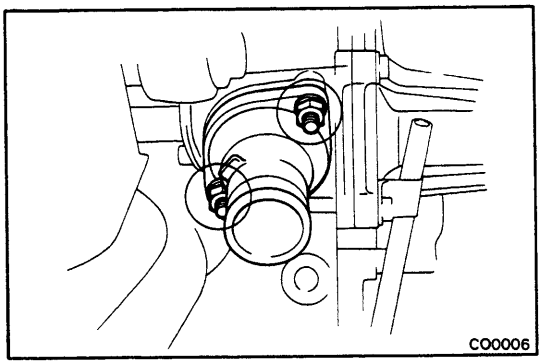
(c) Install mount bolt.



3. INSTALL HEATER OUTLET PIPE MOUNT BOLT

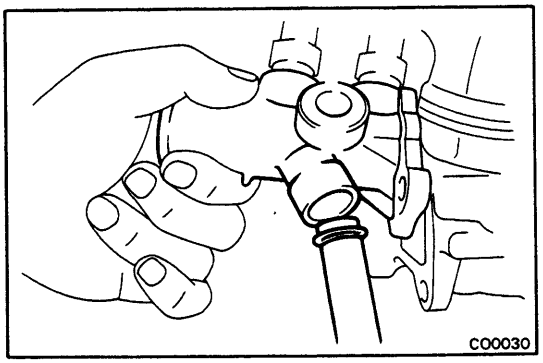
4. CONNECT HEATER OUTLET HOSE TO OUTLET PIPE

5. INSTALL TIMING BELT UPPER COVER



6. INSTALL THERMOSTAT AND WATER INLET HOUSING

Install the thermostat, a new gasket and the water inlet housing with the two nuts.

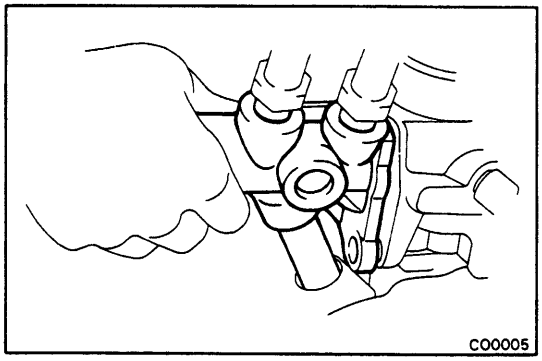


7. INSTALL WATER OUTLET HOUSING AND BY-PASS PIPE

(a) Install two new O-rings on the by-pass pipe.

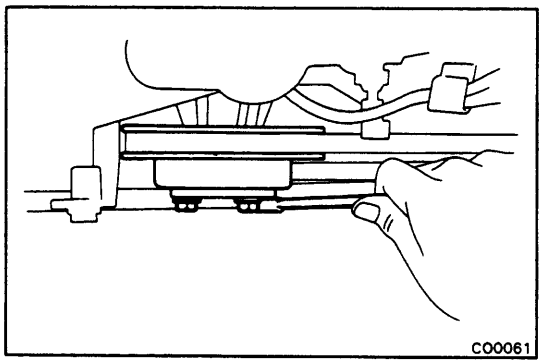
(b) Apply a little engine oil to the O-rings.

(c) Install 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.



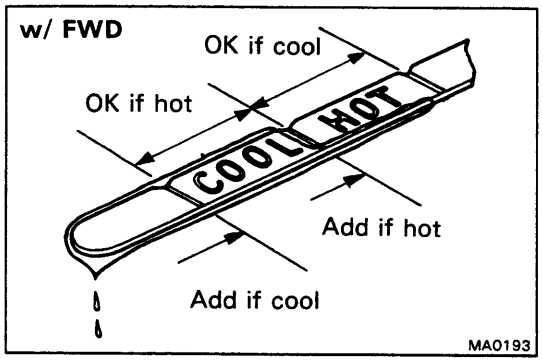
8. INSTALL WATER PUMP PULLEY

Place drive belts on the water pump pulley and install the water pump pulley with the bolts.

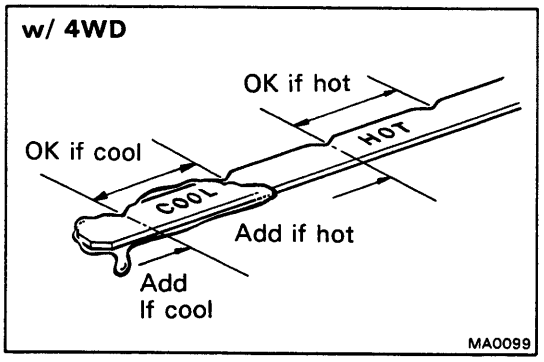
9. INSTALL RADIATOR (See page CO-17)

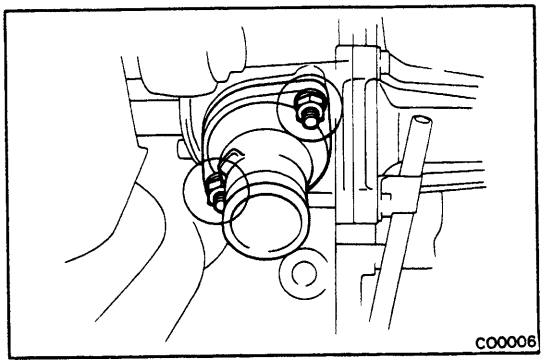
10. FILL WITH ENGINE COOLANT (See page CO-3)

11. START ENGINE AND CHECK FOR LEAKS



12. (w/ A/T)
CHECK A/T FLUID LEVEL (See page MA-20)



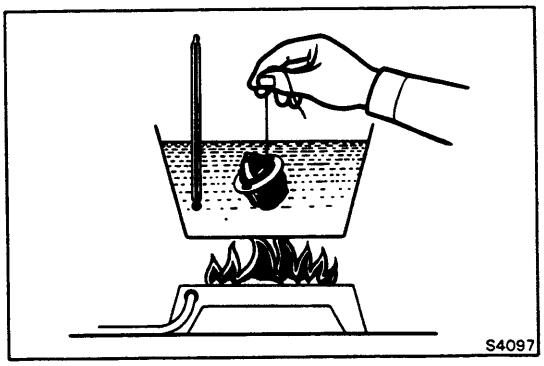


THERMOSTAT

REMOVAL OF THERMOSTAT

1. **DRAIN ENGINE COOLANT (See page CO-3)**
2. **DISCONNECT RADIATOR OUTLET HOSE**
3. **REMOVE WATER INLET HOUSING AND THERMOSTAT**

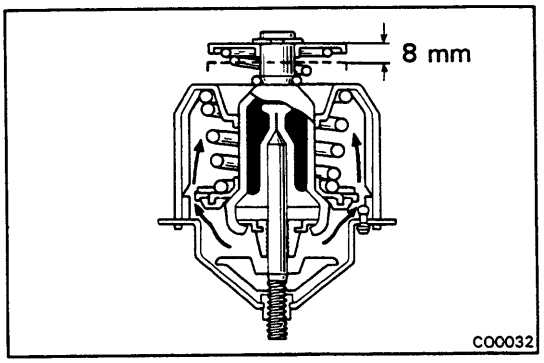
   Remove the two nuts, water inlet housing, thermostat and gasket.



INSPECTION OF THERMOSTAT

NOTE: The thermostat is numbered according to the valve opening temperature.

(a) Immerse the thermostat in water and heat the water gradually.



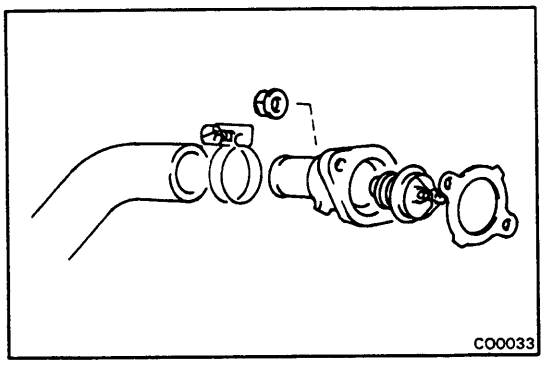
(b) Check the valve opening temperature and valve lift.

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.

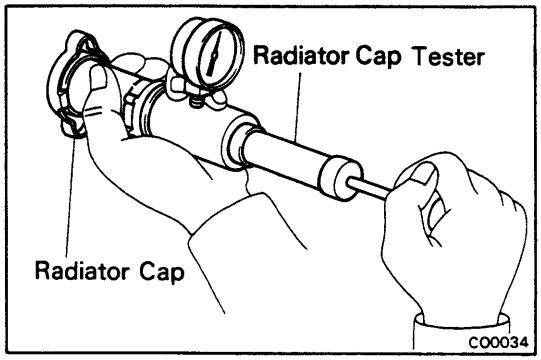
2. **CONNECT RADIATOR OUTLET HOSE**
3. **FILL WITH ENGINE COOLANT (See page CO-3)**

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/cm² (427 – 498 psi, 2,942 – 3,432 kPa).



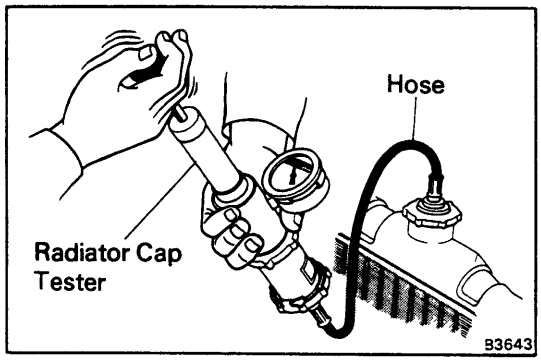
ON-VEHICLE INSPECTION

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/cm² (10.7 psi, 74 kPa) and 1.05 kg/cm² (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/cm² (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/cm² (26 psi, 177 kPa). Check that pressure does not drop.

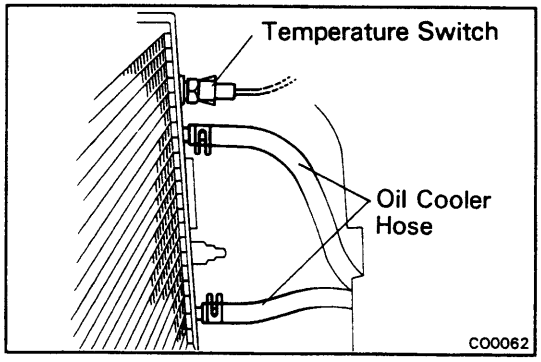
   If the pressure drops, check for leaks from the hoses, radiator or water pump. If no external leaks are found, check the heater core, block and intake manifold.

REMOVAL OF RADIATOR

1. **DRAIN ENGINE COOLANT (See page CO-3)**

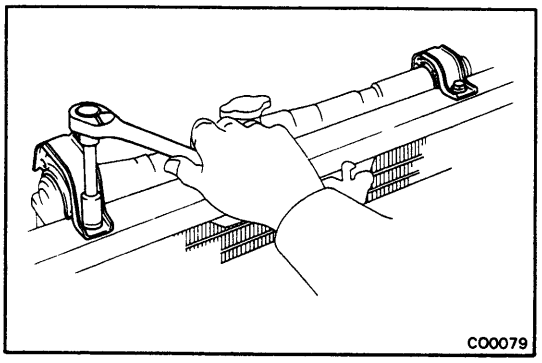
2. **DISCONNECT CONNECTOR FROM WATER TEMPERATURE SWITCH**

   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.



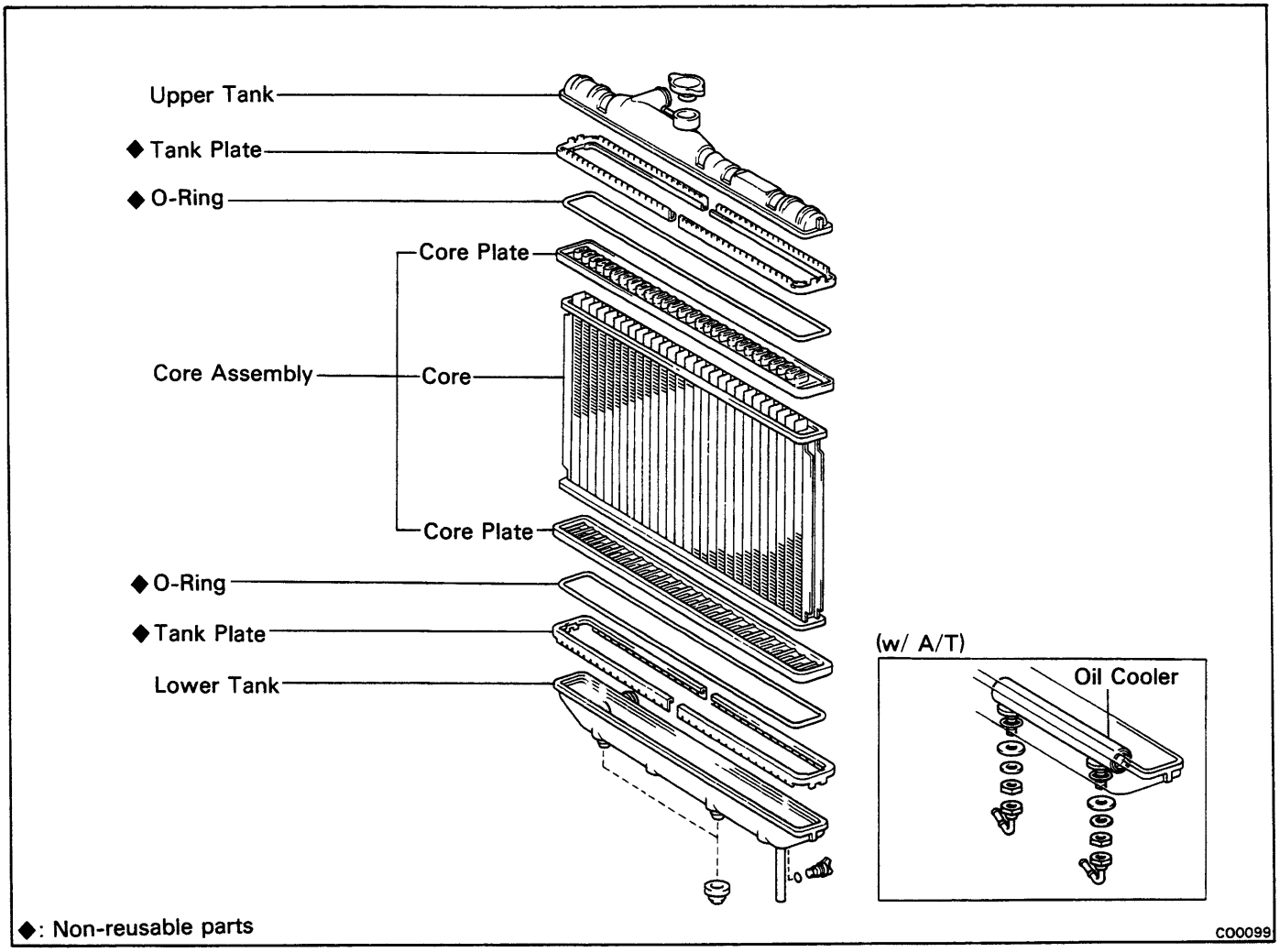
4. **REMOVE BOND CABLE**

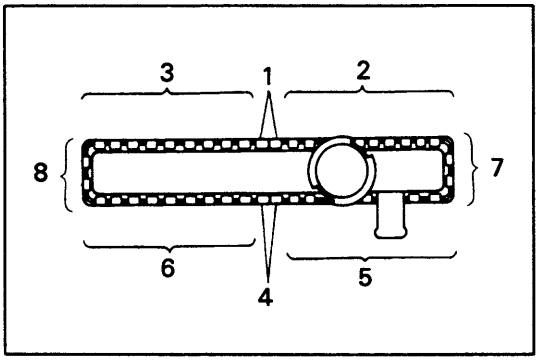
5. **DISCONNECT COOLANT RESERVOIR TUBE**

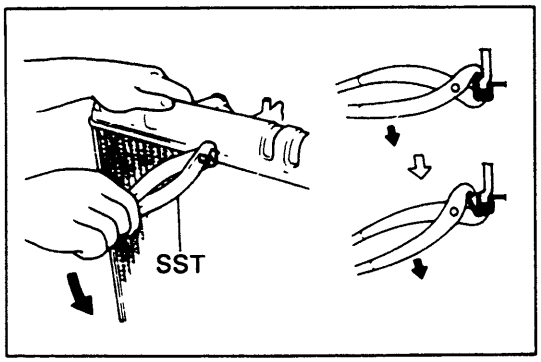
6. **DISCONNECT TWO RADIATOR HOSES**

7. **REMOVE TWO RADIATOR MOUNT BOLTS AND RADIATOR**

COMPONENTS







DISASSEMBLY OF RADIATOR

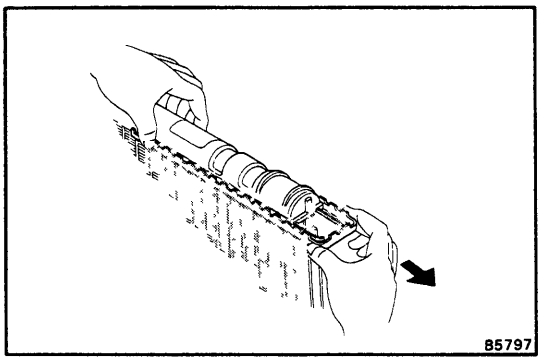
1. **IF NECESSARY, REMOVE TEMPERATURE SWITCH FROM LOWER TANK**

2. **REMOVE TANK PLATE**

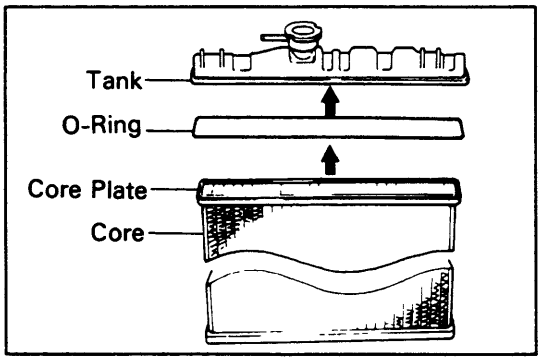
   (a) Raise the claws of the tank plates with SST in the numerical order shown in the figure.

   SST 09230-00010

   NOTE: Be careful not to damage the core plate.



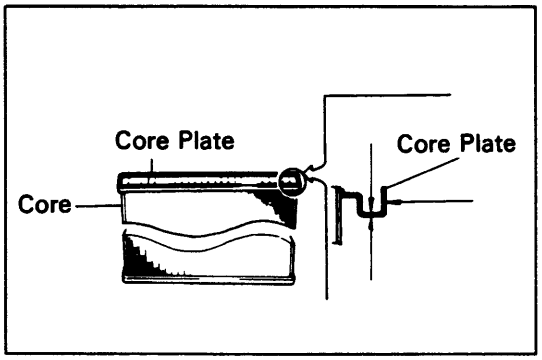
(b) Pull the tank plates outward.



3. REMOVE TANK AND O-RING

(a) Pull the tank upward.

(b) Remove the O-ring.



ASSEMBLY OF RADIATOR

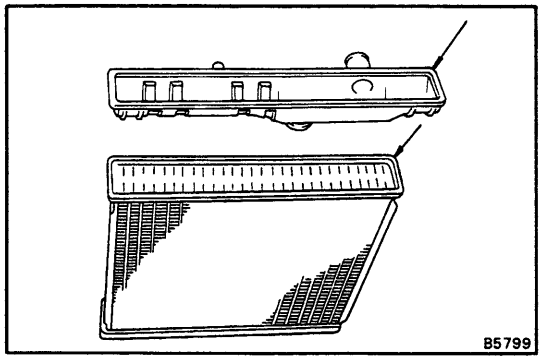
(See page CO-13)

1. INSPECT CORE PLATE

Inspect the core plate for damage.

NOTE:

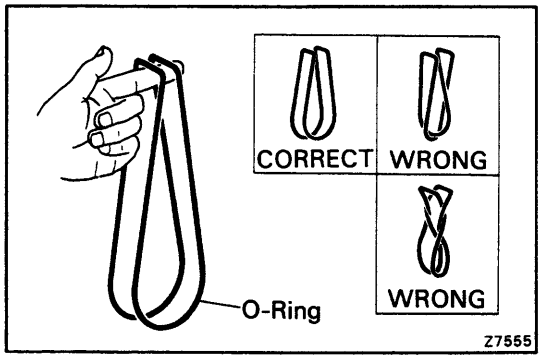
- If the sides of the core plate groove are deformed, reassembly of the tank will be impossible. Therefore, first correct any deformation with pliers or such.
- Water leakage will result if the bottom of the core plate groove is damaged or dented. Therefore, repair or replace if necessary.



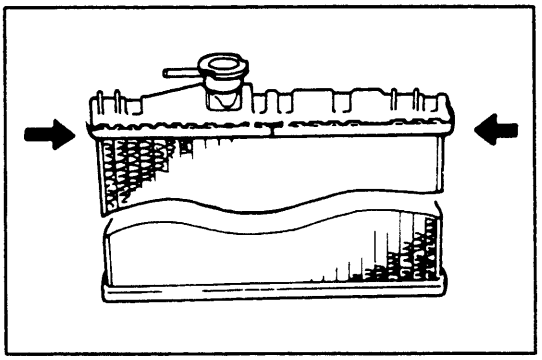
2. INSTALL NEW O-RING AND TANK

NOTE:

- Clean the tank and core plate.

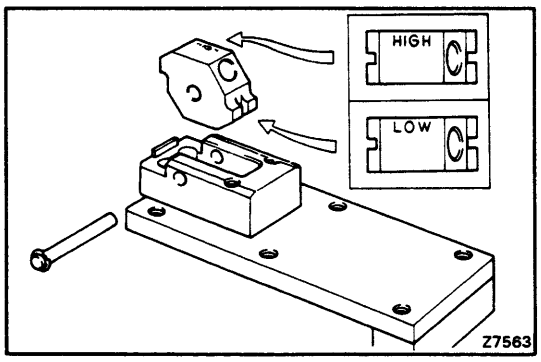


- Take out any twists.



3. INSTALL TANK PLATES

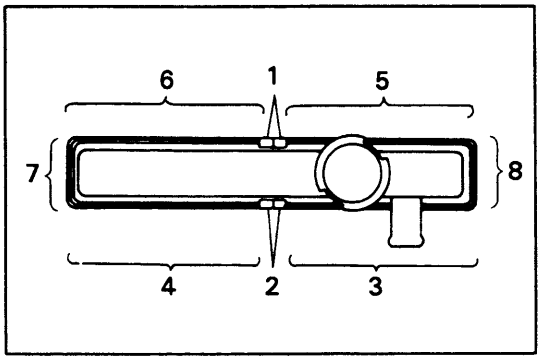
Insert new tank plates from both ends in the direction of the arrows. Insert to where the portions shown with an asterisk make conract with the tank.



4. STAKE CLAWS OF TANK PLATES

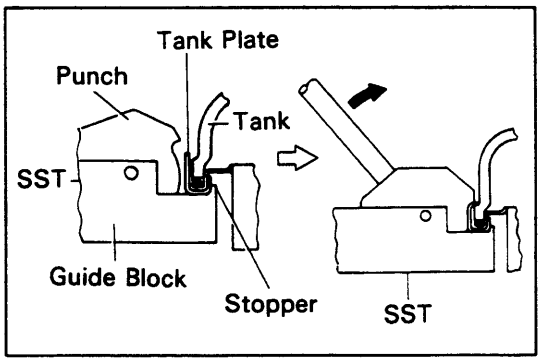
(a) Set the punch of SST to "LOW".

SST 09230-00010

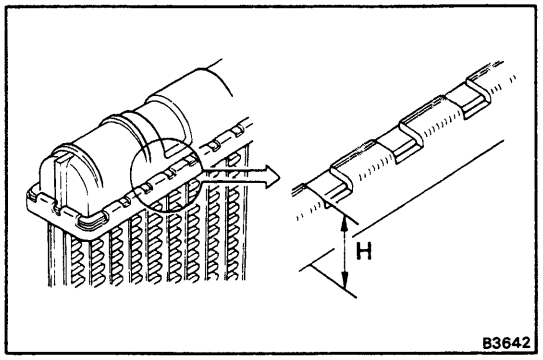


(b) Stake the claws of the tank plates with SST in the numerical order shown in the figure.

SST 09230-00010



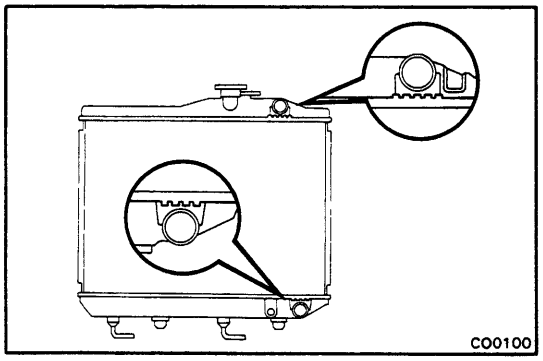
CAUTION: If the bottom of the core plate is staked with the SST on the guide block stopper, it may result in water leakage.



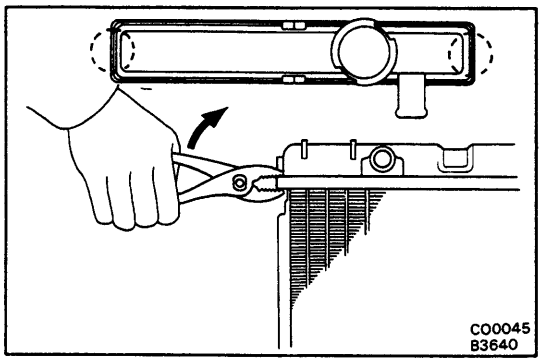
NOTE:

- Stake with just enough pressure to leave a mark on the claw. The staked plate height (H) should be as follows:

Plate height (H): 9.0 — 9.4 mm (0.354 — 0.370 in.)



- Do not stake the areas protruding around the pipes.

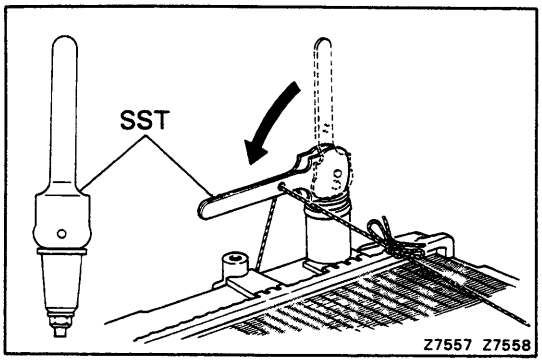


- The points shown in the illustration cannot be staked with the SST. Use a pliers or such and be careful not to damage the core plate.

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 N·m)



6. INSPECT FOR WATER LEAKS

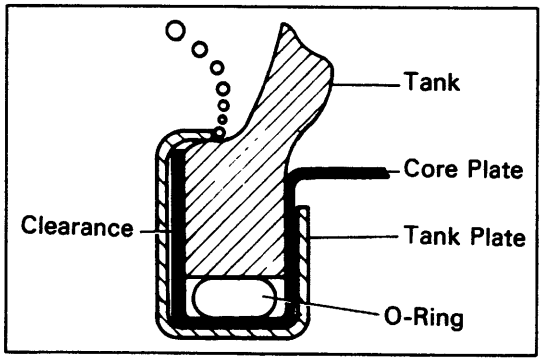
(a) Tighten the drain plug.

(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/cm² (26 psi, 177 kPa)

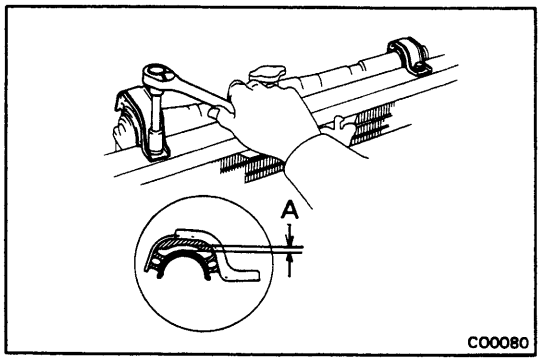


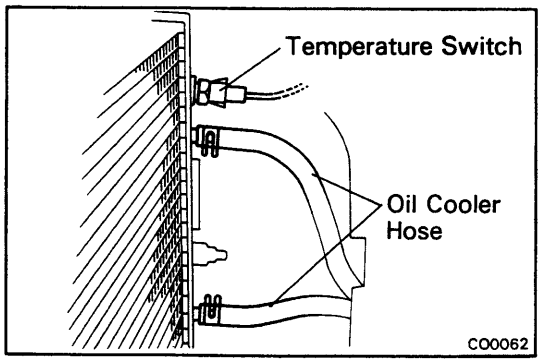
(d) Inspect for water leaks.

NOTE: On radiators with resin tanks, there is a clearance between the core plate and tank plate 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 plate.





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**

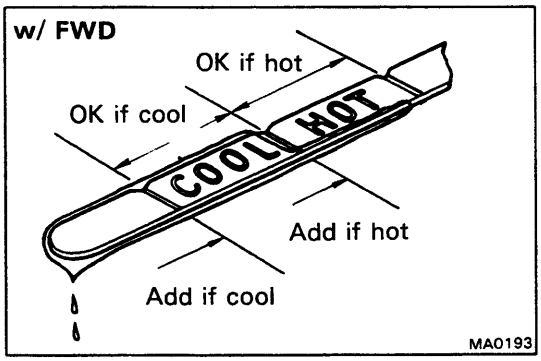
3. **CONNECT COOLANT RESERVOIR TUBE**

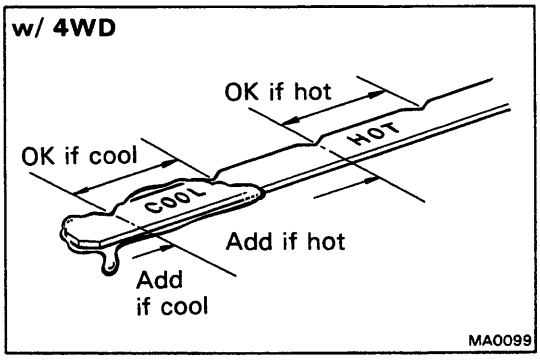
4. **INSTALL BOND CABLE**

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)**

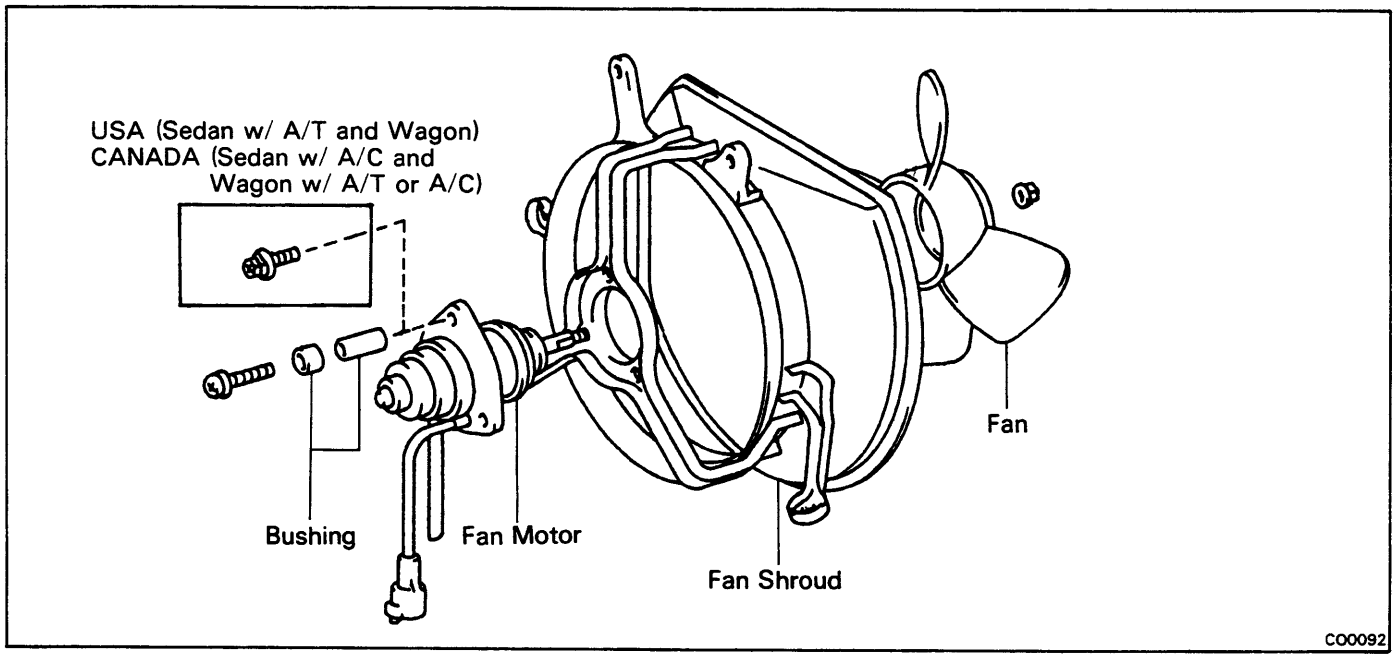


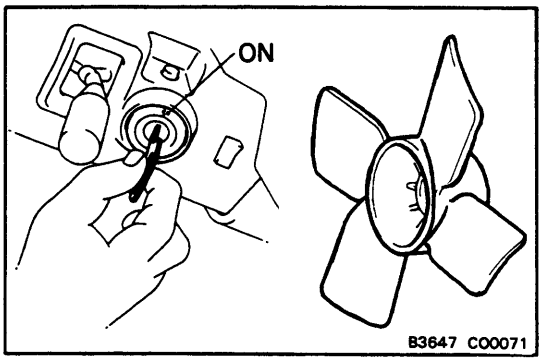


8. **(w/ A/T)**
   CHECK A/T FLUID LEVEL (See page MA-20)

ELECTRIC COOLING FAN

COMPONENTS





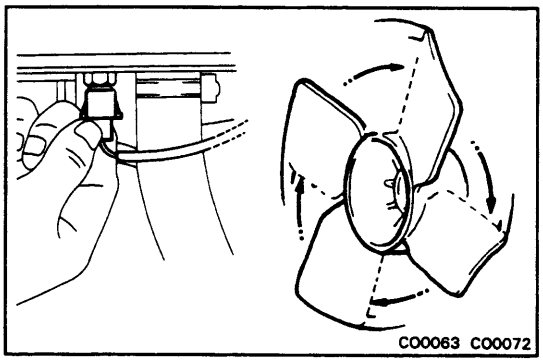
ON-VEHICLE INSPECTION

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.

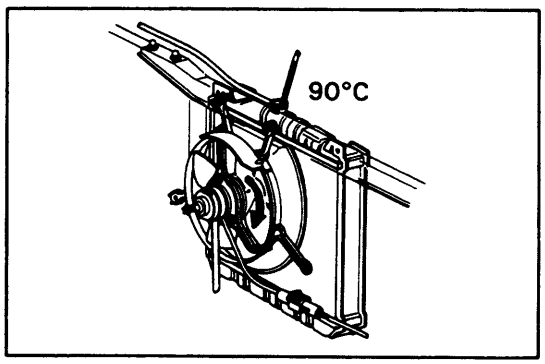


2. **DISCONNECT TEMPERATURE SWITCH CONNECTOR**

   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**



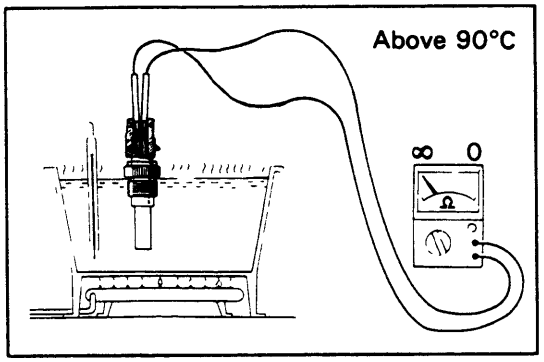
High Temperature [above 90°C (194°F)]

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.

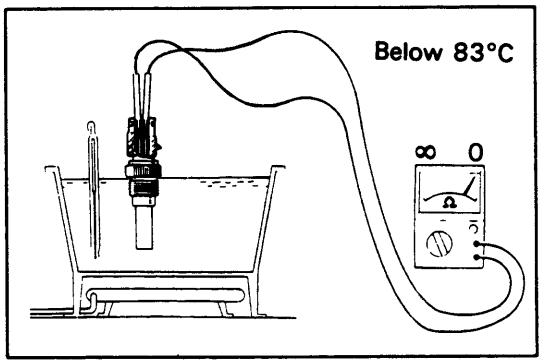


INSPECTION OF ELECTRIC COOLING FAN

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).

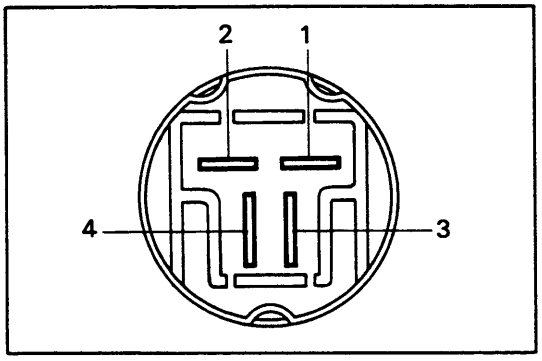


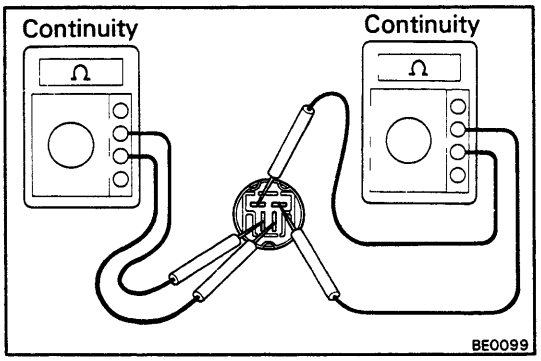
(b) Check that there is continuity when the coolant temperature is below 83°C (181°F).

If continuity is not as specified, replace the switch.

2. INSPECT COOLING FAN MOTOR RELAY

LOCATION: In the engine compartment relay box.



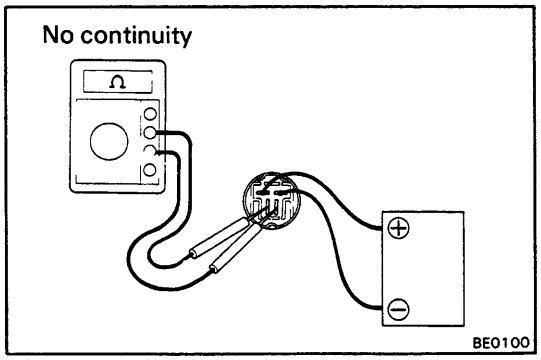


Inspect Relay Continuity

(a) Using an ohmmeter, check that there is continuity between terminals 1 and 2.

(b) Check that there is continuity between terminals 3 and 4.

If there is no continuity, replace the relay.

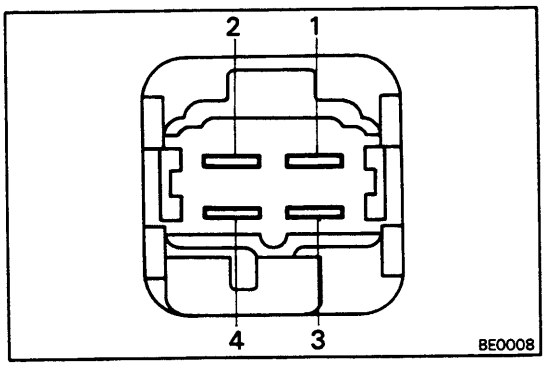


Inspect Relay Operation

(a) Apply battery voltage across terminals 1 and 2.

(b) Check that there is no continuity between terminals 3 and 4.

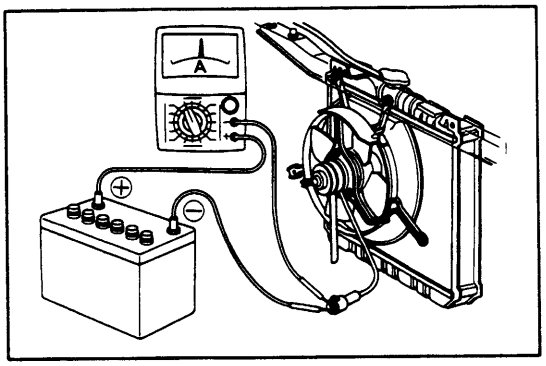
If there is continuity, replace the relay.



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:

Item	Current (A)	
	USA	CANADA
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)
Wagon	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)

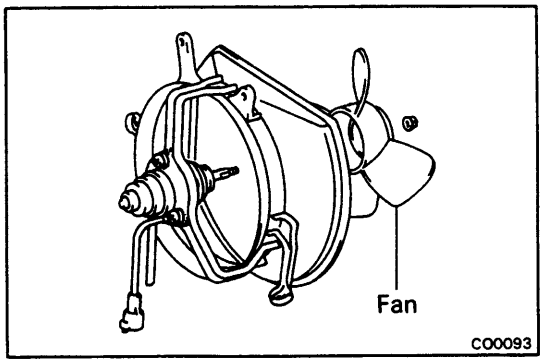
REMOVAL OF ELECTRIC COOLING FAN

1. DISCONNECT CONNECTOR OF FAN MOTOR

2. REMOVE FRONT GRILL

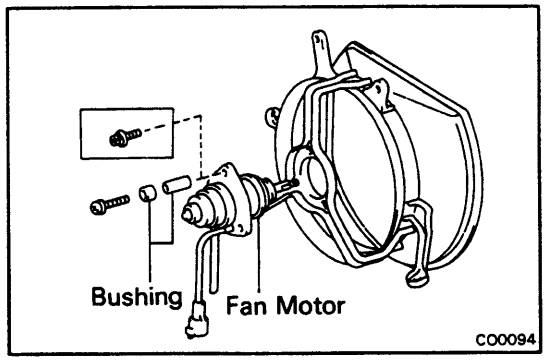
3. REMOVE ELECTRIC COOLING FAN ASSEMBLY

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

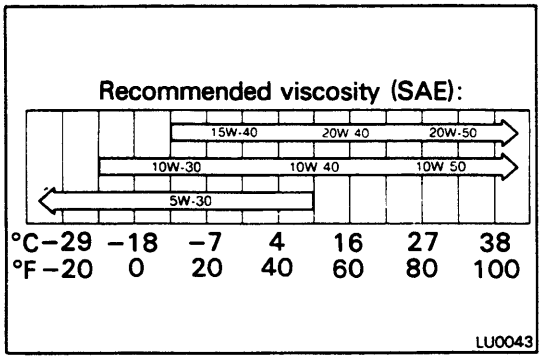
1. **INSTALL ELECTRIC COOLING FAN ASSEMBLY**
2. **INSTALL FRONT GRILL**
3. **CONNECT CONNECTOR OF FAN MOTOR**

LUBRICATION SYSTEM

	Page
TROUBLESHOOTING	LU-2
OIL PRESSURE CHECK	LU-2
REPLACEMENT OF ENGINE OIL AND OIL FILTER	LU-3
OIL PUMP	LU-4

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



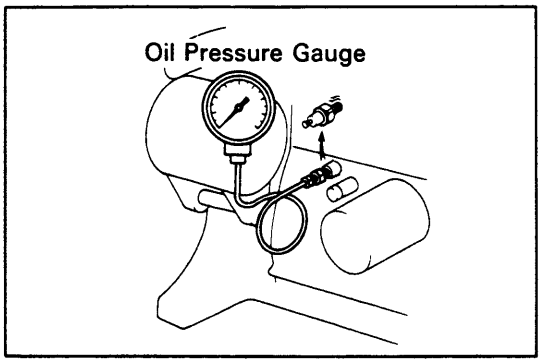
OIL PRESSURE CHECK

1. CHECK OIL QUALITY

Check the oil for deterioration, 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

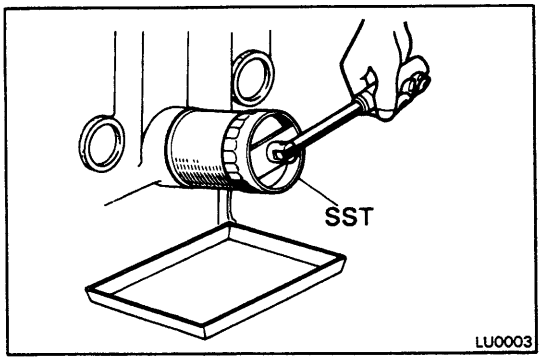
Start the engine and warm it up to normal operating temperature.

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

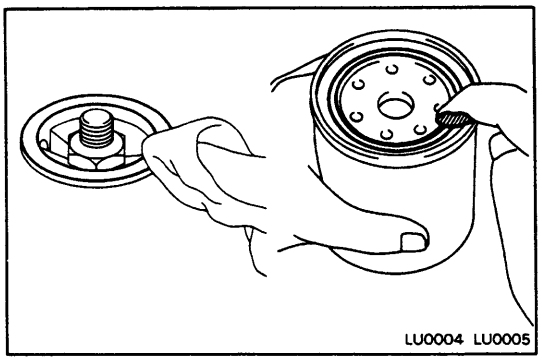
(a) Remove the oil filler cap.

(b) Remove the oil drain plug and drain the oil into a container.

2. REPLACE OIL FILTER

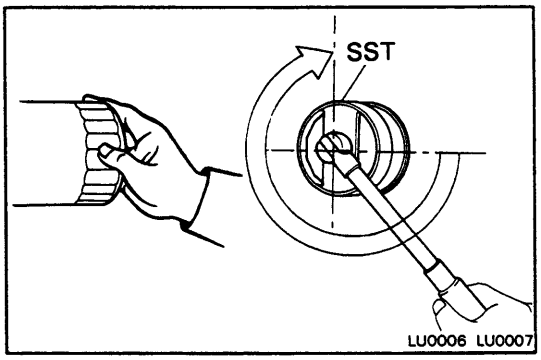
(a) Using SST, remove the oil filter.

SST 09228-22020



(b) Inspect and clean the oil filter installation 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 install the oil drain plug with a new gasket. Torque the drain plug.

Torque: 350 kg-cm (25 ft-lb, 34 N·m)

(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

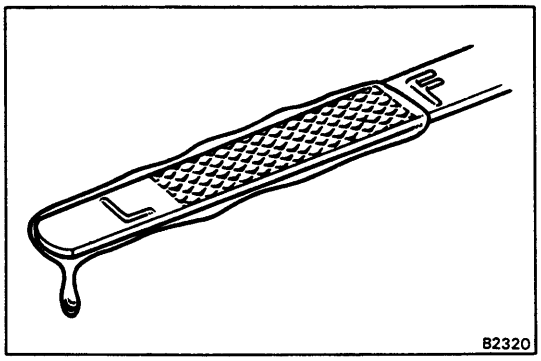
3.0 liters (3.2 US qts, 2.6 Imp.qts)

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) Install the oil filler cap.



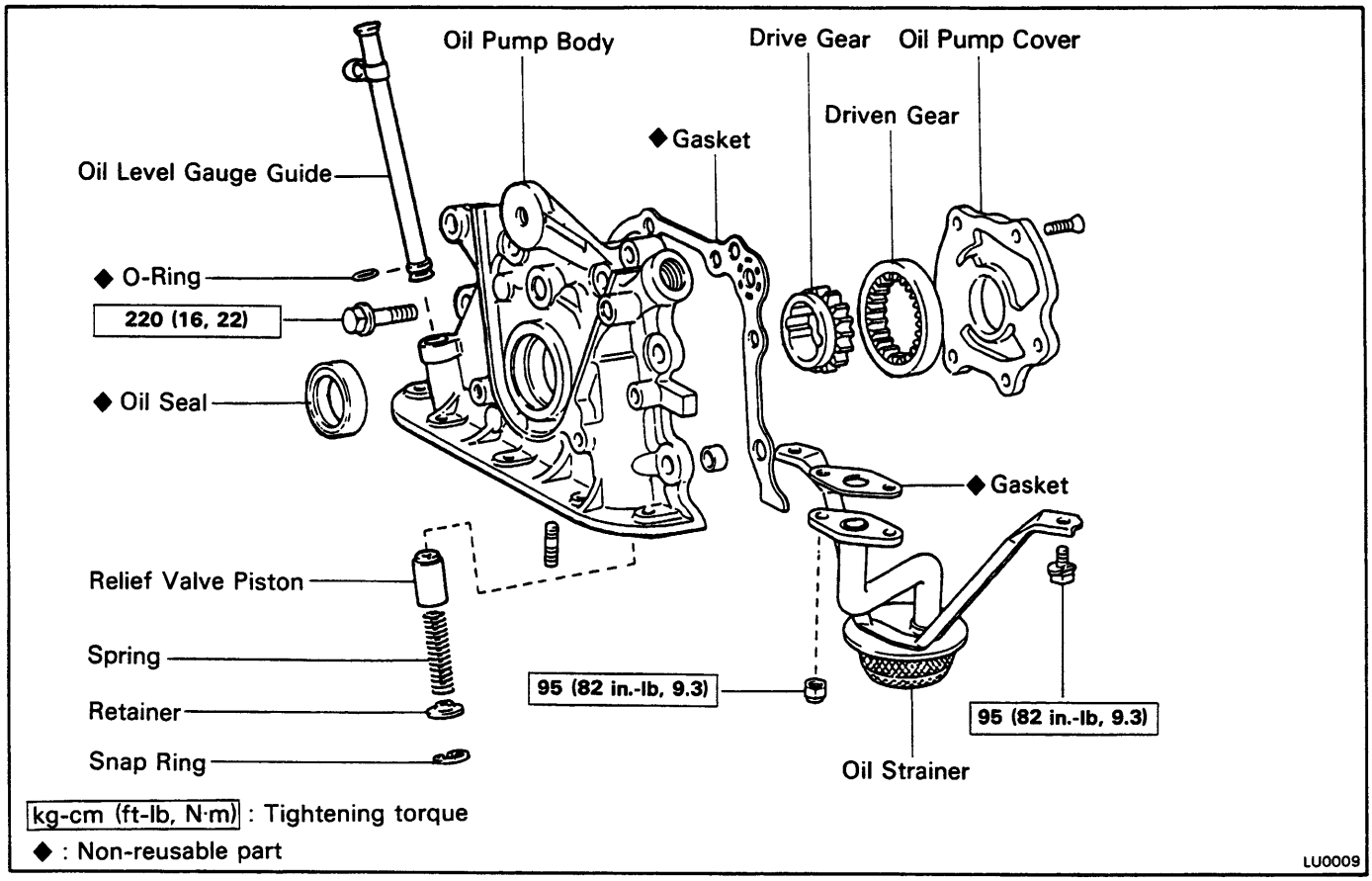
4. START ENGINE AND CHECK FOR LEAKS

5. RECHECK OIL LEVEL

Recheck the engine oil level and refill as necessary.

OIL PUMP

COMPONENTS



REMOVAL OF OIL PUMP

NOTE: When repairing the oil pump, the oil pan and strainer should be removed and cleaned.

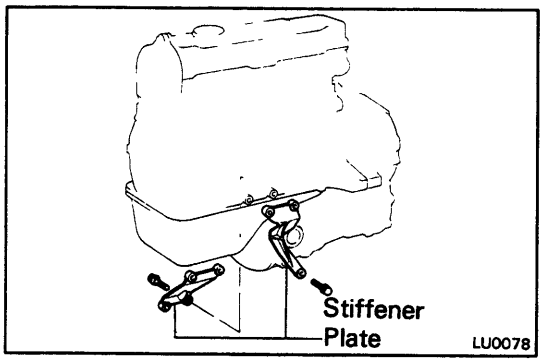
1. **RAISE VEHICLE**

   CAUTION: Be sure the vehicle is securely supported.

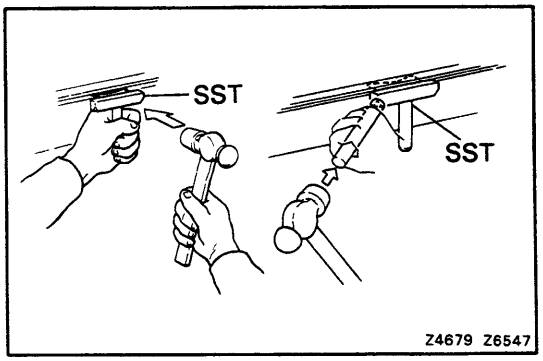
2. **DRAIN ENGINE OIL**

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

4. **REMOVE RADIATOR (See page CO-12)**



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.



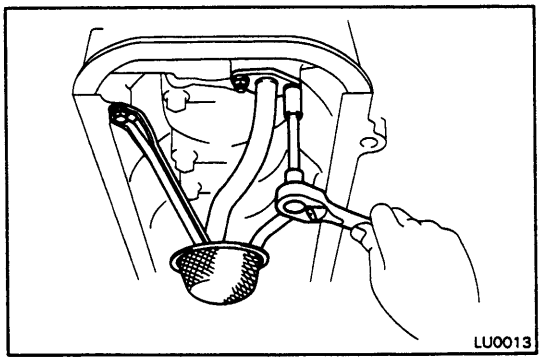
(d) Remove the four nuts and seventeen bolts.

(e) Insert 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:

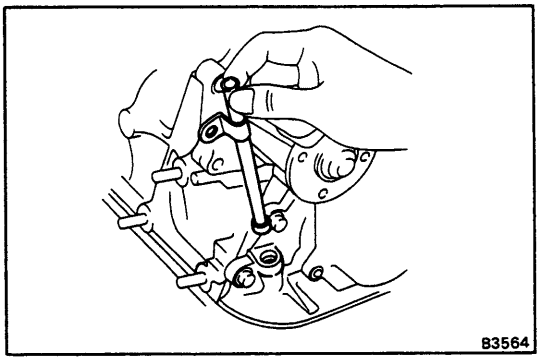
- Do not use SST for the oil pump body side. If necessary, use a screwdriver.
- When removing the oil pan, be careful not to damage the oil pan flange.



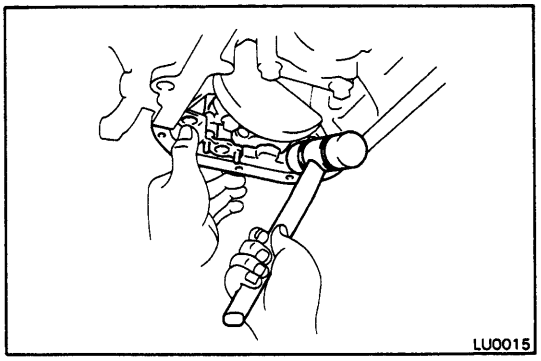
6. REMOVE OIL STRAINER

Remove the two bolts, nuts, oil strainer and gasket.

7. REMOVE TIMING BELT AND CRANKSHAFT TIMING PULLEY (See pages EM-7 and 8)



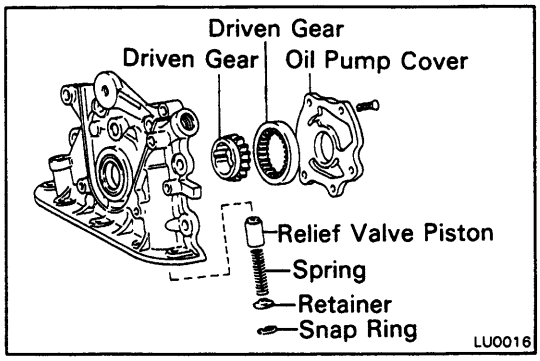
8. REMOVE OIL LEVEL GAUGE AND GUIDE



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

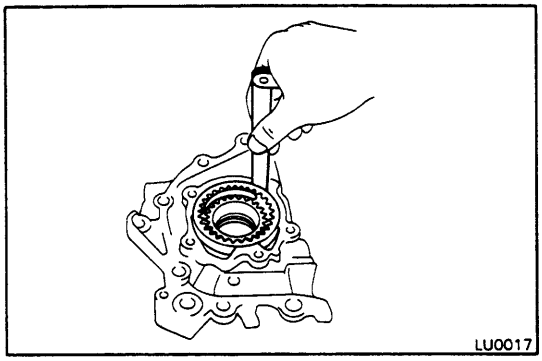
(a) Using snap ring pliers, remove the snap ring.

(b) Remove the retainer, spring and relief valve piston.

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

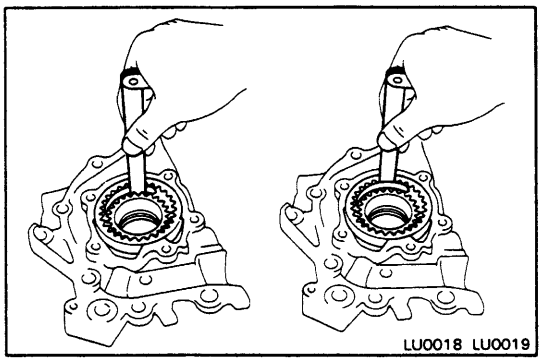
1. INSPECT BODY CLEARANCE

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.)**

Maximum clearance: **0.20 mm (0.0079 in.)**

If the clearance is exceeds maximum, replace the gear and/or body.



2. INSPECT TIP CLEARANCE

Using a feeler gauge, measure the clearance between both gear tips and crescent.

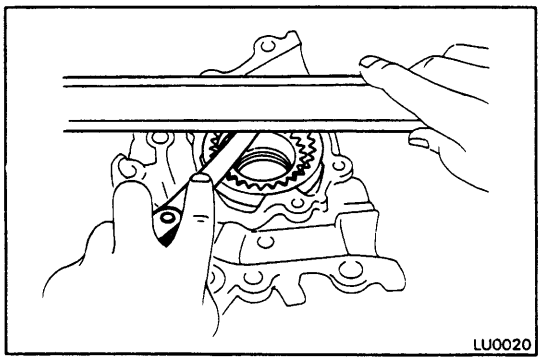
Standard clearance:

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)**

Maximum clearance: **0.35 mm (0.0138 in.)**

If the clearance is exceeds maximum, replace the gear and/or body.



3. INSPECT SIDE CLEARANCE

Using a feeler gauge and flat block, measure the side clearance as shown.

Standard clearance: **0.025 – 0.075 mm (0.0010 – 0.0030 in.)**

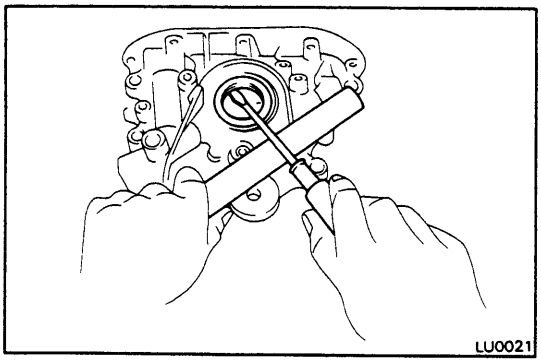
Maximum clearance: **0.10 mm (0.0039 in.)**

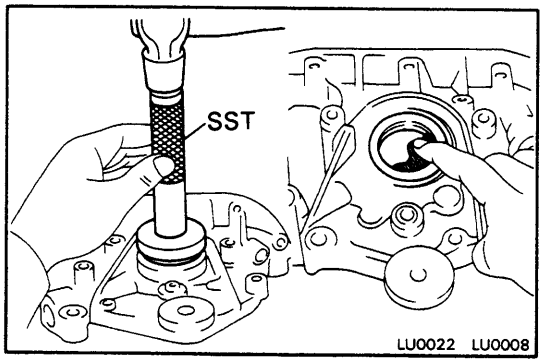
If the clearance is exceeds maximum, replace the gears and/or body.

REPLACEMENT OF OIL SEAL

1. REMOVE OIL SEAL

Using a screwdriver, pry out the oil seal.



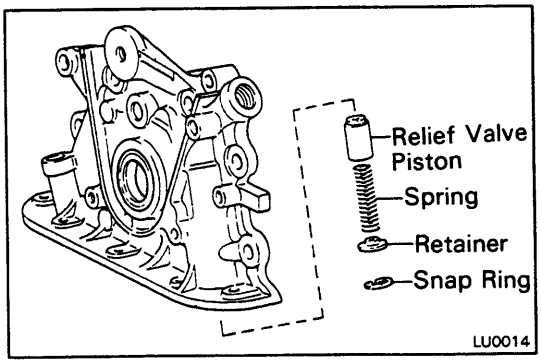


2. INSTALL OIL SEAL

(a) Using SST, drive in a new oil seal.

SST 09517-30010

(b) Apply MP grease to the oil seal.



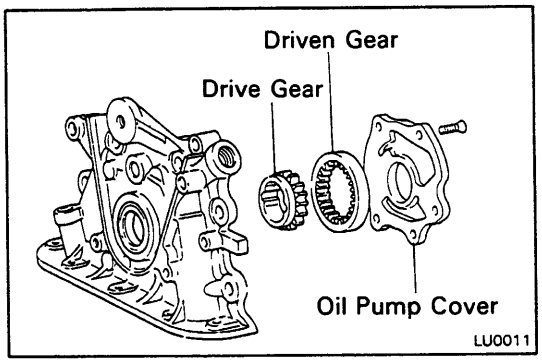
ASSEMBLY OF OIL PUMP

(See page LU-4)

1. INSTALL RELIEF VALVE

(a) Insert the relief valve piston, spring and retainer into the pump body.

(b) Using snap ring pliers, install the snap ring.

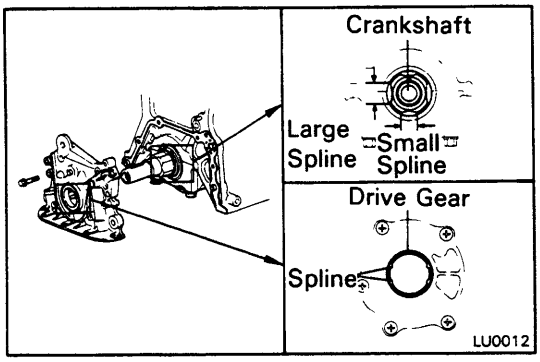


2. INSTALL DRIVE AND DRIVEN GEARS

(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 N·m)



INSTALLATION OF OIL PUMP

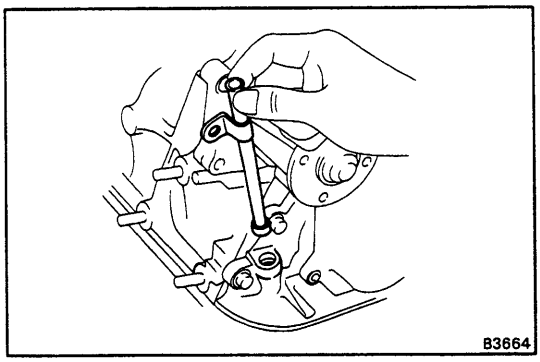
1. INSTALL OIL PUMP

(a) Install a new gasket to the block.

(b) Install the oil pump to the crankshaft with the spline 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 N·m)



2. INSTALL OIL LEVEL GAUGE GUIDE AND GAUGE

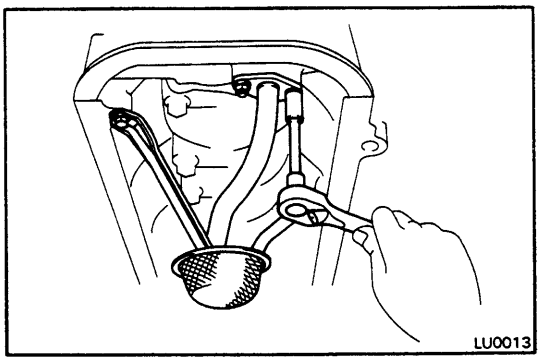
(a) Push in the oil level gauge guide with a new O-ring coated with a small amount of engine oil.

(b) Install the O-ring to the oil level gauge guide.

(c) Insert the oil level gauge guide.

(d) Install the mount bolt.

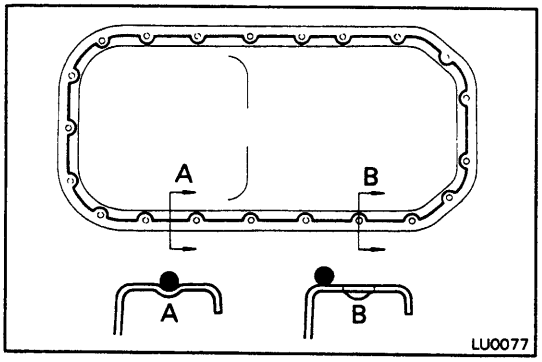
(e) Insert the oil level gauge.



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 N·m)



4. INSTALL OIL PAN

(a) Remove any old 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 loose 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.

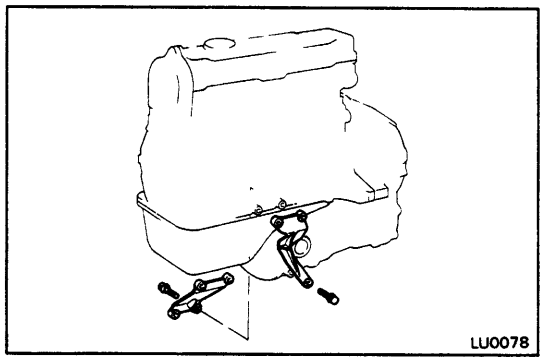
- Install a nozzle that has been cut to a 5mm (0.20 in.) opening.

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) Install the oil pan with the nineteen bolts and two nuts.

Torque: 55 kg-cm (48 in.-lb, 5.4 N·m)



(d) Install 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

	Page
PRECAUTIONS	IG-2
TROUBLESHOOTING	IG-2
ON-VEHICLE INSPECTION	IG-3
INTEGRATED IGNITION ASSEMBLY (IIA)	IG-7

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 probe to the service connector of the IIA.**
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 terminals 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	Possible 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 explosion (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

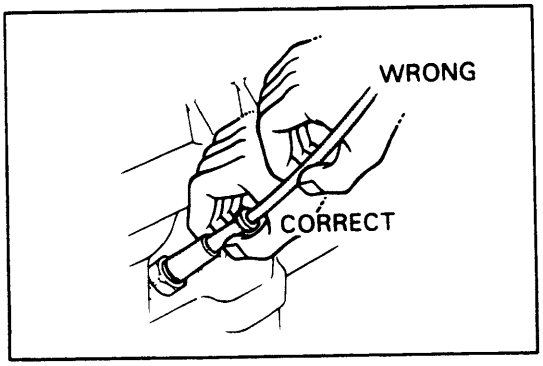
ON-VEHICLE INSPECTION

SPARK TEST

NOTE: Perform this test to check that there is voltage from the IIA to each spark plug.

CRANK ENGINE AND CHECK THAT LIGHT FLASHES

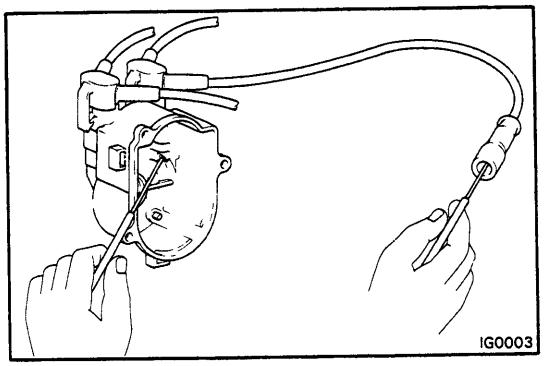
Connect a timing light to the spark plug. If the timing light does not flash, check the wiring connections, ignition coil, igniter and distributor.



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.

Maximum resistance: 25 kΩ/per cord

If resistance is more than maximum, check the terminals. 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.

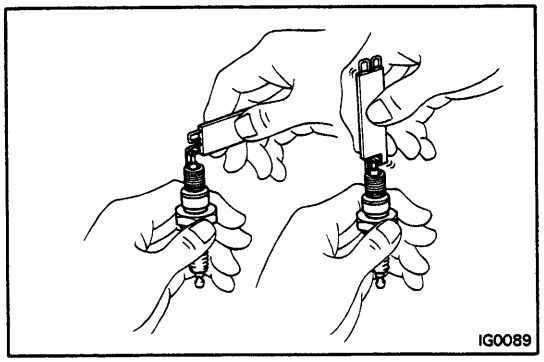
ND W14EXR-U11 or W16EXR-U11
NGK BPR4EY11 or BPR5EY11

Calif. & Canada 3A-C (ex. Wagon M/T)

ND W16EXR-U11
NGK BPR5EY11

Canada 3A-C (Wagon 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.

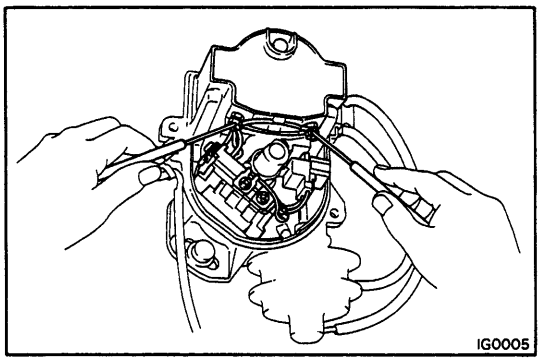
Correct electrode gap:

3A-C (ex. Canada Wagon 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 N·m)

INSPECTION OF IGNITION COIL

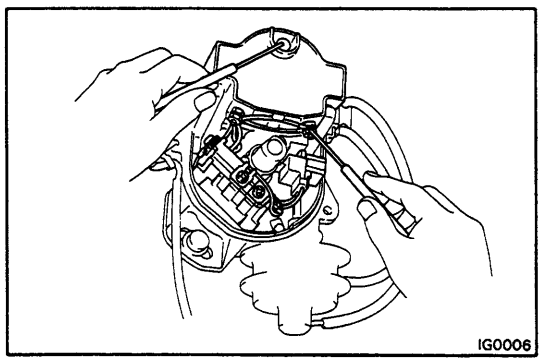


1. INSPECT PRIMARY COIL RESISTANCE

Using an ohmmeter, measure the resistance between the positive (+) and negative (−) terminals.

Primary coil resistance (cold):

3A-C (ex. Canada Wagon M/T)
0.3 − 0.5 Ω
Others 1.2 − 1.5 Ω

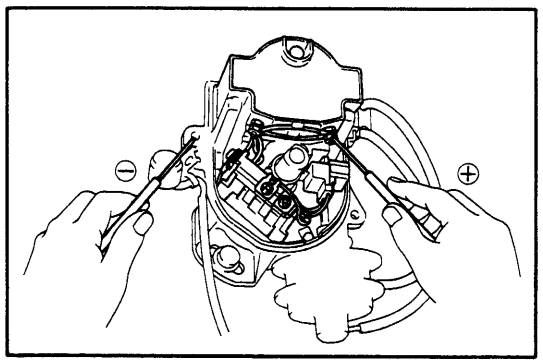


2. INSPECT SECONDARY COIL RESISTANCE

Using an ohmmeter, measure the resistance between the positive (+) terminal and high-tension terminal.

Secondary coil resistance (cold): 7.5 − 10.5 kΩ

INSPECTION OF IGNITER

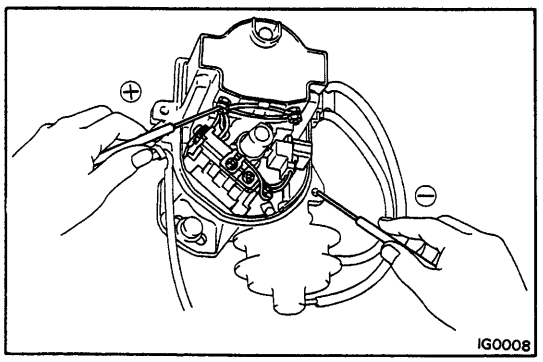


1. TURN IGNITION SWITCH "ON"

2. INSPECT POWER SOURCE LINE VOLTAGE

Using a voltmeter, connect the positive (+) probe to the ignition coil positive (+) terminal and the negative (−) probe to the body ground.

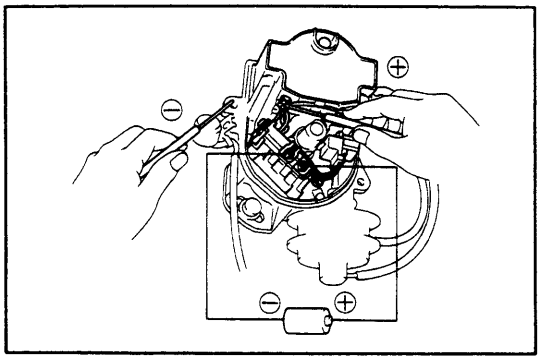
Voltage: Approx. 12 V



3. INSPECT POWER TRANSISTOR IN IGNITER

(a) Using a voltmeter, connect the positive (+) probe to the negative (−) terminal of the ignition coil, and the negative (−) probe 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 (+) probe to the negative (−) terminal of the ignition coil, and the negative (−) probe to the body ground.

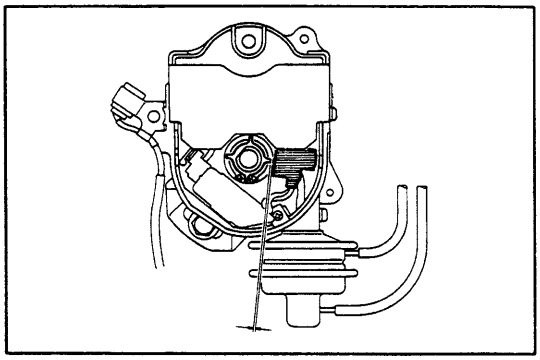
(d) Check the voltage reading.

Voltage:

3A-C (ex. Canada 4WD Wagon M/T)
5 V — Less than battery voltage
Others 0 — 3 V

If there is a problem, replace the igniter.

4. TURN IGNITION SWITCH "OFF"

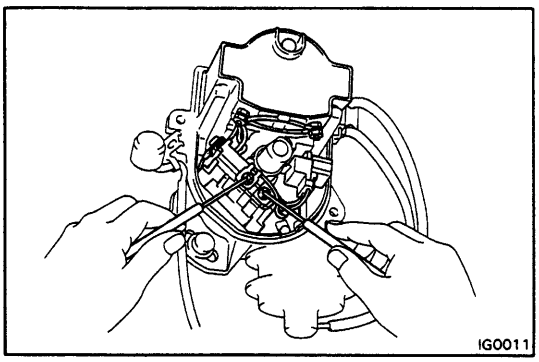


INSPECTION OF IIA

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.)

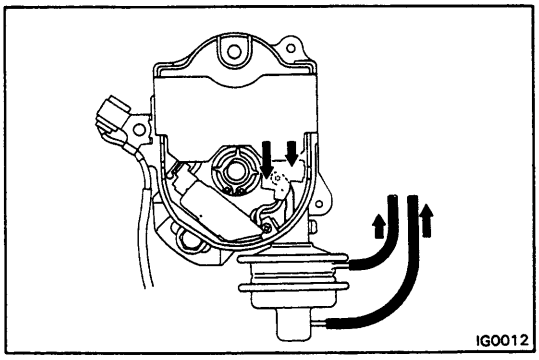


2. INSPECT PICK-UP COIL

Using an ohmmeter, measure the resistance of the pick-up coil.

Pickup coil resistance: 130 — 190 Ω

If the resistance is not correct, replace the pick-up coil and the breaker assembly.

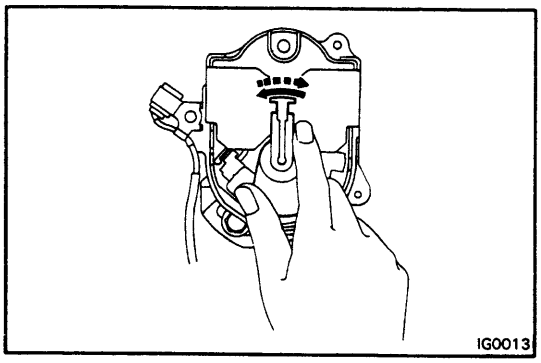


3. INSPECT VACUUM ADVANCE

(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.



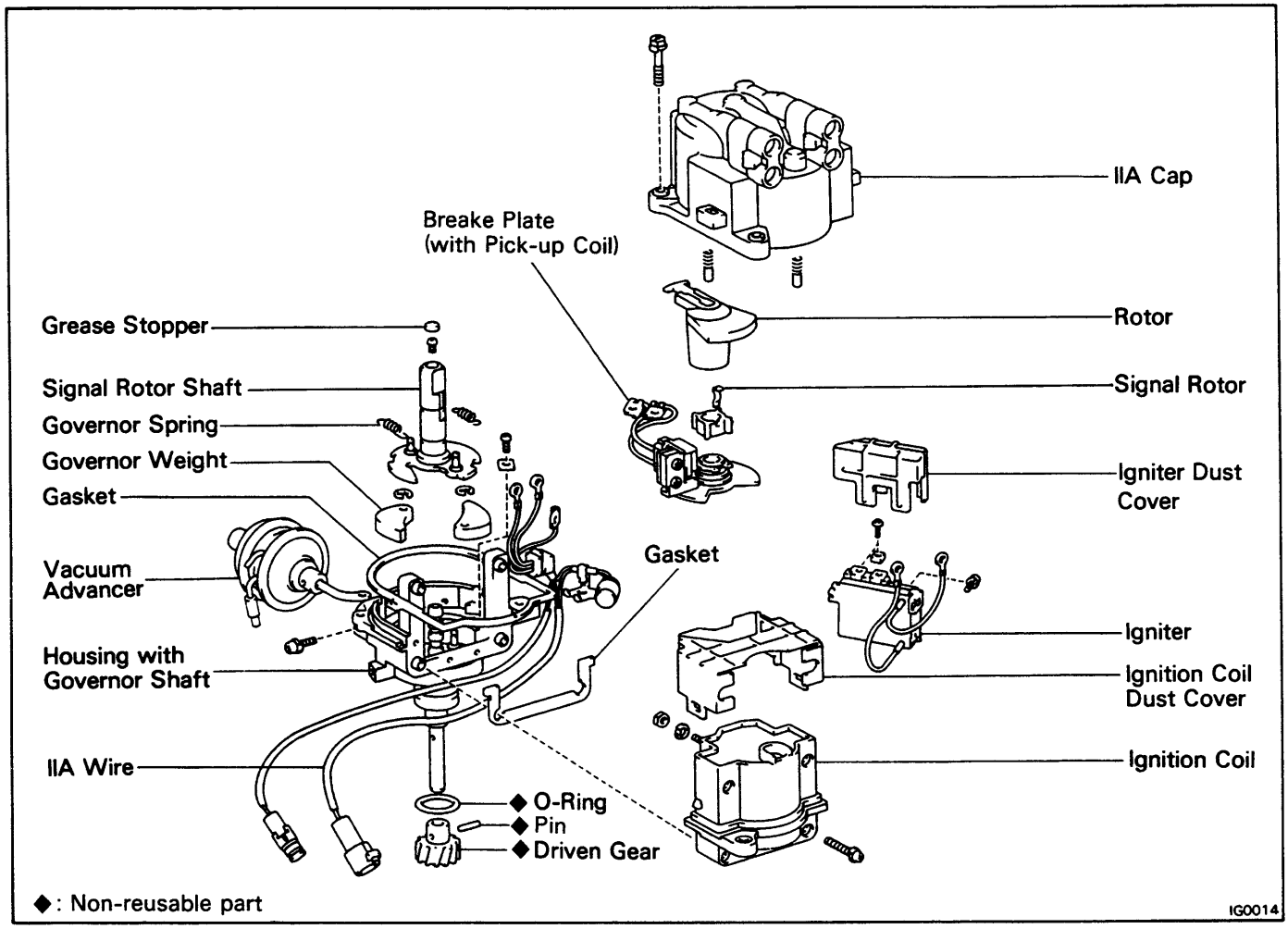
4. INSPECT GOVERNOR ADVANCE

(a) Turn the rotor shaft counterclockwise, release it and check that the rotor returns slightly clockwise.

(b) Check that the rotor shaft is not excessively loose.

INTEGRATED IGNITION ASSEMBLY (IIA)

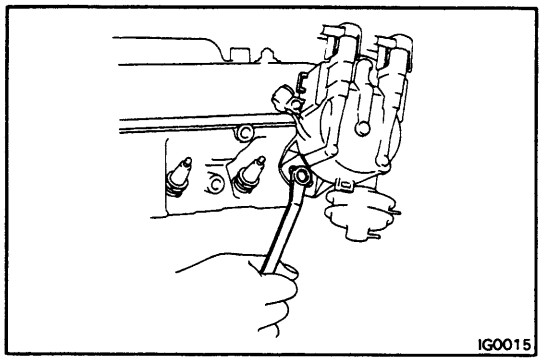
COMPONENTS



REMOVAL OF IIA

1. **DISCONNECT CABLE FROM NEGATIVE TERMINAL OF BATTERY**
2. **DISCONNECT IIA WIRE CONNECTOR**
3. **DISCONNECT HOSES FROM VACUUM ADVANCER**
4. **DISCONNECT HIGH-TENSION CORDS FROM SPARK PLUGS.**

   NOTE: Do not remove the cords from the IIA cap.



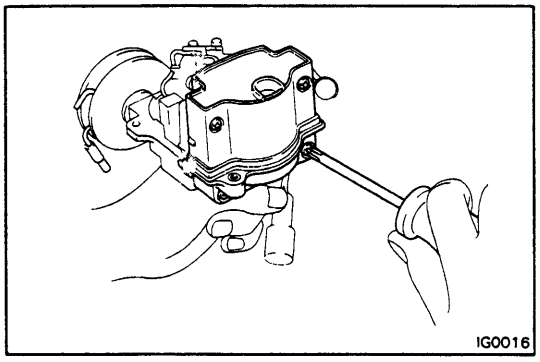
5. **REMOVE IIA**

   Remove the mount bolt and pull out the IIA.

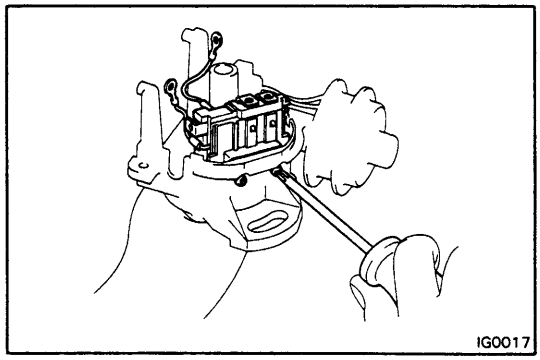
DISASSEMBLY OF IIA

(See page IG-7)

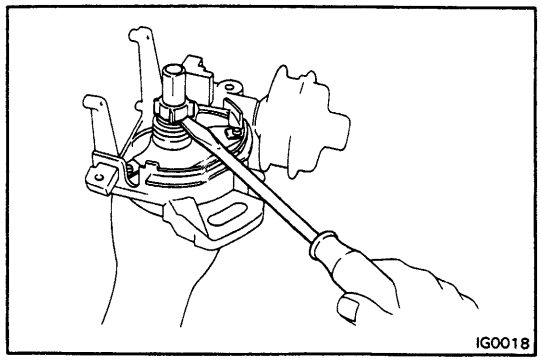
1. REMOVE IIA CAP AND ROTOR
2. REMOVE IGNITER DUST COVER
3. REMOVE IGNITION COIL DUST COVER



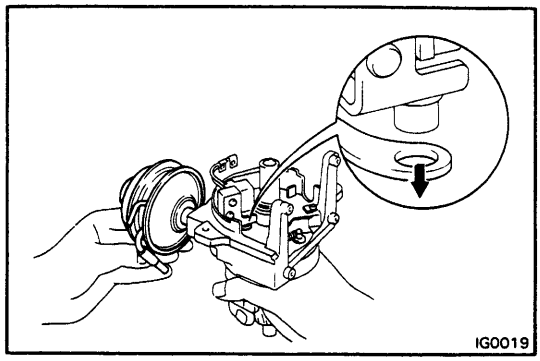
4. REMOVE IGNITION COIL
   (a) Remove the nuts and disconnect the wires from the terminals of the ignition coil.
   (b) Remove the four screws and ignition coil.
5. REMOVE IIA WIRE AND CONDENSER



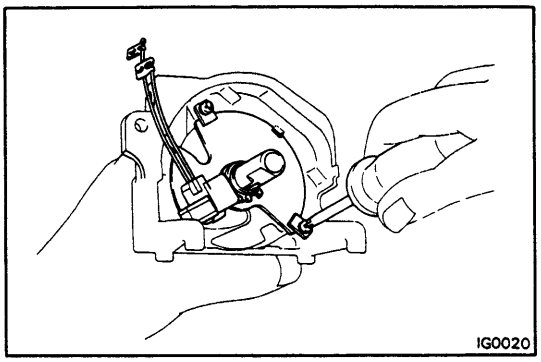
6. REMOVE IGNITER
   (a) Remove the screws and nuts, and disconnect the wires from the terminals of the igniter.
   (b) Remove the two screws and igniter.



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 plate pin and remove the advancer.

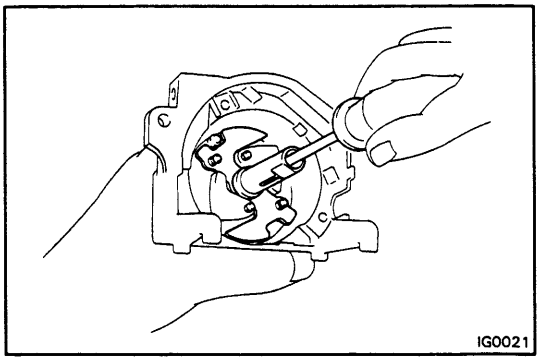


9. REMOVE BREAKER PLATE

(a) Remove the two screws and plate washers.

(b) Remove the breaker plate.

10. REMOVE GOVERNOR SPRINGS

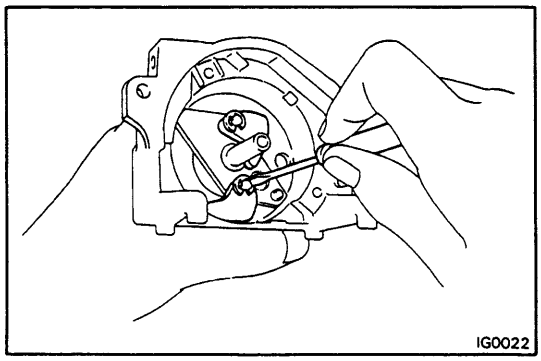


11. REMOVE SIGNAL ROTOR SHAFT

(a) Remove the grease stopper.

(b) Remove the screw at the end of the governor shaft.

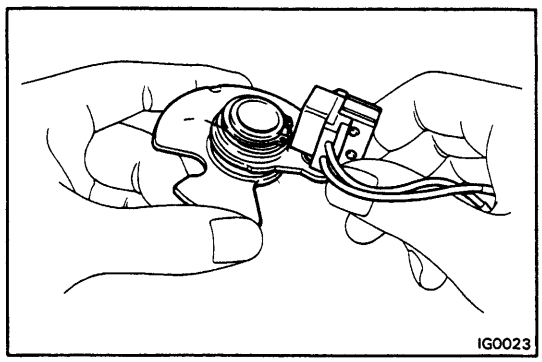
(c) Pull out the signal rotor shaft.



12. REMOVE GOVERNOR WEIGHTS

Using a small screwdriver, remove the E-rings and pull out the weights.

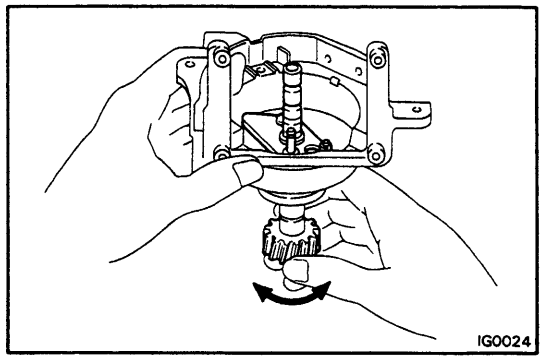
INSPECTION OF IIA



1. INSPECT BREAKER PLATE

Turn the breaker plate and check that it has a slight drag.

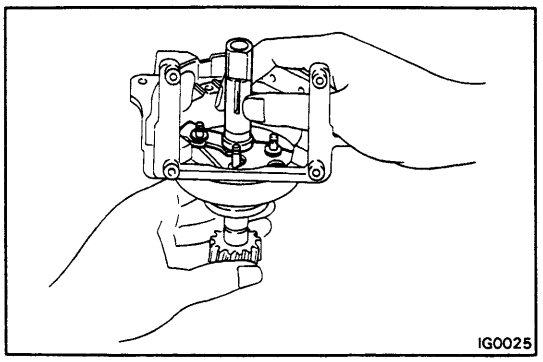
If it sticks or has a strong resistance replace the breaker plate and the pick-up coil assembly.



2. INSPECT GOVERNOR SHAFT BEARING

Turn the governor shaft and check that the bearing is not rough or worn.

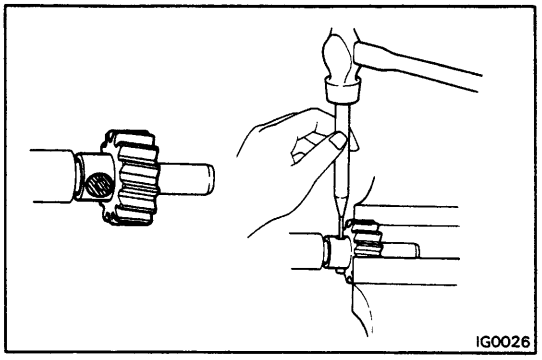
If it feels rough or worn, replace the IIA.



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 IIA.



REPLACEMENT OF DRIVEN GEAR

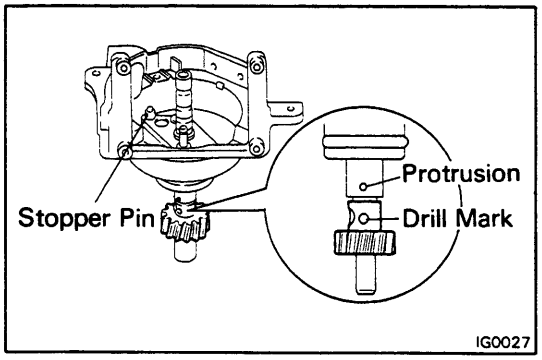
REPLACE DRIVEN GEAR

(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.

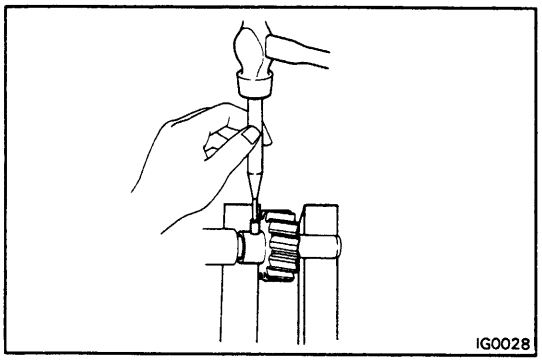
(c) Remove the driven gear.



(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.

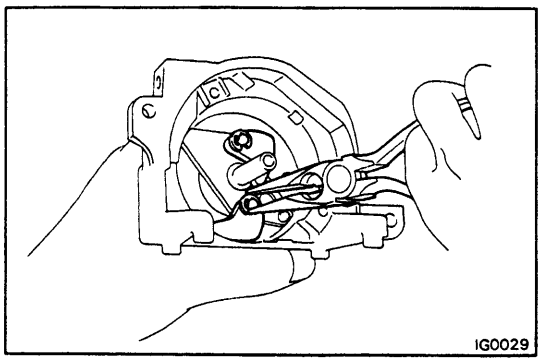
(e) Align the pin holes of the driven gear and governor shaft.



(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.



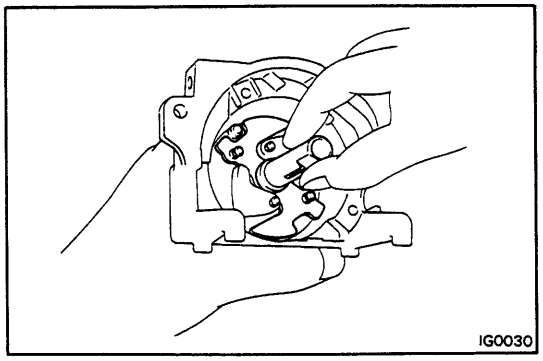
ASSEMBLY OF IIA

(See page IG-7)

1. INSTALL GOVERNOR WEIGHTS

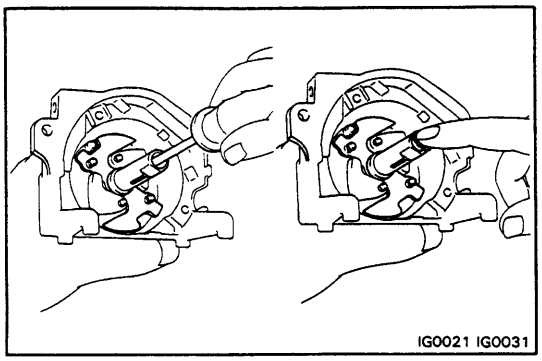
Using needle-nose pliers, install the weights with the E-rings.

2. LIGHTLY COAT GOVERNOR SHAFT WITH HIGH-TEMPERATURE GREASE



3. INSTALL SIGNAL ROTOR SHAFT

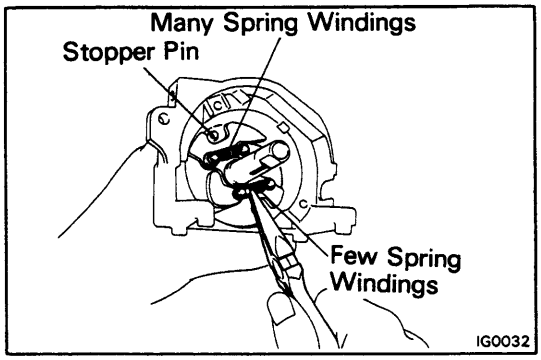
(a) Install the signal rotor shaft on the governor shaft as shown.



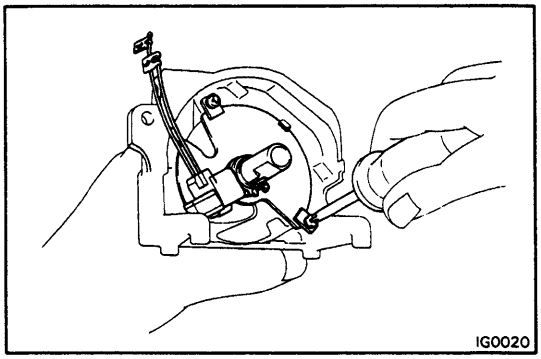
(b) Install the screw.

(c) Pack high-temparature grease into the shaft.

(d) Push on the grease stopper with your finger.



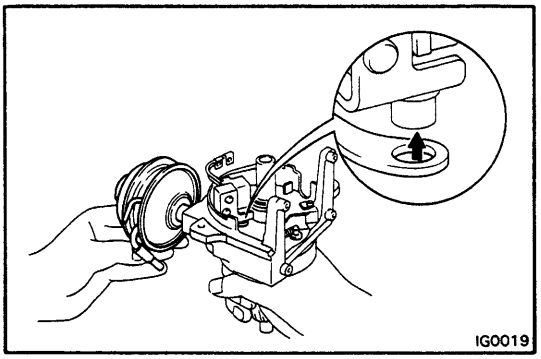
4. INSTALL GOVERNOR SPRINGS



5. INSTALL BREAKER PLATE

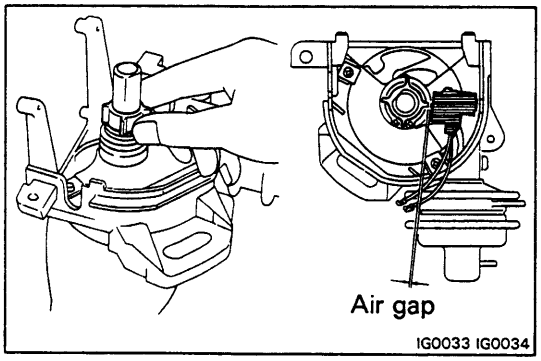
(a) Align the cutout parts of the breaker plate and housing, and install the breaker plate.

(b) Secure the breaker plate with the two plate washers and screws.



6. INSTALL VACUUM ADVANCER

Connect the advancer link hole to the breaker plate pin and install the advancer with the screw.



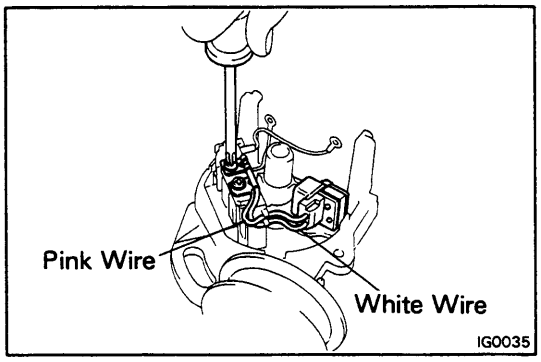
7. INSTALL SIGNAL ROTOR

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.

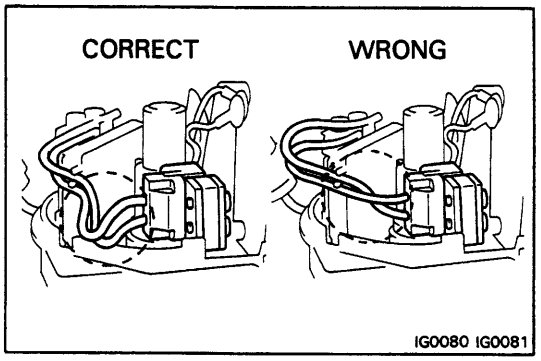
Air gap: 0.2 – 0.4 mm (0.008 – 0.016 in.)



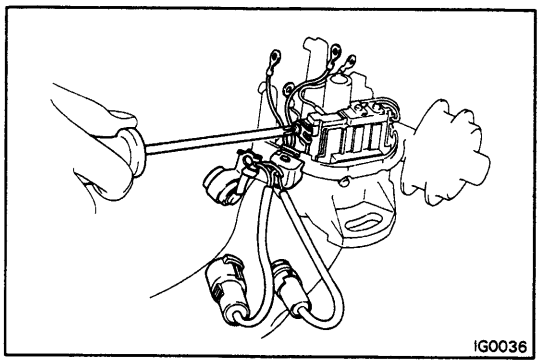
9. INSTALL IGNITER

(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.



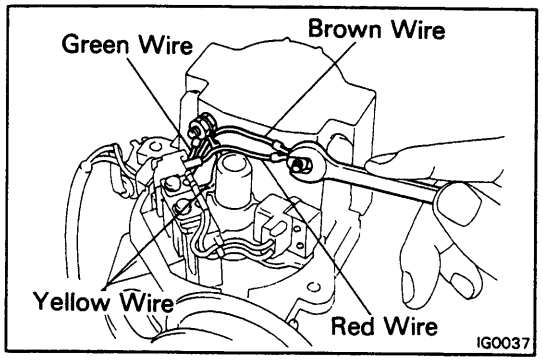
(c) As shown in the figure, secure the pick-up coil wires in the clips, allowing sufficient slack.



10. INSTALL IIA 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.



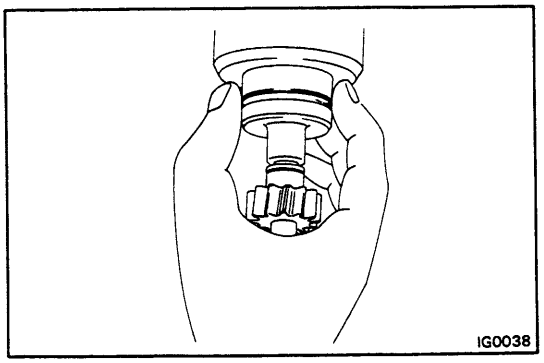
11. INSTALL IGNITION COIL

(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

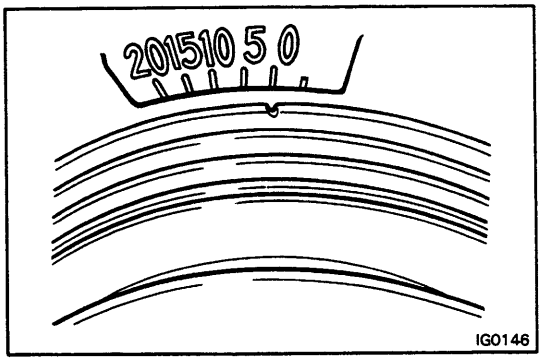
(a) Install the rotor.

(b) Place a new gasket and the cap in position.

(c) Install the condenser and three screws.

15. INSTALL NEW O-RING TO IIA HOUSING

NOTE: Lightly coat the O-ring with engine oil.



INSTALLATION OF IIA

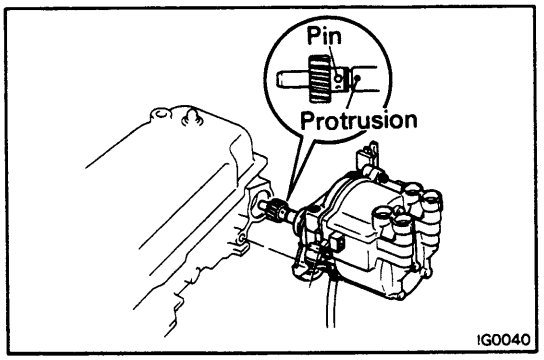
1. SET NO. 1 CYLINDER TO TDC/COMPRESSION

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 rotate 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) Install the No. 1 spark plug.



2. INSTALL IIA

(a) Coat the spiral gear and governor shaft tip with engine oil.

(b) Align the protrusion on the housing with the pin of the spiral gear drill mark side.

(c) Insert the IIA, 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

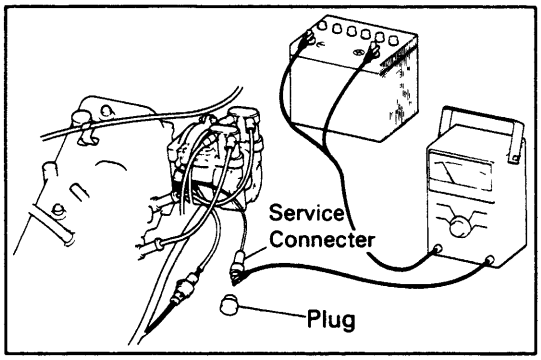
Firing order: 1 — 3 — 4 — 2

4. CONNECT HOSES TO VACUUM ADVANCER

5. CONNECT IIA WIRE CONNECTOR

6. CONNECT CABLE TO NEGATIVE TERMINAL OF BATTERY

7. START ENGINE



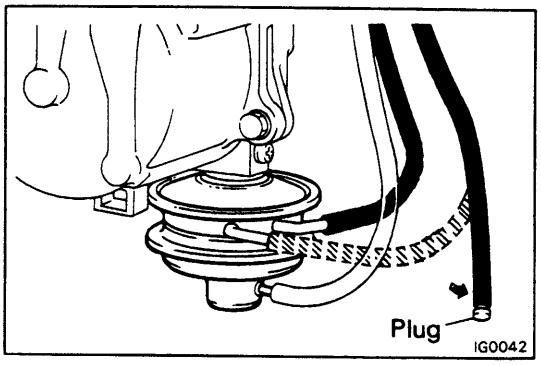
8. CONNECT ENGINE TACHOMETER

Remove the rubber cap and connect the test probe of a tester to the service connecter of the IIA.

CAUTION:

(1) NEVER allow the ignition coil terminals to touch ground as it could result in damage to the igniter and/or ignition coil.

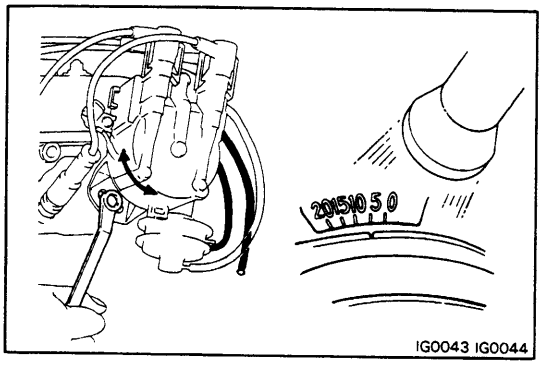
(2) It is recommended that you consult with the manufacturer before using a tachometer as some are not compatible with this system.



9. ADJUST IGNITION TIMING

(a) (3A-C)

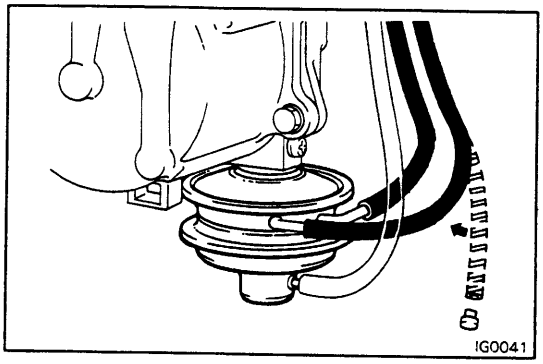
Disconnect the hose from the vacuum advancer sub-diaphragm and plug the hose ends.



(b) Using a timing light, slowly turn the IIA until the timing mark on the crankshaft pulley is aligned with the 5° mark. Tighten the IIA 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

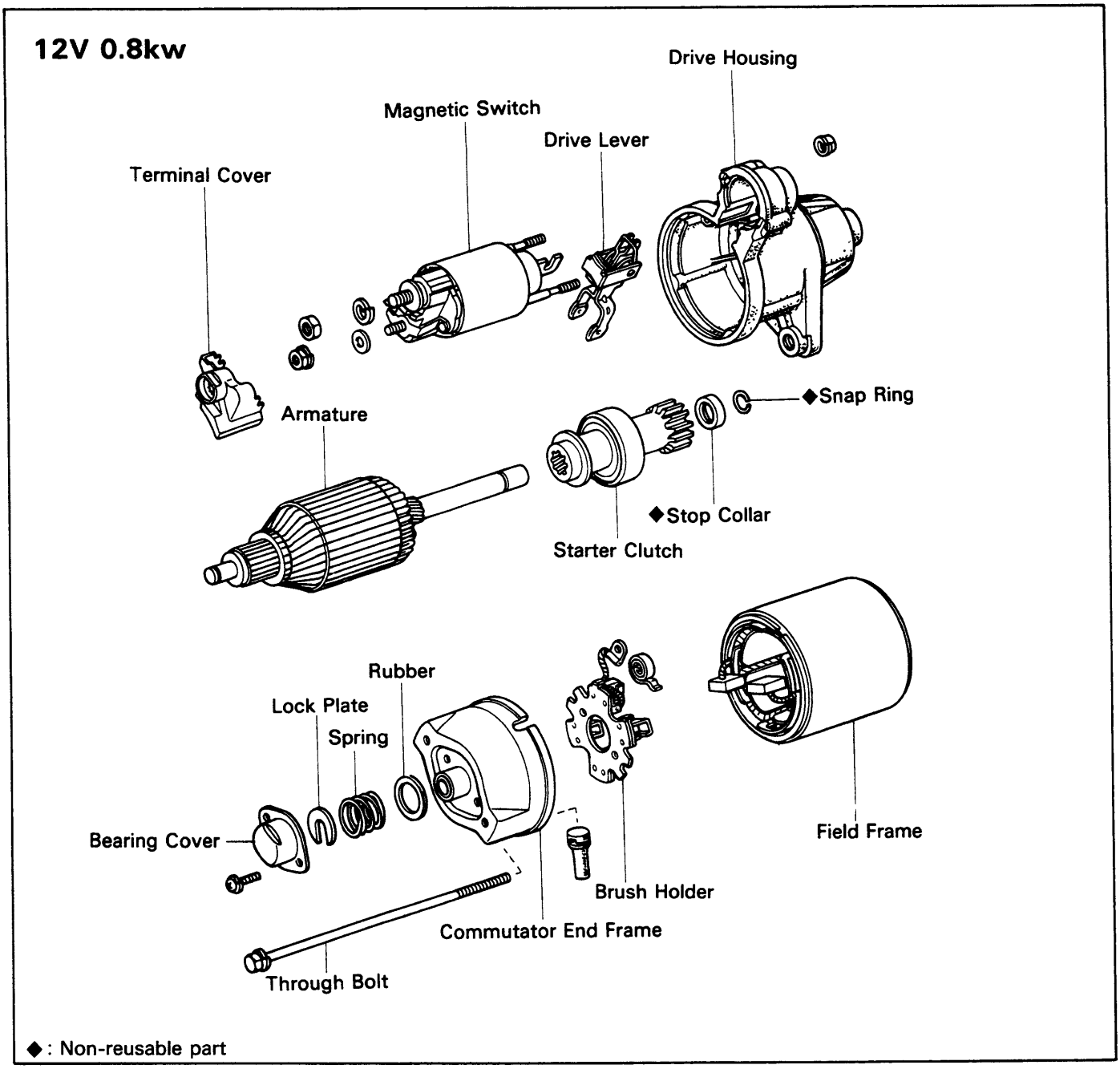
	Page
TROUBLESHOOTING	ST-2
CONVENTIONAL STARTER	ST-3
REDUCTION TYPE STARTER	ST-11

TROUBLESHOOTING

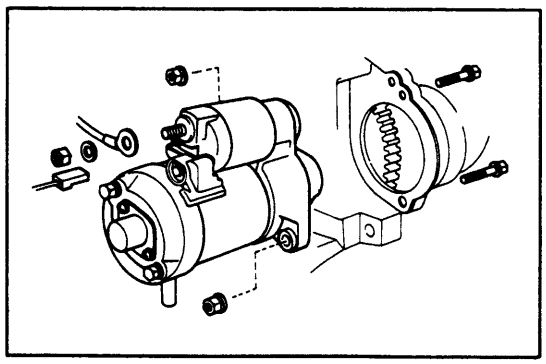
Problem	Possible cause	Remedy	Page
Engine will not crank	Battery charge low	Check battery specific gravity Charge or replace battery	CH-4
	Battery cables loose, corroded or worn	Repair or replace cables	
	Neutral start switch faulty (auto. trans.)	Replace switch	
	Fusible link blown	Replace fusible link	
	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 loose, 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



REMOVAL OF CONVENTIONAL STARTER



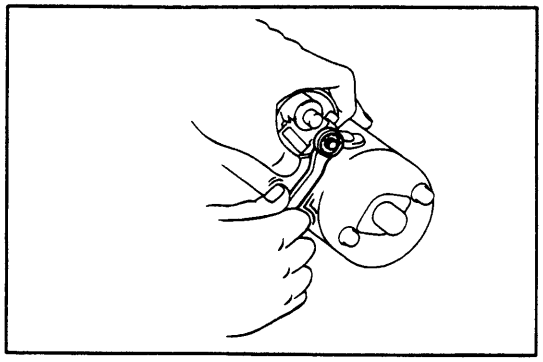
1. **DISCONNECT CABLE FROM NEGATIVE TERMINAL OF BATTERY**

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.



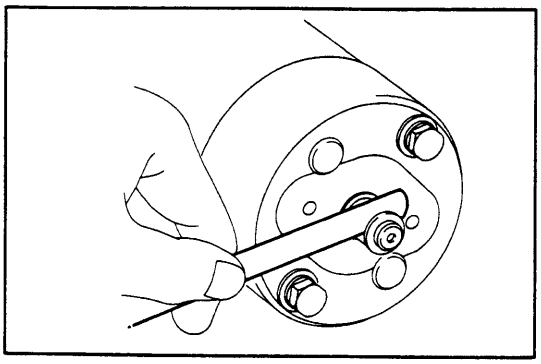
DISASSEMBLY OF CONVENTIONAL STARTER

(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.

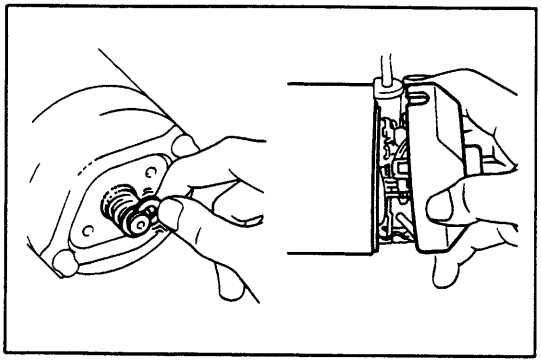


2. REMOVE END FRAME

(a) Remove the bearing cover.

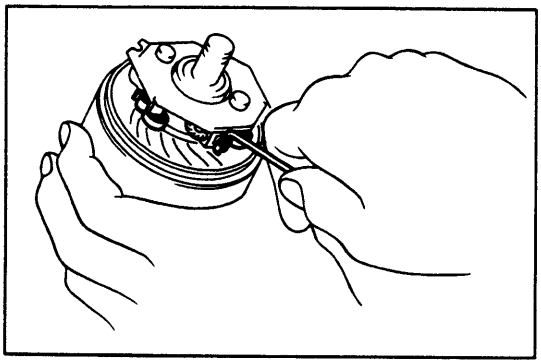
(b) Using a feeler gauge, check the armature shaft thrust clearance between the lock plate and end frame.

Thrust clearance: 0.05 – 0.60 mm (0.0020 – 0.0236 in.)



(c) Remove the lock plate, spring and rubber.

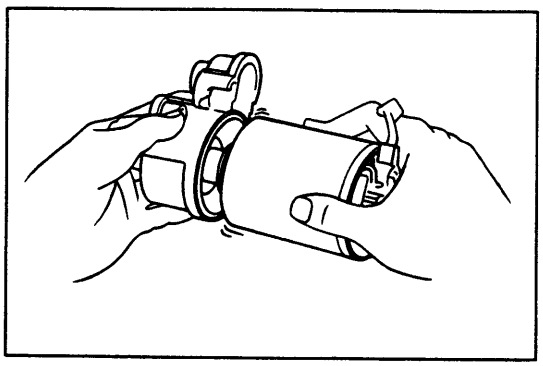
(d) Remove the two through bolts and pull out the commutator end frame.



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) Pull the brush holder off the armature.



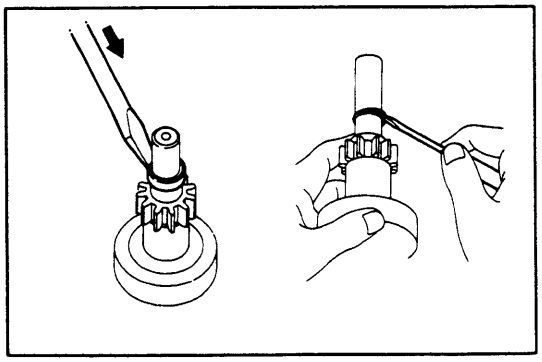
4. REMOVE FIELD FRAME FROM DRIVE HOUSING

Pull apart by hand.

5. REMOVE ARMATURE

(a) Remove the drive lever from the drive housing.

(b) Pull the armature from the drive housing.

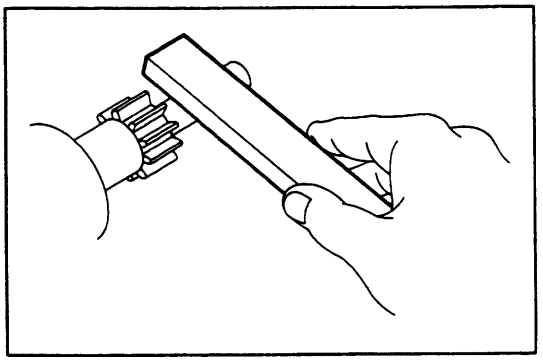


6. REMOVE STARTER CLUTCH

(a) Using a screwdriver, tap in the stop collar.

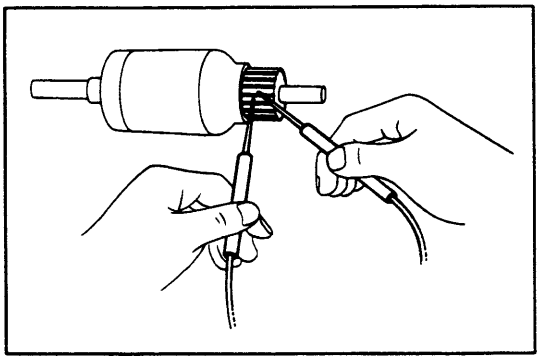
(b) Using a screwdriver, pry off the snap ring.

(c) Remove the collar from the shaft.



(d) If the pinion was difficult to pull out, smooth out the shaft with an oil stone.

(e) Remove the starter clutch.



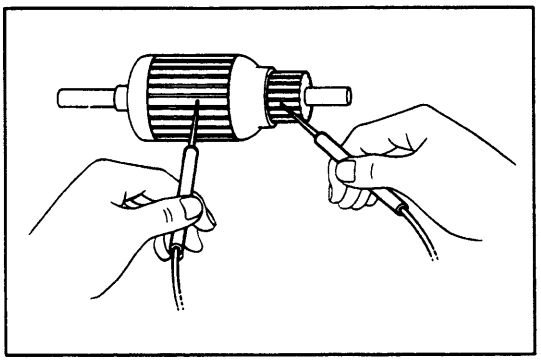
INSPECTION OF CONVENTIONAL STARTER

Armature Coil

1. INSPECT COMMUTATOR FOR OPEN CIRCUIT

Using an ohmmeter, check that there is continuity between the segments of the commutator.

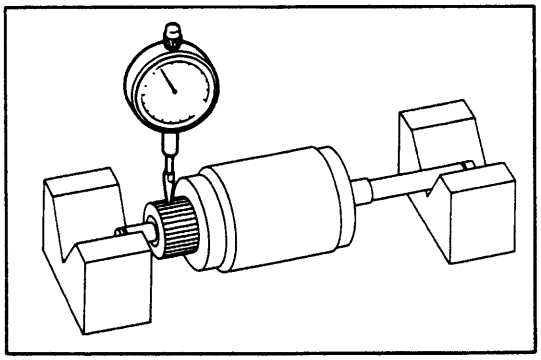
If there is no continuity, replace the armature.



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

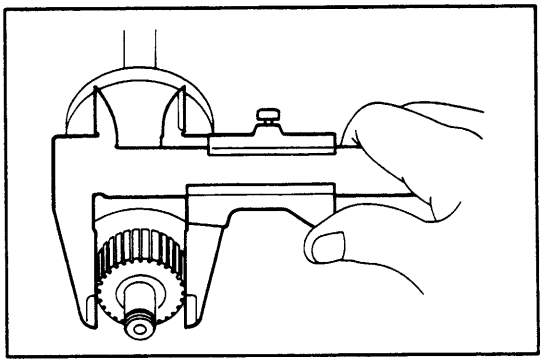
1. INSPECT COMMUTATOR FOR DIRTY AND BURNT SURFACES

If surface is dirty or burnt, correct with sandpaper (No. 400) or a lathe.

2. INSPECT COMMUTATOR RUNOUT

Maximum runout: 0.4 mm (0.016 in.)

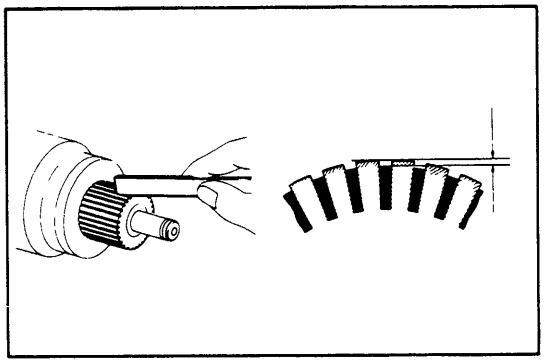
If runout is exceeds maximum, correct with a lathe.



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.



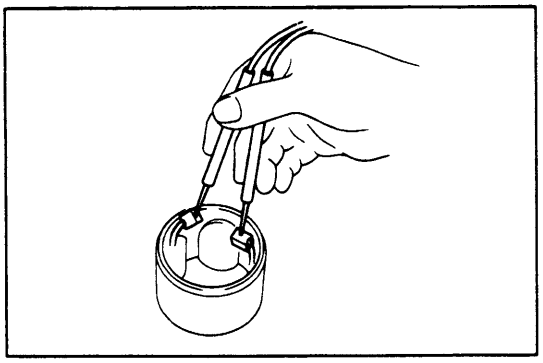
4. INSPECT SEGMENT

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.

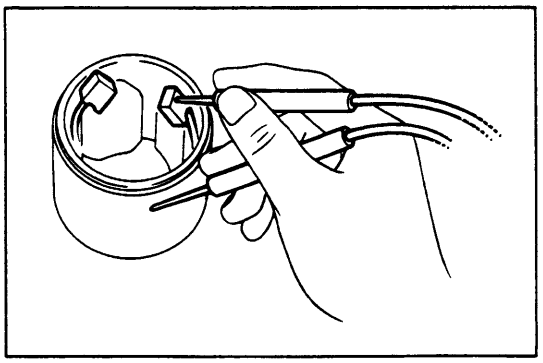
Field Coil (Field Frame)



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.

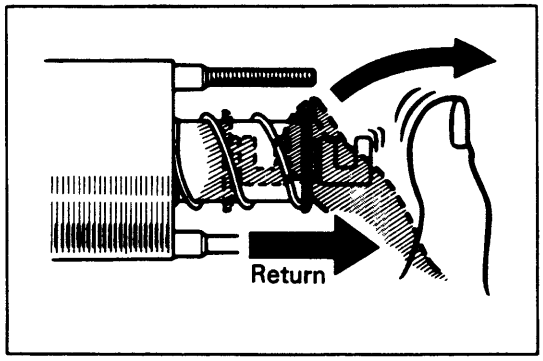


2. INSPECT FIELD COIL FOR GROUND

Using an ohmmeter, check that there is continuity between the field coil end and field frame.

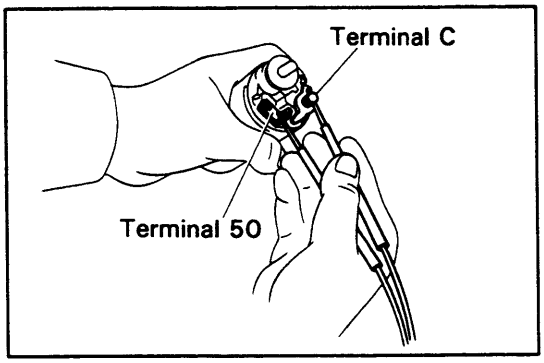
If there is continuity, replace the field coil.

Magnetic Switch



1. CHECK PLUNGER

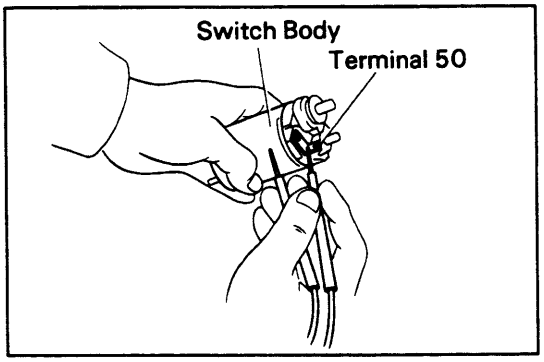
Push in the plunger and release it. Check that it returns quickly to its original position.



2. PERFORM PULL-IN COIL OPEN CIRCUIT TEST

Using an ohmmeter, check that there is continuity between terminals 50 and C.

If there is no continuity, replace the magnetic switch.

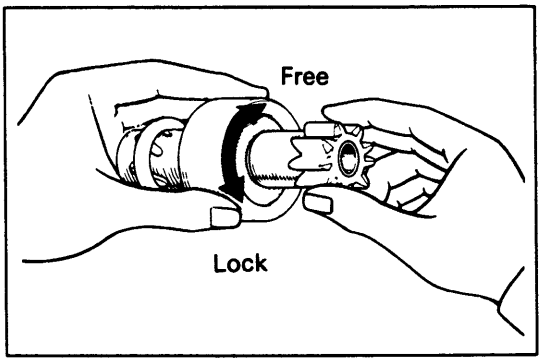


3. PERFORM HOLD-IN COIL OPEN CIRCUIT TEST

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

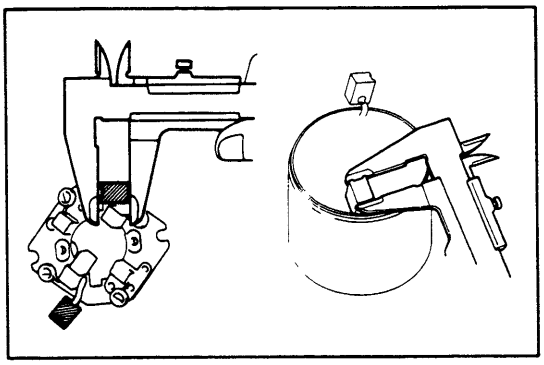
Inspect the pinion gear and spline teeth for wear or damage.

If damaged, replace and also inspect the flywheel 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.

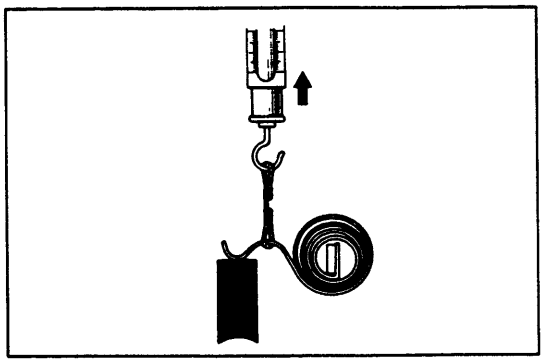


Brushes

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.



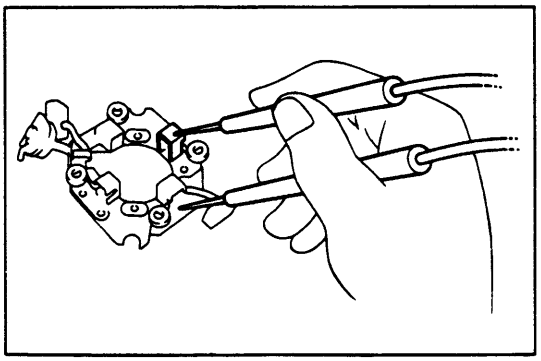
Brush Springs

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 pull scale reading at the very instant the brush spring separates from the brush.

If the reading is below standard, replace the brush springs.

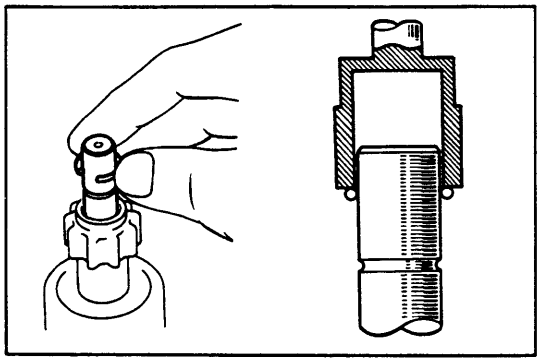


Brush Holder

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

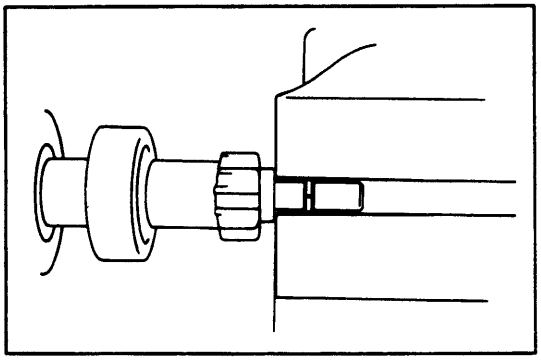
(See page ST-3)

NOTE: Use high-temperature grease to lubricate the bearings and sliding parts when assemblying the starter.

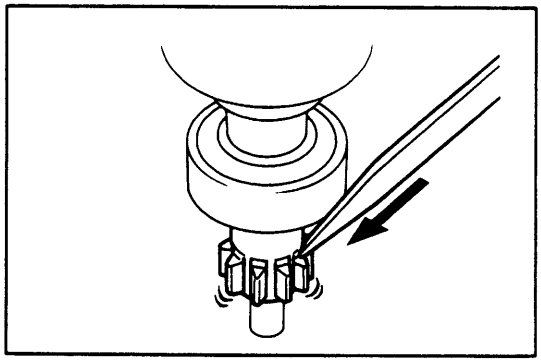
1. ASSEMBLE STARTER CLUTCH TO ARMATURE

(a) Place a new stop collar on the armature.

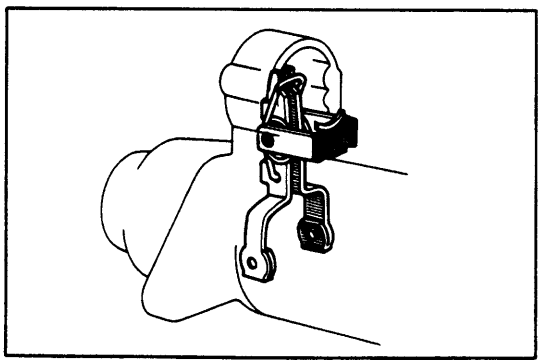
(b) Drive in new snap ring with a 14 mm (0.55 in.) socket wrench, and then fit it into the shaft groove.



(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.

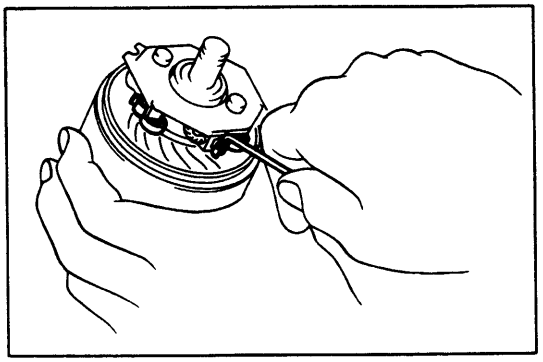


2. ASSEMBLE DRIVE HOUSING, DRIVE LEVER AND FIELD FRAME TO ARMATURE

(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

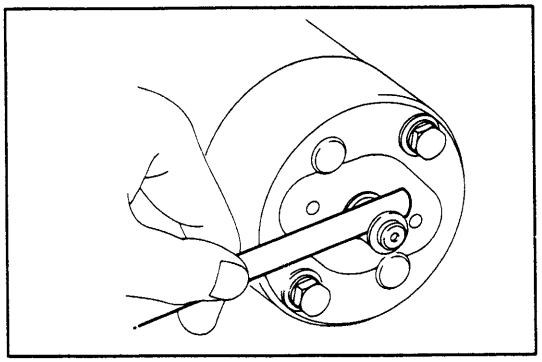
(a) Place the brush holder over the armaute shaft.

(b) Using a piece of steel wire, hold the brush spring back and install the brush in the brush holder. Install 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 it with the two through bolts.



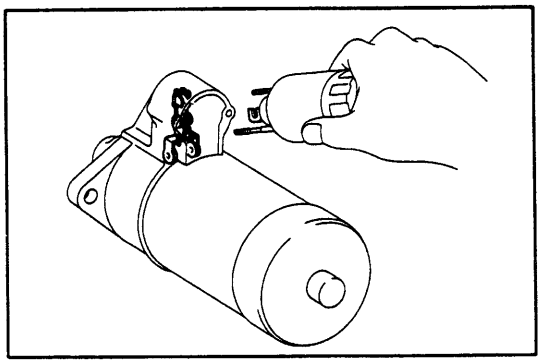
5. INSTALL BEARING COVER

(a) Install the rubber, spring and lock plate.

(b) Using a feeler gauge, measure the armature thrust clearance between the lock plate and end frame.

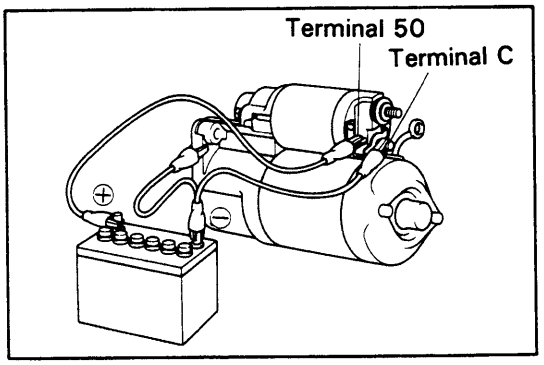
Thrust clearance: 0.05 – 0.60 mm (0.0020 – 0.0236 in.)

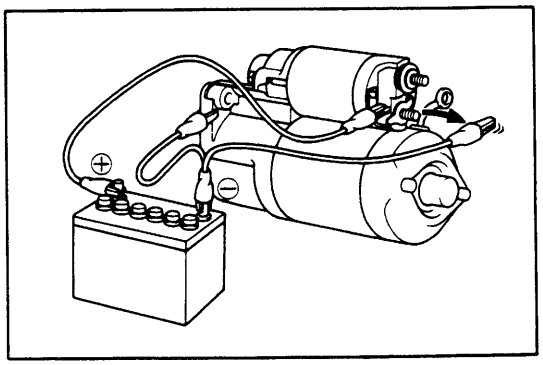
(c) Install the bearing cover with the two screws.



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.

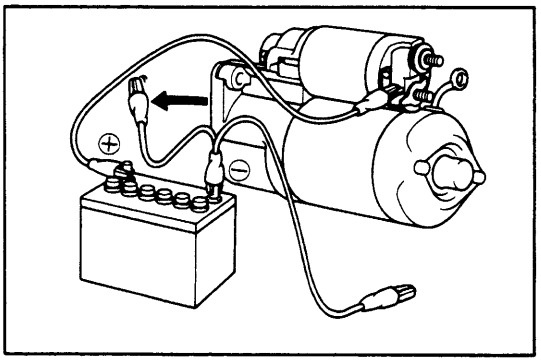
(b) Connect the battery to the magnetic switch as shown. Check that the pinion gear moves outward.

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.

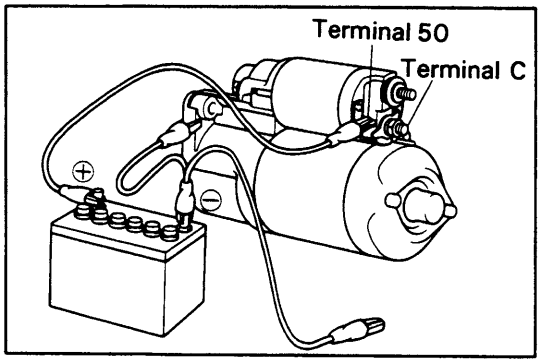
If the pinion gear returns inward, replace the magnetic switch.



3. CHECK PINION GEAR RETURN

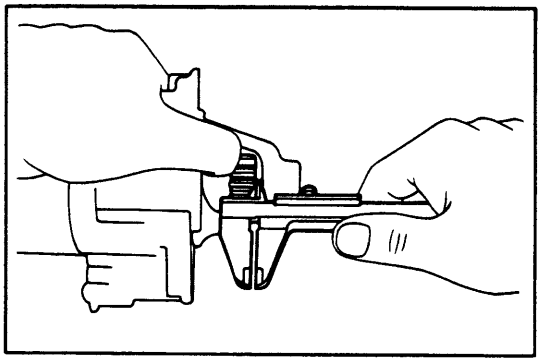
Disconnect the negative (−) lead from the switch body. Check that the pinion returns inward.

If the pinion does not return, replace the magnetic switch.



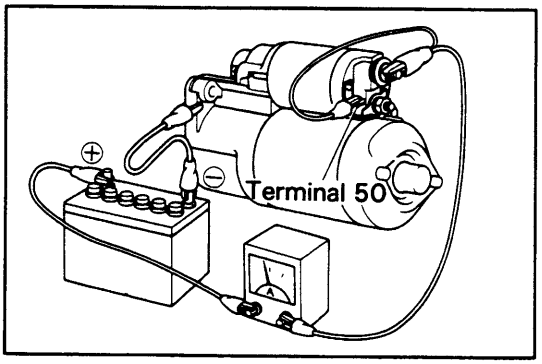
4. CHECK PINION GEAR CLEARANCE

(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.

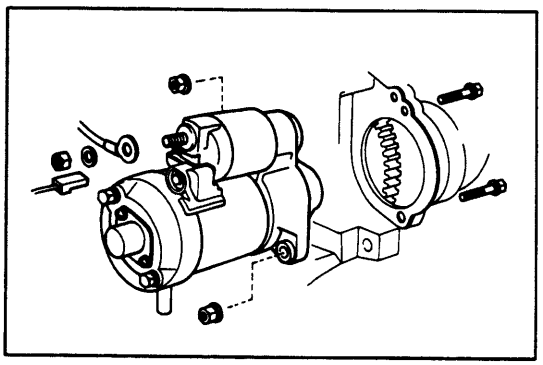
(c) Check that the starter rotates smoothly and steadily with the pinion gear moving out.

(d) Check that the ammeter reads the specified current.

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

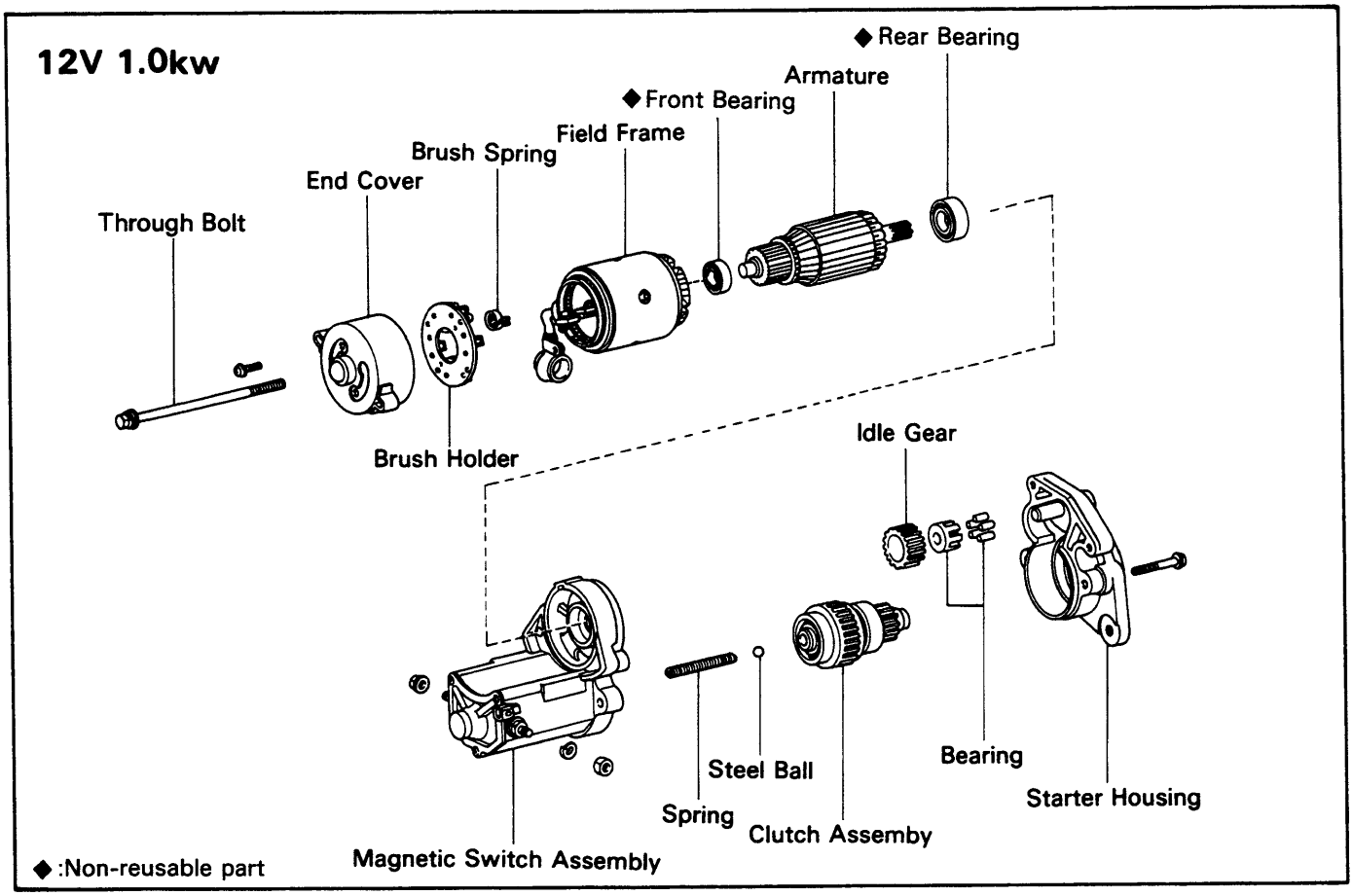
Connect the connector to the terminal on the magnetic switch. Connect the cable from the bettery to the terminal on the switch, and install the nut.

3. CONNECT CABLE TO NEGATIVE TERMINAL OF BATTERY

Check that the car starts.

REDUCTION TYPE STARTER

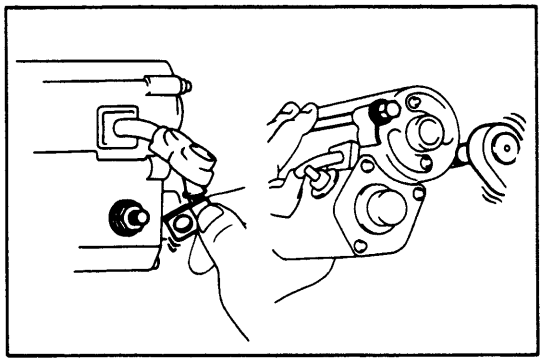
COMPONENTS



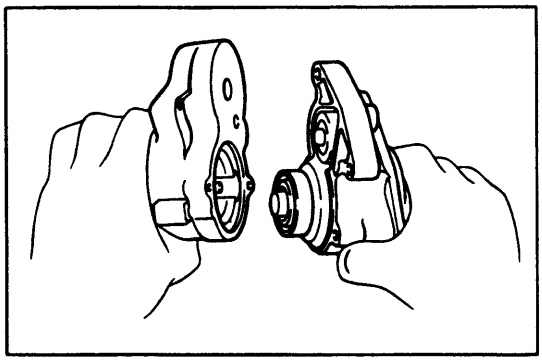
REMOVAL OF REDUCTION TYPE STARTER

(See procedure on page ST-3)

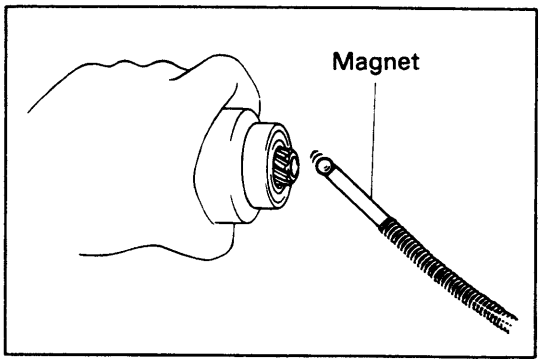
DISASSEMBLY OF REDUCTION TYPE STARTER



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. Pull out the field frame together with the armature from the magnetic switch.



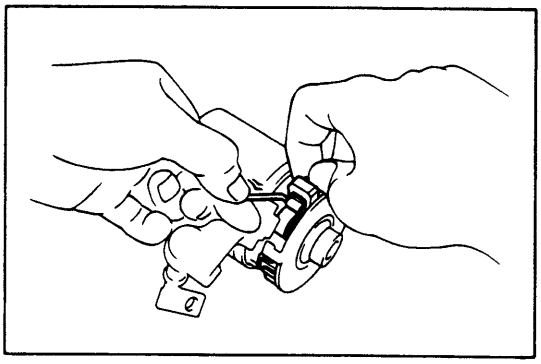
2. **REMOVE STARTER HOUSING FROM MAGNETIC SWITCH ASSEMBLY**
   Remove the two screws and starter housing together with the idler gear and clutch assembly.



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.



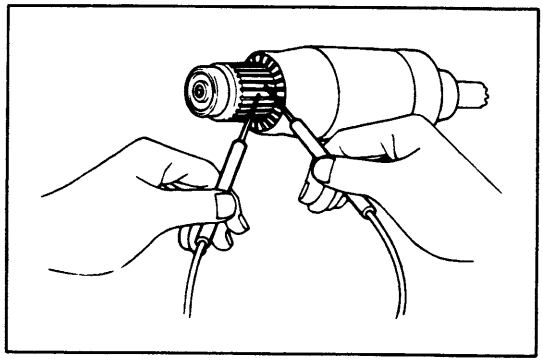
5. **REMOVE BRUSH HOLDER**

(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) Pull the brush holder off the armature.

6. **REMOVE ARMATURE FROM FIELD FRAME**



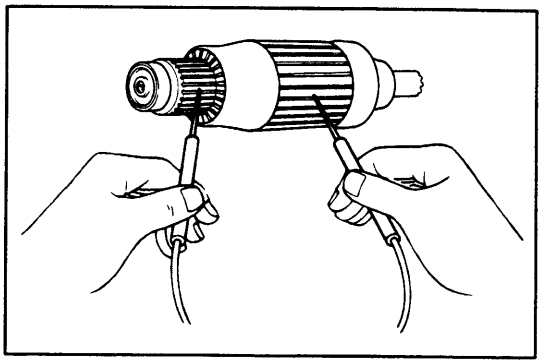
INSPECTION OF REDUCTION TYPE STARTER

Armature Coil

1. **INSPECT COMMUTATOR FOR OPEN CIRCUIT**

Using an ohmmeter, check that there is continuity between the segments of the commutator.

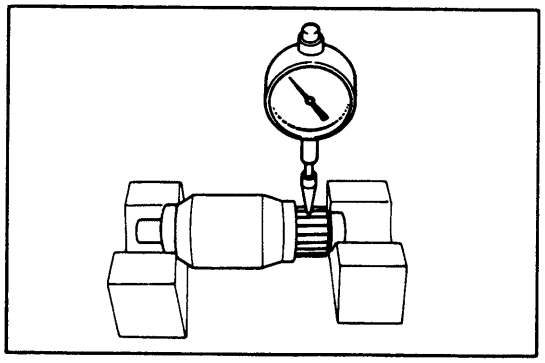
If there is no continuity between any segment, replace the armature.



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

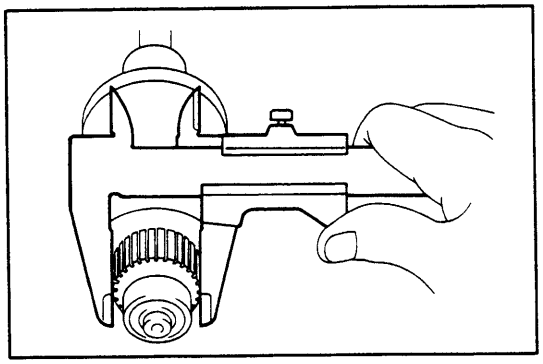
1. **INSPECT COMMUTATOR FOR DIRTY AND BURNT SURFACES**

If the surface is dirty or burnt, correct with sandpaper (No. 400) or a lathe.

2. **INSPECT COMMUTATOR RUNOUT**

Maximum cricle runout: 0.05 mm (0.0020 in.)

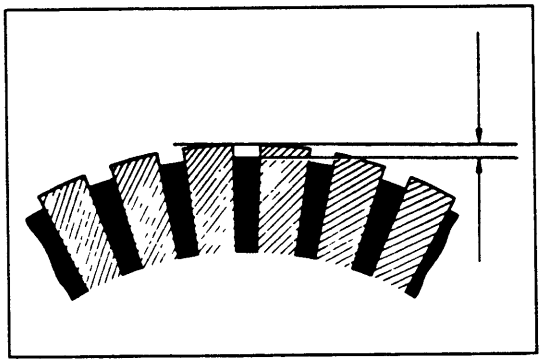
If the circle runout is exceeds maximum, correct with a lathe.



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.



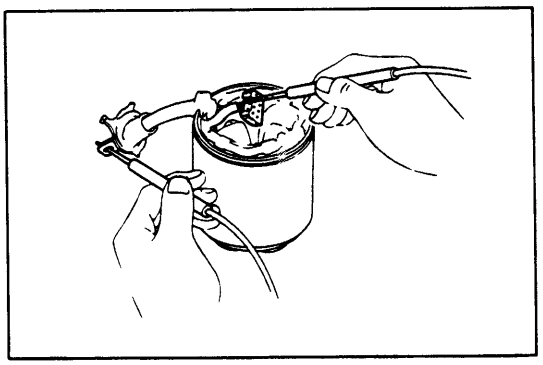
4. **INSPECT SEGMENT**

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.

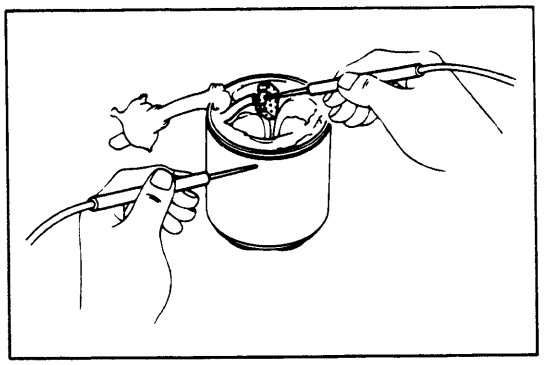
Field Coil (Field Frame)



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.

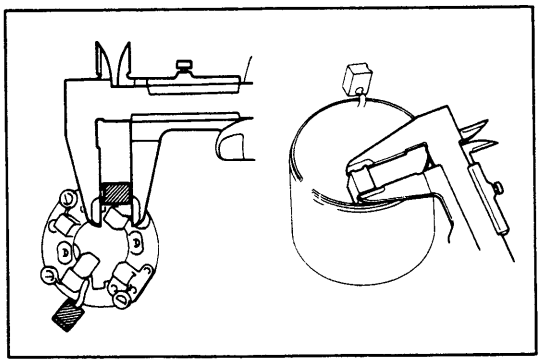


2. **INSPECT FIELD COIL FOR GROUND**

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.

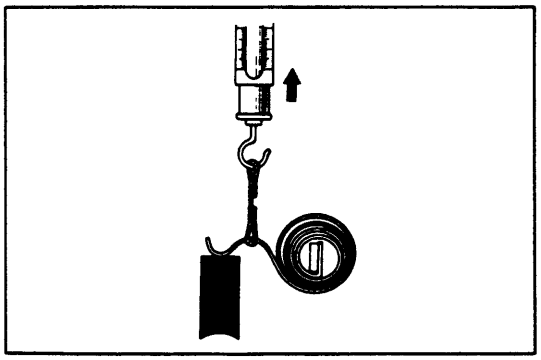
Brushes



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.



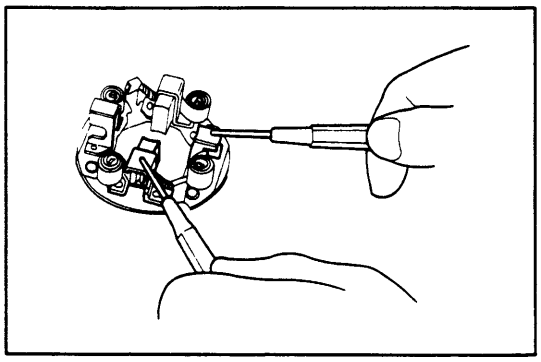
Brush Springs

INSPECT BRUSH SPRING LOAD WITH PULL SCALE

Spring installed load: 1.79 – 2.41 kg (3.9 – 5.3 lb, 18 – 24 N)

NOTE: Take the pull scale reading at the very instant the brush spring separates from the brush.

If the reading is below standard, replace the brush springs.

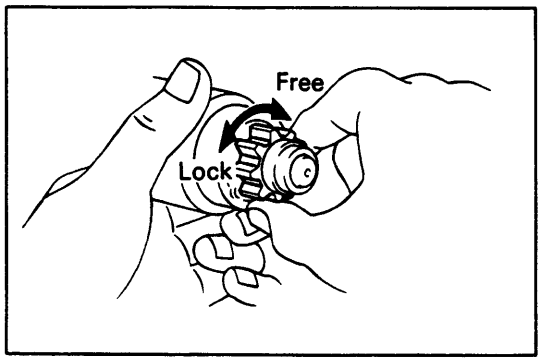


Brush Holder

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.



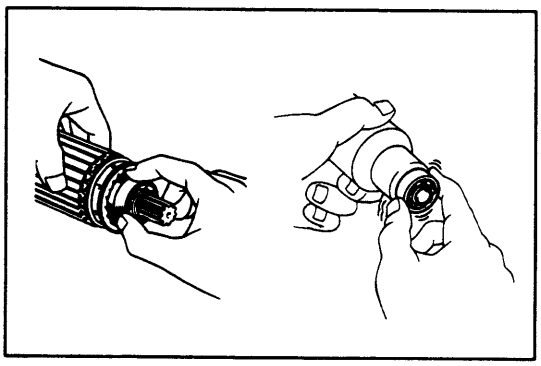
Clutch and Gears

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 flywheel 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.

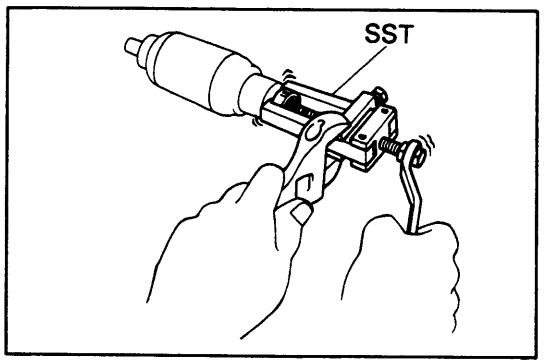


Bearings

1. **INSPECT BEARINGS**

Turn each bearing by hand while applying inward force.

If the bearing resists or sticks, replace it.

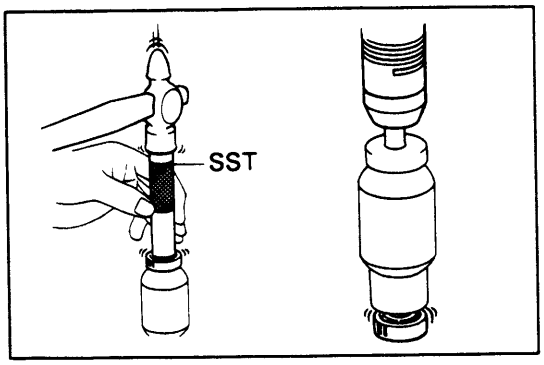


2. **IF NECESSARY, REPLACE BEARINGS**

(a) Using SST, remove the bearing from the armature shaft.

(b) Using SST, remove the other bearing from the opposite side.

SST 09286-46011

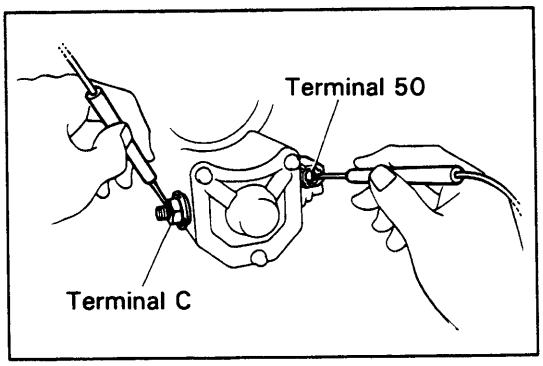


(c) Using SST and a hammer, tap a new front bearing onto the shaft.

SST 09285-76010

(d) Using a press, install a new rear bearing onto the shaft.

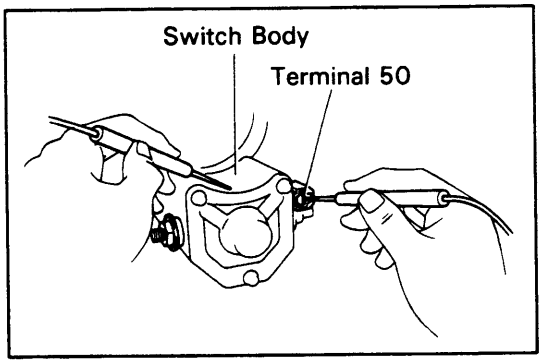
Magnetic Switch



1. PERFORM PULL-IN COIL OPEN CIRCUIT TEST

Using an ohmmeter, check that there is continuity between terminals 50 and C.

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.

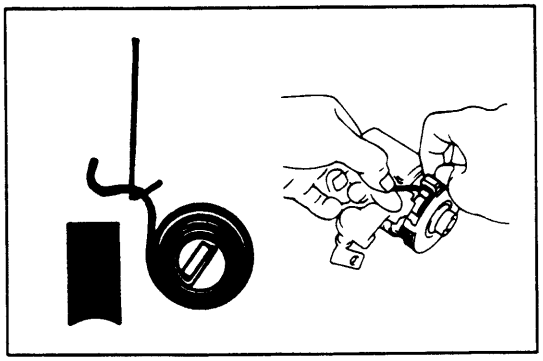
ASSEMBLY OF REDECTION TYPE STARTER

(See page ST-11)

NOTE: Use high temperature grease to lubricate 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.

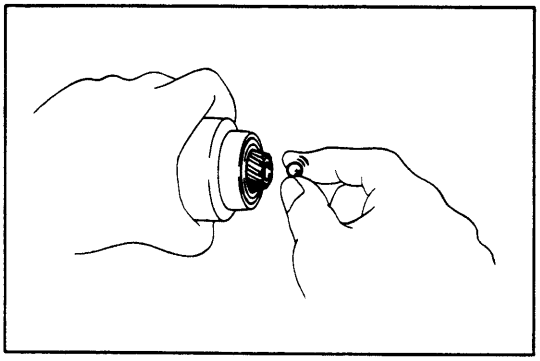


2. INSTALL BRUSH HOLDER

(a) Using a screwdriver, hold the brush spring back, and install the brush into the brush holder. Install the four brushes.

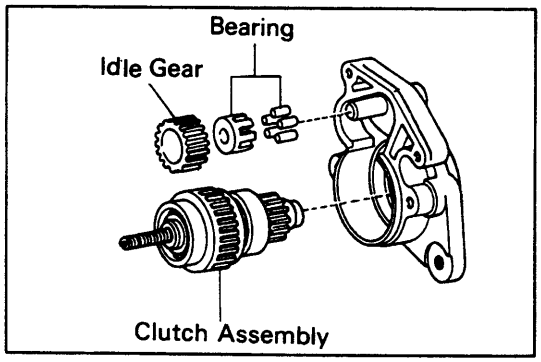
NOTE: Check that the positive (+) lead wires are not grounded.

(b) Install the end cover to the field frame.



3. INSERT STEEL BALL INTO CLUTCH SHAFT HOLE

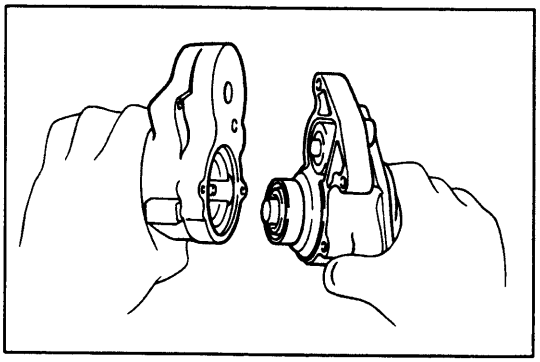
Apply grease to the ball and spring and insert them into the clutch shaft hole.



4. INSTALL GEAR AND CLUTCH ASSEMBLY

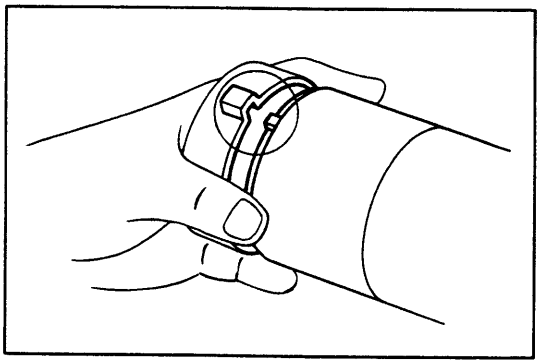
(a) Apply grease to gear and the clutch assembly.

(b) Place the clutch assembly, idler gear and bearing in the starter housing.



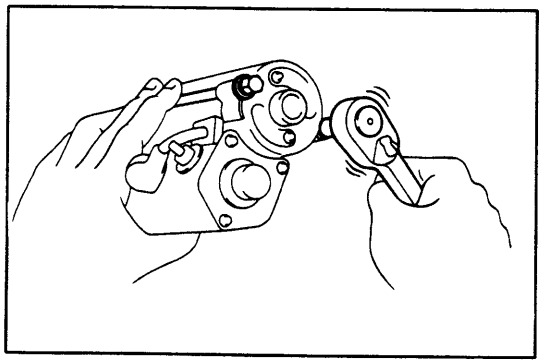
5. INSTALL STARTER HOUSING

Place the starter housing on the magnetic switch and install the two screws.



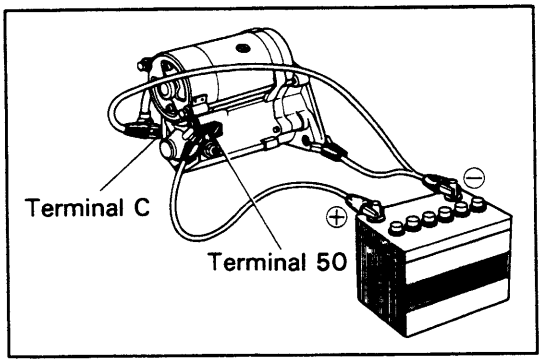
6. INSTALL FIELD FRAME AND ARMATURE ASSEMBLY IN MAGNETIC SWITCH

(a) Match the protrusion of the field frame 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

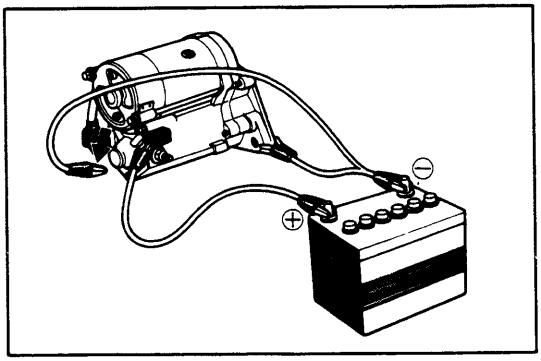
CAUTION: These tests must be performed within 3 to 5 seconds to avoid burning out the coil.

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.

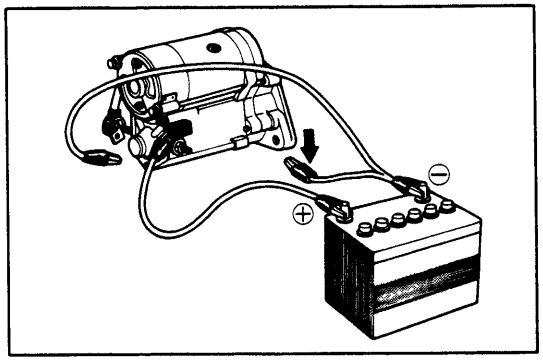
If the pinion gear does not move, replace the magnetic switch.



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.

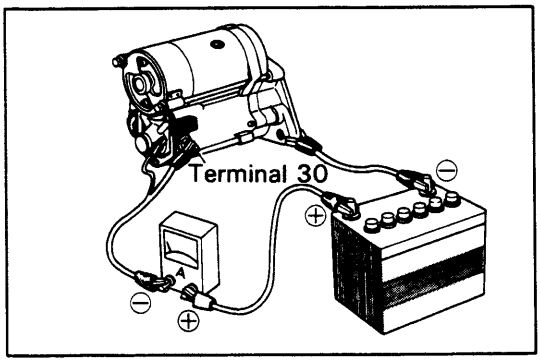
If the pinion gear returns inward, replace the magnetic switch.



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

	Page
PRECAUTIONS	CH-2
TROUBLESHOOTING	CH-2
ON-VEHICLE INSPECTION	CH-3
ALTERNATOR	CH-7
ALTERNATOR REGULATOR	CH-22
IGNITION MAIN RELAY	CH-24

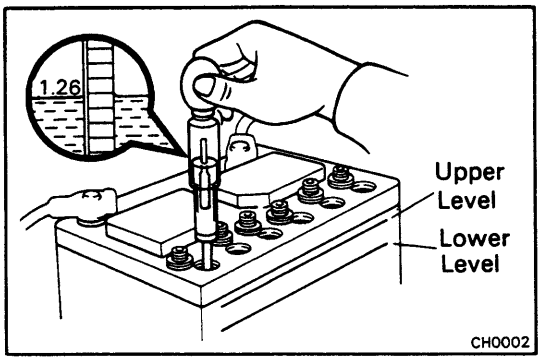
PRECAUTIONS

1. **Check that the battery cables are connected to the correct terminals.**
2. **Disonnect 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 loose	Tighten loose 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 loose or worn	Adjust or replace drive belt	CH-3
	Battery cables loose, 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

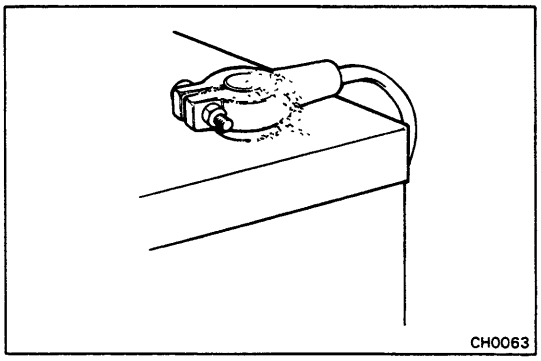
1. INSPECT BATTERY SPECIFIC GRAVITY

(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.



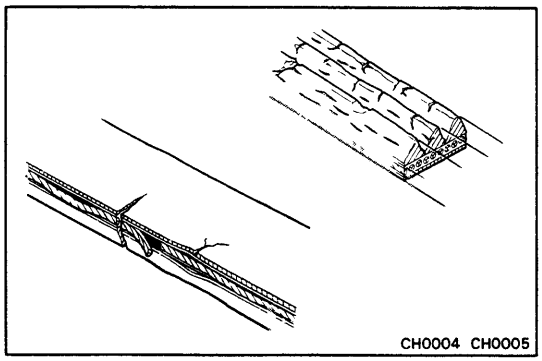
2. CHECK BATTERY TERMINALS, FUSIBLE LINKS AND FUSES

(a) Check that the battery terminals are not loose 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)

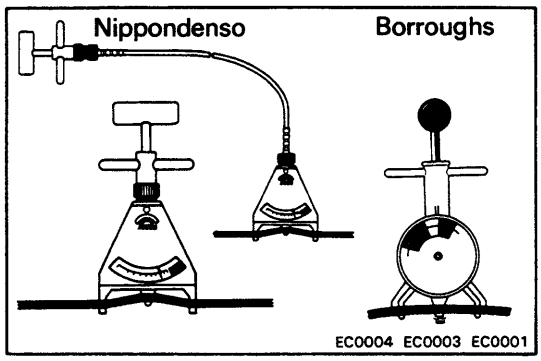
Fuse: CHARGE 7.5A
ENGINE 15A
IGN 7.5A



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.

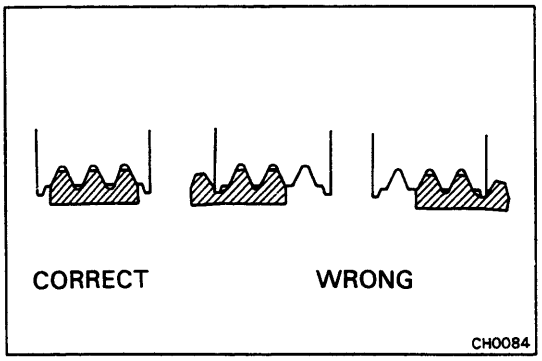


(b) Using a belt tension gauge, check the drive belt tension.

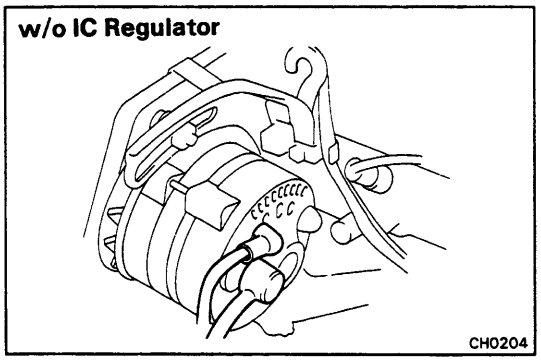
Belt tension gauge:
Nippondenso BTG-20 (95506-00020) or
Borroughs No. BT-33-73F

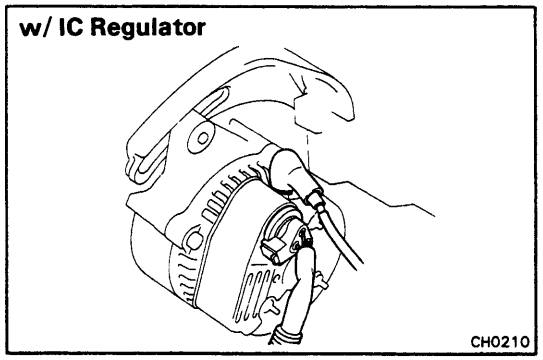
Drive belt tension: Used belt 80 ± 20 lb
New belt 125 ± 25 lb

If the belt tension is not within specification, adjust it.



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 installing the drive belt, check that it fits properly in the ribbed grooves.





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 alternator while the engine is running.

5. CHECK CHARGE LIGHT CIRCUIT

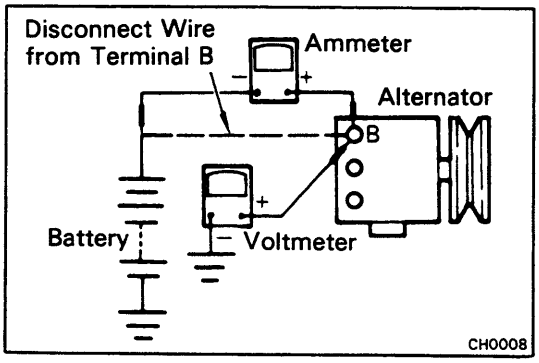
(a) Warm up the engine and then turn it off.

(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.

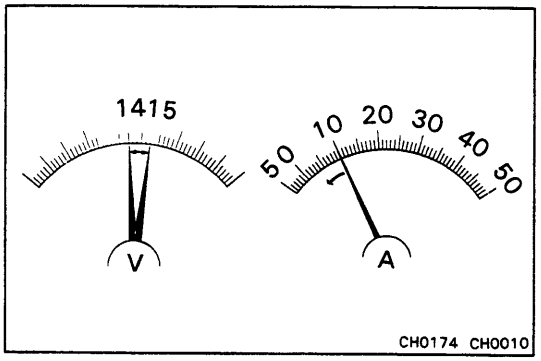


6. CHECK CHARGING CIRCUIT WITHOUT LOAD

NOTE: If a battery/alternator tester is available, connect the tester to the charging circuit as per manufacturer's instructions.

(a) If a tester is not available, connect a voltmeter and ammeter to the charging circuit as follows:

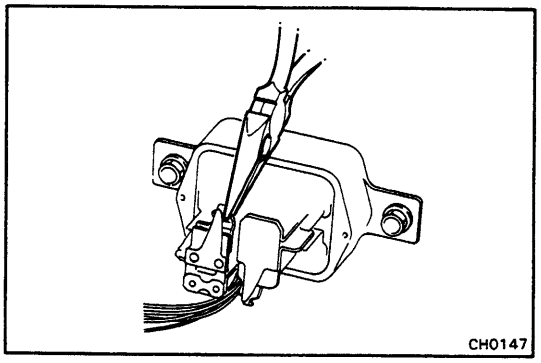
- Disconnect the wire from terminal B of the alternator and connect it to the negative probe of the ammeter.
- Connect the test probe from the positve (–) terminal of the ammeter to terminal B of the alternator.
- Connect the positive probe of the voltmeter to terminal B of the alternator.
- Ground the negative probe of the voltmeter.



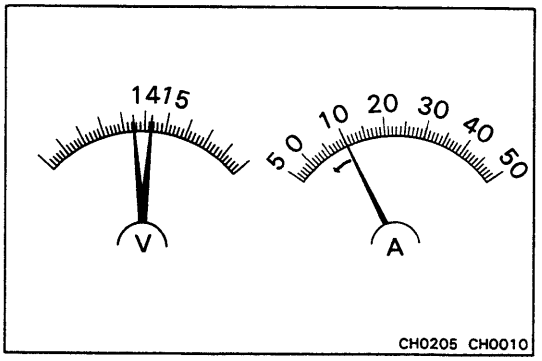
(b) Check the charging circuit as follows:

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)

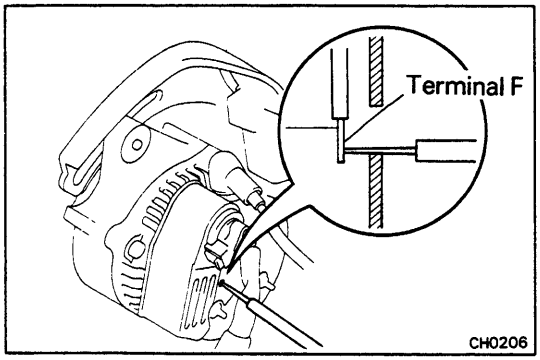


If the reading is not within standard voltage, adjust the regulator or replace it.



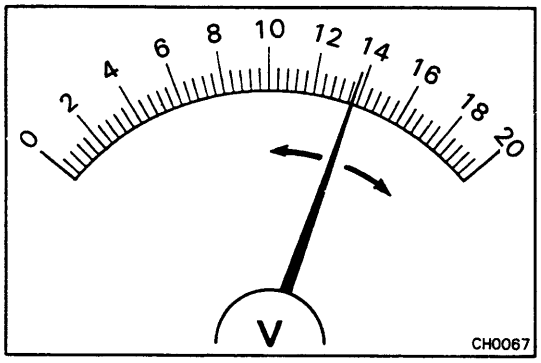
(w/ IC Regulator)
Standard amperage: Less than 10A
Standard voltage: 13.5 – 15.1V at 25°C (77°F)

If the voltage reading is not within standard voltage, replace the IC regulator.

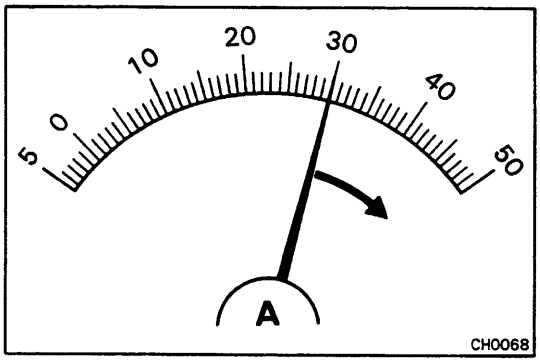


If the voltage reading is less than standard voltage, check the IC regulator and alternator as follows:

- 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.

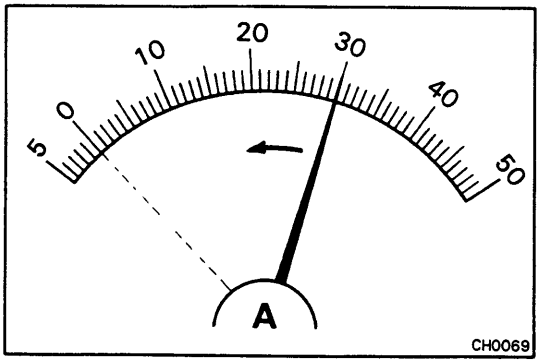


7. CHECK CHARGING CIRCUIT WITH LOAD

(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.

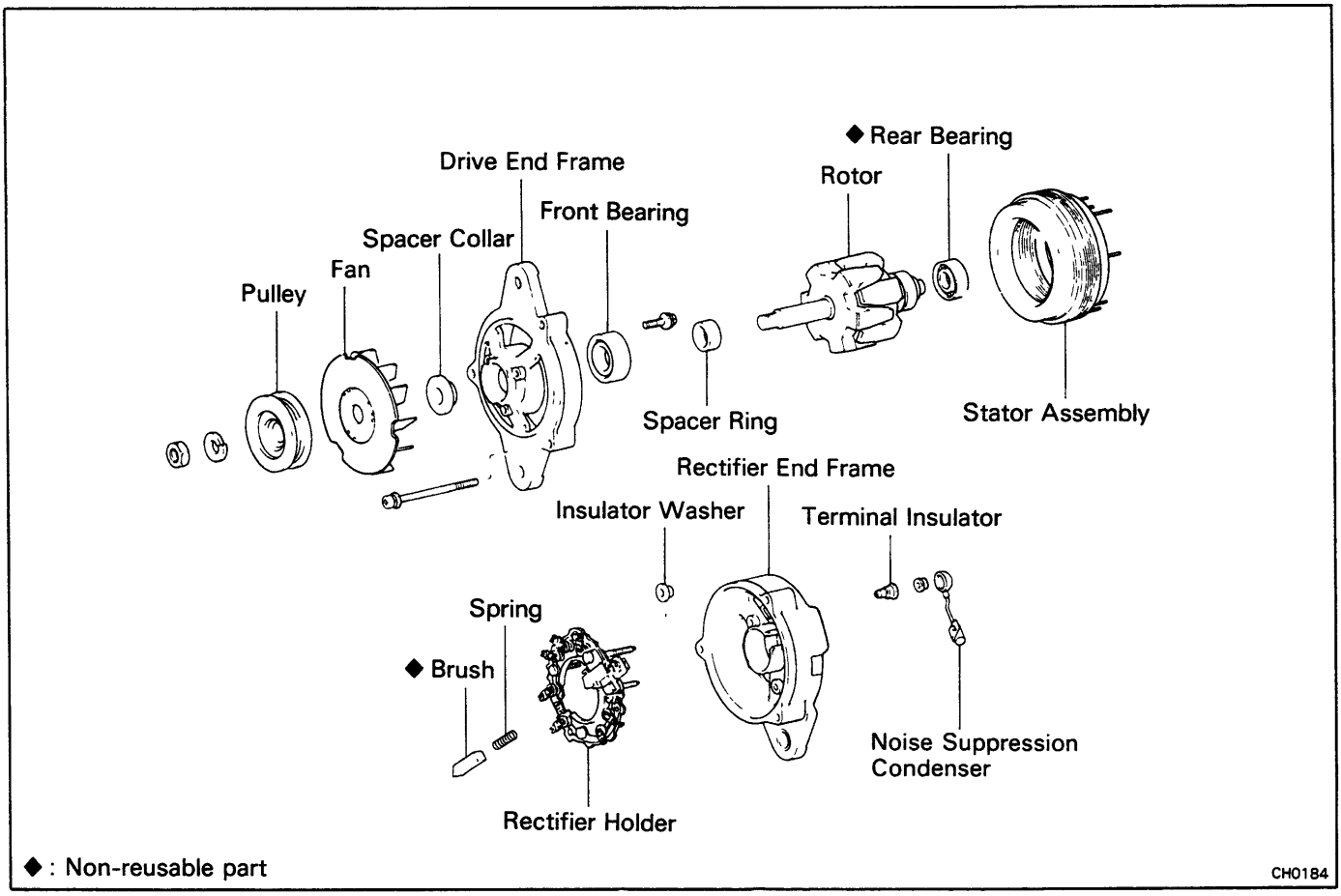
Standard amperage: More than 30A

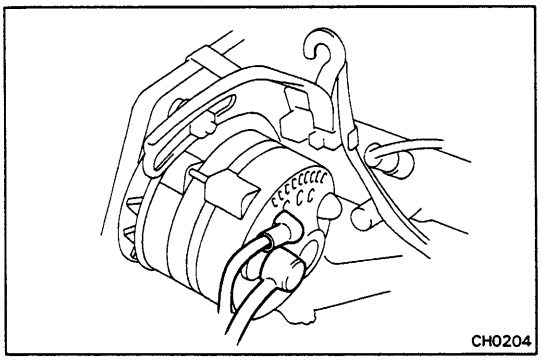


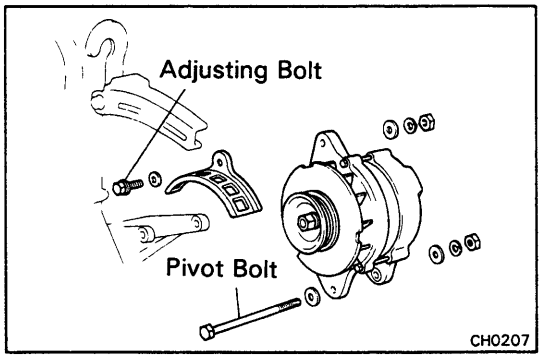
If the ammeter reading is less than 30A, repair the alternator. (See page CH-7)

NOTE: With the battery fully charged, the indication will sometimes be less than 30A.

ALTERNATOR
w/o IC Regulator
COMPONENTS

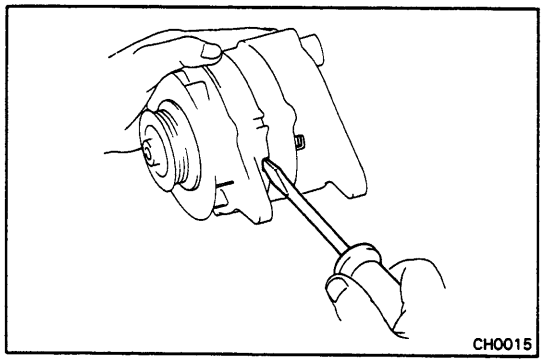






REMOVAL OF ALTERNATOR

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

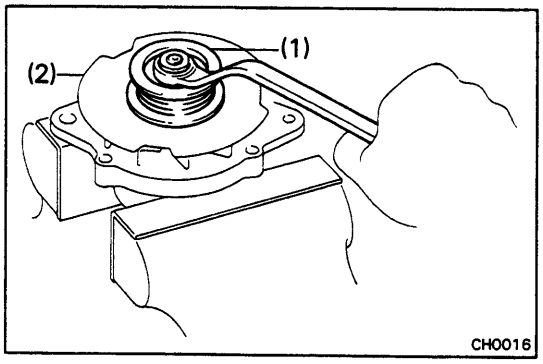
(See page CH-7)

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

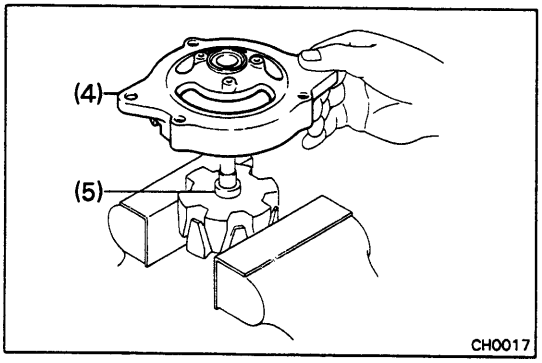
(a) Mount the rotor in a soft jaw vise.

(b) Remove the nut, spring washer and following parts from the rotor.

(1) Pulley

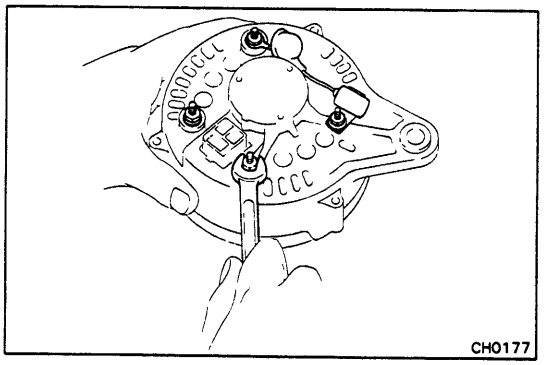
(2) Fan

(3) Spacer collar



(4) Drive end frame

(5) Spacer ring



3. REMOVE RECTIFIER END FRAME

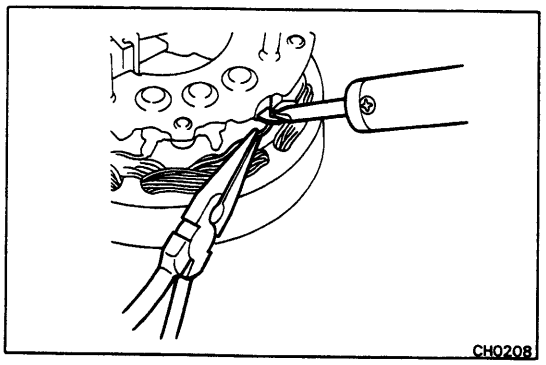
Remove the four nuts and following parts from the rectifier holder.

(1) Noise suspension condenser

(2) Two terminal insulators

(3) Rectifier end frame

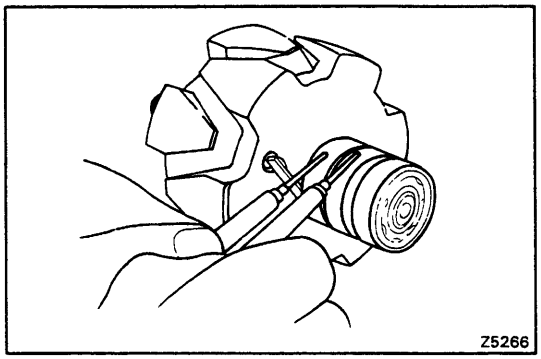
(4) Two insulator washers



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

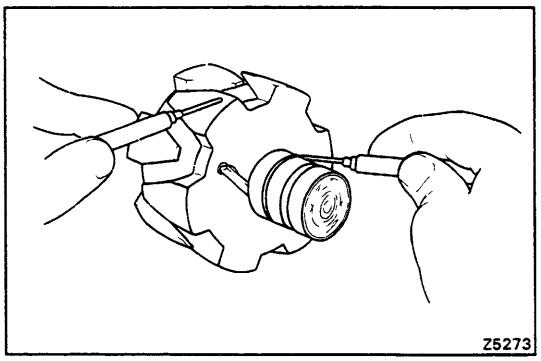
Rotor

1. INSPECT ROTOR FOR OPEN CIRCUIT

Using an ohmmeter, check that there is continuity between the slip rings.

Standard resistance: 4.0 – 4.2 Ω

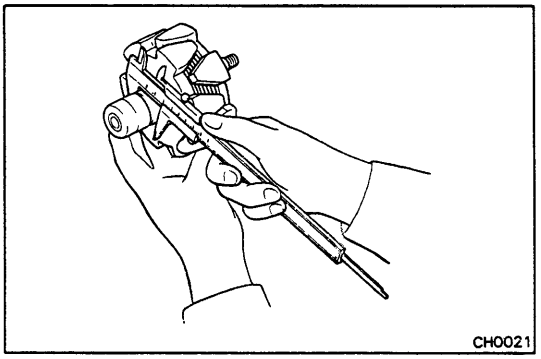
If there is no continuity, replace the rotor.



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

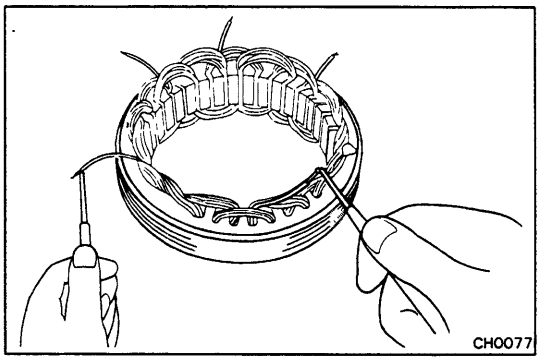
(a) Check the slip rings for roughness or scoring.

If rough or scored, replace the rotor.

(b) Using calipers, measure the slip ring diameter.

Standard diameter: 32.5 mm (1.280 in.)
Minimum diameter: 32.1 mm (1.264 in.)

If the diameter is less than minimum, replace the rotor.



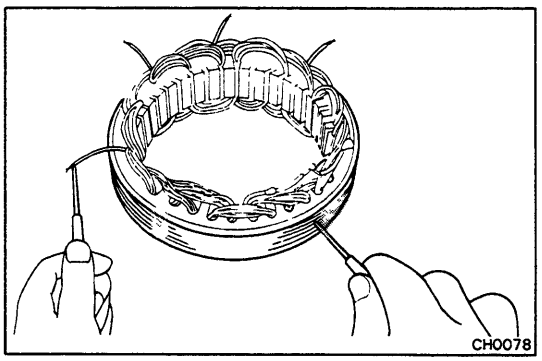
Stator

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.

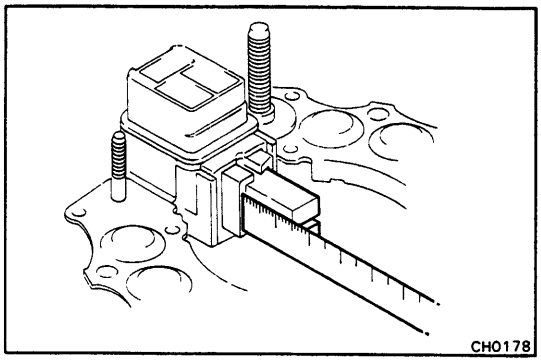
If there is no continuity, replace the stator.



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.

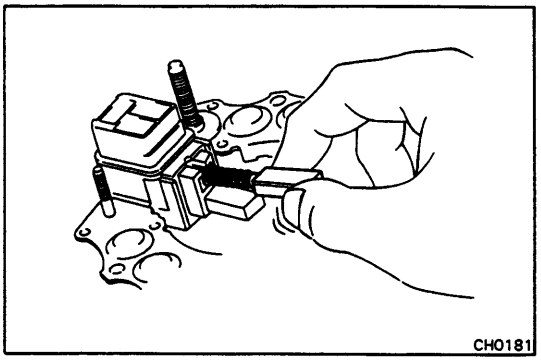


Brushes

1. **INSPECT EXPOSED BRUSH LENGTH**

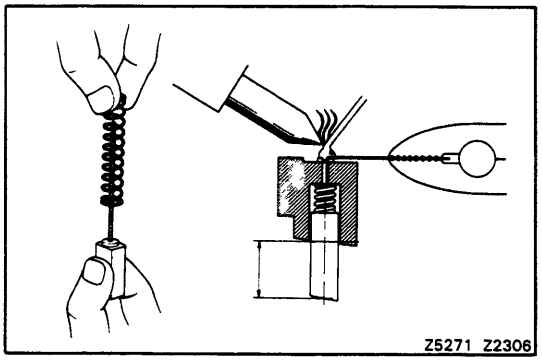
   Minimum exposed length: 5.5 mm (0.217 in.)

   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 insert the brush into the brush holder.

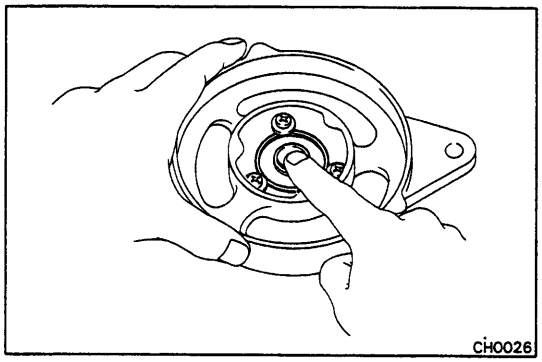
   (c) Solder the wire to the brush holder as shown.

   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.

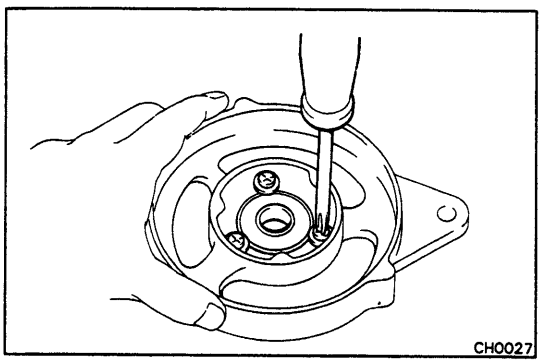
   (f) Apply insulation paint to the soldered point.



Bearings

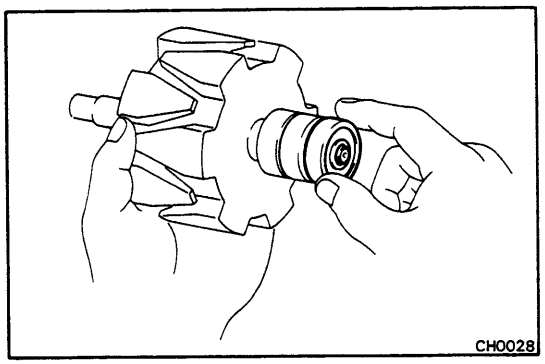
1. **INSPECT FRONT BEARING**

   Check that the bearing is not rough or worn.



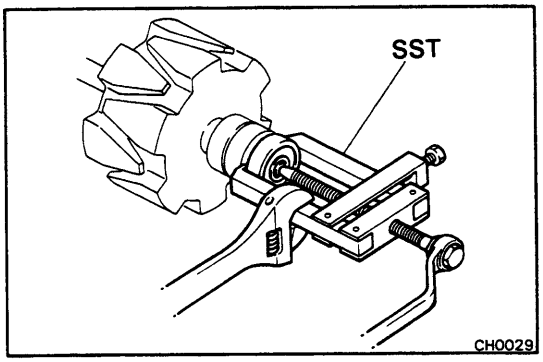
2. **IF NECESSARY, REPLACE FRONT BEARING**

   Remove the three screws, and replace the bearing.



3. INSPECT REAR BEARING

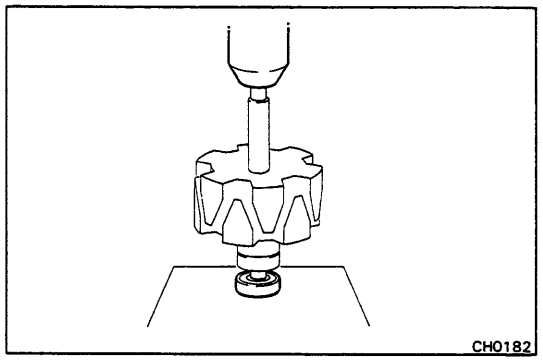
Check that the bearing is not rough or worn.



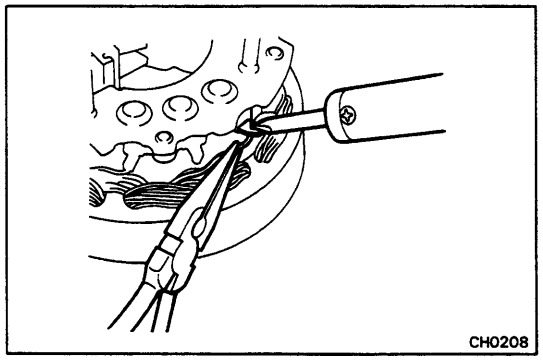
4. IF NECESSARY, REPLACE REAR BEARING

(a) Using SST, remove the bearing from the rotor shaft.

SST 09286-46011



(b) Using a press, install a new rear bearing onto the rotor shaft.



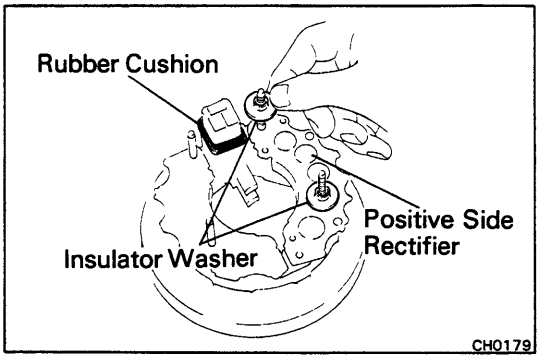
ASSEMBLY OF ALTERNATOR

(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.

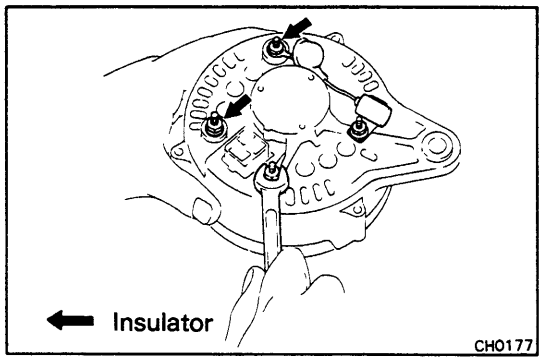


2. INSTALL RECTIFIER END FRAME TO RECTIFIER HOLDER

(a) Place the two insulator washers on the positive side studs.

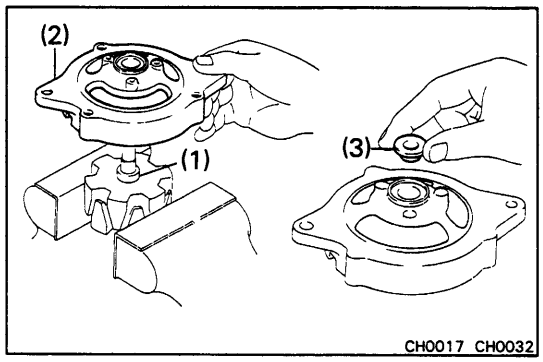
(b) Place a rubber cushion on the brush holder.

(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

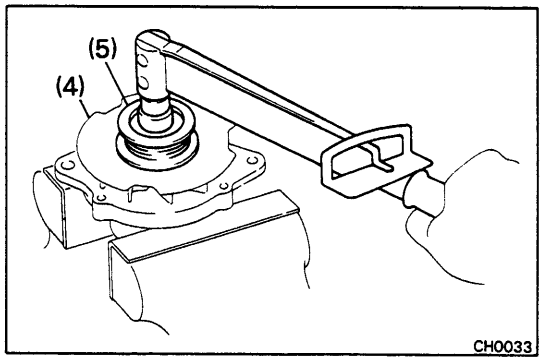
(a) Mount the rotor in a soft jaw vise.

(b) Slide the following parts on the rotor shaft.

(1) Spacer ring

(2) Drive end frame

(3) Spacer collar

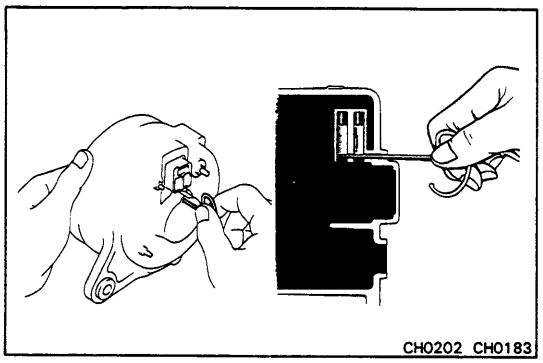


(4) Fan

(5) Pulley

(c) Install the spring washer and nut. Torque the nut.

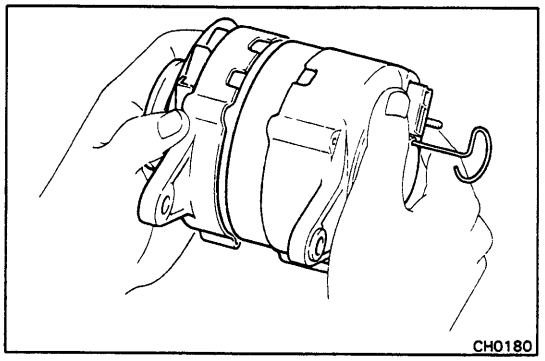
Torque: 625 kg-cm (45 ft-lb, 61 N·m)



4. ASSEMBLE DRIVE END FRAME AND RECTIFIER END FRAME

(a) Bend the rectifier lead wires back to clear the rotor.

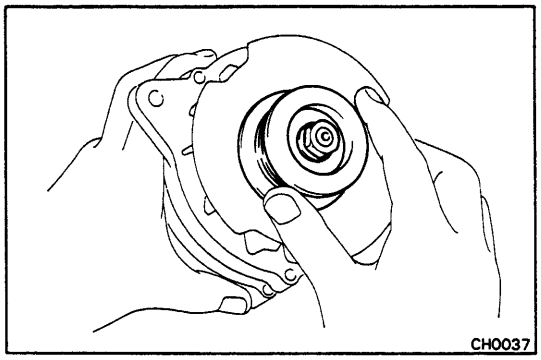
(b) Using a curved tool, push the brushes in as far as they will go and hold them in place by inserting a stiff wire through the access hole in the rectifier end frame.



(c) Assemble the drive end frame and the rectifier end frame by inserting the rear bearing on the rotor shaft into the rectifier end frame.

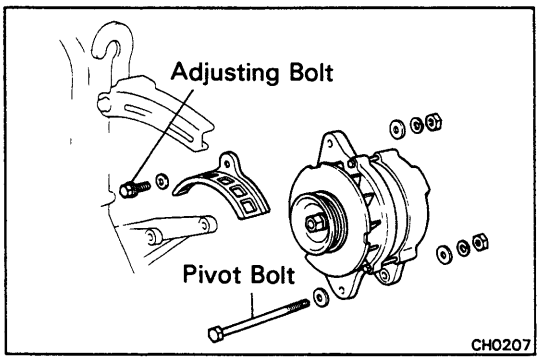
(d) Install the three through bolts.

(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.

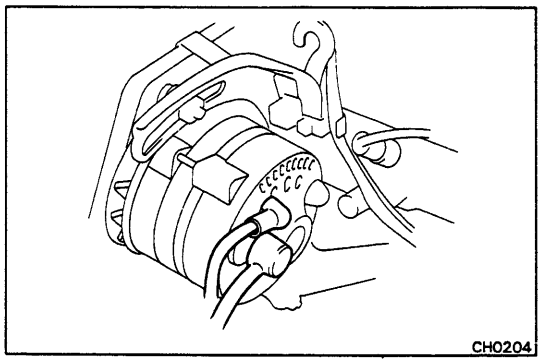
(c) Install the cover with the adjusting bolt.

(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)



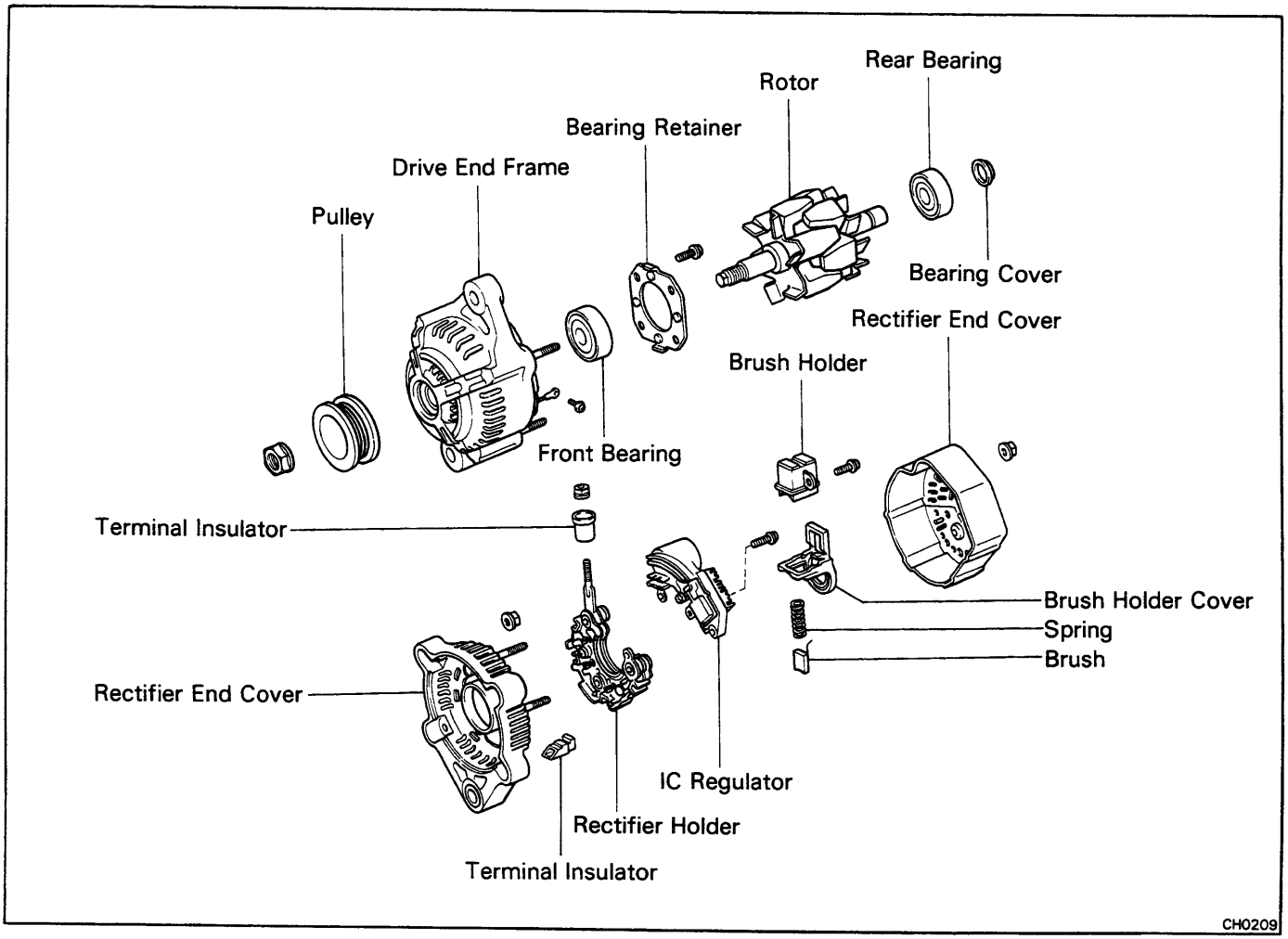
3. CONNECT CONNECTOR AND WIRE TO ALTERNATOR

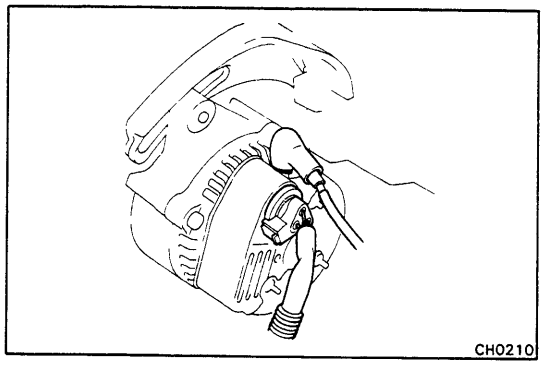
4. CONNECT CABLE TO NEGATIVE TERMINAL OF BATTERY

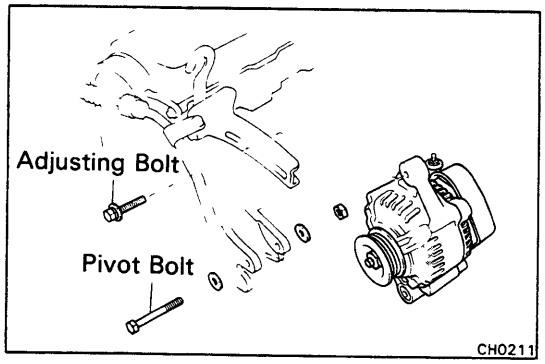
5. PERFORM ON-VEHICLE INSPECTION
(See page 5 to 7 on pages CH-4 to 6)

w/ IC Regulator

COMPONENTS







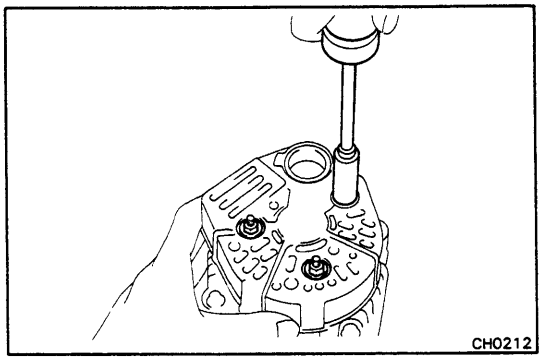
REMOVAL OF ALTERNATOR

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 alternator



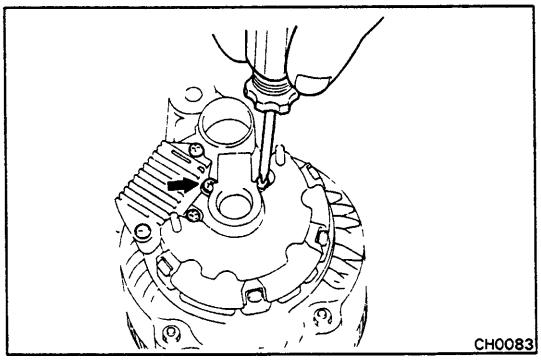
DISASSEMBLY OF ALTERNATOR

(See page CH-14)

1. REMOVE REAR END COVER

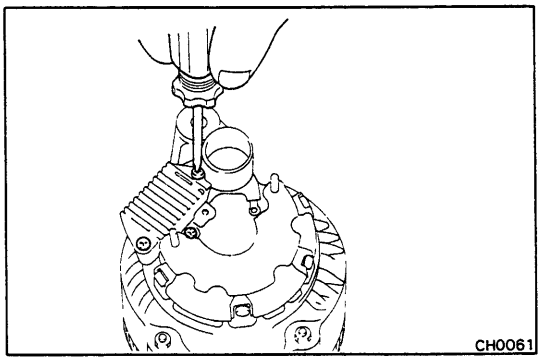
(a) Remove the nut and terminal insulator.

(b) Remove the three nuts and end cover.



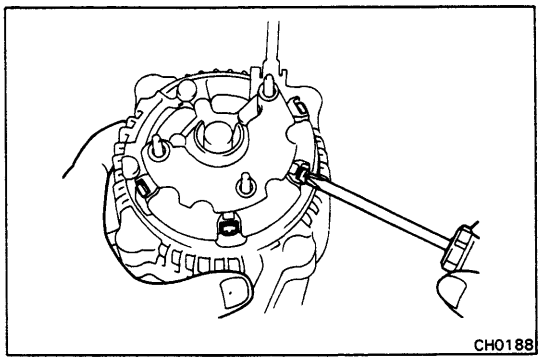
2. REMOVE BRUSH HOLDER

Remove the two screws, brush holder and cover.



3. REMOVE IC REGULATOR

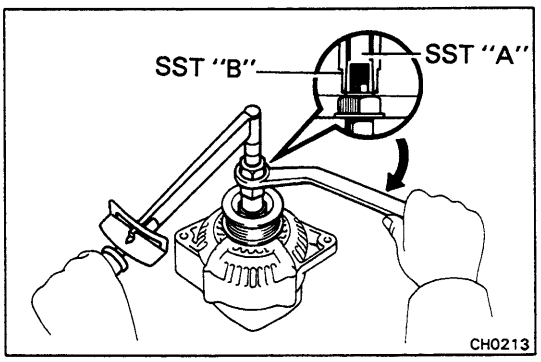
Remove the three screws and IC regulator.



4. REMOVE RECTIFIER HOLDER

(a) Remove the four screws and rectifier holder.

(b) Remove the four terminal insulators.



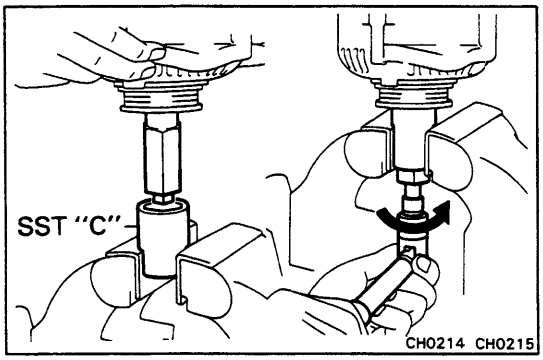
5. REMOVE PULLEY

(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".

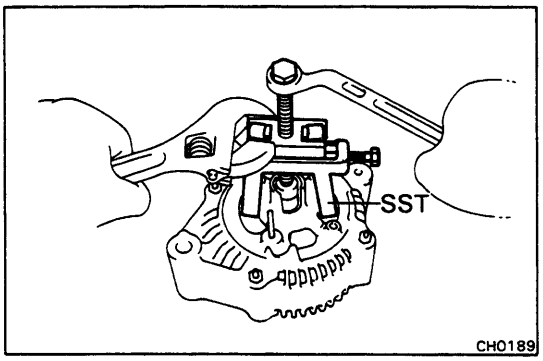
(d) To loosen the pulley nut turn SST "A" in the direction shown in the figure.

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.



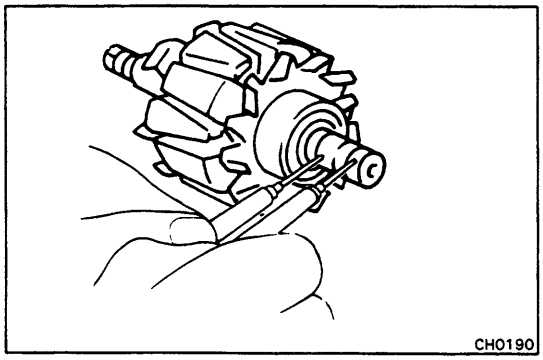
6. REMOVE RECTIFIER END FRAME

(a) Remove the four nuts.

(b) Using SST, remove the rectifier end frame.

SST 09286-46011

7. REMOVE ROTOR FROM DRIVE END FRAME



INSPECTION AND REPAIR OF ALTERNATOR

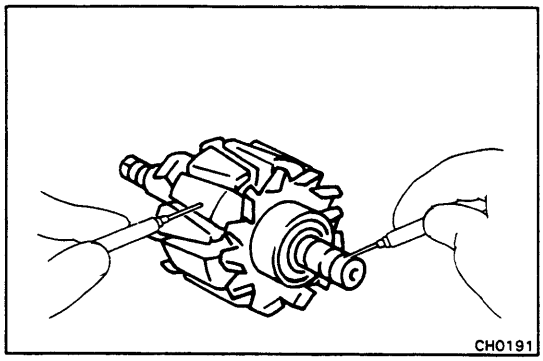
Rotor

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 Ω

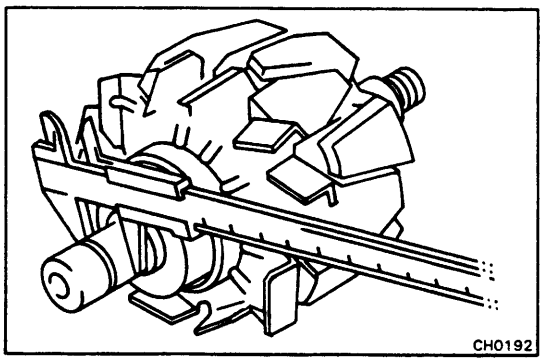
If there is no continuity, replace the rotor.



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.

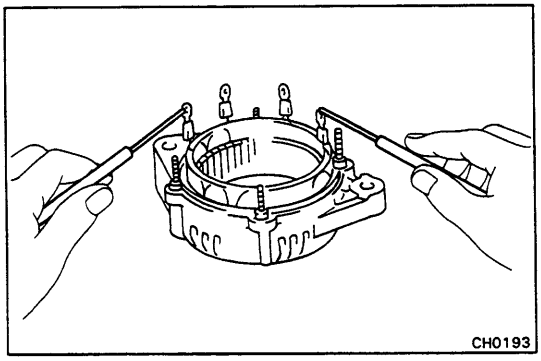
If rought or scored, replace the rotor.

(b) Using calipers, measure the slip ring diameters.

Standard diameter: 14.2 – 14.4 mm (0.559 – 0.567 in.)

Minimum diameter: 14.0 mm (0.551 in.)

If the diameter is less than minimum, replace the rotor.

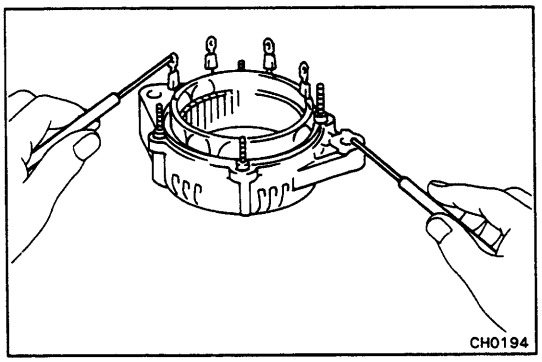


Stator

1. INSPECT STATOR FOR OPEN CIRCUIT

Using an ohmmeter, check that there is continuity between the coil leads.

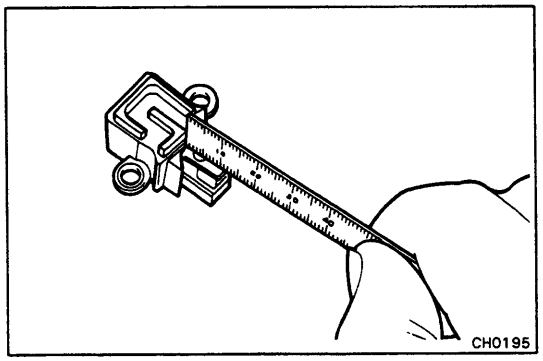
If there is no continuity, replace the drive end frame assembly.



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.



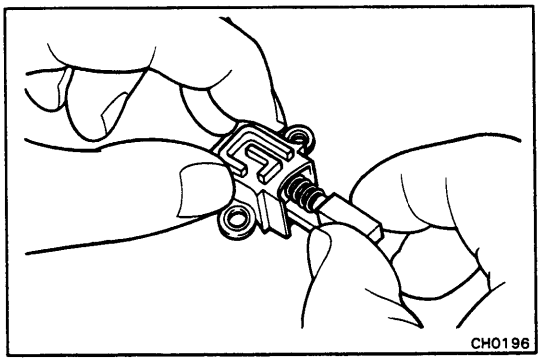
Brushes

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.)

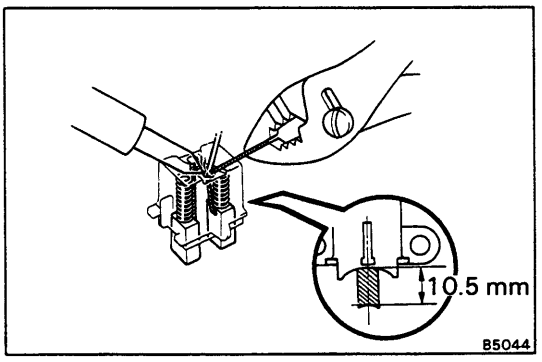
If the exposed length is less than minimum, replace the brushes.



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 insert the spring and brush into the brush holder.



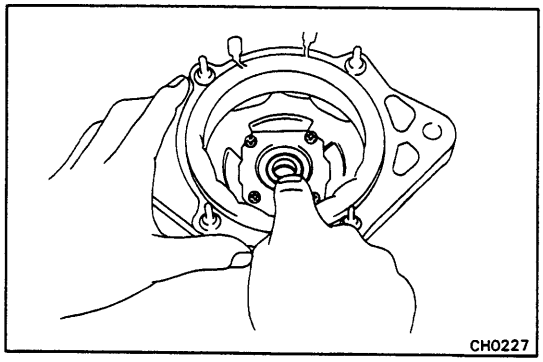
(c) Solder the brush wire to the brush holder at the exposed length.

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.

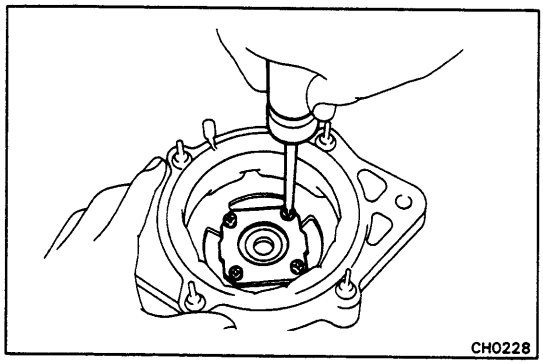
(f) Apply insulation paint to the soldered point.



Bearings

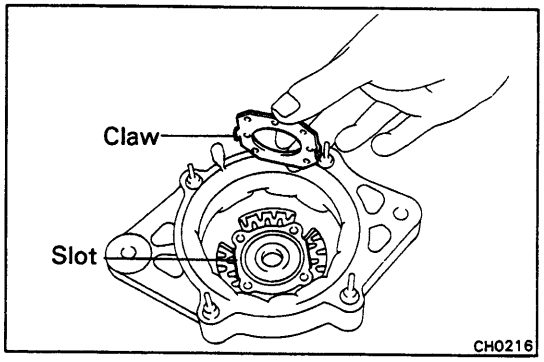
1. INSPECT FRONT BEARING

Check that the bearing is not rough or worn.



2. IF NECESSARY, REPLACE FRONT BEARING

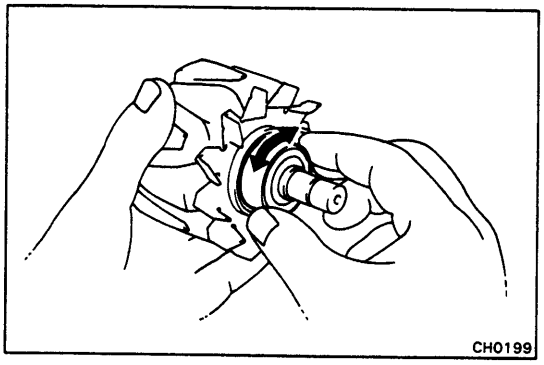
(a) Remove the four screws, bearing retainer and bearing.



(b) Install the bearing.

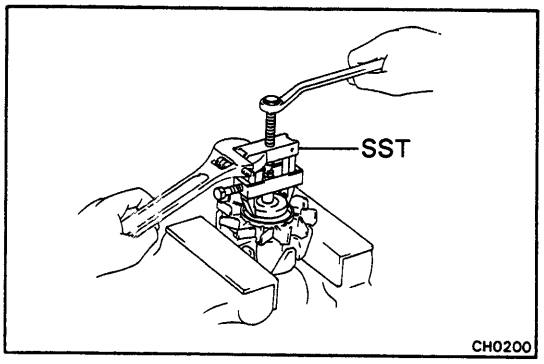
(c) Align the claws of the bearing retainer with the slots of the drive end frame.

(d) Install the bearing retainer with the four screws.



3. INSPECT REAR BEARING

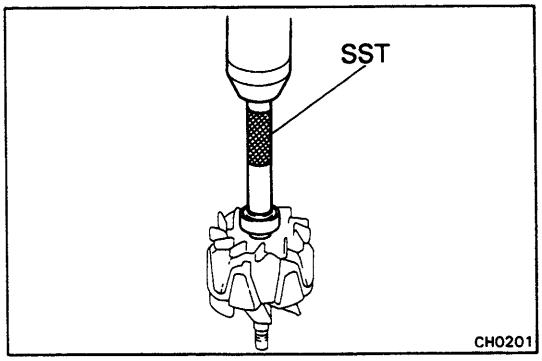
Check that the bearing is not rough or worn.



4. IF NECESSARY, REPLACE REAR BEARING

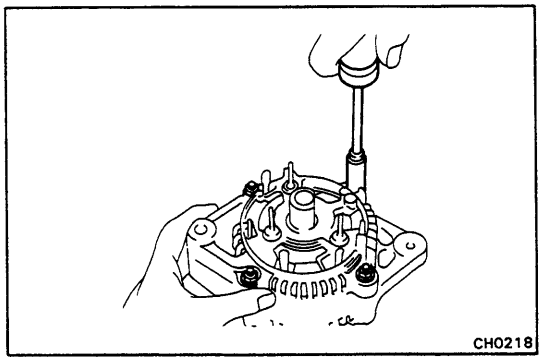
(a) Using SST, remove the bearing cover and cover.

SST 09820-00021



(b) Using SST and a press, press in the bearing and bearing cover.

SST 09285-76010



ASSEMBLY OF ALTERNATOR

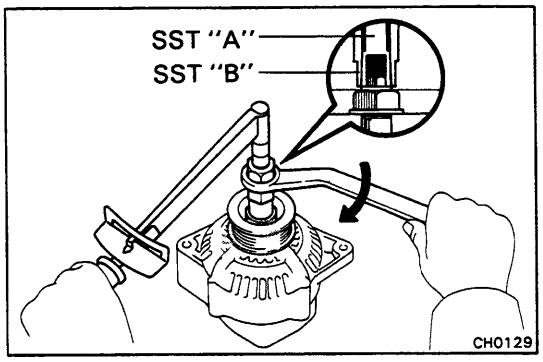
(See page CH-14)

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

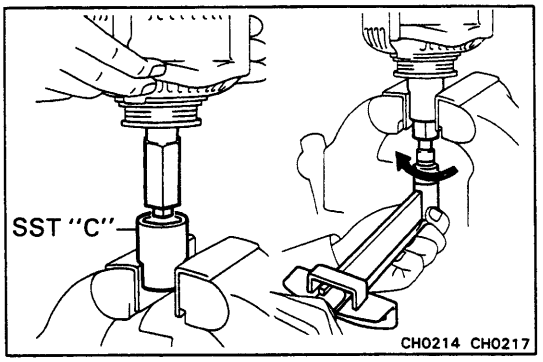
(a) Install the pulley to the rotor shaft by tightening the pulley nut by hand.

(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.



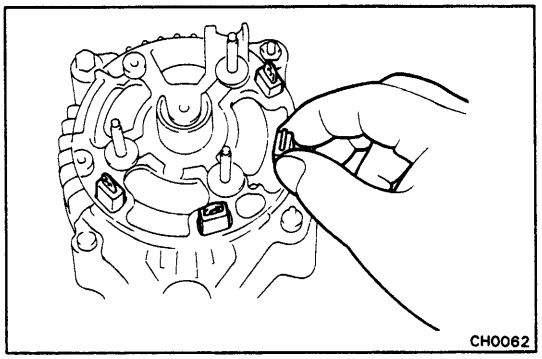
(d) As shown in the figure, mount SST "C" in a vise, and install the alternator to SST "C".

(e) To torque the pulley nut turn SST "A" in the direction shown in the figure.

Torque: 1,125 kg-cm (81 ft-lb, 110 N·m)

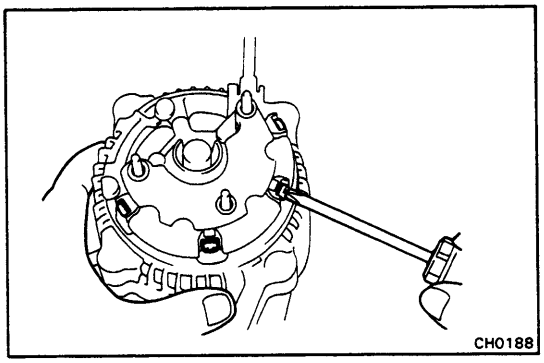
(f) Remove the alternator from SST "C".

(g) Turn SST "B" and remove SSTs "A" and "B".

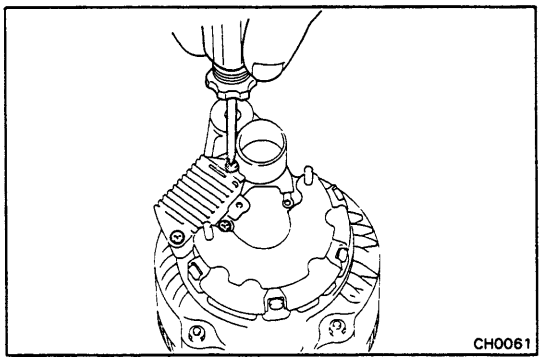


4. INSTALL RECTIFIER HOLDER

(a) Install the four rubber insulators on the lead wires.

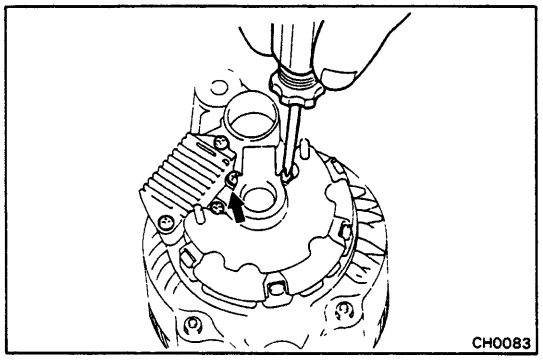


(b) Install the rectifier with the four screws.



5. INSTALL IC REGULATOR

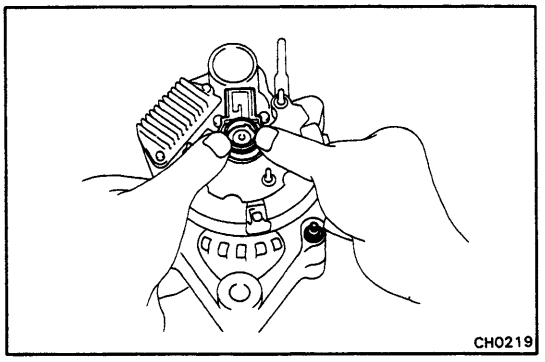
Install the IC regulator with the three screws.



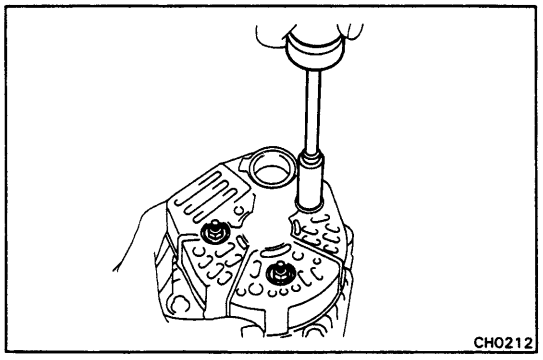
6. INSTALL BRUSH HOLDER

(a) Install the brush holder cover to the brush holder.

(b) Install the brush holder with the two screws.



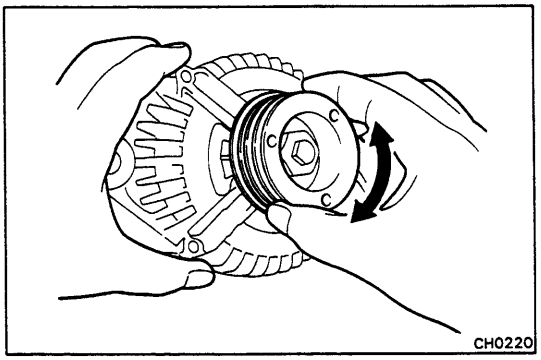
(c) Install the brush holder cover to the rear end frame.



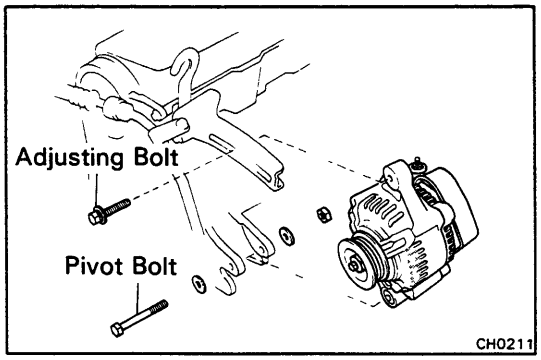
7. INSTALL REAR END COVER

(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

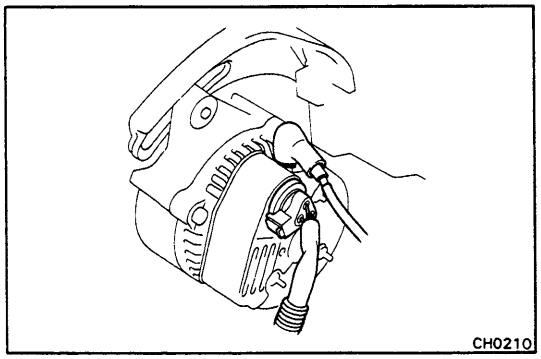
1. INSTALL ALTERNATOR

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) Install the drive belt, and tighten the adjusting and pivot bolts.

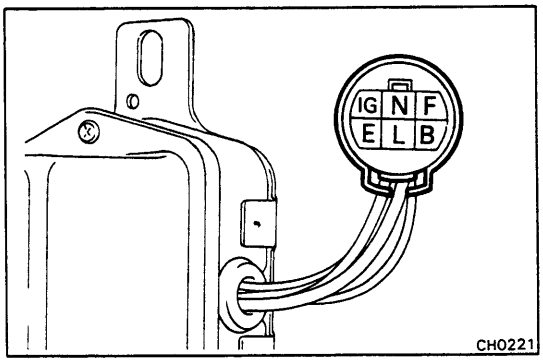
(b) Check and adjust the drive belt (See page CH-3)



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)

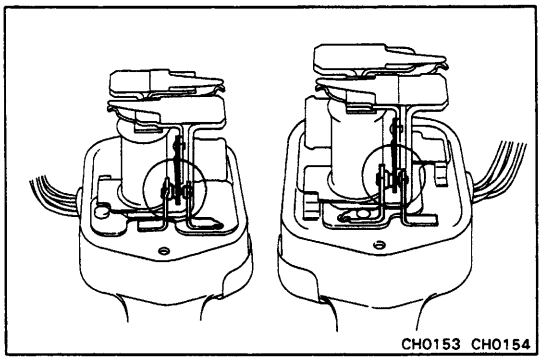


ALTERNATOR REGULATOR (w/o IC Regulator)

INSPECTION OF ALTERNATOR REGULATOR

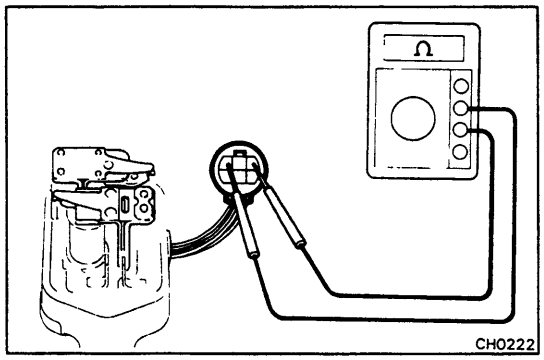
LOCATION: On the left fender apron in the engine compartment.

1. REMOVE ALTERNATOR REGULATOR COVER



2. INSPECT POINT SURFACES FOR BURN OR DAMAGE

If defective, replace the regulator.

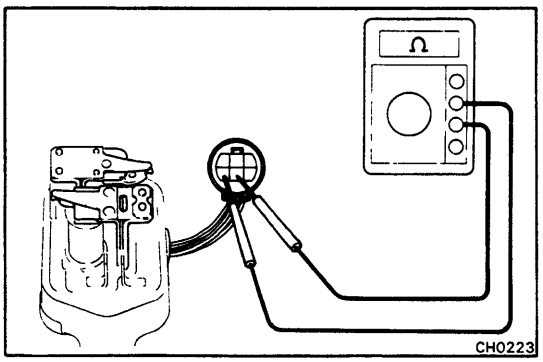


3. INSPECT RESISTANCE BETWEEN TERMINALS

(a) Using an ohmmeter, measure the resistance between terminals IG and F.

Resistance (voltage regulator):

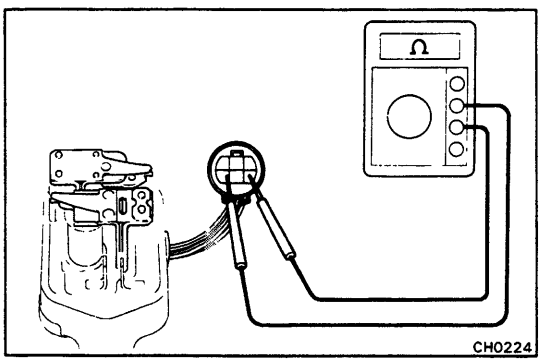
At rest	**0 Ω**
Pulled in	**Approx. 11 Ω**



(b) Using an ohmmeter measure the resistance between terminals L and E.

Resistance (voltage relay):

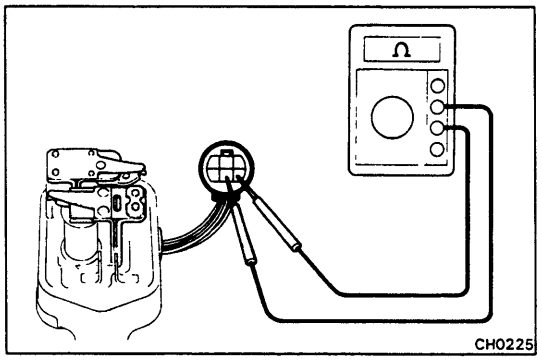
At rest	**0 Ω**
Pulled in	**Approx. 100 Ω**



(c) Using an ohmmeter, measure the resistance between terminals B and E.

Resistance (voltage relay):

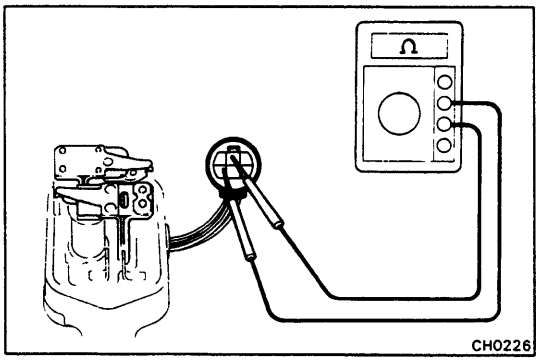
At rest	**Infinity**
Pulled in	**Approx. 100 Ω**



(d) Using an ohmmeter, measure the resistance between terminals B and L.

Resistance (voltage relay):

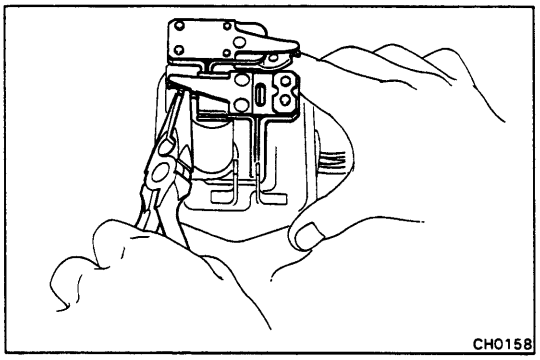
At rest	**Infinity**
Pulled in	**0 Ω**



(e) Using an ohmmeter, measure the resistance between terminals N and E.

Resistance: Approx. 24 Ω

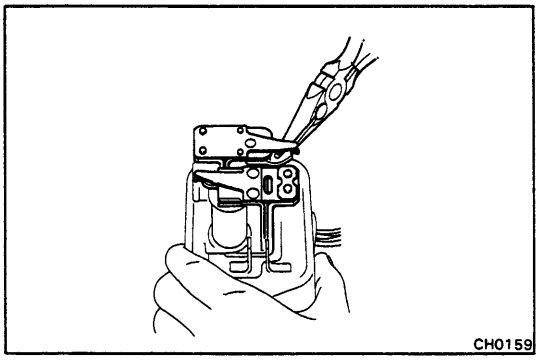
If any of the above checks are not positive, replace the alternator regulator.



4. ADJUST ALTERNATOR REGULATOR

(a) Adjust the voltage regulator by bending the regulator adjusting arm.

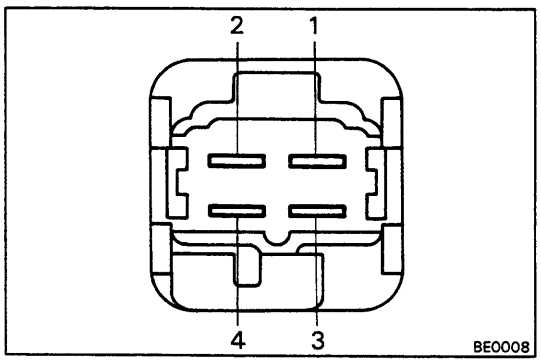
Regulation voltage: 13.8 – 14.8 V



(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

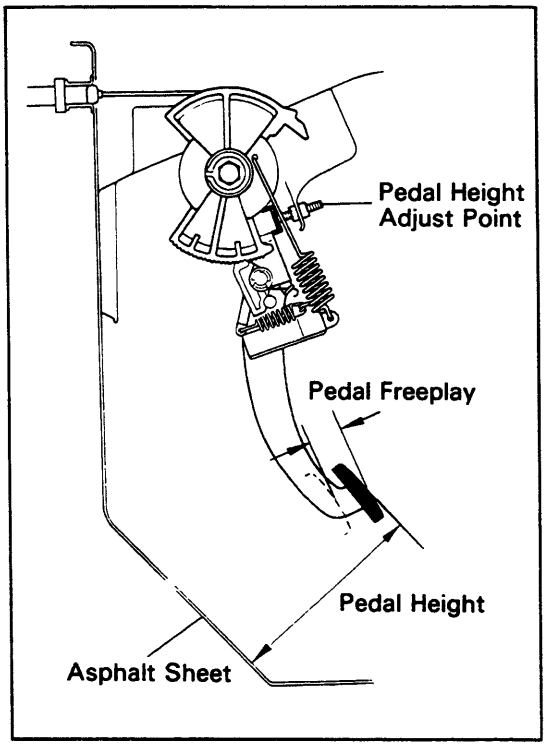
INSPECT RELAY OPERATION AND CONTINUITY
(See Sun Roof Relay on page BE-34)

CLUTCH

	Page
TROUBLESHOOTING	CL-2
CHECK AND ADJUSTMENT OF CLUTCH PEDAL	CL-3
CLUTCH PEDAL	CL-4
CLUTCH RELEASE CABLE	CL-6
CLUTCH UNIT	CL-8

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
	Splines on input shaft or clutch disc dirty or burred	Repair as necessary	
	Clutch pressure plate faulty	Replace clutch cover	
	Release cable faulty	Replace release cable	
Clutch slips	Clutch pedal freeplay insufficient	Check pedal freeplay	CL-3
	Clutch disc lining oily or worn out	Inspect clutch disc	CL-9
	Pressure plate faulty	Replace clutch cover	
Clutch grabs/chatters	Clutch disc lining oily or worn out	Inspect clutch disc	CL-9
	Pressure plate faulty	Replace clutch cover	
	Clutch linkage binding	Repair as necessary	
	Engine mounts loose	Repair as necessary	
Clutch pedal spongy	Release cable faulty	Replace release cable	CL-6
Clutch noisy	Loose part inside housing	Repair as necessary	
	Release bearing worn or dirty	Replace release bearing	CL-10
	Pilot bearing worn	Replace pilot bearing	CL-10
	Release cable broken	Replace release cable	CL-6
	Release 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

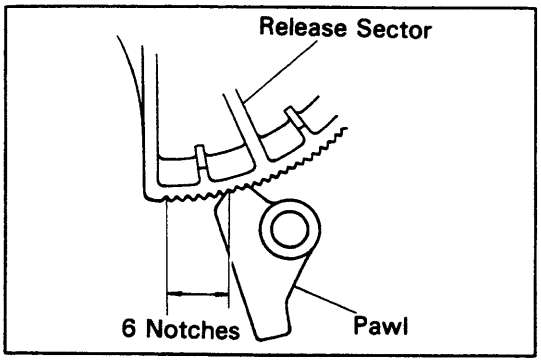
(a) Loosen the lock nut and turn the adjusting bolt until the height is correct.

(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 – 28 mm (0.08 – 1.10 in.)



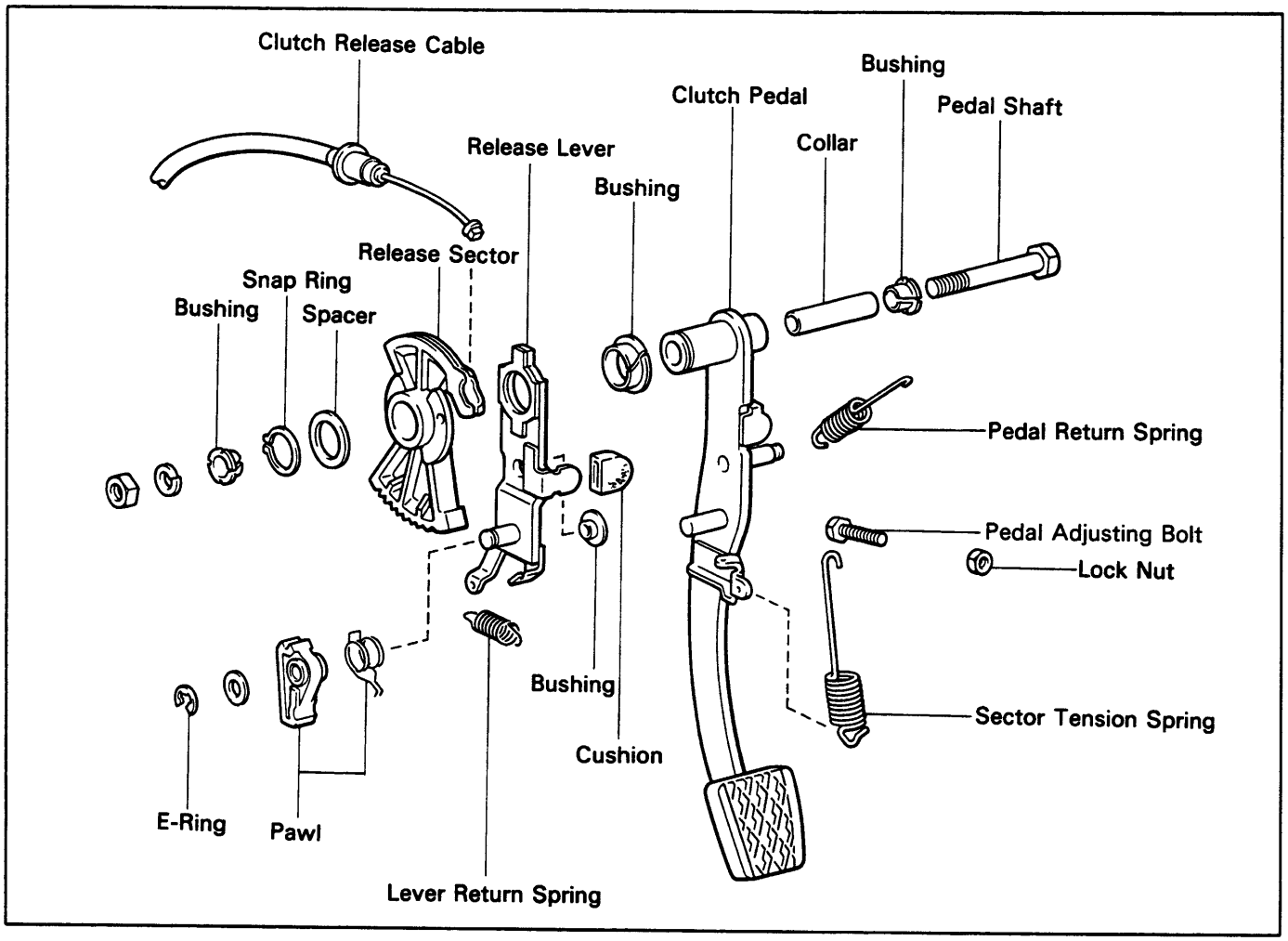
4. CHECK RELEASE SECTOR AND PAWL POSITION

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

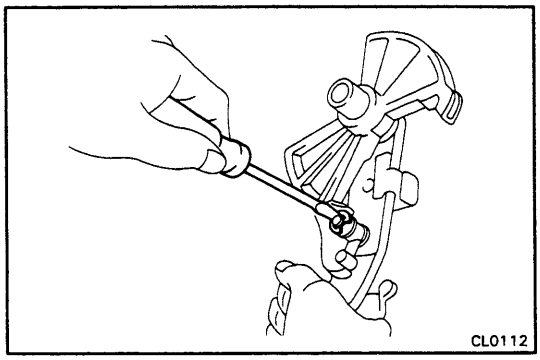


REMOVAL OF CLUTCH PEDAL

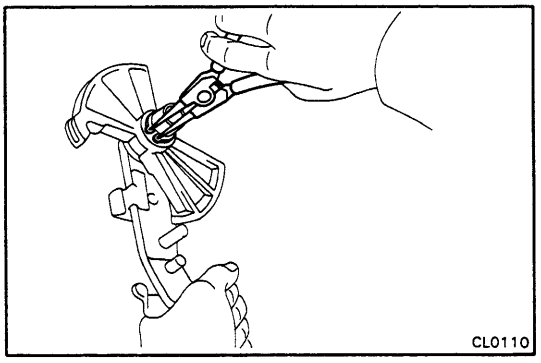
1. **REMOVE PEDAL RETURN SPRING**
2. **REMOVE SECTOR TENSION SPRING**
3. **REMOVE CLUTCH PEDAL**
   (a) Remove the pedal shaft and nut.
   (b) Disconnect the release cable from the release sector and remove the pedal.

DISASSEMBLY OF CLUTCH PEDAL

1. **REMOVE PEDAL SHAFT COLLAR AND BUSHINGS**
2. **REMOVE RELEASE LEVER RETURN SPRING**



3. **REMOVE PAWL**
   (a) Using a screwdriver, remove the E-ring and washer.
   (b) Remove the pawl together with the spring.



4. **REMOVE RELEASE SECTOR AND LEVER**
   Using snap ring pliers, remove the snap ring, spacer, release sector, lever and bushings.

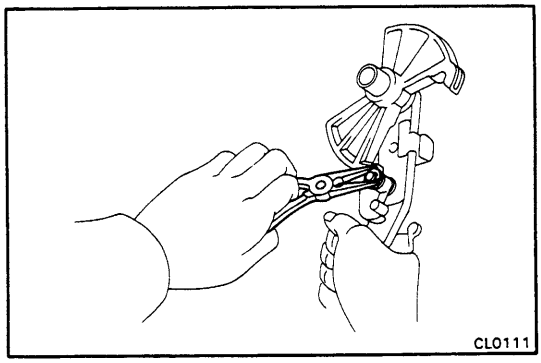
ASSEMBLY OF CLUTCH PEDAL

(See page CL-4)

NOTE: Coat MP grease to all bushings before assembly.

1. **INSTALL RELEASE LEVER AND SECTOR**
   (a) Install new bushings, the release 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 RELEASE 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 release 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 N·m)

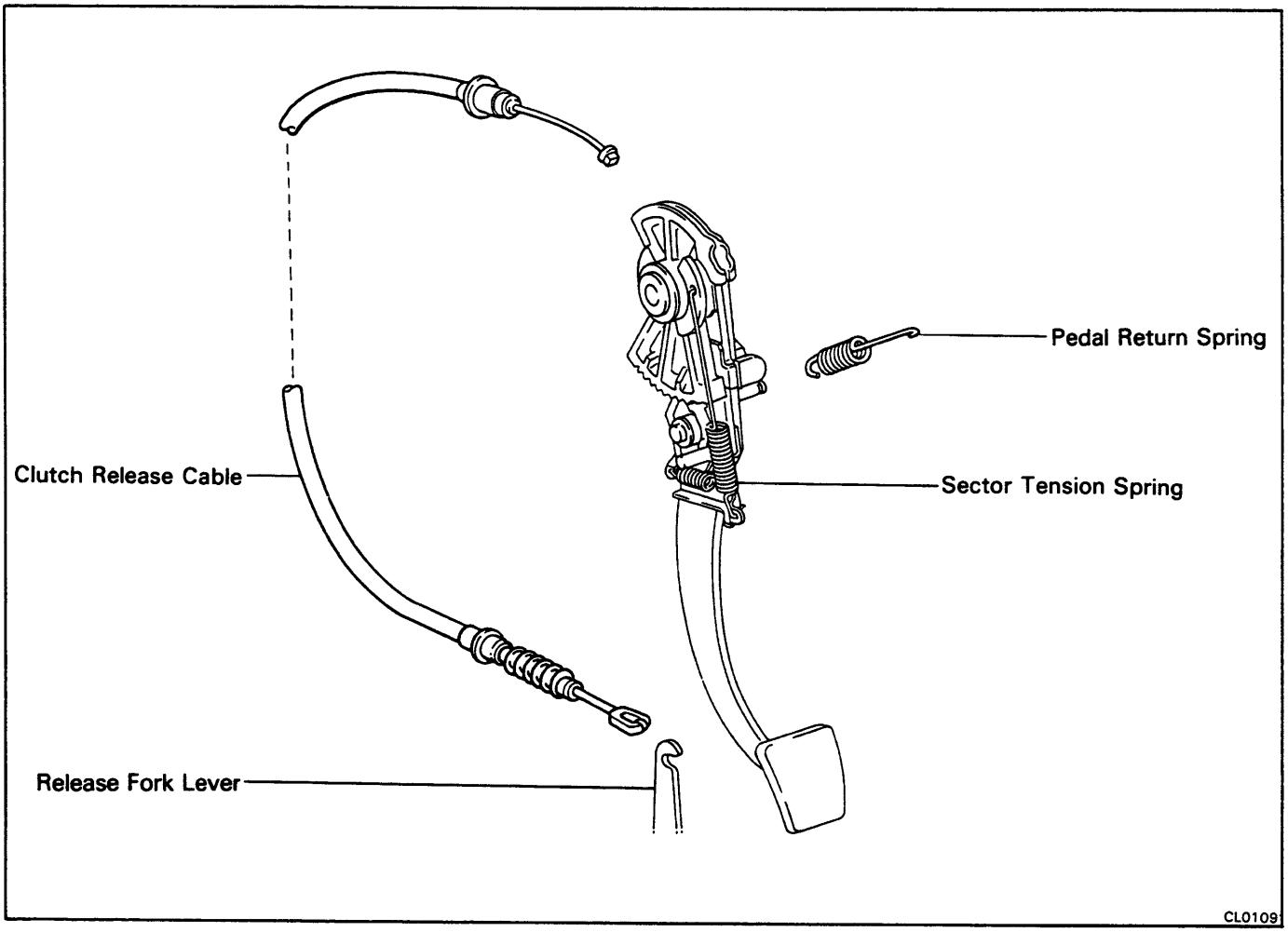
2. **INSTALL SECTOR TENSION SPRING**

3. **INSTALL PEDAL RETURN SPRING**

4. **CHECK AND ADJUST CLUTCH PEDAL**
   (See page CL-3)

CLUTCH RELEASE CABLE

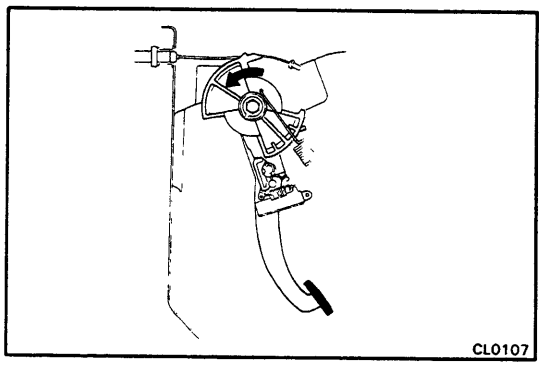
COMPONENTS



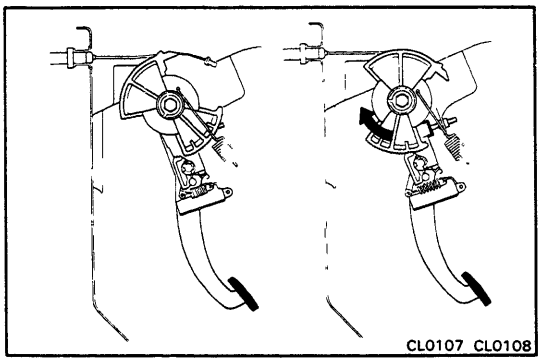
REMOVAL OF CLUTCH RELEASE CABLE

1. **DISCONNECT SECTOR TENSION SPRING FROM CLUTCH PEDAL**

2. **DISCONNECT CLUTCH RELEASE CABLE FROM FORK LEVER**



3. **REMOVE CLUTCH RELEASE CABLE**
   (a) Turn the release sector toward the front side and disconnect the release cable from the release sector.
   (b) Remove the release cable.



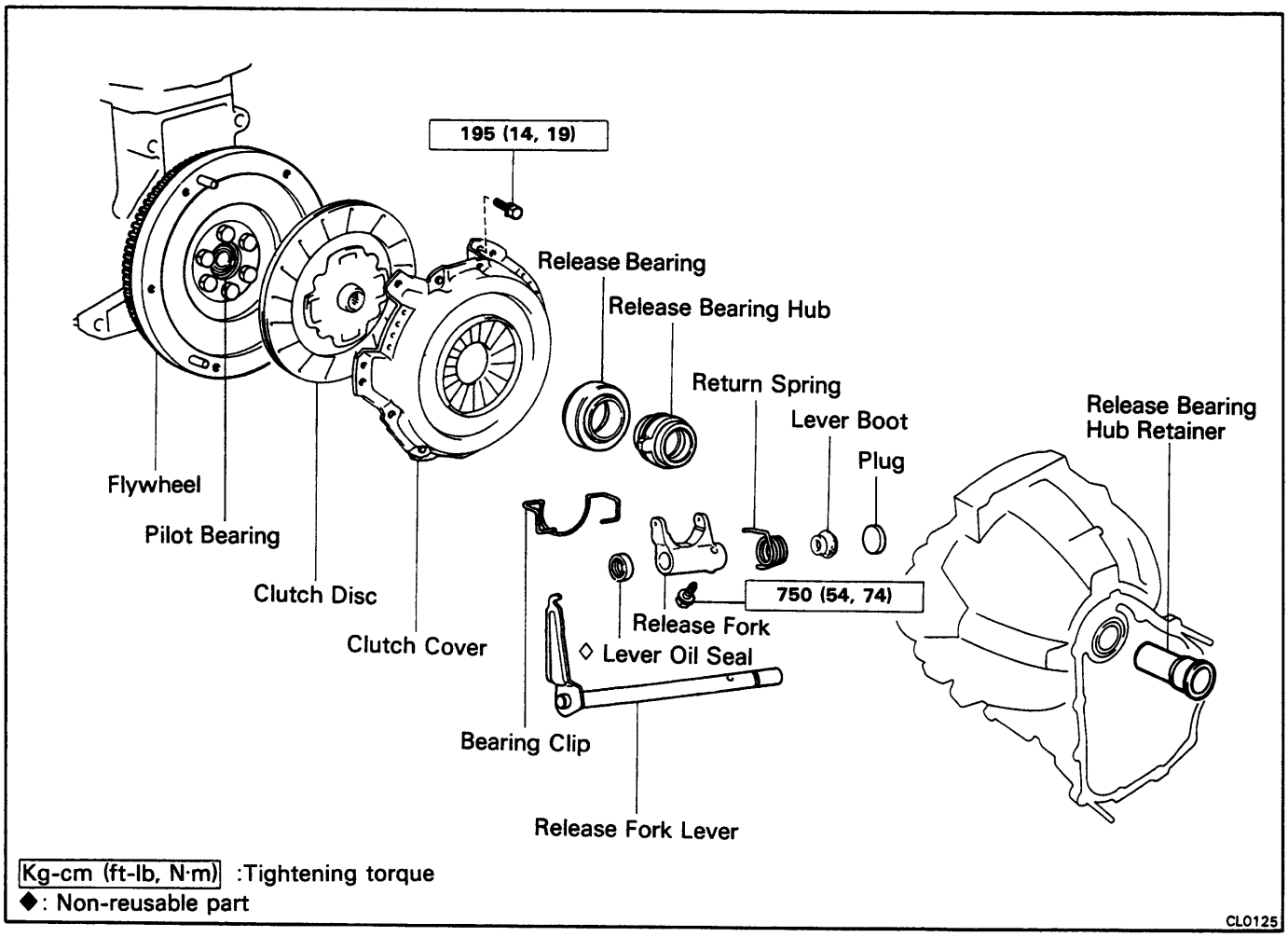
INSTALLATION OF CLUTCH RELEASE CABLE

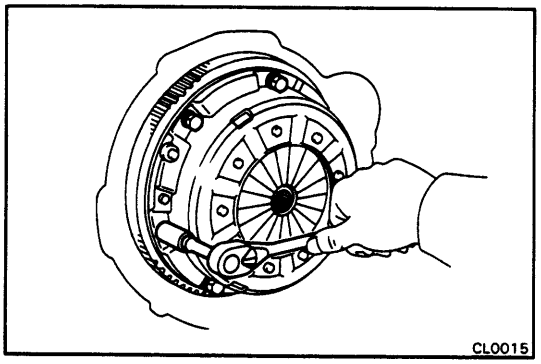
(See page CL-6)

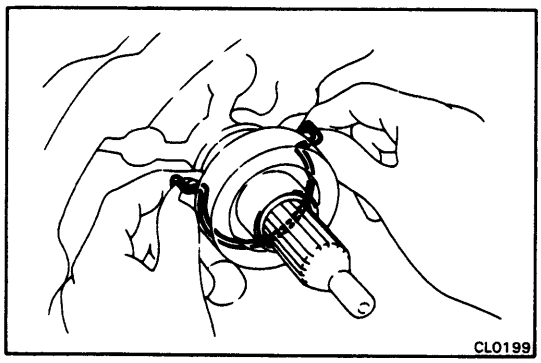
1. **CONNECT CLUTCH RELEASE CABLE IN PEDAL**
   (a) Run the release cable through the hole in the floorboard.
   (b) Turn the release sector, and connect the release cable in the groove of it.
2. **CONNECT CLUTCH RELEASE CABLE IN FORK LEVER**
3. **CONNECT PEDAL TENSION SPRING**
4. **CHECK PEDAL FREEPLAY (See page CL-3)**
5. **CHECK CLUTCH RELEASE SECTOR AND PAWL POSITION (See page CL-3)**

CLUTCH UNIT

COMPONENTS







REMOVAL OF CLUTCH UNIT

1. **REMOVE TRANSAXLE (See page TA-4)**

   NOTE: Do not drain the gear oil.

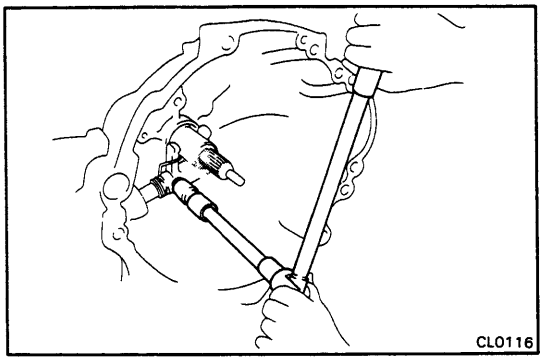
2. **REMOVE CLUTCH COVER AND DISC**

   (a) Loosen each mount bolt one turn at a time until spring tension is released.

   (b) Remove the mount bolts, and pull off the clutch assembly.

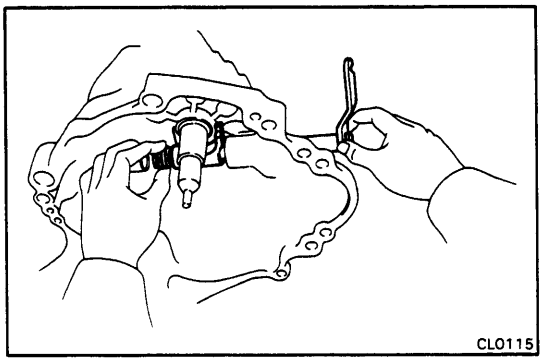
3. **REMOVE RELEASE BEARING AND HUB**

   Remove the bearing clip and pull off the release bearing and hub.



4. **REMOVE RELEASE FORK, RETURN SPRING AND FORK LEVER**

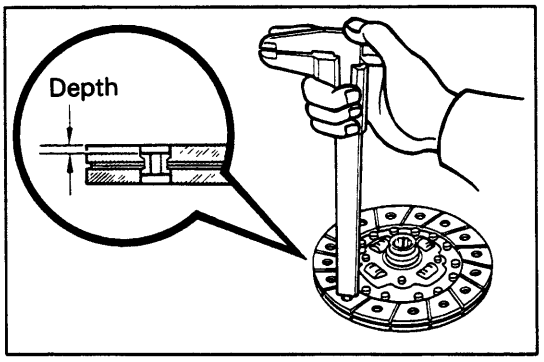
(a) Remove the mount bolt.



(b) Pull out the release fork lever, and remove the release fork and return spring.

(c) Remove the lever boot.

INSPECTION AND REPAIR OF CLUTCH PARTS

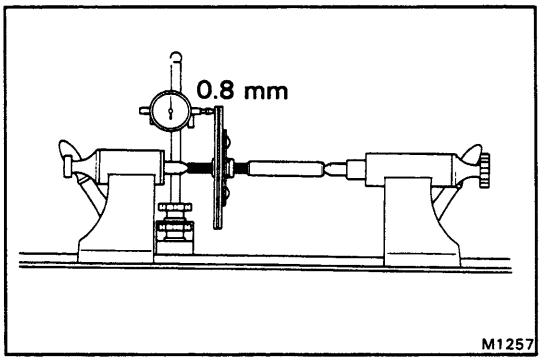


1. **INSPECT CLUTCH DISC FOR WEAR OR DAMAGE**

Using calipers, measure the rivet head depth.

Minimum rivet depth: 0.3 mm (0.012 in.)

If a problem is found, replace the clutch disc.

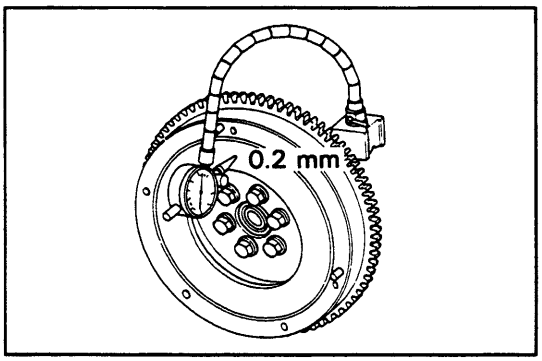


2. **INSPECT CLUTCH DISC RUNOUT**

Using a dial indicator, measure the disc runout.

Maximum runout: 0.8 mm (0.031 in.)

If runout is excessive, replace the disc.

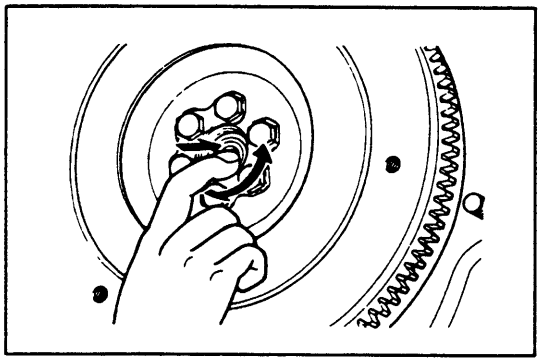


3. **INSPECT FLYWHEEL RUNOUT**

Using a dial indicator, measure the flywheel runout.

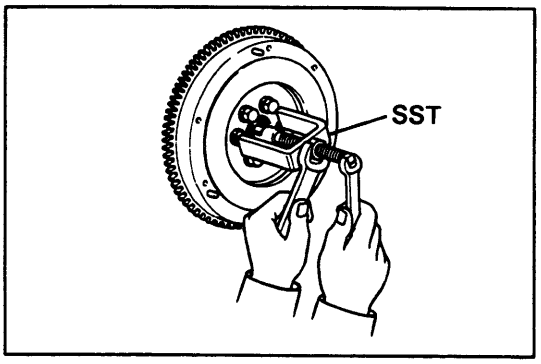
Maximum runout: 0.2 mm (0.008 in.)

If runout is excessive, repair or replace the flywheel.



4. INSPECT PILOT BEARING

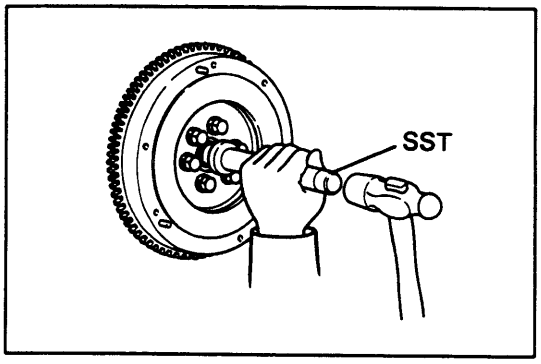
Turn the bearing by hand while applying force in the axial direction.



5. IF NECESSARY, REPLACE PILOT BEARING

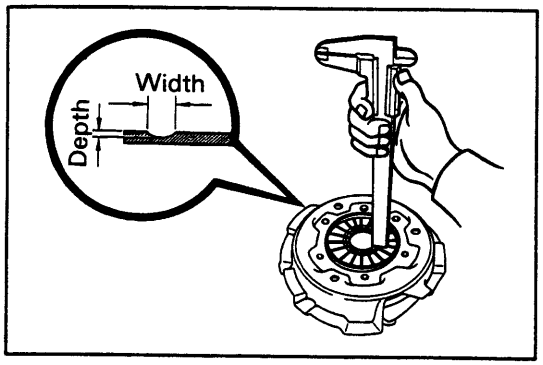
(a) Using SST, remove the pilot bearing.

SST 09303-35011



(b) Using SST, install a new pilot bearing.

SST 09304-30012

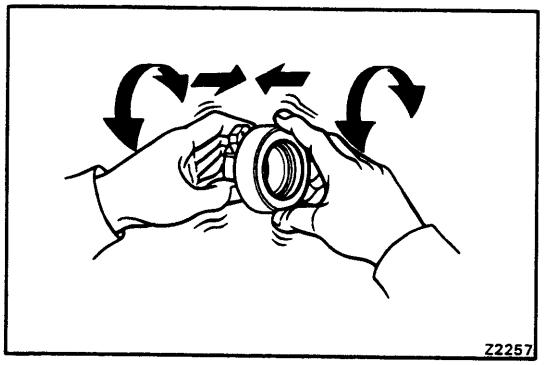


6. INSPECT DIAPHRAGM SPRING FOR WEAR

Using calipers, measure the diaphragm spring for depth and width of wear.

Maximum: Depth 0.6 mm (0.024 in.)
Width 5.0 mm (0.197 in.)

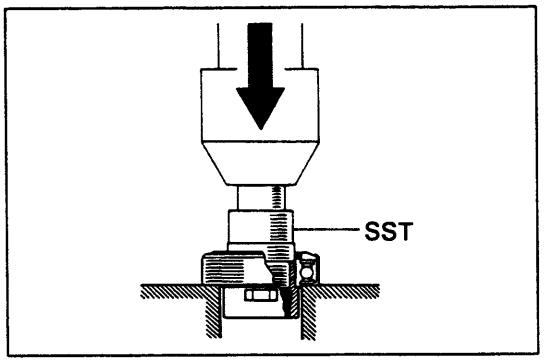
If necessary, replace the clutch cover.



7. INSPECT RELEASE BEARING

Turn the bearing by hand while applying force in the axial direction.

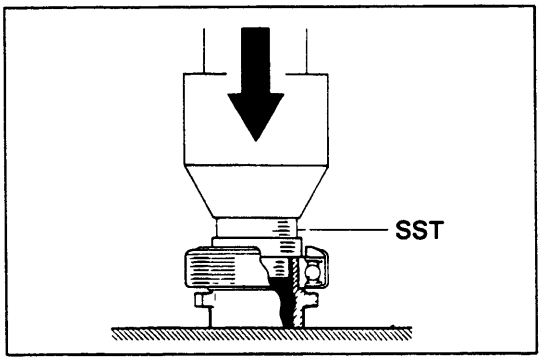
NOTE: The bearing is permanently lubricated and requires no cleaning or lubrication.



8. IF NECESSARY, REPLACE RELEASE BEARING

(a) Using a press and SST, press the release bearing from the hub.

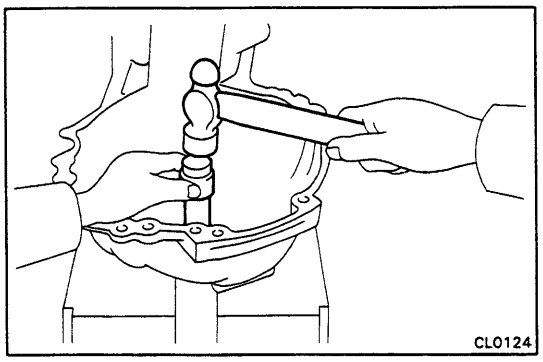
SST 09315-00010



(b) Using a press and SST, press a new release bearing into the hub.

SST 09315-00010

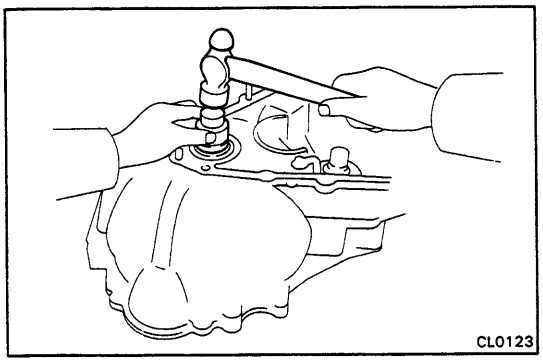
(c) After installing the bearing, check that there is no drag on the bearing when it is turned under pressure.



9. IF NECESSARY, REPLACE RELEASE BEARING HUB RETAINER

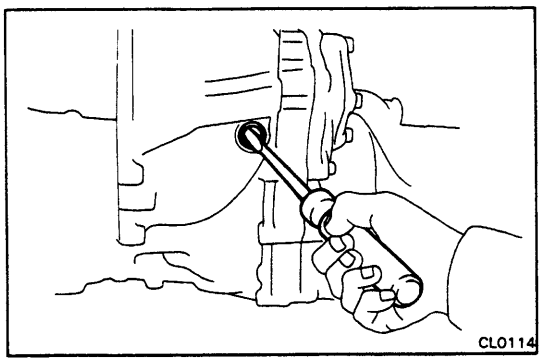
(a) Using SST and a hammer, tap out the hub retainer.

SST 09315-00010



(b) Using SST and a hammer, tap in a new hub retainer.

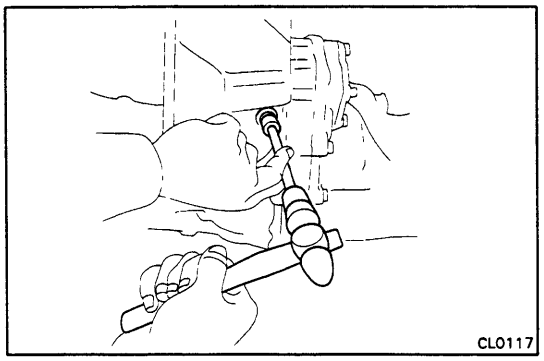
SST 09315-00010



REPLACEMENT OF OIL SEAL

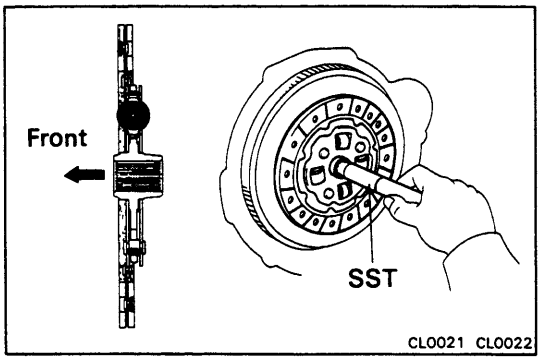
REPLACE OIL SEAL

(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.)



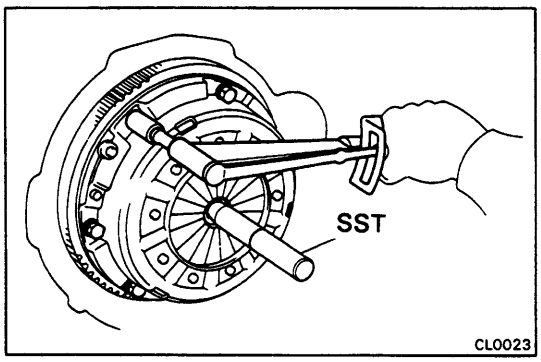
INSTALLATION OF CLUTCH UNIT

(See page CL-8)

1. INSTALL DISC ON FLYWHEEL

Using SST, install the clutch on the flywheel.

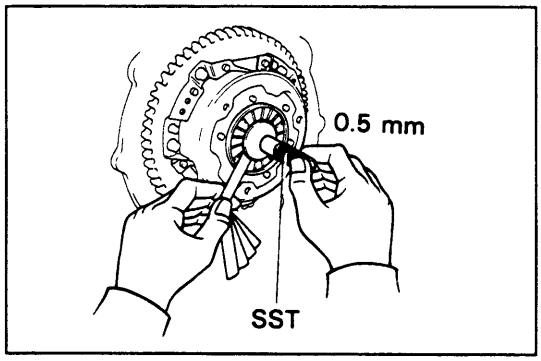
SST 09301-36010



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)



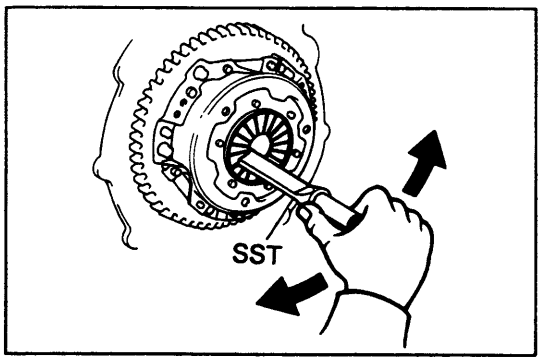
3. CHECK DIAPHRAGM SPRING TIP ALIGNMENT

Using a feeler gauge and SST, measure the gap between the spring tips and the tool.

SST 09302-20021

Maximum gap: 0.5 mm (0.020 in.)

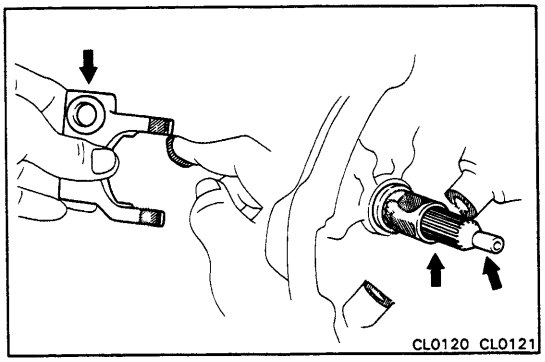
If gap is excessive, adjust as follows.



4. IF NECESSARY, ADJUST SPRINGS

Using SST, bend the springs until alignment is correct.

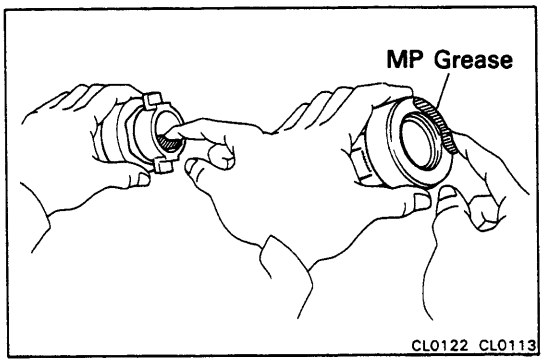
SST 09333-00012



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

(a) Apply molybdenum disulphide lithium base grease to the following parts:
- Release fork and hub contact points
- Release fork and fork lever contact points
- Release fork lever and bushings contact points
- Release fork lever and oil seal contact points
- Release bearing hub inside
- Clutch disc spline

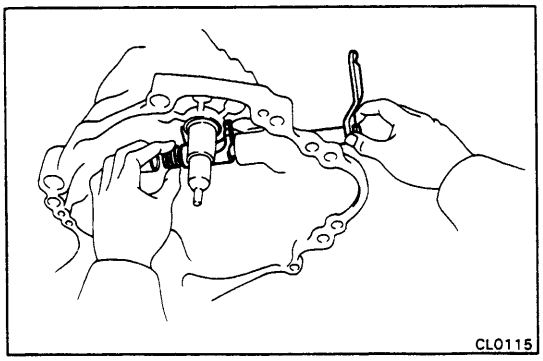
(b) Apply MP grease to the following parts:
- Front of the release bearing
- Input shaft end



6. INSTALL RELEASE FORK, RETURN SPRING AND FORK LEVER

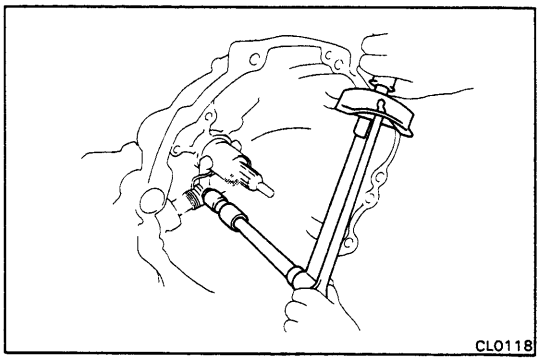
(a) Install the lever boot.

(b) Put in the release fork lever and install the release fork and return spring.



(c) Install and torque the mount bolt.

Torque: 750 kg-cm (54 ft-lb, 74 N·m)

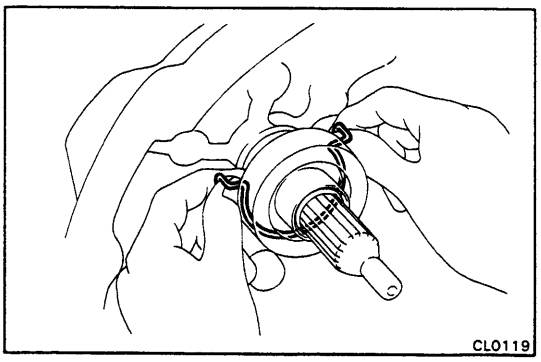


7. INSTALL RELEASE BEARING AND HUB

Insert the bearing and hub and install the bearing clip.

8. INSTALL TRANSAXLE (See page TA-6)

9. CHECK AND ADJUST CLUTCH PEDAL (See page CL-3)



MANUAL TRANSAXLE

	Page
TROUBLESHOOTING	MT-2
MANUAL TRANSAXLE	MT-3
Removal of Transaxle (FWD)	MT-3
Installation of Transaxle (FWD)	MT-5
Removal of Transaxle (4WD)	MT-7
Installation of Transaxle (4WD)	MT-9
MANUAL TRANSMISSION	MT-11
Removal of Transmission (FWD)	MT-11
Removal of Transmission (4WD)	MT-13
Components	MT-15
Disassembly of Transmission	MT-20
Inspection of Transmission Components	MT-34
Replacement of Transmission components	MT-36
Assembly of Transmission	MT-45
Installation of Transmission (FWD)	MT-65
Installation of Transmission (4WD)	MT-68
DIFFERENTIAL	MT-71

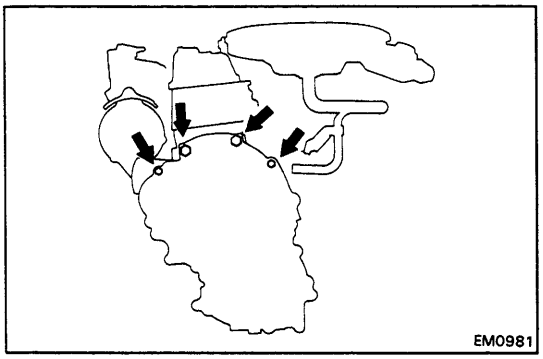
TROUBLESHOOTING

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

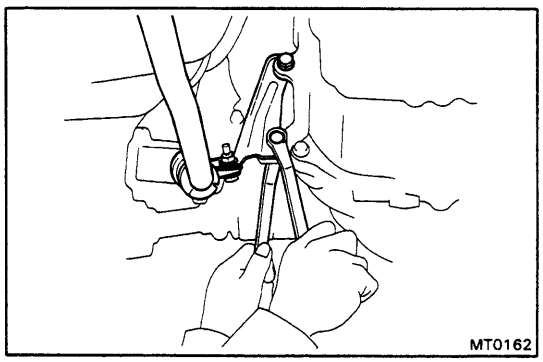
Problem	Possible cause	Remedy	Page
Hard to shift oil will not shift	Lack of grease on control linkage	Repair as necessary	
	Transmission faulty	Disassemble and inspect transmission	MT-11
Jumps out of gear	Transmission faulty	Disassemble and inspect transmission	MT-11



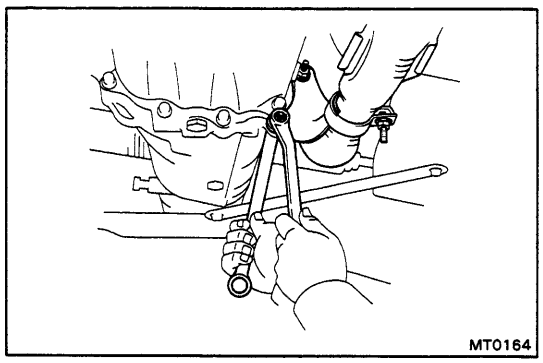
MANUAL TRANSAXLE

REMOVAL OF TRANSAXLE (FWD)

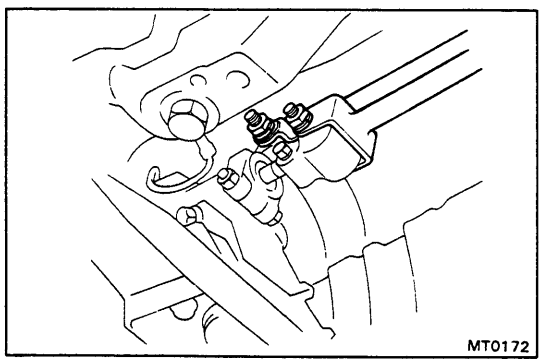
1. DISCONNECT CABLE FROM NEGATIVE TERMINAL OF BATTERY
2. REMOVE TRANSAXLE UPPER MOUNT BOLTS
3. REMOVE BOTH DRIVE SHAFTS (See page FA-13)
4. RAISE VEHICLE
   CAUTION: Be sure the vehicle is securely supported.
5. DISCONNECT CLUTCH CABLE (See page CL-4)



6. (Fed.)
   REMOVE CONVERTER AIR INLET PIPE



7. REMOVE EXHAUST FRONT PIPE

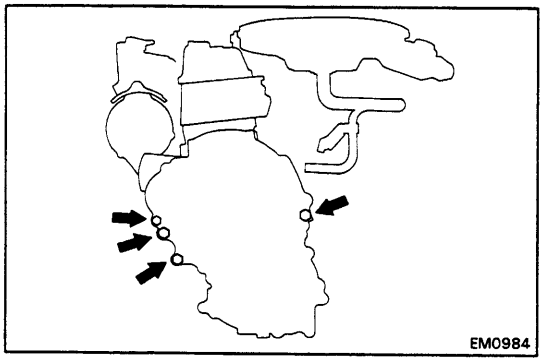


8. DISCONNECT GEAR SHIFTING ROD
9. DISCONNECT SHIFT LEVER HOUSING ROD

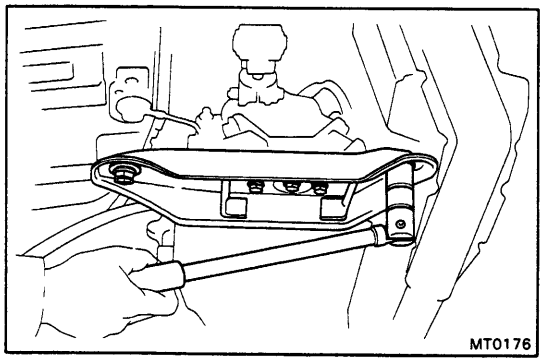
10. DISCONNECT BACK-UP LIGHT SWITCH CONNECTOR

11. DISCONNECT SPEEDOMETER CABLE

12. REMOVE RIGHT STIFFENER PLATE



13. REMOVE TRANSAXLE LOWER MOUNT BOLTS



14. REMOVE REAR SUPPORT MEMBER

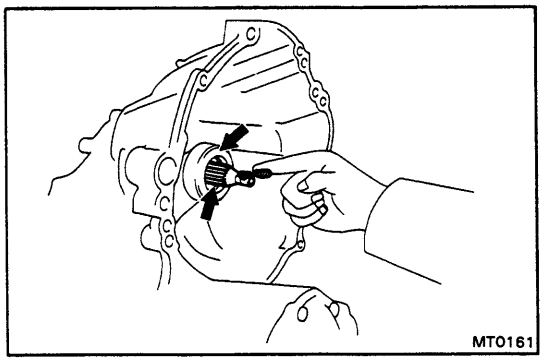
(a) Put a wooden block between the engine and dash panel because the IIA will make contact with the brake booster when the rear support member is removed.

(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.

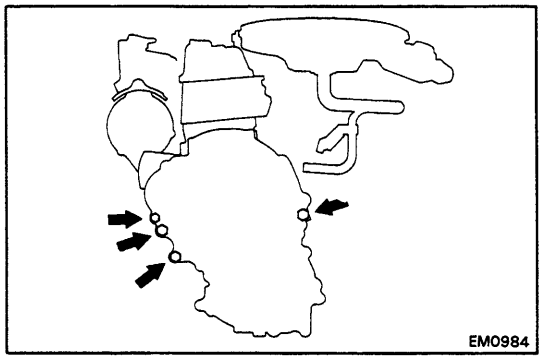


INSTALLATION OF TRANSAXLE (FWD)

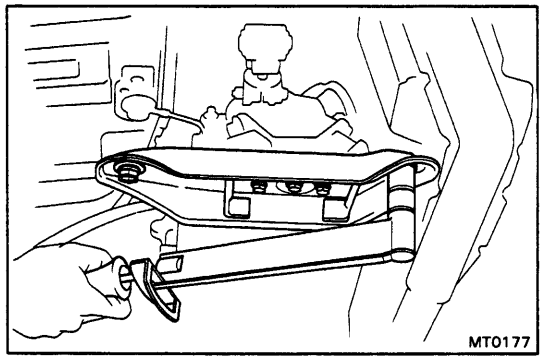
1. **APPLY MOLYBDENUM DISULPHIDE LITHIUM BASE GREASE (NLGI NO. 2) OR MP GREASE TO INPUT SHAFT**
   (a) Apply molybdenum disulphide lithium base grease to the input shaft spline.
   (b) Apply MP grease to the input shaft end.
   (c) Apply MP grease to the front of the release bearing.

2. **ALIGN TRANSAXLE AT INSTALLATION POSITION**

3. **CONNECT TRANSAXLE TO ENGINE**
   Align the input shaft spline 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 N·m)
   17 mm bolt head 600 kg-cm (43 ft-lb, 59 N·m)

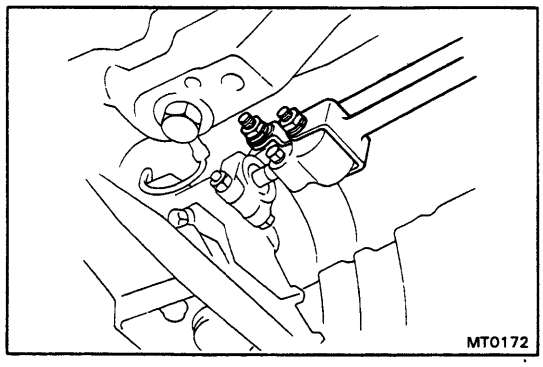


5. **INSTALL REAR SUPPORT MEMBER**
   Torque: 970 kg-cm (70 ft-lb, 95 N·m)

6. **INSTALL RIGHT STIFFENER PLATE**
   Torque: 400 kg-cm (29 ft-lb, 39 N·m)

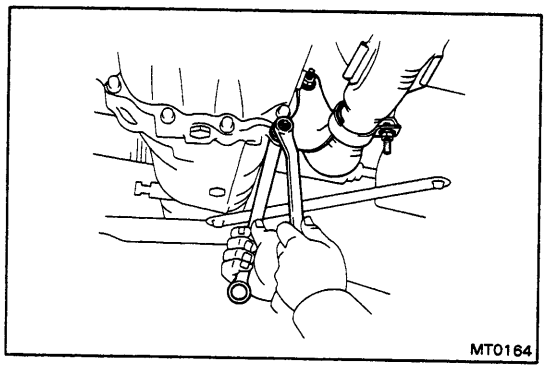
7. **CONNECT SPEEDOMETER CABLE**

8. **CONNECT BACK-UP LIGHT SWITCH**



9. **CONNECT SHIFT LEVER HOUSING ROD**

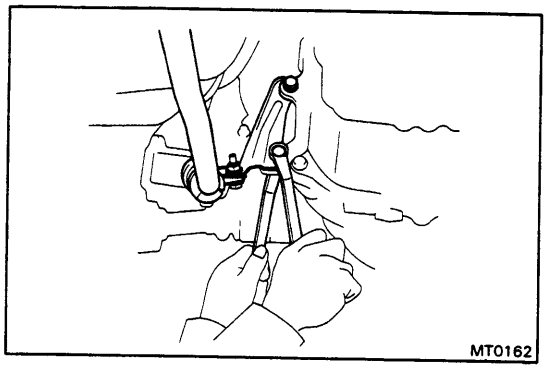
10. **CONNECT GEAR SHIFTING ROD**



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)

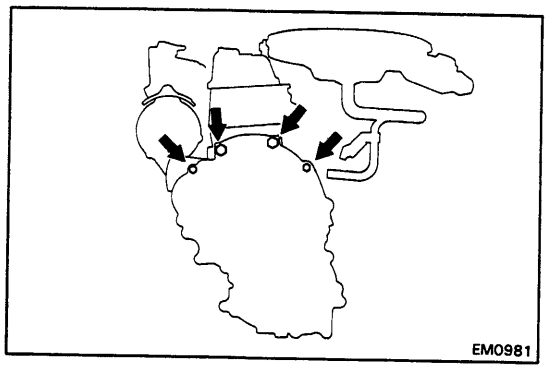


12. **(Fed.)**
INSTALL CONVERTER AIR INLET PIPE

13. **CONNECT CLUTCH CABLE (See page CL-7)**

14. **LOWER VEHICLE**

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 GEAR OIL**

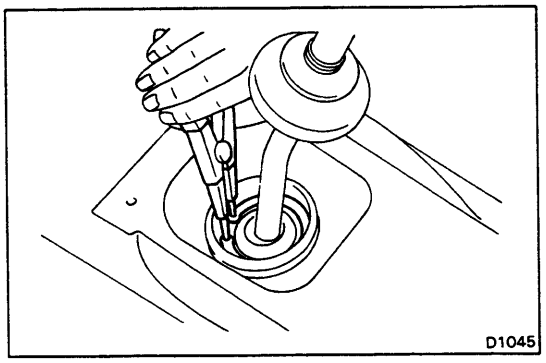
If necessary, fill with gear oil (See page MT-66)

18. **CONNECT CABLE TO NEGATIVE TERMINAL OF BATTERY**

19. **CHECK FRONT WHEEL ALIGNMENT (See page FA-3)**

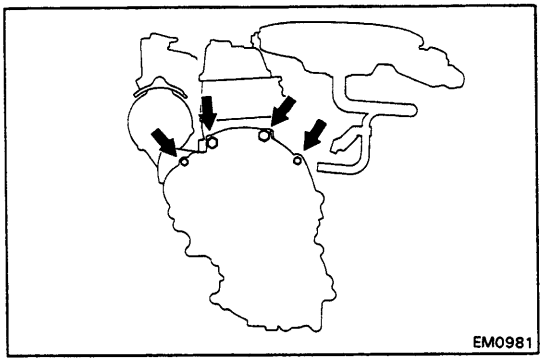
20. **PERFORM ROAD TEST**

21. **CHECK FOR GEAR OIL LEAKAGE**

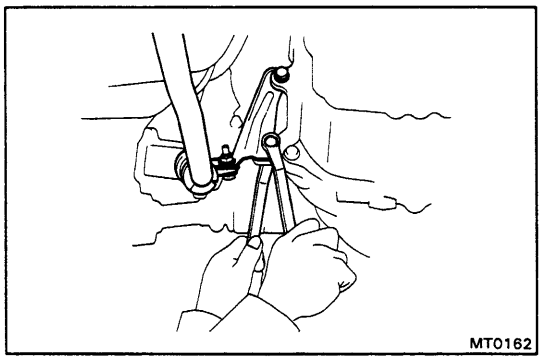

D1045

REMOVAL OF TRANSAXLE (4WD)

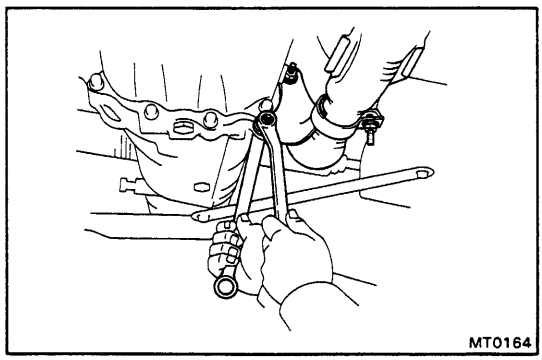
1. **DISCONNECT CABLE FROM NEGATIVE TERMINAL OF BATTERY**
2. **REMOVE CONSOLE BOX**
3. **REMOVE SHIFT LEVER FROM INSIDE OF VEHICLE**
   Using snap ring pliers, remove the snap ring.


EM0981

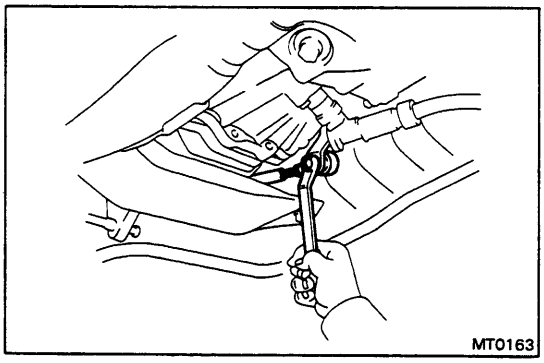
4. **REMOVE TRANSAXLE UPPER MOUNT BOLTS**
5. **REMOVE BOTH SHAFTS**
6. **RAISE VEHICLE**
   CAUTION: Be sure the vehicle is securely supported.
7. **DISCONNECT CLUTCH CABLE (See page CL-4)**
8. **REMOVE PROPELLER SHAFT (See page PR-3)**


MT0162

9. **(Fed.)**
   REMOVE CONVERTER AIR INLET PIPE


MT0164

10. **REMOVE EXHAUST FRONT PIPE**



11. DISCONNECT SELECTING ROD FROM REAR DRIVE SHIFT LINK LEVER

12. DISCONNECT FOLLOWING CONNECTORS:

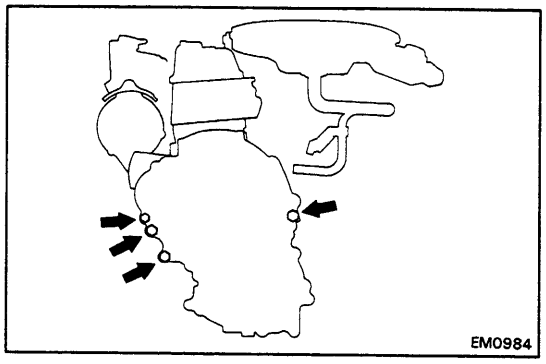
(a) Back-up light switch connector

(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

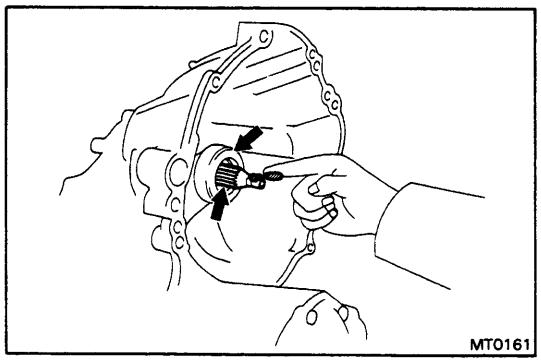
(a) Put a wooden block between the engine and dash panel because the IIA will make contact with the brake booster when the rear support member is removed.

(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.

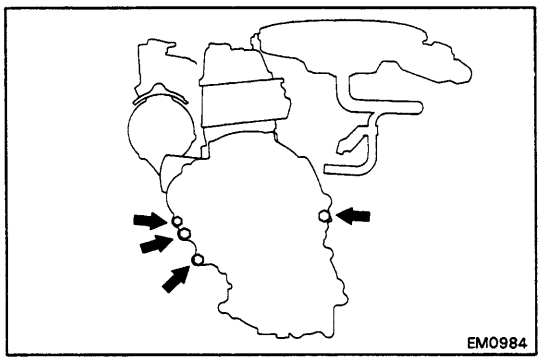


INSTALLATION OF TRANSAXLE (4WD)

1. **APPLY MOLYBDENUM DISULPHIDE LITHIUM BASE GREASE (NLGI NO. 2) OR MP GREASE TO INPUT SHAFT**
   (a) Apply molybdenum disulphide lithium base grease to the input shaft spline.
   (b) Apply MP grease to the input shaft end.
   (c) Apply MP grease to the front of the release bearing.

2. **ALIGN TRANSAXLE INSTALLATION POSITION**

3. **INSTALL TRANSAXLE TO ENGINE**
   Align the input shaft spline with the clutch disc, and push the transmission fully into position.



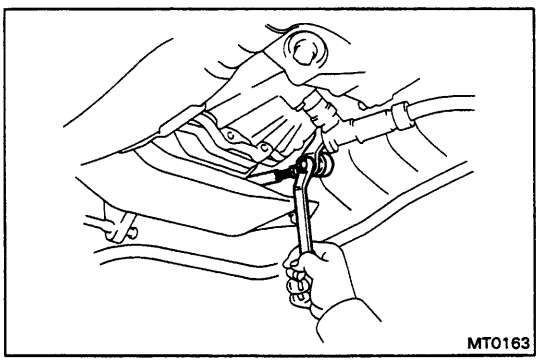
4. **INSTALL TRANSAXLE LOWER MOUNT BOLTS**
   Install the starter on the left side of the transaxle case.
   Torque:
   14 mm bolt head 400 kg-cm (29 ft-lb, 39 N·m)
   17 mm bolt head 600 kg-cm (43 ft-lb, 59 N·m)

5. **INSTALL REAR SUPPORT MEMBER**
   Torque: 970 kg-cm (70-lb, 95 N·m)

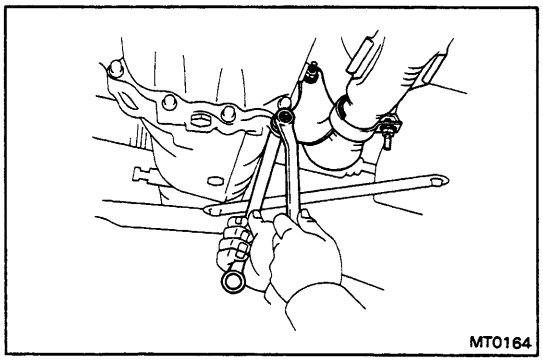
6. **INSTALL RIGHT STIFFENER PLATE**
   Torque: 400 kg-cm (29 ft-lb, 39 N·m)

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



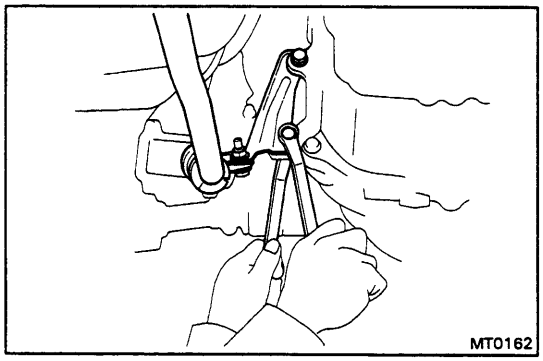
9. **CONNECT SELECTING ROD TO REAR DRIVE SHIFT LINK LEVER**



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

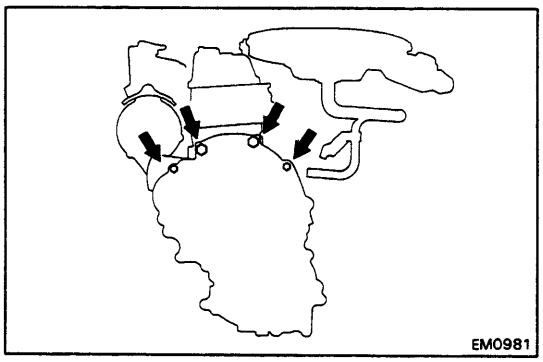
12. **INSTALL PROPELLER SHAFT (See page PR-6)**

    Torque: 430 kg-cm (31 ft-lb, 42 N·m)

13. **CONNECT CLUTCH CABLE (See page CL-7)**

14. **LOWER VEHICLE**

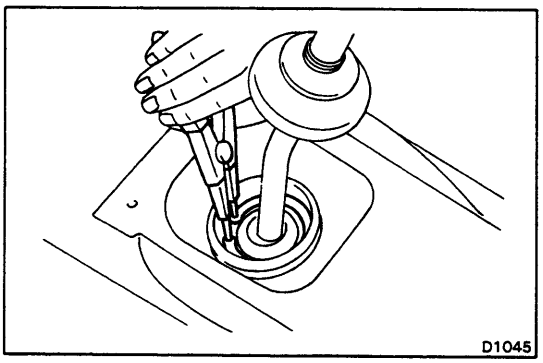
15. **INSTALL BOTH DRIVE SHAFTS (See page FA-18)**



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 CONSOLE BOX**

19. **CHECK GEAR OIL**

    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)**

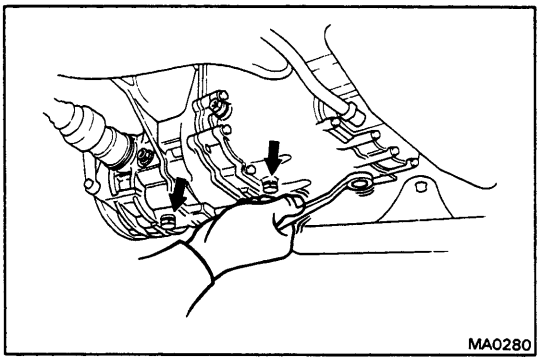
22. **PERFORM ROAD TEST**

23. **CHECK FOR GEAR OIL LEAKAGE**

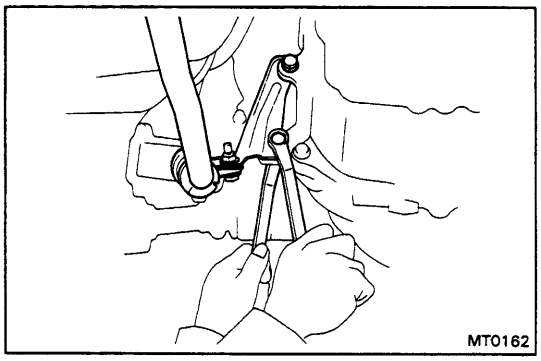
MANUAL TRANSMISSION

REMOVAL OF TRANSMISSION (FWD)

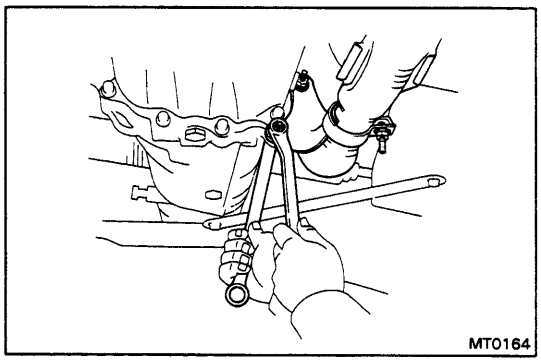
1. **DISCONNECT CABLE FROM NEGATIVE TERMINAL OF BATTERY**
2. **DISCONNECT AIR CLEANER INLET DUCT**


MA0280

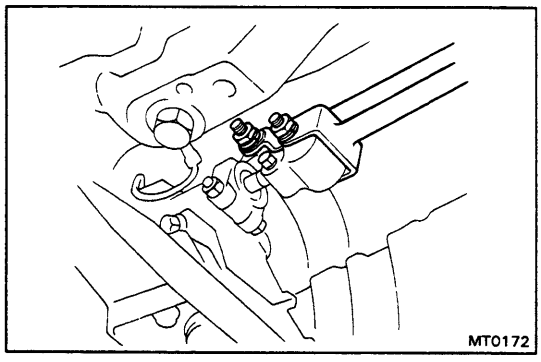
3. **RAISE VEHICLE**
   CAUTION: Be sure the vehicle is securely supported.
4. **DRAIN GEAR OIL**
   Remove the three drain plugs and drain the gear oil.


MT0162

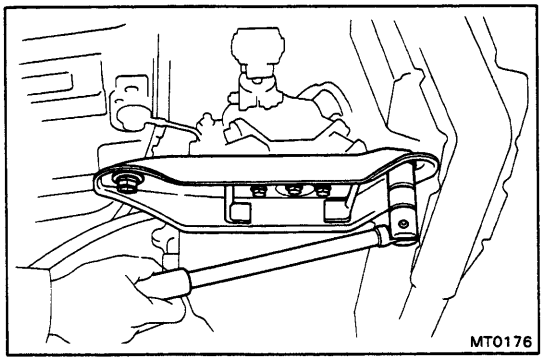
5. **(Fed.)**
   REMOVE CONVERTER AIR INLET PIPE


MT0164

6. **REMOVE EXHAUST FRONT PIPE**


MT0172

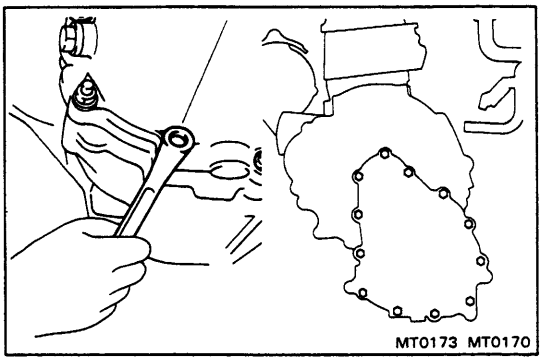
7. **DISCONNECT GEAR SHIFTING ROD**
8. **DISCONNECT SHIFT LEVER HOUSING ROD**
9. **DISCONNECT BACK-UP LIGHT SWITCH CONNECTOR**
10. **DISCONNECT SPEEDOMETER CABLE**



11. REMOVE REAR SUPPORT MEMBER

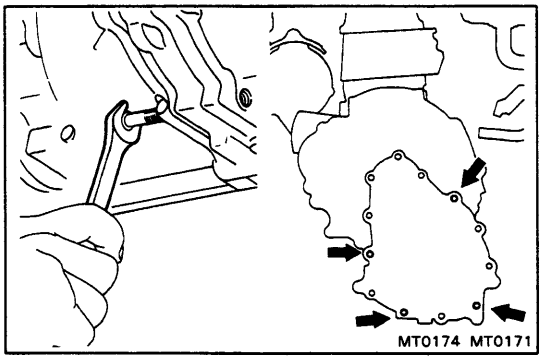
(a) Put a wooden block between the engine and dash panel because the IIA will make contact with the brake booster when the rear support member is removed.

(b) Remove the four bolts and rear support member.



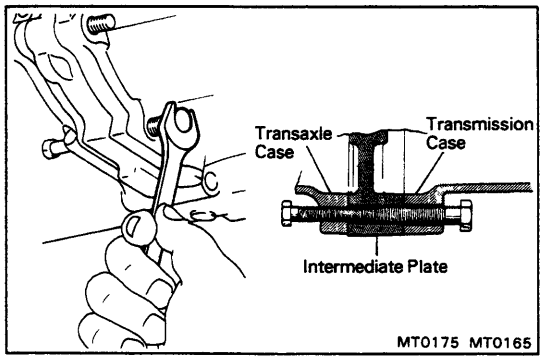
12. REMOVE TRANSMISSION FROM TRANSAXLE CASE

(a) Remove the ten bolts and two nuts.



(b) From the transaxle side, install four bolts about an equal distance apart at the locations indicated by arrows in the figure.

Bolt size: 8 mm ϕ (0.31 in. ϕ)
Pitch: 1.25 mm (0.0492 in.)



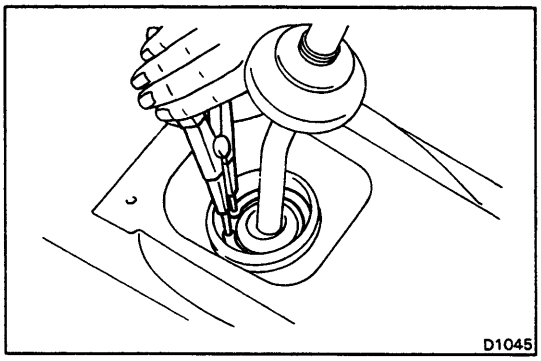
(c) Separate the transmission by turning the four bolts a little at a time on the transmission case side.

Bolt size: 10 mm ϕ (0.39 in. ϕ)
Pitch: 1.25 mm (0.0492 in.)

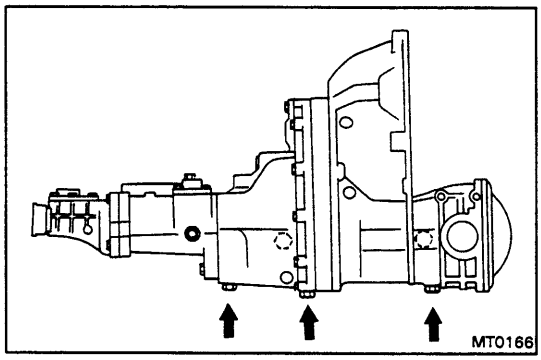
(d) Remove the transmission from the transaxle.

REMOVAL OF TRANSMISSION (4WD)

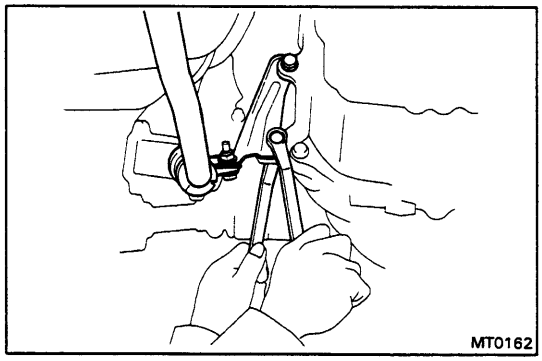
1. **DISCONNECT CABLE FROM NEGATIVE TERMINAL OF BATTE**
2. **DISCONNECT AIR CLEANER INLET DUST**



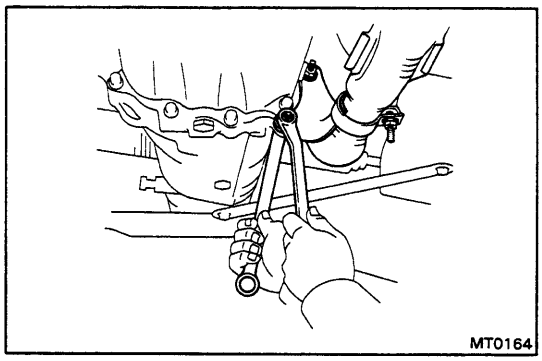
3. **REMOVE CONSOLE BOX**
4. **REMOVE SHIFT LEVER FROM INSIDE OF VEHICLE**



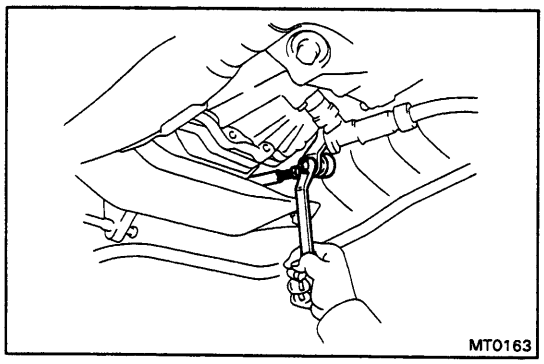
5. **RAISE VEHICLE**
   CAUTION: Be sure the vehicle is securely supported.
6. **DRAIN GEAR OIL**
   Remove the three drain plugs and drain the gear oil.



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

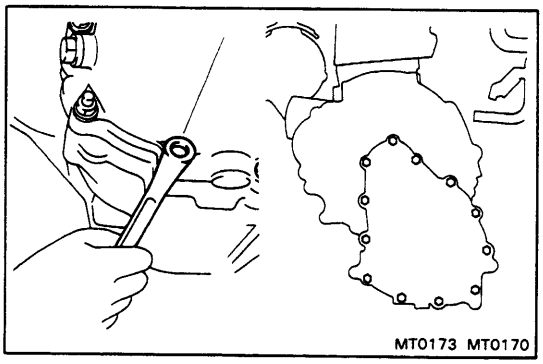
(c) Extra low gear (EL) indicator switch connector

11. DISCONNECT SPEEDOMETER CABLE

12. REMOVE REAR SUPPORT MEMBER

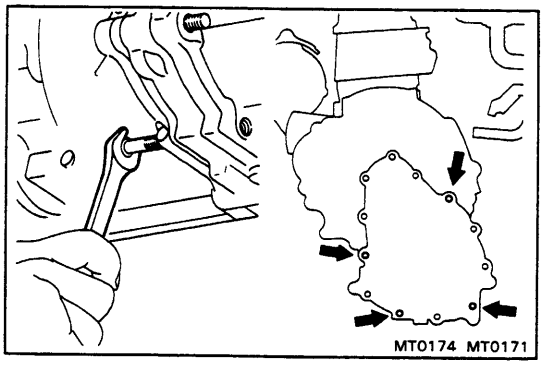
(a) Put a wooden block between the engine and dash panel because the IIA will make contact with the brake booster when the rear support member is removed.

(b) Remove the four bolts and rear support member.


MT0173 MT0170

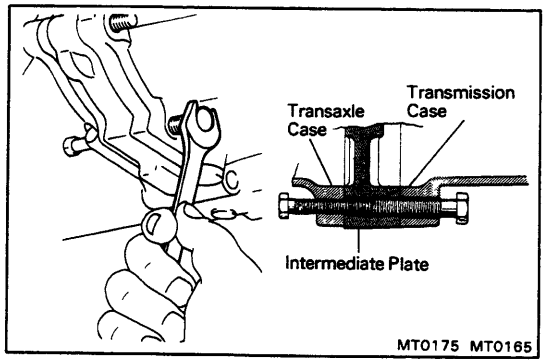
13. REMOVE TRANSMISSION FROM TRANSAXLE CASE

(a) Remove the ten bolts and two nuts.


MT0174 MT0171

(b) From the transaxle side, install four bolts about an equal distance apart at the locations indicated by arrows in the figure.

Bolts size: 8 mm ϕ (0.31 in. ϕ)
Pitch: 1.25 mm (0.0492 in.)



MT0175 MT0165

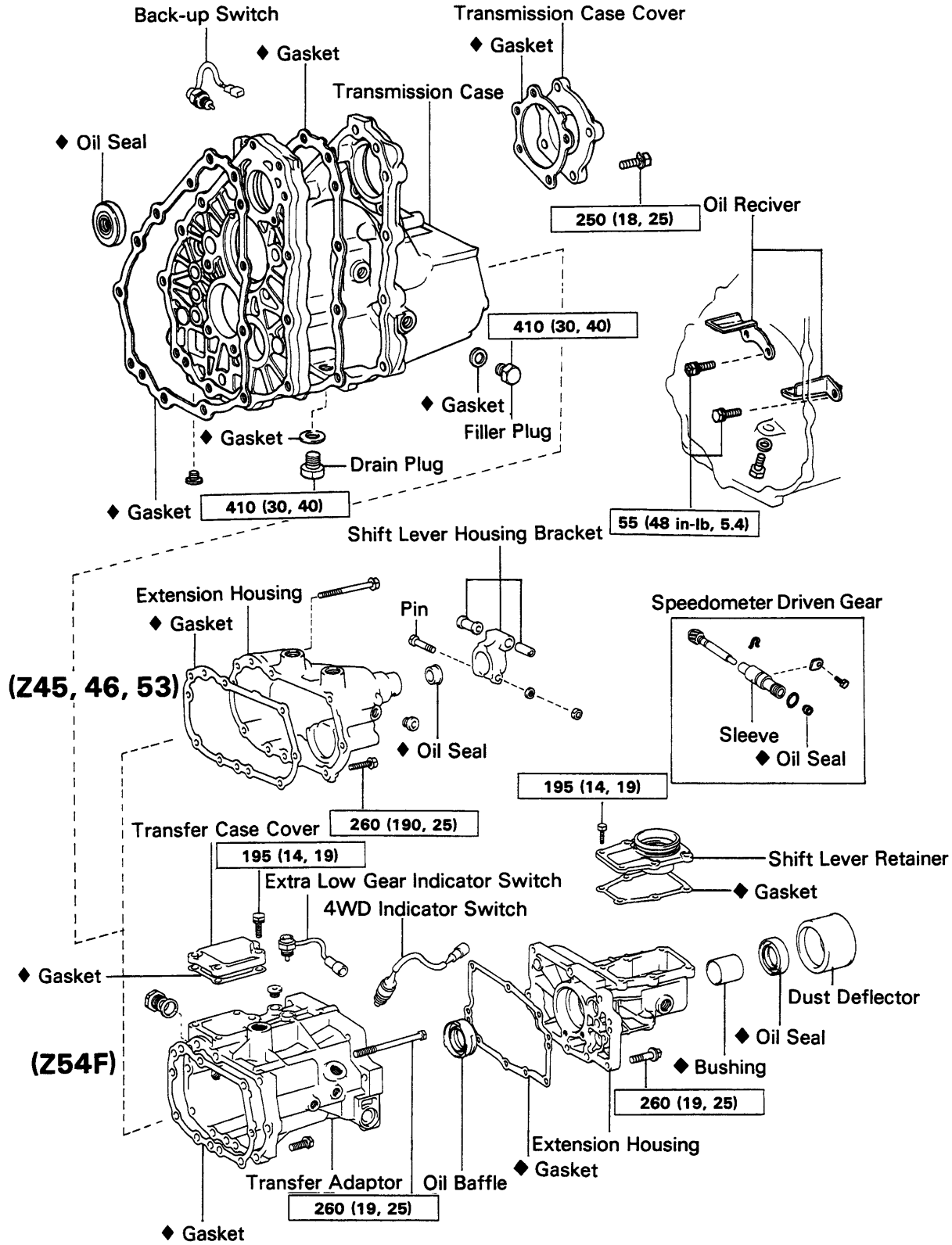
(c) Separate the transmission by turning the four bolts a little at a time on the transmission case side.

Bolts size: 10 mm ϕ (0.39 in. ϕ)
Pitch: 1.25 mm (0.0492 in.)

(d) Remove the transmission from the transaxle.

COMPONENTS

Z45, 46, 53, 54F



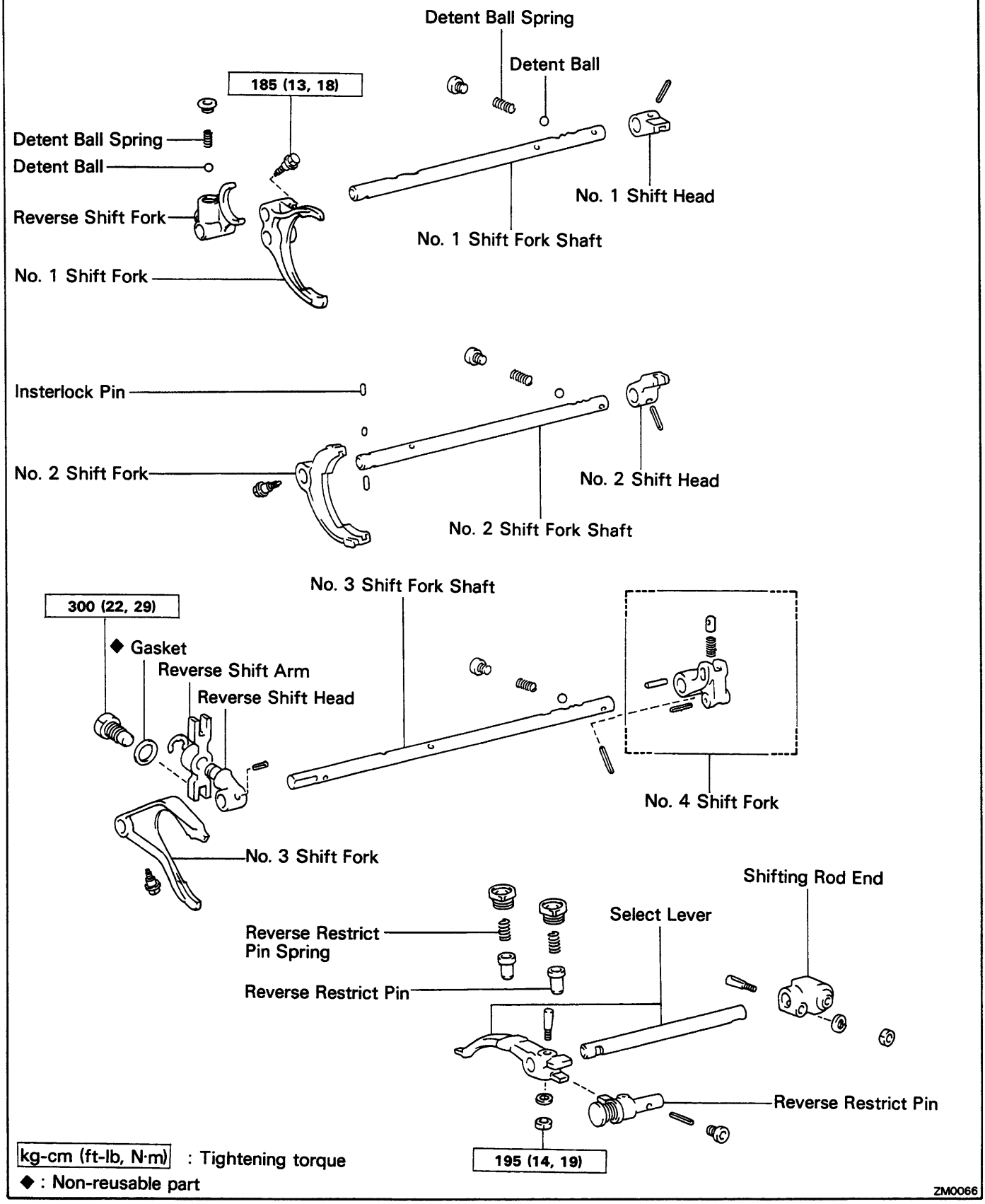
kg-cm (ft-lb, N·m) : Tightening torque

◆ : Non-reusable part

ZM0065

COMPONENTS (Cont'd)

Z45, 46, 53



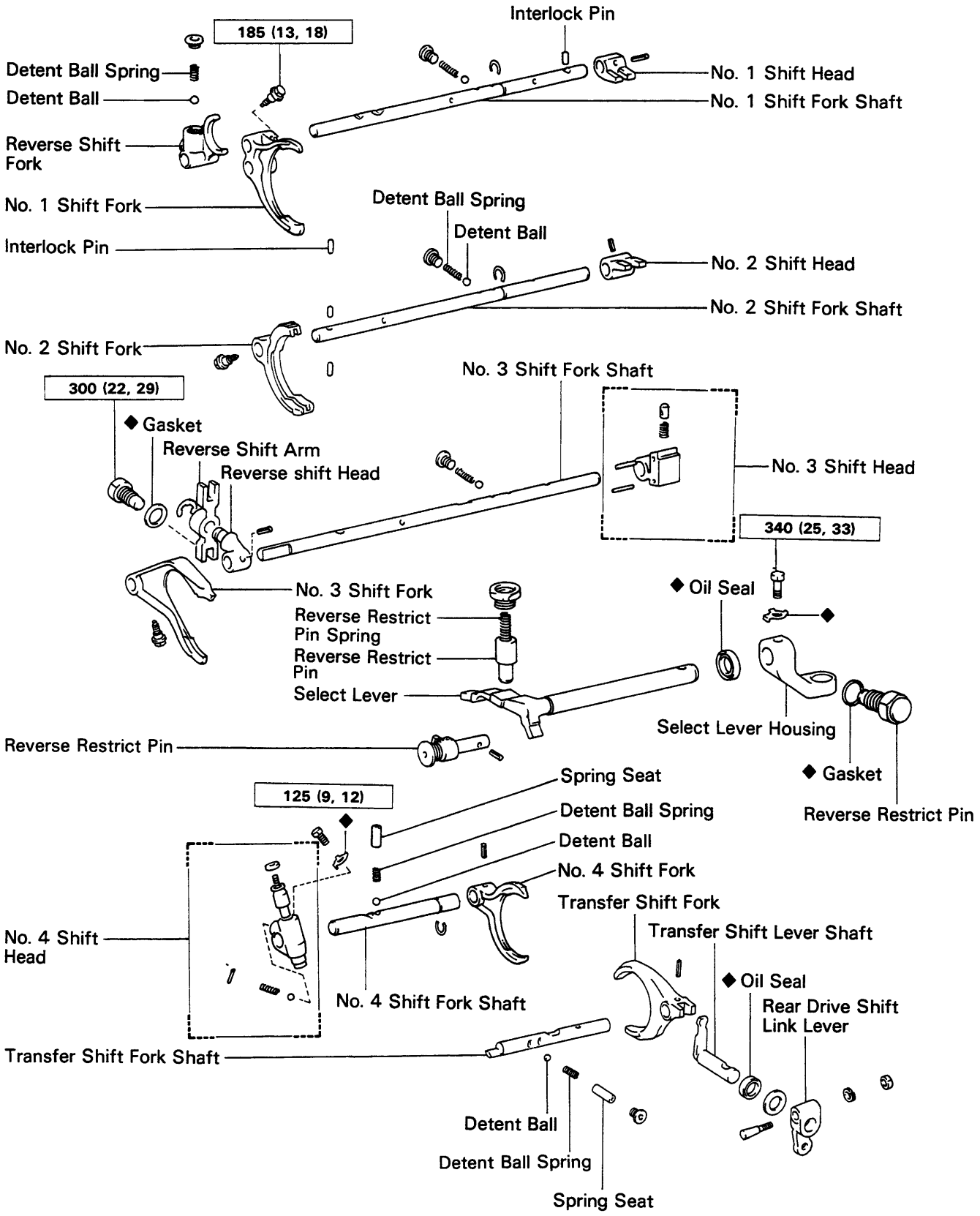
kg-cm (ft-lb, N·m) : Tightening torque

◆ : Non-reusable part

ZM0066

COMPONENTS (Cont'd)

Z54F



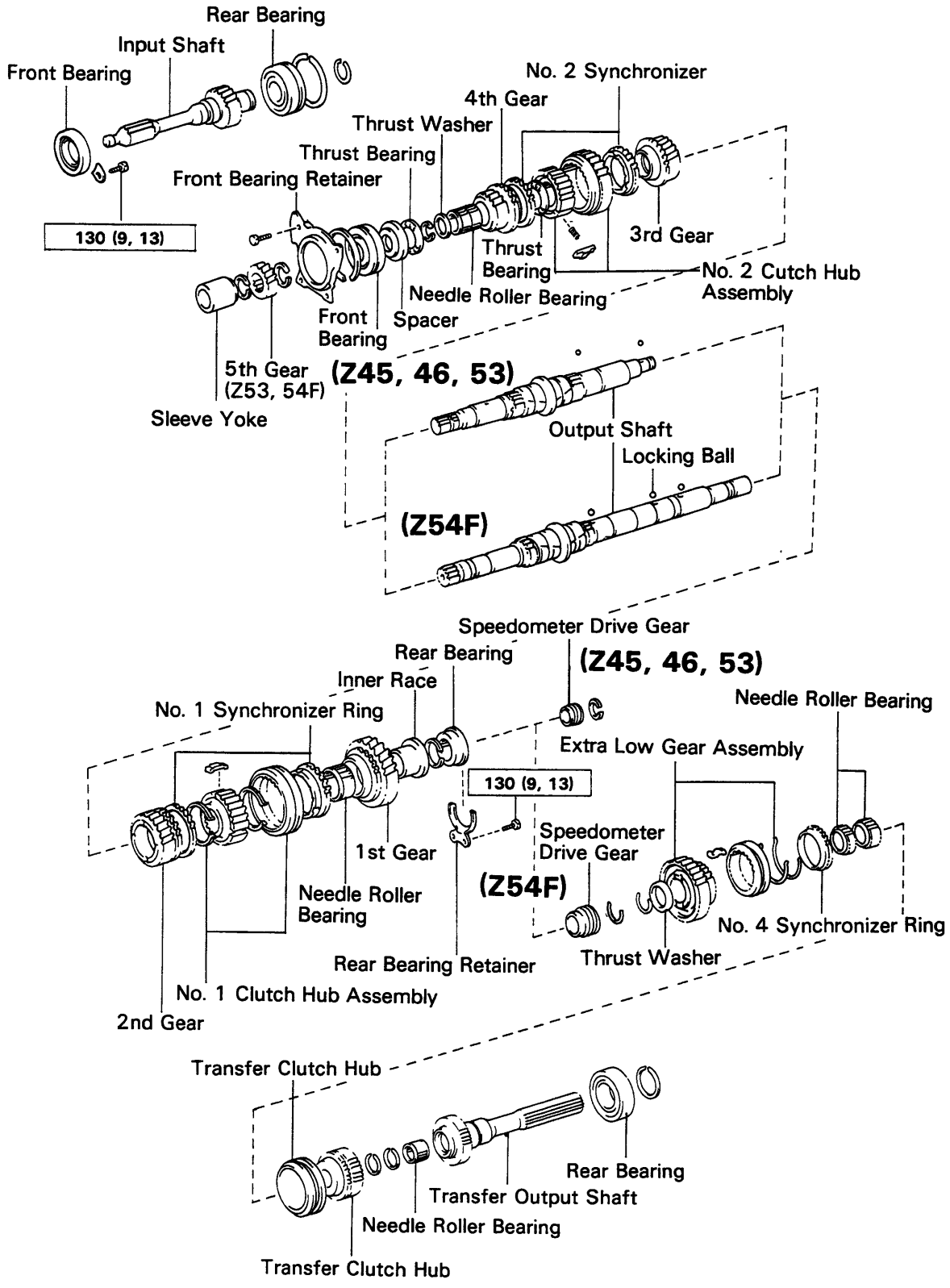
kg-cm (ft-lb, N·m) : Tightening torque

◆ : Non-reusable part

ZM0067

COMPONENTS (Cont'd)

Z45, 46, 53, 54F

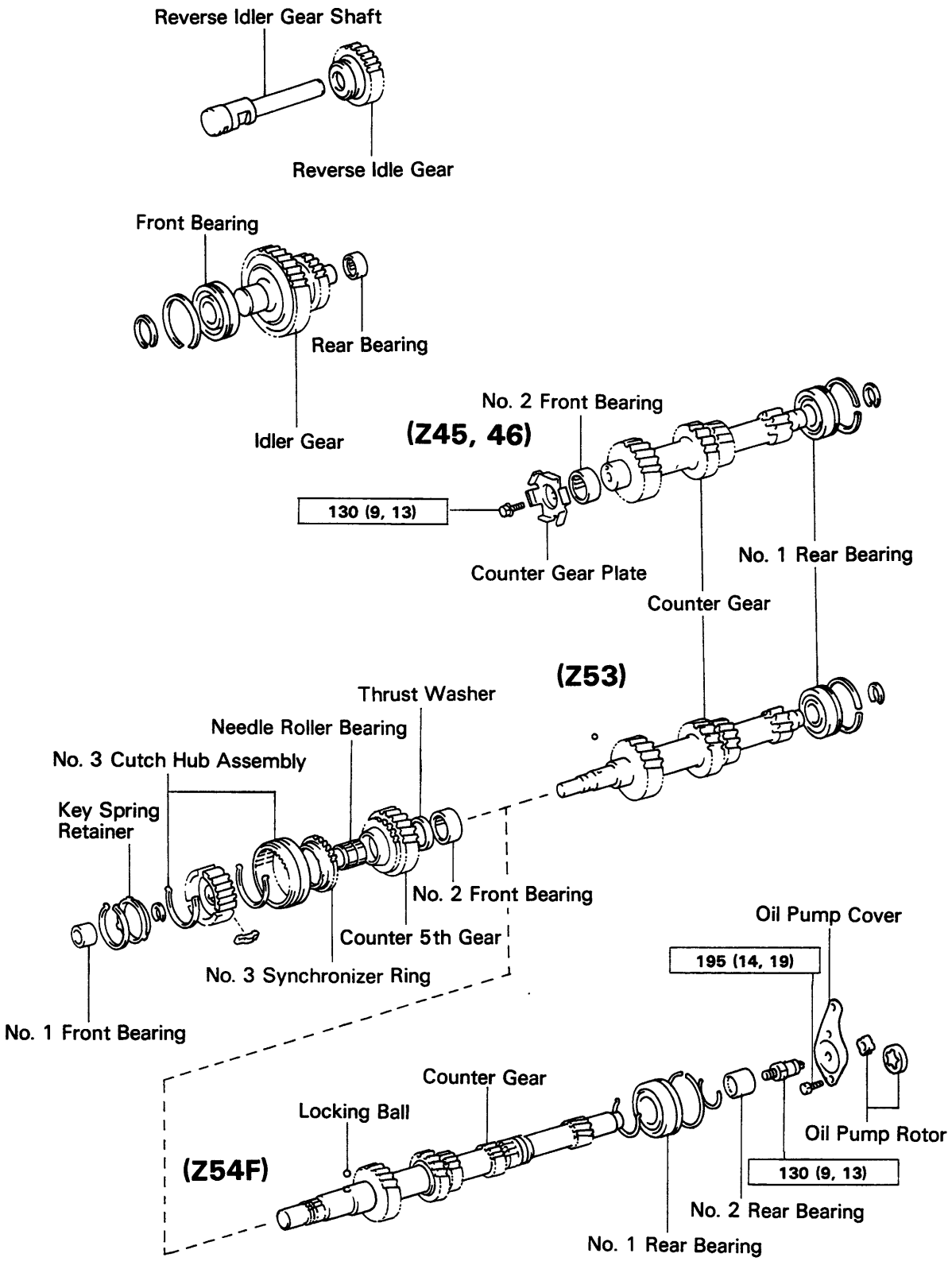


kg-cm (ft-lb, N·m) : Tightening torque

MT0068

COMPONENTS (Cont'd)

Z45, 46, 53, 54F



kg-cm (ft-lb, N·m) : Tightening torque

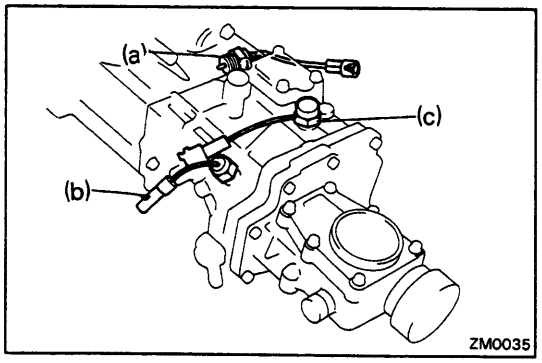
ZM0069

DISASSEMBLY OF TRANSMISSION

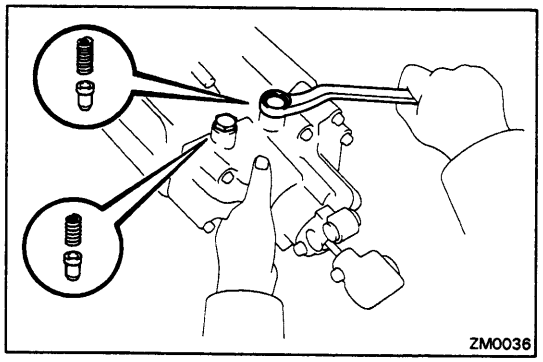
(See page MT-15)

1. **REMOVE MOUNTING INSULATOR**

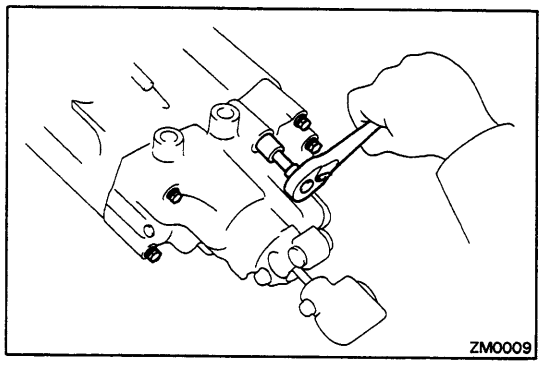
2. **REMOVE SPEEDOMETER DRIVEN GEAR**



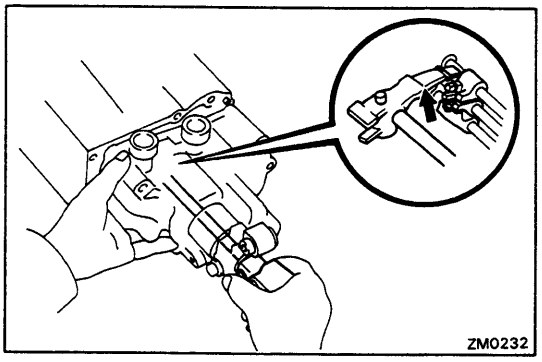
3. **REMOVE FOLLOWING SWITCH:**
   (a) Back-up light switch
   (b) (Z54F)
   4WD indicator switch
   (c) (Z54F)
   Extra low gear (EL) indicator switch



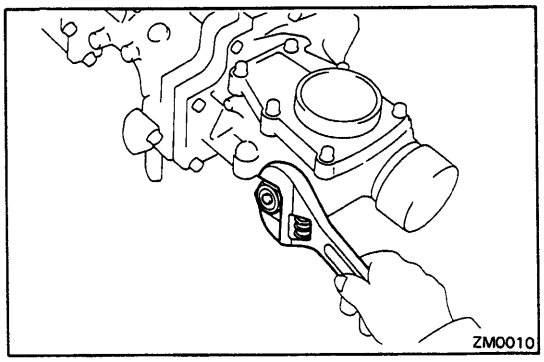
4. **REMOVE EXTENSION HOUSING**
   (Z45, 46, 53)
   (a) Remove the two plug, spring and reverse restrict pin.



   (b) Remove the nine bolts.
   (c) Using a plastic-faced hammer, tap the extension housing.

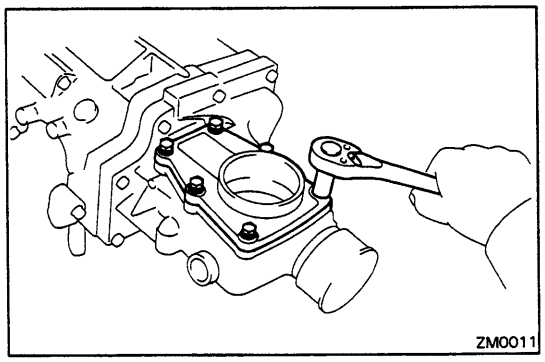


   (d) Turn the select lever and disconnect the tip from the shift head groove. Remove the extension housing and gasket.
   (e) If necessary, remove the shifting rod end and remove the select lever from the extension housing.

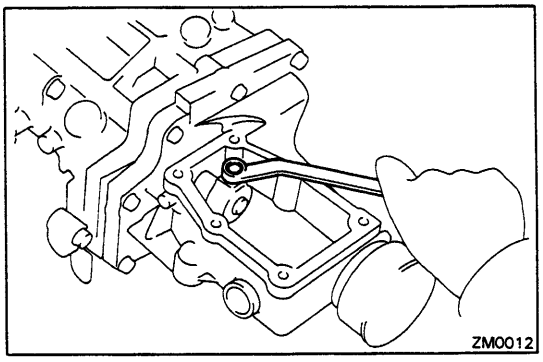


(Z54F)

(a) Remove the reverse restrict pin.

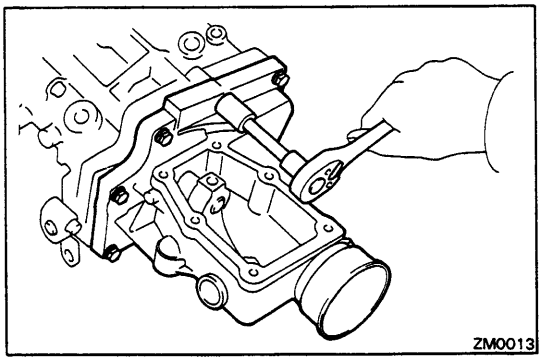


(b) Remove the six bolts, shift lever retainer and gasket.

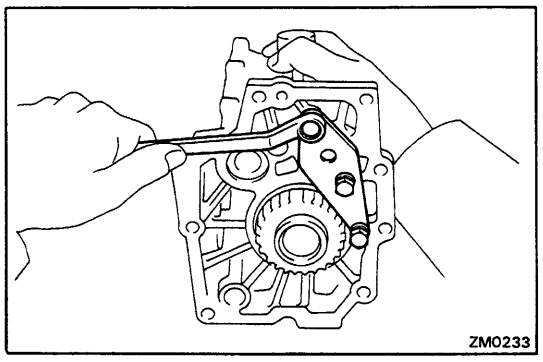


(c) Unstake the lock washer of the select lever housing mount bolt.

(d) Remove the select lever housing mount bolt.



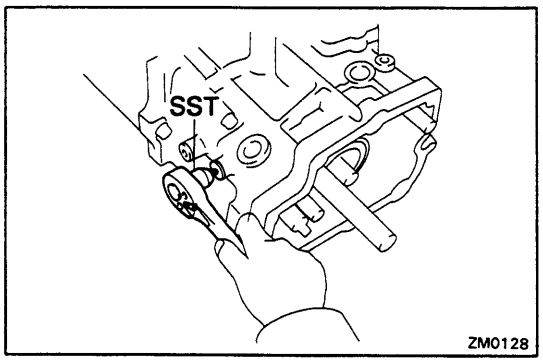
(e) Remove the nine bolts, extension housing, select lever housing and gasket.



5. (Z54F)
REMOVE TRANSFER OUTPUT SHAFT AND OIL PUMP ROTORS

Remove the three bolts, oil pump cover and following parts:

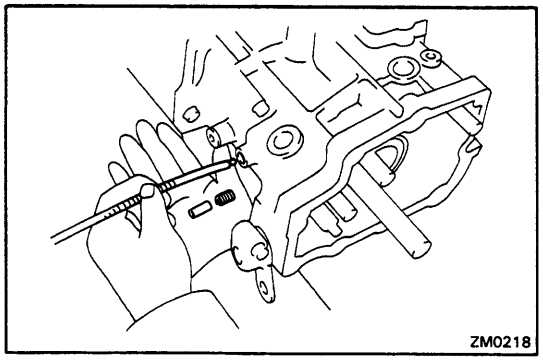
(1) Oil pump rotors
(2) Transfer output shaft
(3) Oil baffle.



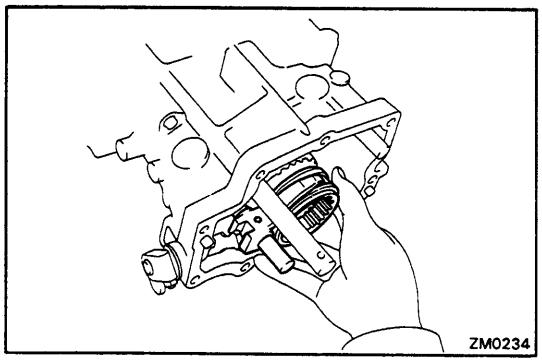
6. **(Z54F)**
REMOVE TRANSFER SHIFT FORK

(a) Using SST, remove the screw plug.

SST 09313-30021



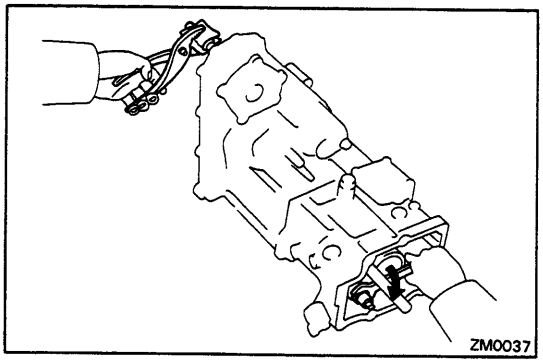
(b) Using a magnetic finger, remove the spring seat, spring and detent ball.



(c) Pull out the shift fork, shift shaft and hub sleeve together.

(d) Remove the No. 4 cynchronizer ring.

(e) If necessary, disassemble the shift fork and shift fork shaft.

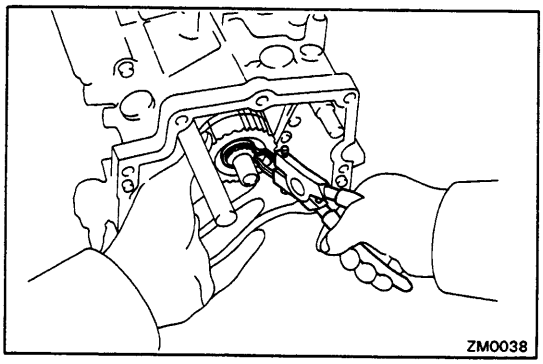


7. **(Z54F)**
REMOVE OIL PUMP DRIVE SHAFT

(a) Cover the tip of the input shaft with a shop cloth and secure it with pliers.

(b) Remove the oil pump drive shaft.

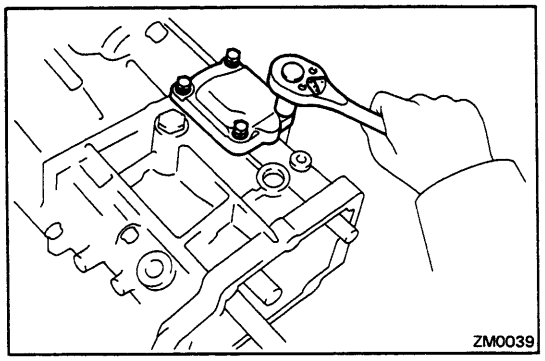
NOTE: The oil pump drive shaft has left-hand threads.



8. **(Z54F)**
REMOVE TRANSFER CLUTCH HUB

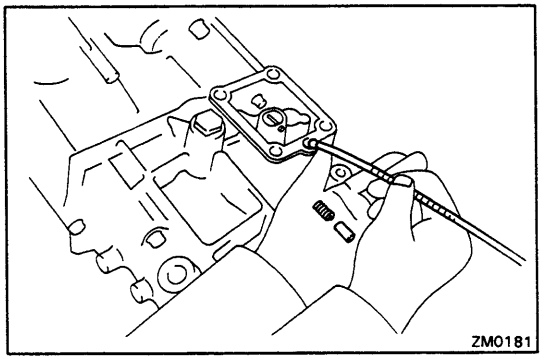
(a) Using snap ring pliers, remove the snap ring.

(b) Remove the clutch hub and No. 4 cynchronizer ring.



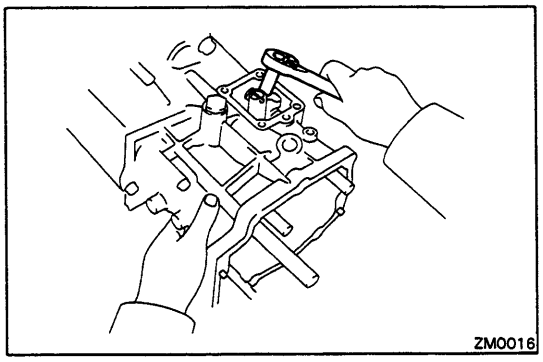
9. **(Z54F)**
REMOVE NO. 4 SHIFT FORK SHAFT AND NO. 4 SHIFT HEAD

(a) Remove the four bolts, transfer case cover and gasket.



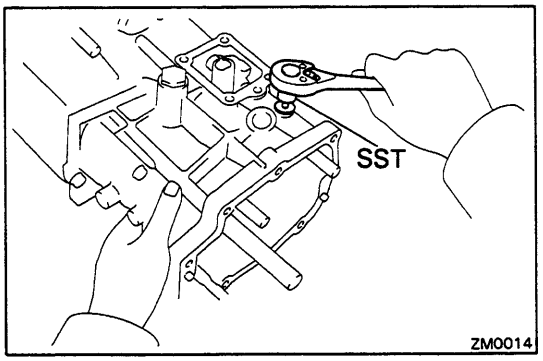
(b) Remove the spring seat and spring.

(c) Using a magnetic finger remove the detent ball.



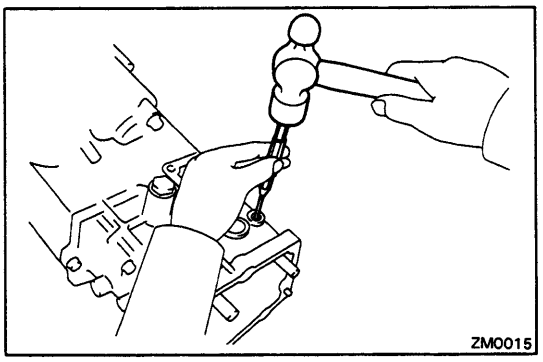
(d) Unstake the lock plate of the No. 4 shift head mount bolt.

(c) Remove the No. 4 shift head mount bolt.

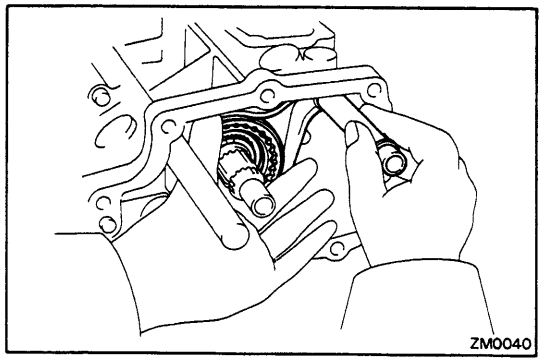


(f) Using SST, remove the screw plug.

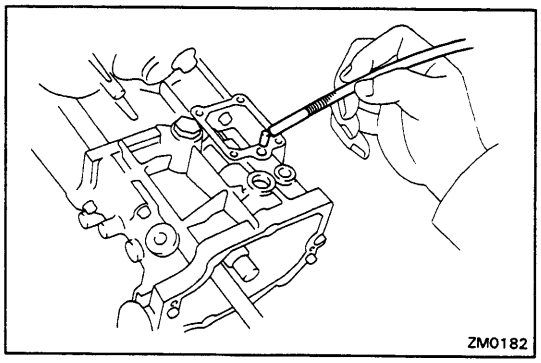
SST 09313-30021



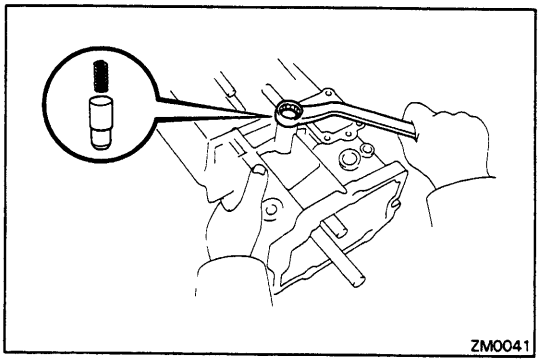
(g) Using a pin punch and hammer, tap out the slotted spring pin.



(h) Pull out the No. 4 shift fork shaft and remove the No. 4 shift head.

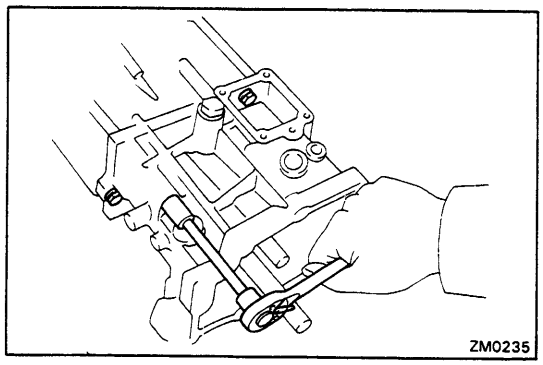


(i) Using a magnetic finger, remove the interlock pin.



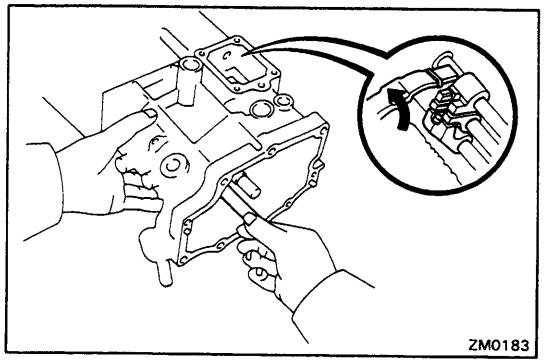
10. (Z54F)
REMOVE TRANSFER ADAPTOR

(a) Remove the plug, spring and reverse restrict pin.

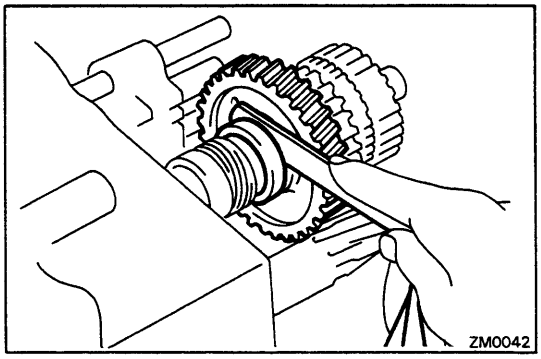


(b) Remove the nine bolts.

(c) Using a plastic-faced hammer, tap the transfer adaptor.



(d) Turn 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.



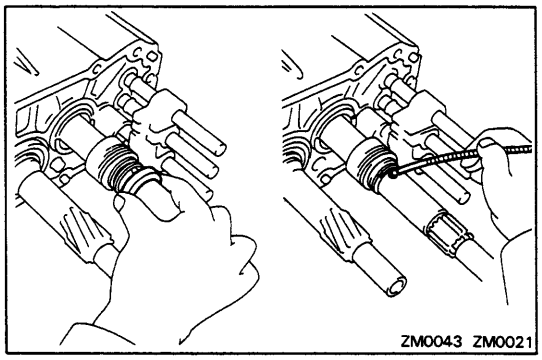
11. (Z54F)
CHECK EXTRA LOW GEAR THRUST CLEARANCE

(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.)
Maximum clearance: 0.50 mm (0.0197 in.)

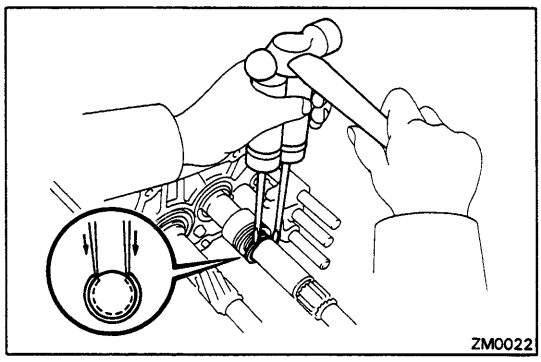
(c) Remove the snap ring, transfer clutch hub, extra low gear and needle roller bearing.



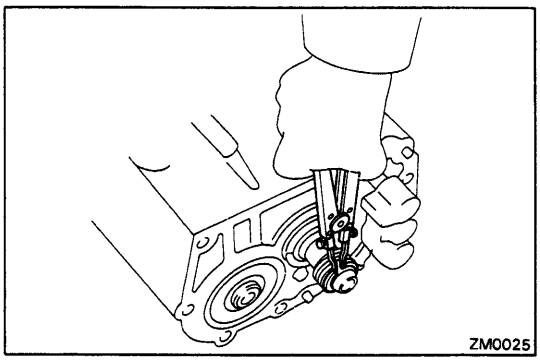
12. (Z54F)
REMOVE EXTRA LOW GEAR THRUST WASHER

(a) Remove the thrust washer.

(b) Using a magnetic finger, remove the locking ball.



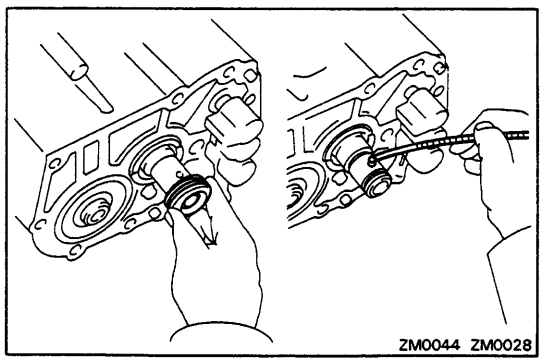
(c) Using two screwdrivers and a hammer, tap out the snap ring.



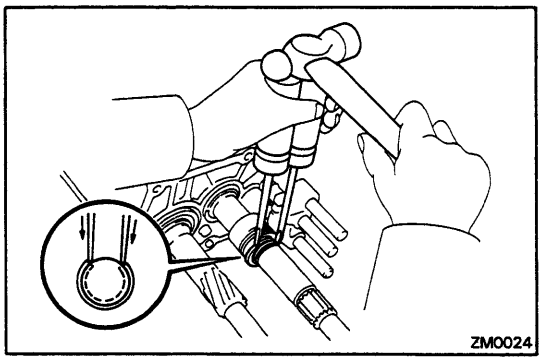
13. REMOVE SPEEDOMETER DRIVE GEAR (Z45, 46, 53)

(a) Using snap ring pliers, remove the snap ring.

(b) Remove the drive gear.

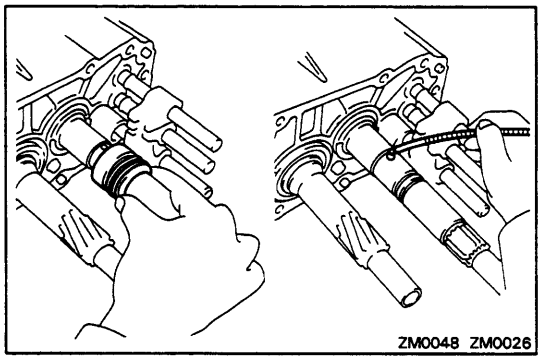


(c) Using a magnetic finger, remove the snap ring.



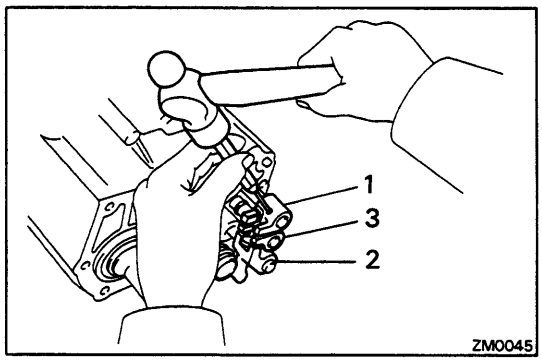
(Z54F)

(a) Using two screwdriver and a hammer, tap out the snap ring.



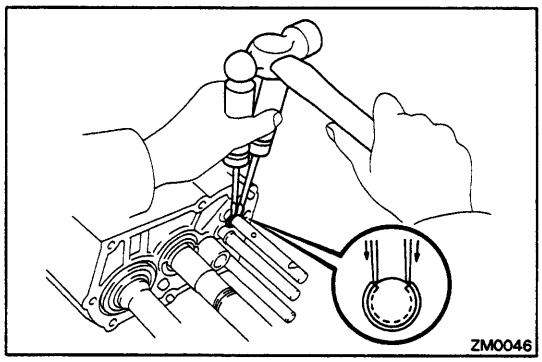
(b) Remove the drive gear.

(c) Using a magnetic finger, remove the locking ball.



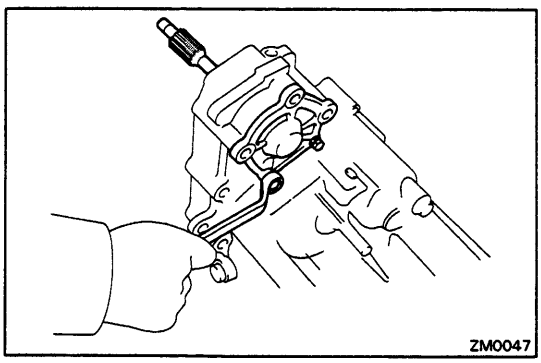
14. (Z54F)
REMOVE SHIFT HEADS (NO. 1, NO. 2 AND NO. 3)

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.



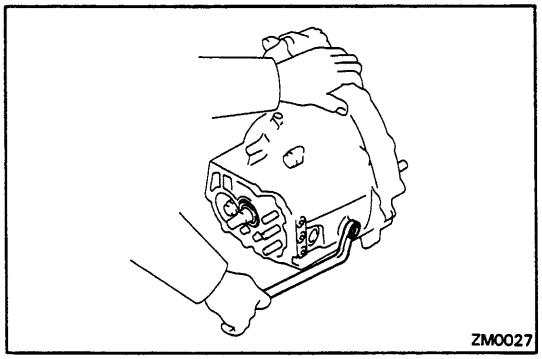
15. (Z54F)
REMOVE SNAP RINGS

Using two screwdriver and a hammer, tap the snap ring out of the No. 1 and No. 2 shift fork shafts.

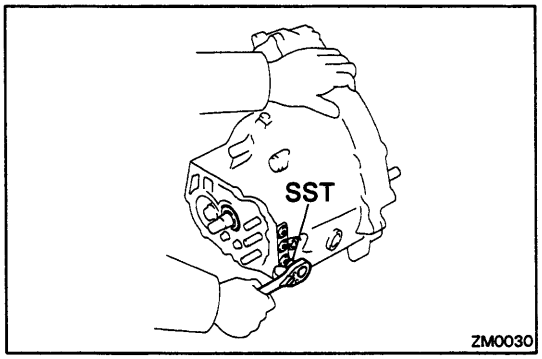


16. REMOVE INPUT SHAFT

Remove the two bolts, transmission case cover, gasket and input shaft.



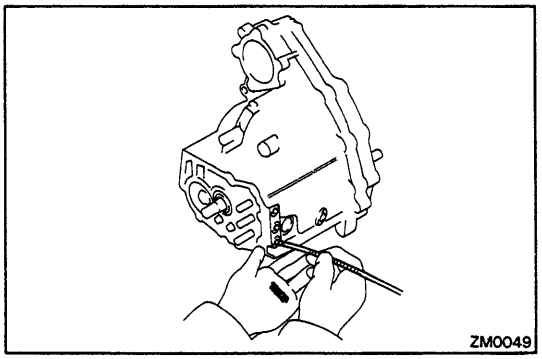
17. REMOVE REVERSE SHIFT ARM PIVOT



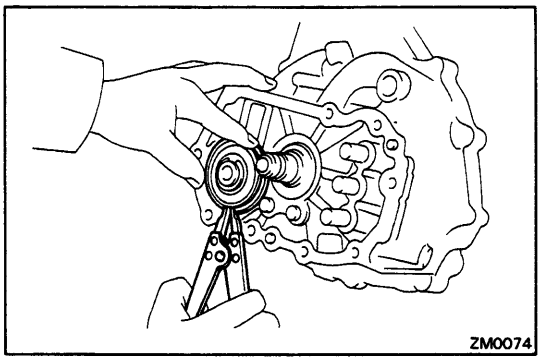
18. REMOVE TRANSMISSION CASE

(a) Using SST, remove the three screw plugs.

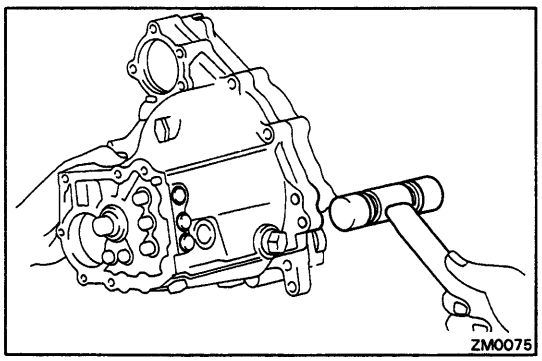
SST 09313-30021



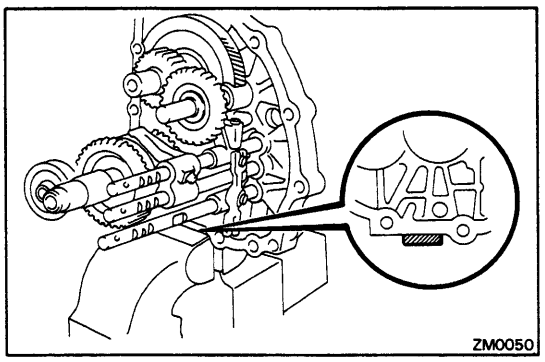
(b) Using a magnetic finger, remove the three springs and detent balls.



(c) Using snap ring pliers, remove the snap ring.

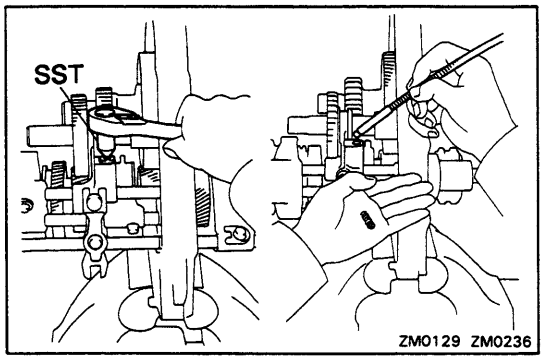


(d) Using a plastic-faced hammer, tap the case protrusion to remove the case from the intermidiate plate.



19. MOUNT INTERMEDIATE PLATE IN VISE

Secure the protrusion on the lower part of the intermediate plate.

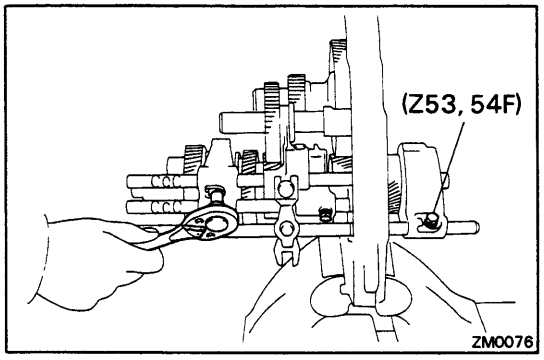


20. REMOVE SHIFT FORKS, SHIFT ARM AND SHIFT FORK SHAFTS

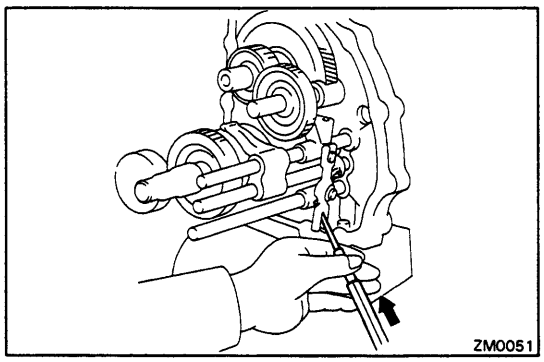
(a) Using SST, remove the screw plug.

SST 09313-30021

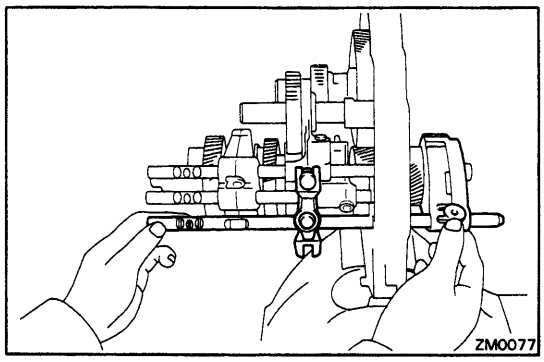
(b) Using a magnetic finger, remove the spring and detent ball.



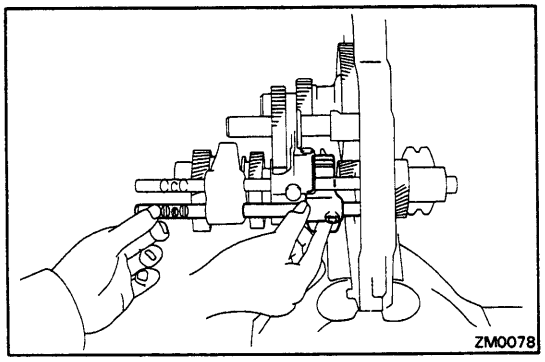
(c) Remove the shift fork mount bolts.



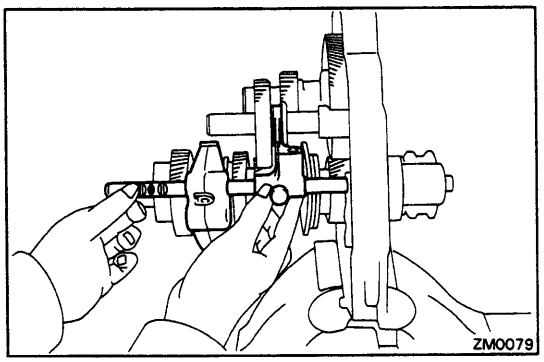
(d) Using a pin punch and hammer, tap out the slotted spring pin (for the reverse shif head).



(e) Remove the No. 3 shift fork (Z53, 54F), reverse shift arm and No. 3 shift fork shaft.

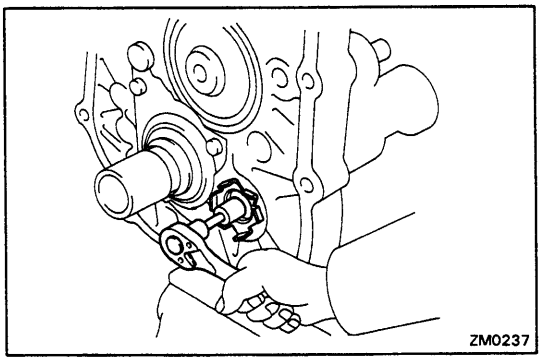


(f) Remove the No. 2 shift fork and No. 2 shift fork shaft.



(g) Remove the reverse shift fork, No. 1 shift fork and No. 1 shift fork shaft.

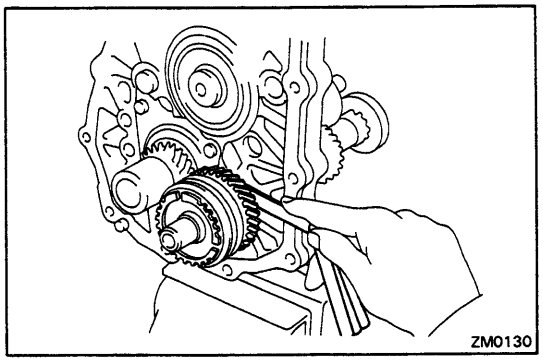
(h) Remove the three interlock pin from the No. 2 shift fork shaft and intermediate plate.



21. (Z45, 46)
REMOVE COUNTER GEAR PLATE

Remove the bolt and gear plate.

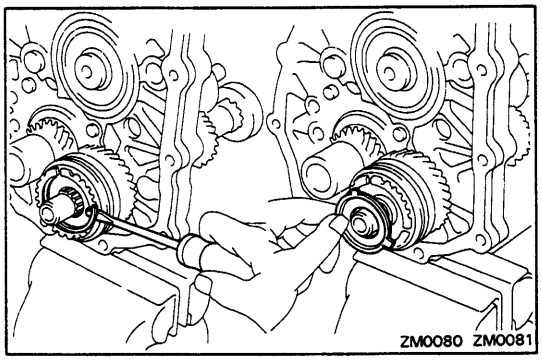
NOTE: Mesh the gears and lock the counter gear.



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.

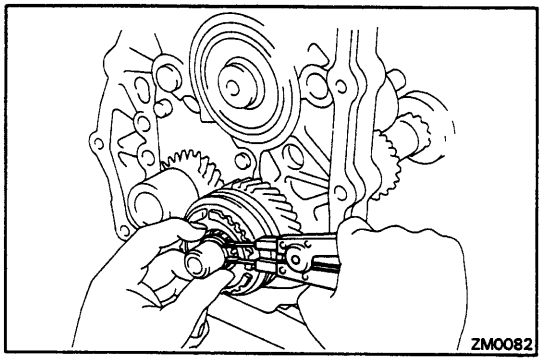
Standard clearance: 0.150 – 0.325 mm (0.0059 – 0.0128 in.)
Maximum clearance: 0.40 mm (0.0157 in.)



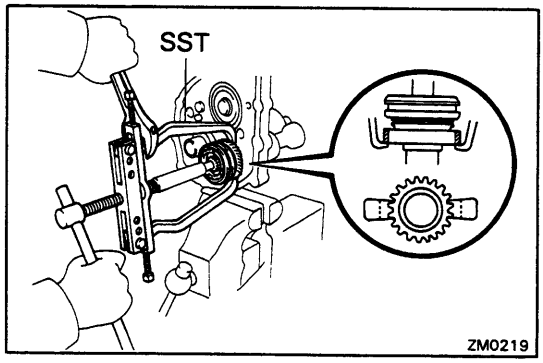
23. (Z53, 54F)
REMOVE NO. 3 CLUTCH HUB ASSEMBLY AND COUNTER FIFTH GEAR

(a) Using a screwdriver, pry out the snap ring.

(b) Remove the shifting key retainer.



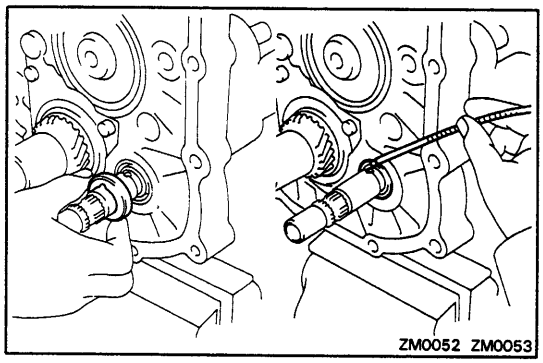
(c) Using snap ring pliers, remove the snap ring.



(d) Using SST, remove the No. 3 clutch hub assembly, No. 3 cynchronizer ring and counter 5th gear together. Remove the needle roller bearing.

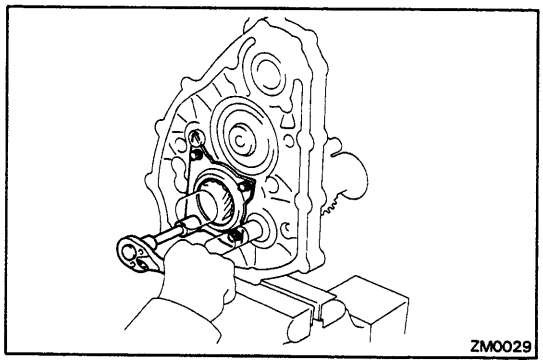
SST 09950-20015

CAUTION: Be careful not to drop the needle roller bearing when removing the 5th gear.



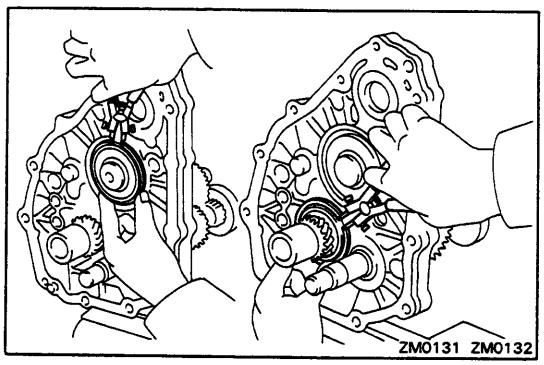
(e) Remove the thrust washer.

(f) Using a magnetic finger, remove the locking ball.

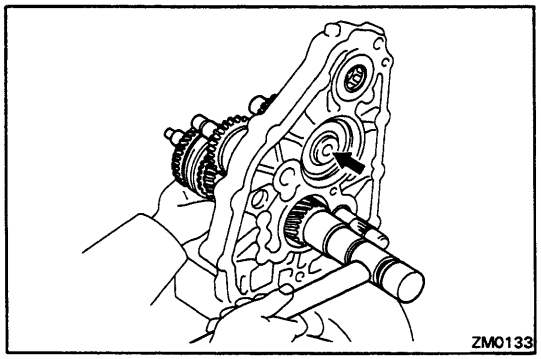


24. REMOVE IDLER GEAR, REVERSE IDLER GEAR, OUTPUT SHAFT AND COUNTER GEAR

(a) Remove the four bolts and the front bearing reatainer of the output shaft.

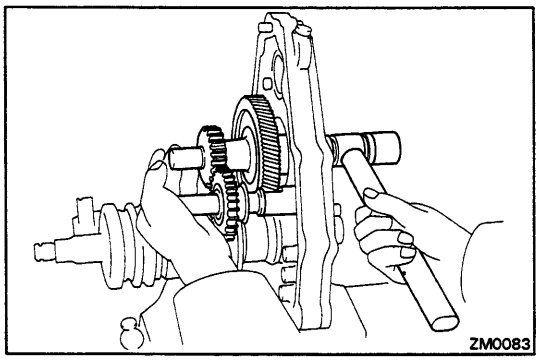


(b) Using snap ring pliers, remove the two snap rings.

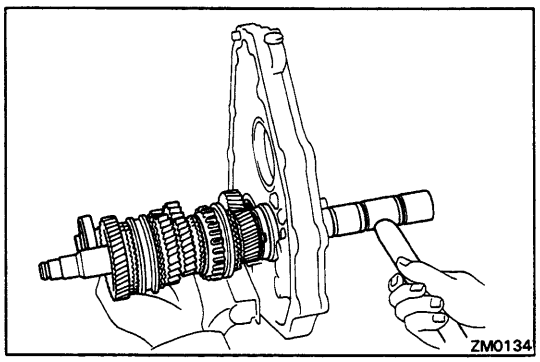


(c) Using a plastic-faced hammer, tap the idler gear and output shaft halfway out from the intermediate.

NOTE: Support the gear shaft by hand.

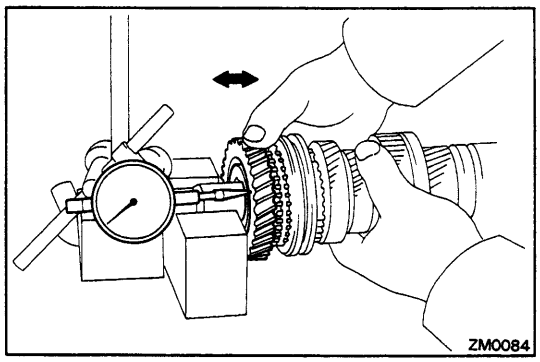


(d) Using a plastic-faced hammer, tap the idler gear to remove the idler gear, reverse idler gear and reverse idler gear shaft together.



(e) Using a plastic-faced hammer, tap the output shaft to remove the output shaft and counter gear together.

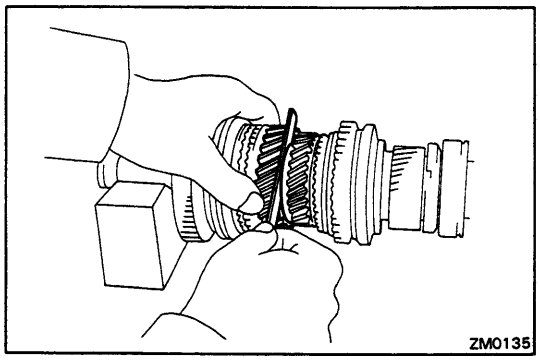
NOTE: Support the gear and shaft by hand.



25. CHECK EACH GEAR THRUST CLEARANCE

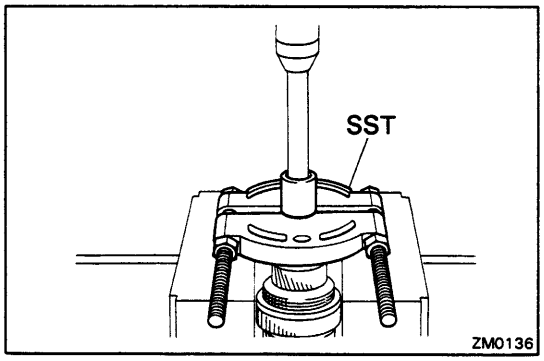
(a) Using a dial indicator, measure the 1st and 4th gear thrust clearances and record the result for later reference.

Standard clearance:
1st gear 0.150 — 0.275 mm (0.0059 — 0.0108 in.)
4th gear 0.020 — 0.0240 mm (0.0008 — 0.0094 in.)
Maximum clearance: 0.30 mm (0.0118 in.)



(b) Using a feeler gauge, measure the 2nd and 3rd gear thrust clearances and record the resuld for later reference.

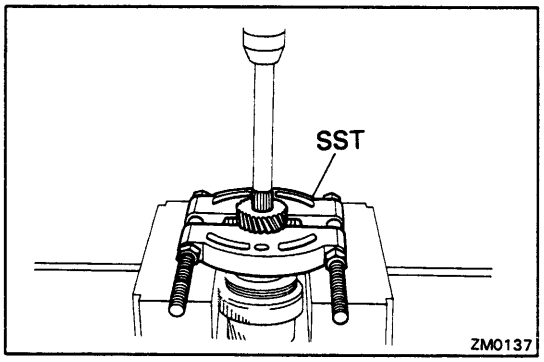
Standard clearance: 0.150 — 0.250 mm (0.0059 — 0.0098 in.)
Maximum clearance: 0.30 mm (0.0118 in.)



26. REMOVE SLEEVE YOKE

Using SST and a press, press out the sleeve yoke.

SST 09950-00020

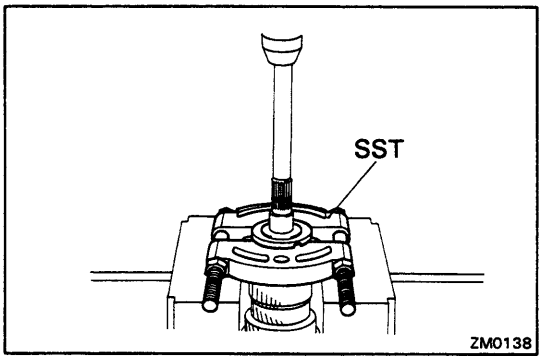


27. (Z53, 54F)
REMOVE FIFTH GEAR

(a) Using snap ring pliers, remove the snap ring.

(b) Using SST and a press, press out the 5th gear.

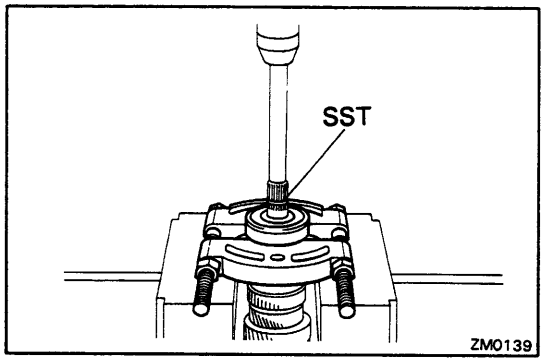
SST 09950-00020



28. REMOVE OUTPUT SHAFT FRONT BEARING

(a) Using snap ring pliers, remove the snap ring.

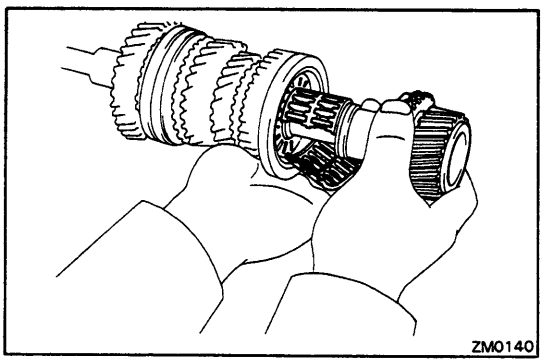
(b) Using SST and a press, press out the bearing.



29. REMOVE SPACER AND FOURTH GEAR THRUST BEARING

Using SST and a press, press out the spacer and thrust bearing.

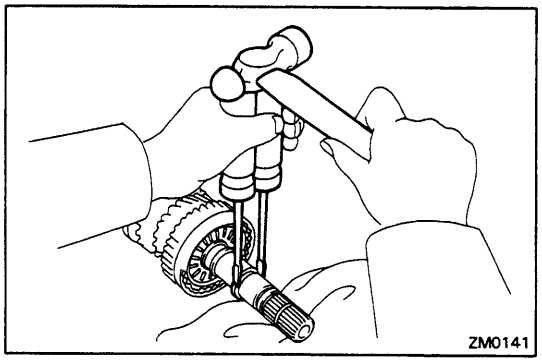
SST 09950-00020



30. REMOVE FOURTH GEAR

Remove the 4th gear and needle roller bearing.

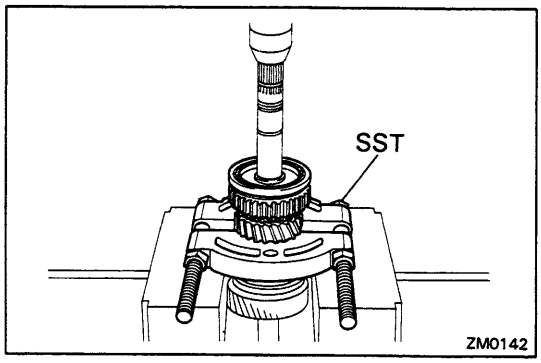
CAUTION: Be careful not to drop the needle roller bearing when removing the 4th gear.



31. REMOVE FOURTH GEAR THRUST WASHER AND THRUST BEARING

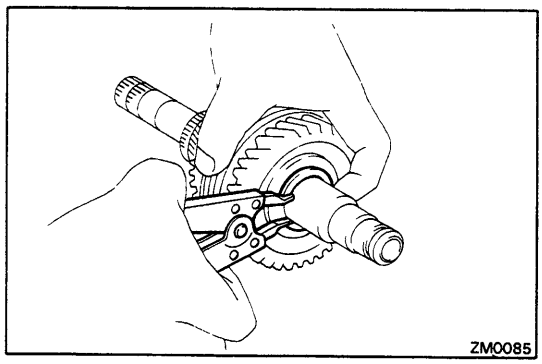
(a) Using two screwdriver and a hammer, tap out the snap ring.

(b) Remove the thrust washer and thrust bearing.



32. REMOVE NO. 2 CLUTCH HUB ASSEMBLY AND THIRD GEAR

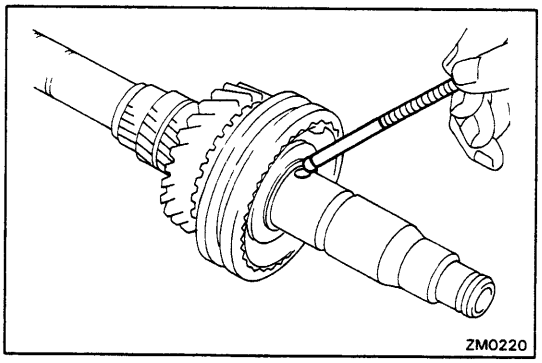
Using SST and a press, press the 3rd gear and remove the No. 2 clutch hub assembly, No. 2 cynchronizer ring and 3rd gear.



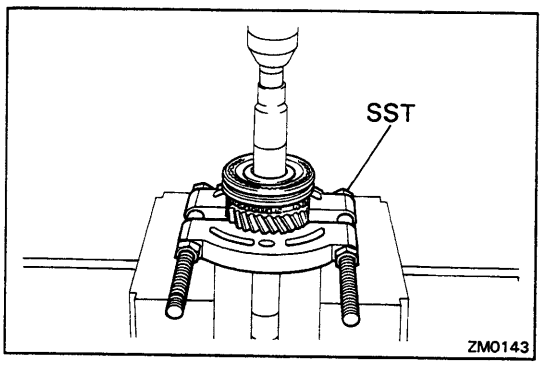
33. REMOVE FIRST GEAR

(a) Using snap ring pliers, remove the snap ring.

(b) Remove the 1st gear, inner race, needle roller bearing and No. 1 cynchronizer ring.

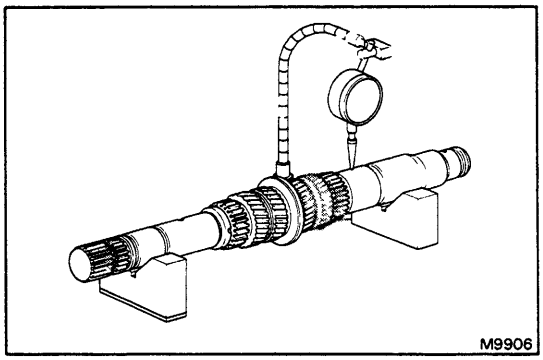


(c) Using a magnetic finger, remove the locking ball.



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.

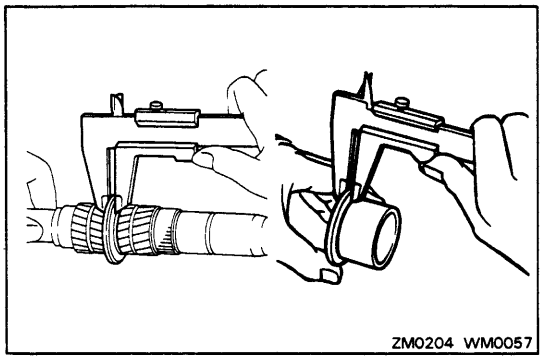

M9906

INSPECTION OF TRANSMISSION COMPONENTS

1. INSPECT OUTPUT SHAFT AND FIRST GEAR INNER RACE

(a) Using a dial indicator, measure the circle runout.

Maximum runout: 0.06 mm (0.0024 in.)

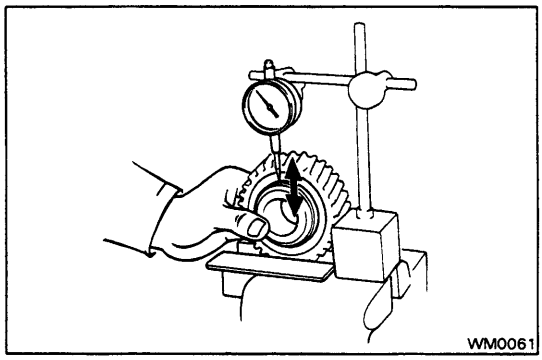

ZM0204 WM0057

(b) Using calipers, measure the output shaft flange thickness.

Standard thickness: 4.24 – 4.54 mm (0.1669 – 0.1787 in.)
Minimum thickness: 3.00 mm (0.1181 in.)

(c) Using calipers, measure the inner race flange thickness.

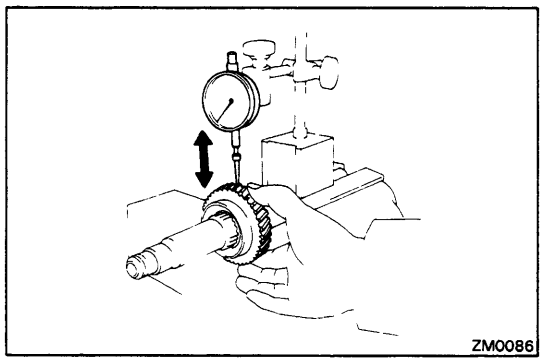
Standard thickness: 4.175 – 4.275 mm (0.1643 – 0.1683 in.)
Minimum thickness: 3.00 mm (0.1181 in.)


WM0061

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.

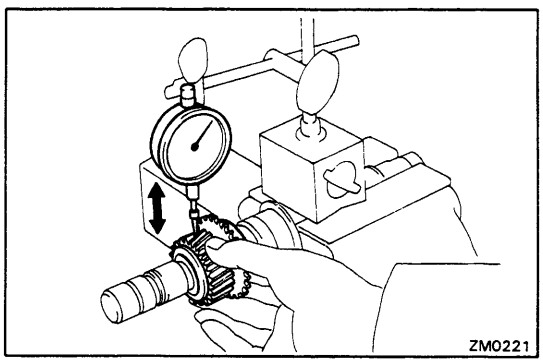
Standard clearance: 0.009 – 0.062 mm (0.0004 – 0.0024 in.)
Maximum clearance: 0.07 mm (0.0028 in.)


ZM0086

3. INSPECT OIL CLEARANCE OF SECOND AND THIRD GEARS

Using a dial indicator, measure the oil clearance between the gear and output shaft.

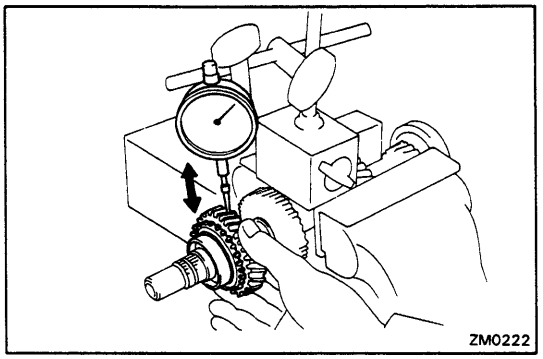
Standard clearance: 0.060 – 0.101 mm (0.0024 – 0.0040 in.)
Maximum clearance: 0.11 mm (0.0043 in.)


ZM0221

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.

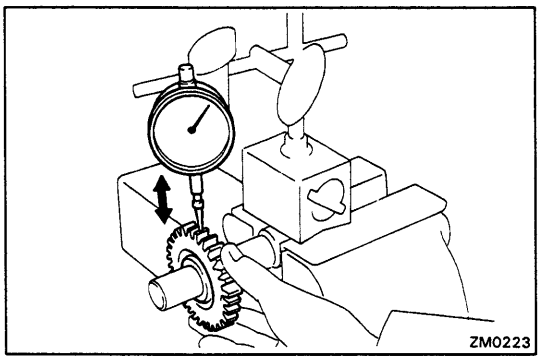
Standard clearance:
4th gear 0.015 – 0.035 mm (0.0006 – 0.0014 in.)
Extra low gear 0.009 – 0.032 mm (0.0004 – 0.0013 in.)
Maximum clearance: 0.04 mm (0.0016 in.)



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.

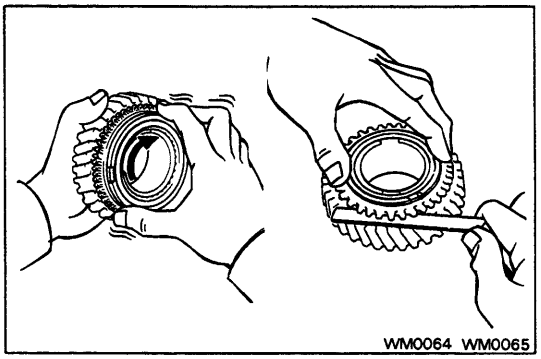
Standard clearance: **0.009 – 0.055 mm (0.0004 – 0.0022 in.)**
Maximum clearance: **0.06 mm (0.0024 in.)**



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.)**
Maximum clearance: **0.06 mm (0.0024 in.)**

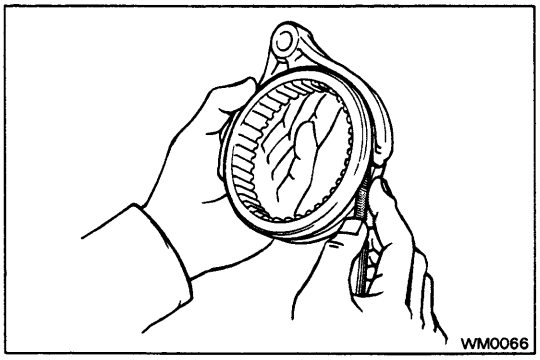


7. INSPECT SYNCHRONIZER RINGS

(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.

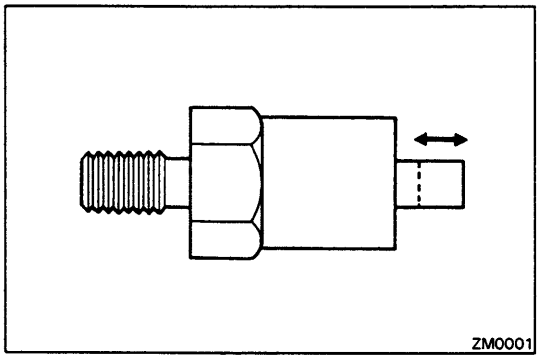
Standard clearance:
5th and extra low gears **0.7 – 1.3 mm (0.028 – 0.051 in.)**
Others **0.9 – 1.5 mm (0.035 – 0.059 in.)**
Maximum clearance: **0.6 mm (0.024 in.)**



8. INSPECT SHIFT FORKS AND HUB SLEEVES

Using a feeler gauge, measure the clearance between the hub sleeve and shift fork.

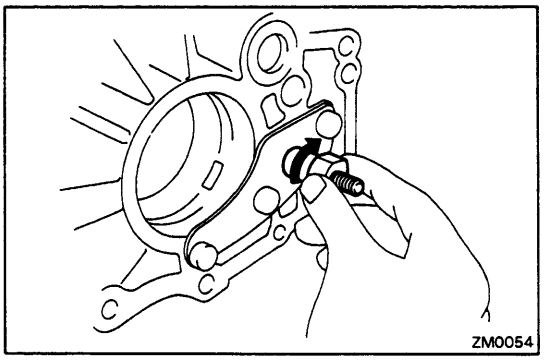
Maximum clearance: **1.0 mm (0.039 in.)**



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.)**



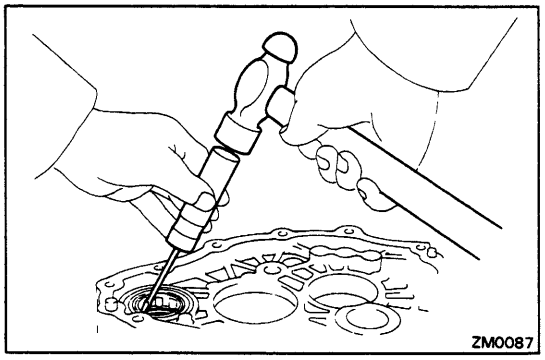
(b) Install the pump rotors with the pump cover and three bolts. Torque the bolts.

Torque: 195 kg-cm (14 ft-lb, 19 N·m)

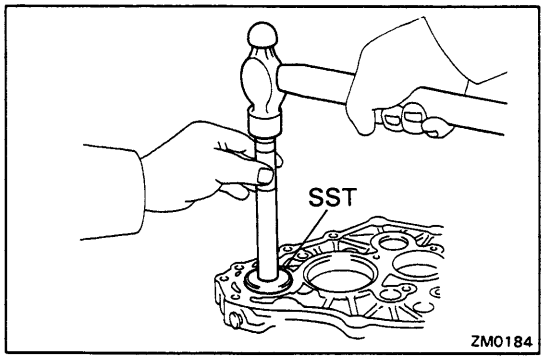
(c) Check that the rotors rotates smoothly.

REPLACEMENT OF TRANSMISSION COMPONENTS

1. REPLACE INPUT SHAFT FRONT BEARING AND OIL SEAL



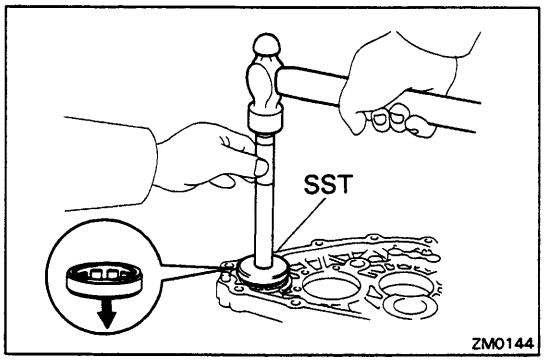
(a) Using a screwdriver and hammer, tap out the oil seal.



(b) Remove the bolt and bearing lock plate.

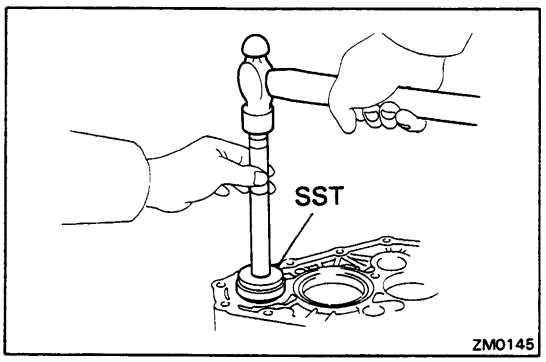
(c) Using SST and a press, press out the bearing.

SST 09608-30021



(d) Using SST and a press, press in a new bearing.

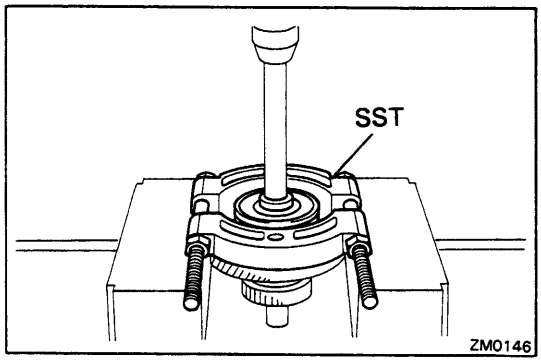
SST 09608-30021



(e) Using SST and a hammer, tap in a new oil seal until its surface is flush with the intermediate plate edge.

SST 09608-30021

(f) Apply MP grease to the oil seal lip.

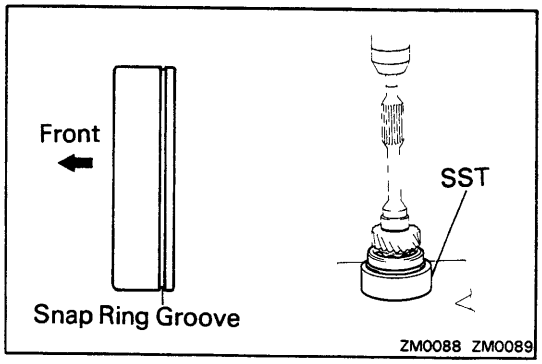


2. REPLACE INPUT SHAFT REAR BEARING

(a) Using snap ring pliers, remove the snap ring.

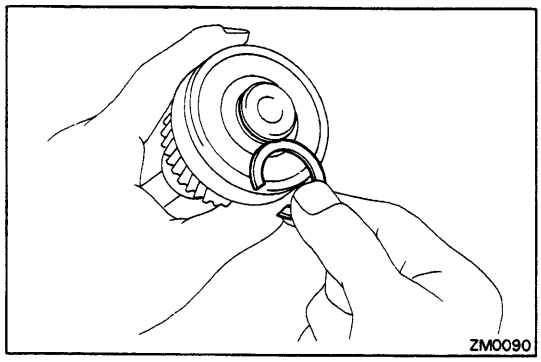
(b) Using SST and a press, press out the bearing.

SST 09950-00020



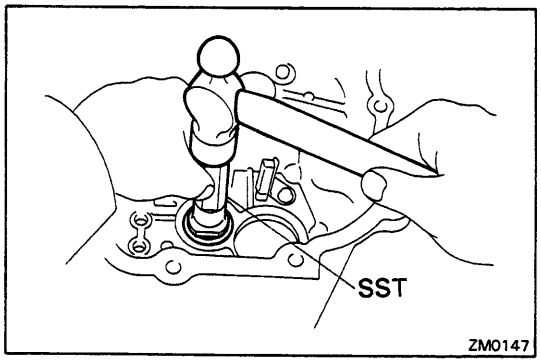
(c) Using SST and a press, press in a new bearing.

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)	

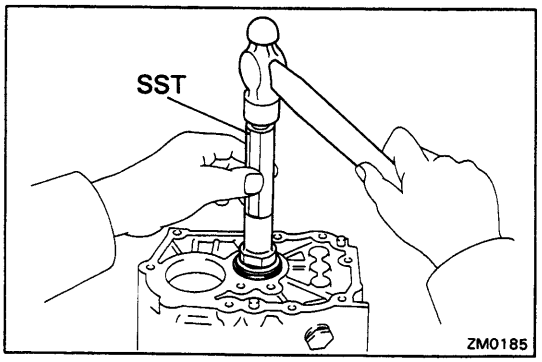


3. REPLACE OUTPUT SHAFT REAR BEARING

(a) Remove the two bolts and bearing retainer.

(b) Using SST and a hammer, tap out the bearing.

SST 09304-47010

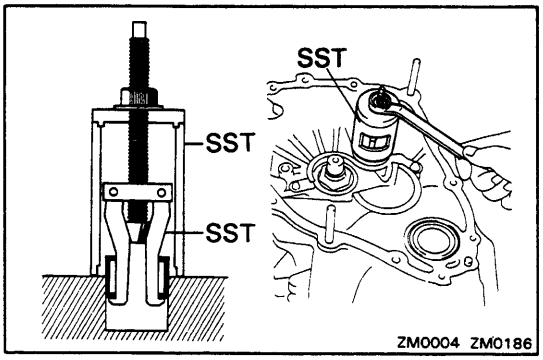


(c) Using SST and a hammer, tap in a new bearing.

SST 09304-47010

(d) Install the bearing retainer with the two bolts. Torque the bolts.

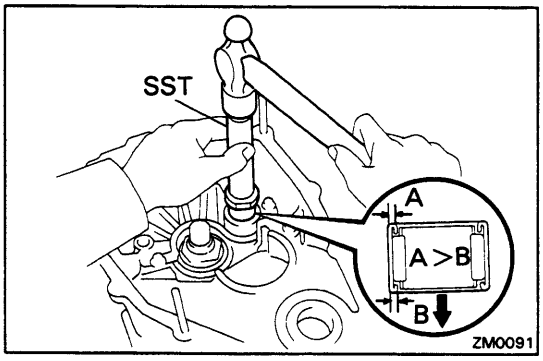
Torque: 130 kg-cm (9 ft-lb, 13 N·m)



4. **(Z53, 54F)**
REPLACE COUNTER GEAR NO. 1 FRONT BEARING

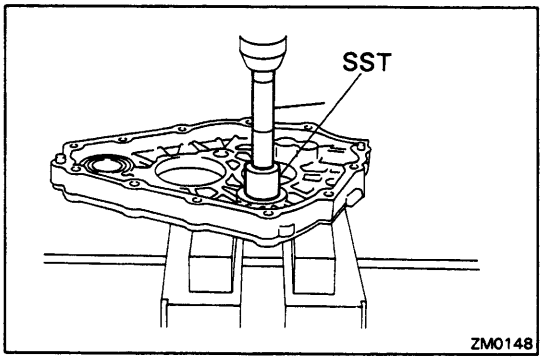
(a) Using SST, remove the bearing.

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.

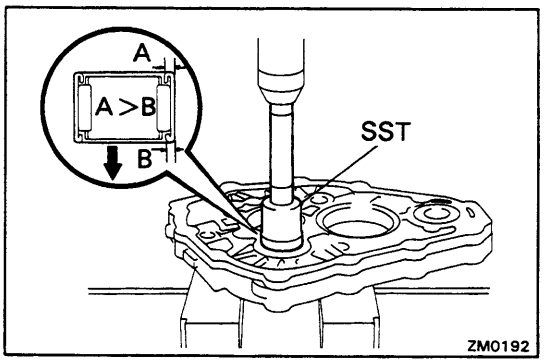
SST 09304-47010



5. **REPLACE COUNTER GEAR NO. 2 FRONT BEARING**

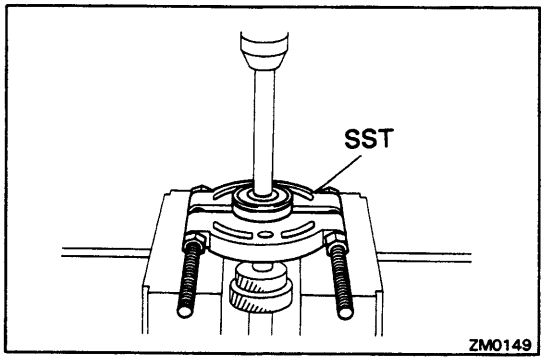
(a) Using SST and a press, press out the bearing.

SST 09710-30020



(b) Using SST and a press, press in a new bearing until its surface is flush with the intermediate plate edge.

SST 09710-30020

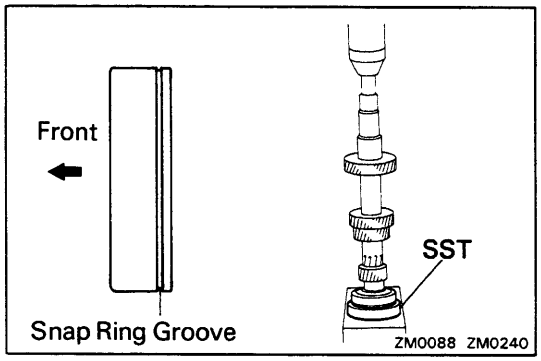


6. **REPLACE COUNTER GEAR NO. 1 REAR BEARING (Z45, 46, 53)**

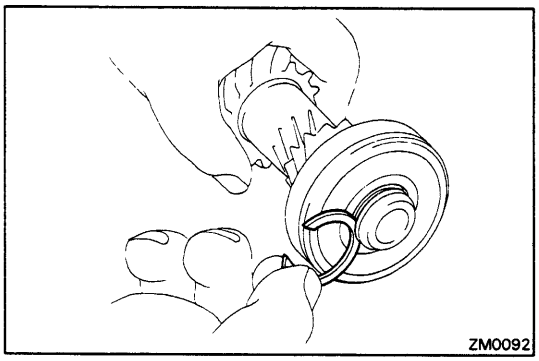
(a) Using snap ring pliers, remove the snap ring.

(b) Using SST and a press, press out the bearing.

SST 09950-00020

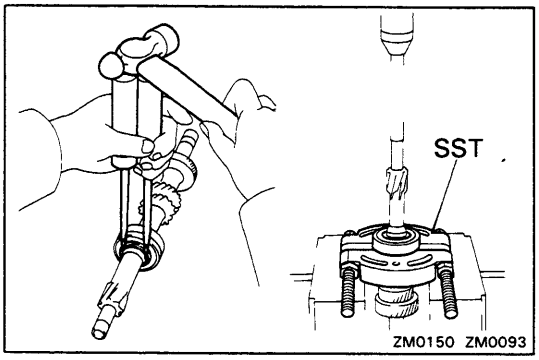


(c) Using SST and a press, press in a new bearing.
SST 09515-20010



(d) Select a snap ring that will allow minimum axial play and install it on the shaft.

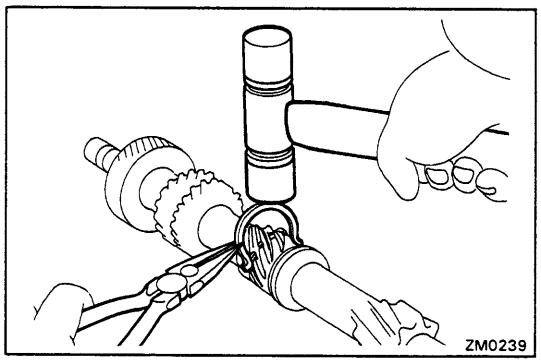
Snap ring thickness	mm (in.)
1.80 – 1.85 (0.0709 – 0.0728) 1.95 – 2.00 (0.0768 – 0.0787)	



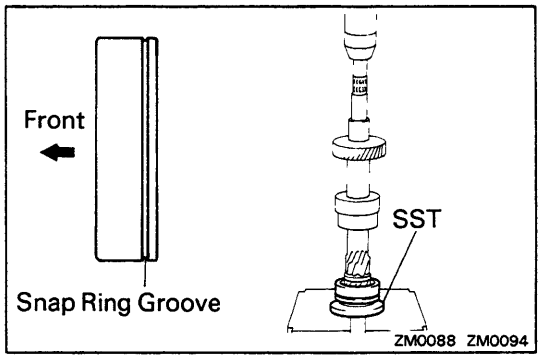
(Z54F)

(a) Using two screwdrivers and a hammer, tap out the two snap rings.

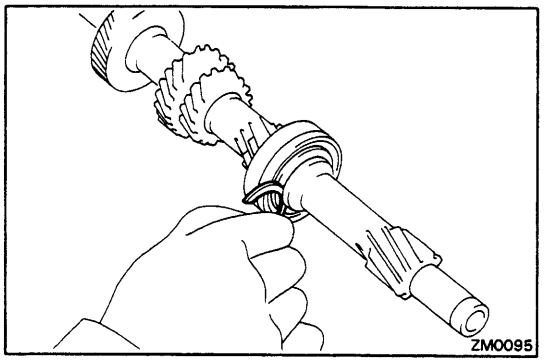
(b) Using SST and a press, press out the bearing.
SST 09950-00020



(c) Using a plastic-faced hammer, tap in the front snap ring.

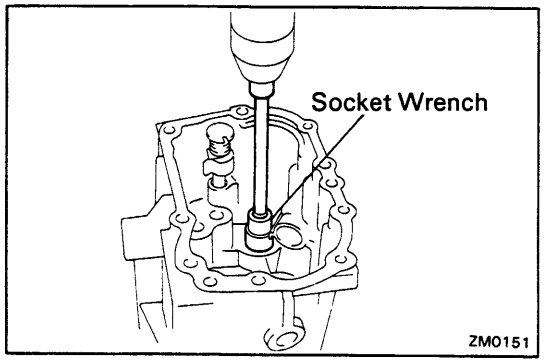


(d) Using SST and a press, press in a new bearing.
SST 09608-20011



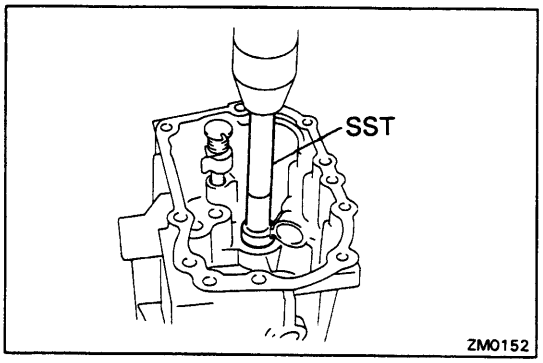
(e) Select a rear snap ring that will allow minimum axial play and install it on the shaft.

Snap ring thickness	mm (in.)
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)	



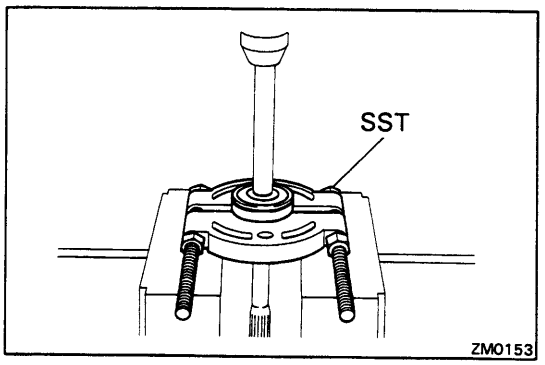
7. (Z54F)
REPLACE COUNTER GEAR NO. 2 REAR BEARING

(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

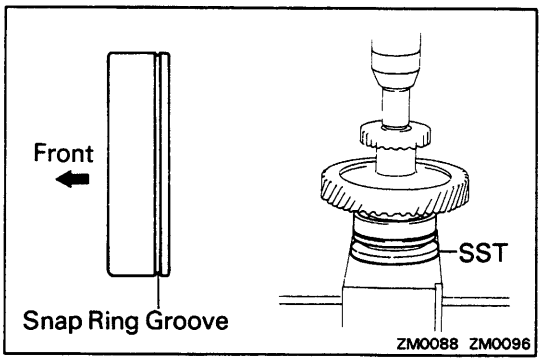


8. REPLACE IDLER GEAR FRONT BEARING

(a) Using snap ring pliers, remove the snap ring.

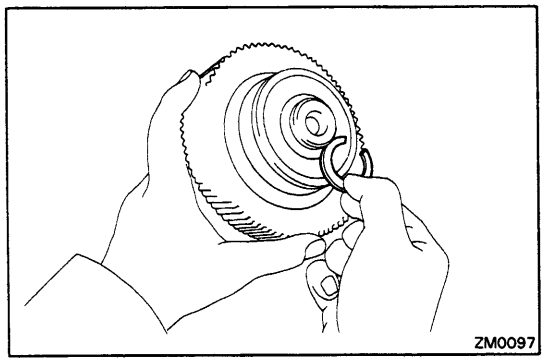
(b) Using SST and a press, press out the bearing.

SST 09950-00020



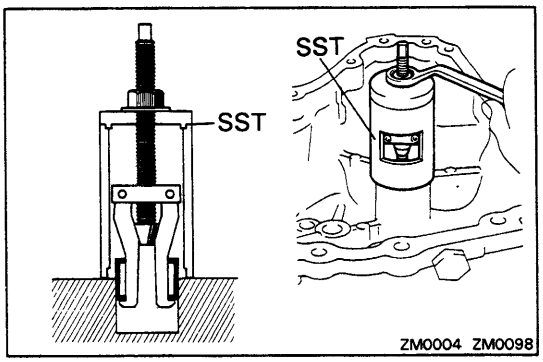
(c) Using SST and a press, press in a new bearing.

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)	

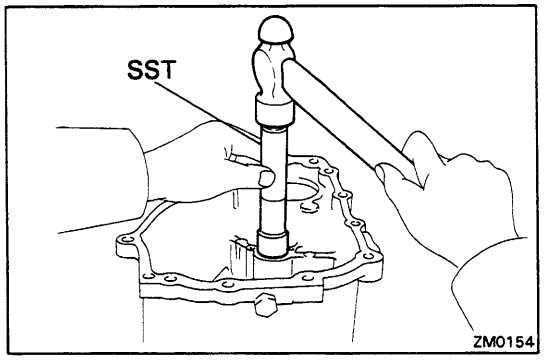


9. REPLACE REAR BEAR OF IDLER GEAR

(a) Remove the two bolts and oil receiver.

(b) Using SST, remove the bearing.

SST 09612-10092

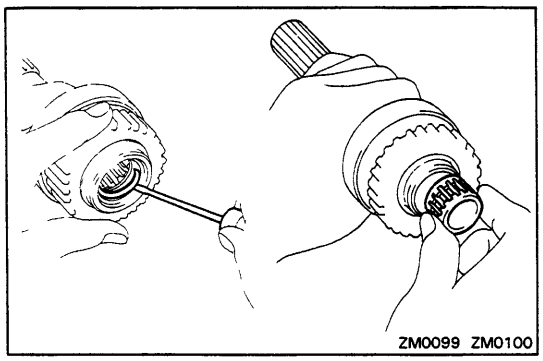


(c) Using SST and a hammer, tap in a new bearing until its surface is flush with the transmission case edge.

SST 09304-47010

(d) Install the oil receiver with the two nut. Torque the nuts.

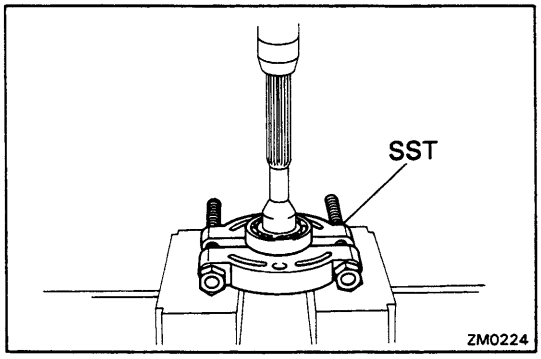
Torque: 55 kg-cm (48 in.-lb, 5.4 N·m)



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.

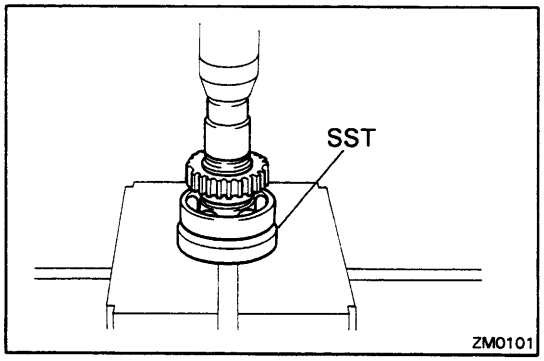


11. (Z54F)
REPLACE REAR BEARING OF TRANSFER OUTPUT SHAFT

(a) Using snap ring pliers, remove the snap ring.

(b) Using SST and a press, press out the bearing.

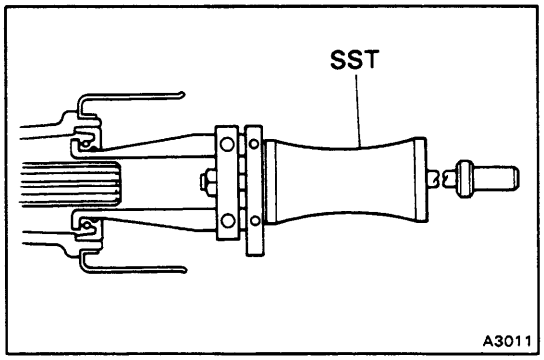
SST 09950-00020



(c) Using SST and a press, press in a new bearing.

SST 09608-20011

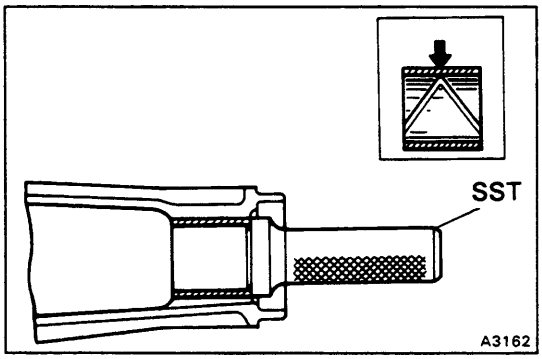
(d) Using snap ring pliers, install the snap ring.



12. (Z54F)
REPLACE EXTENSION HOUSING BUSHING AND OIL SEAL

(a) Using SST, remove the oil seal.

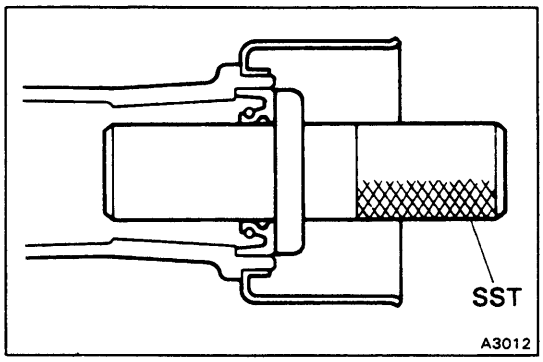
SST 09308-00010 or
09308-10010 with output shaft installed



(b) Gradually heat the extension housing end 80 – 100°C (176 – 212°F) in an oil bath.

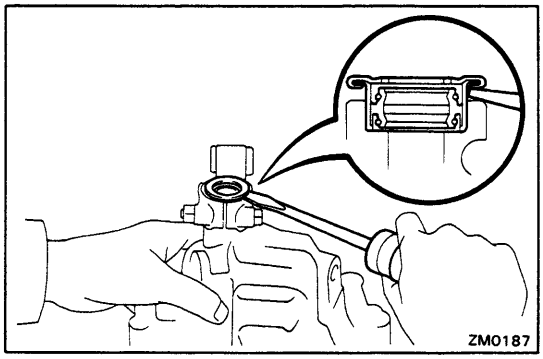
(c) Using SST and a press, press out the bushing and press in a new bushing until it's surface is flush with the extension housing edge.

SST 09307-12010



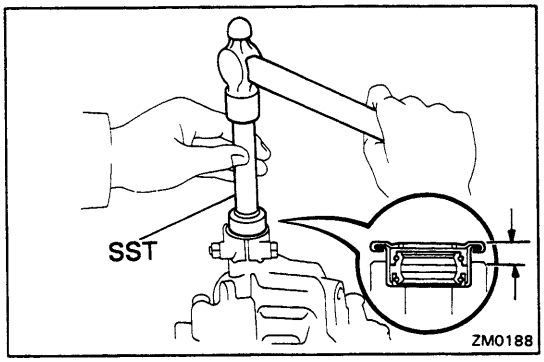
(d) Using SST and a hammer, tap in a new oil seal until it's surface is flush with the extension housing edge.

SST 09325-12010



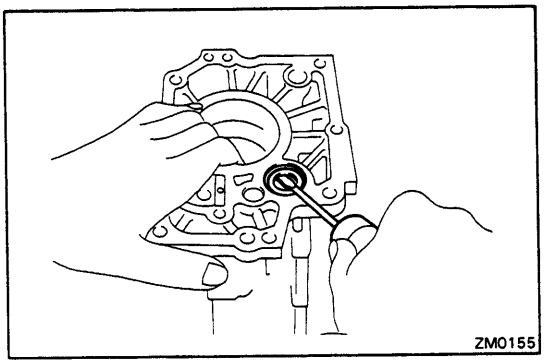
13. (Z45, 46, 53)
REPLACE EXTENSION HOUSING OIL SEAL

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



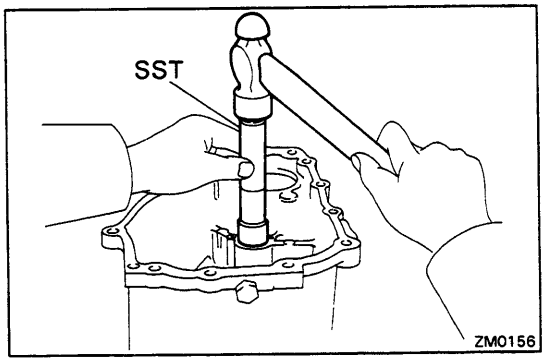
(b) Using SST and a hammer, tap in a new oil until 4.7 – 5.7 mm (0.185 – 0.224 in.) of it is left protruding from the extension housing.

SST 09304-30012



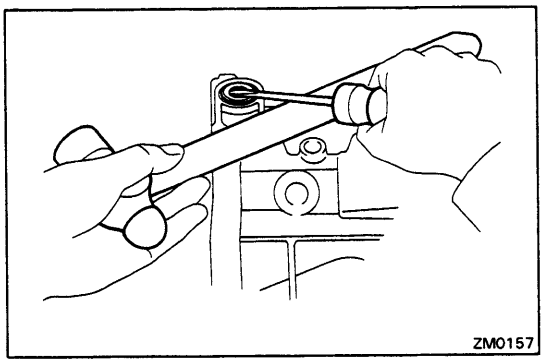
14. (Z54F)
REPLACE SELECT LEVER OIL SEAL

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



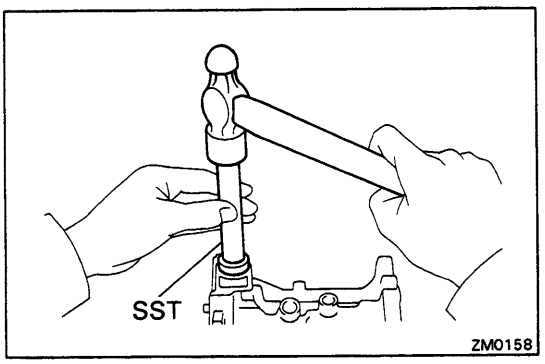
(b) Using SST and a hammer, tap in a new oil seal until it's surface is flush with the extension housing edge.

SST 09304-30012



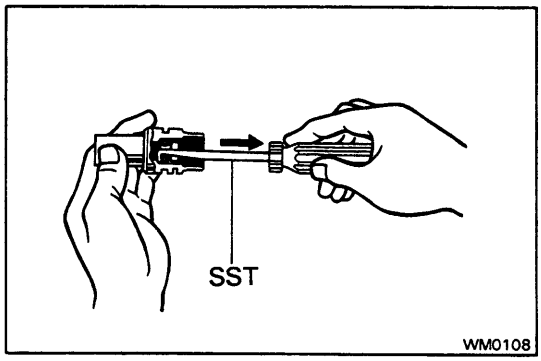
15. (Z54F)
REPLACE OIL SEAL OF TRANSFER SHIFT LEVER

(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.

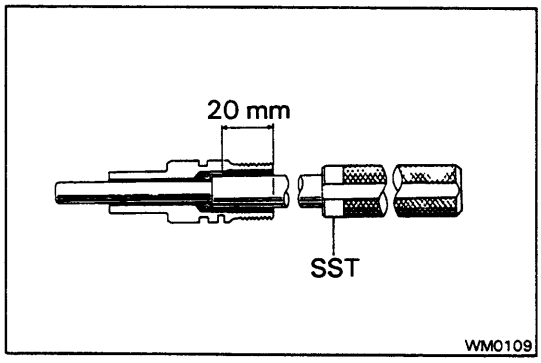
SST 09304-12012



16. REPLACE SPEEDOMETER DRIVEN GEAR OIL SEAL

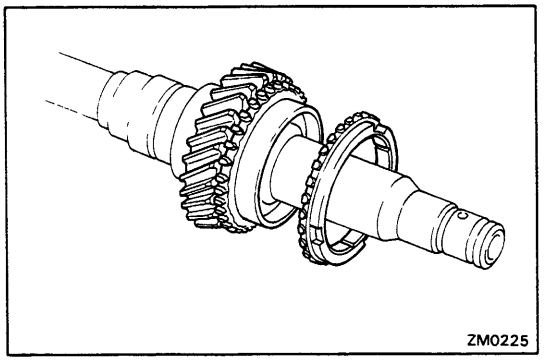
(a) Using SST, pull out the oil seal.

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 sleeve edge.

SST 09201-60011


ZM0225

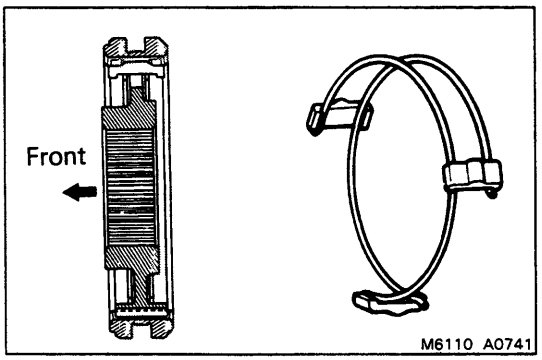
ASSEMBLY OF TRANSMISSION

(See page MT-15)

1. INSTALL SECOND GEAR

(a) Apply gear oil to the output shaft.

(b) Slide the 2nd gear and No. 1 synchronizer ring onto the output shaft.



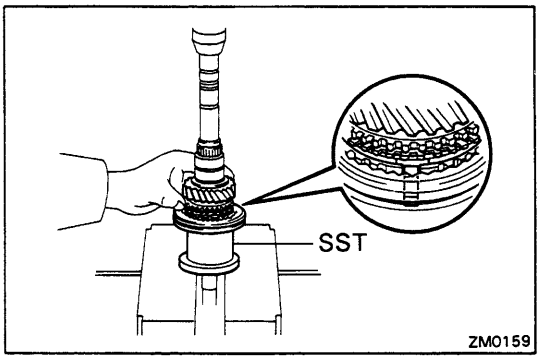
M6110 A0741

2. ASSEMBLE NO. 1 CLUTCH HUB AND HUB SLEEVE

(a) Install the clutch hub and shifting keys to the hub sleeve.

(b) Install the shifting key springs under the shifting keys.

CAUTION: Install the key springs positioned so that their end gaps are not in line.

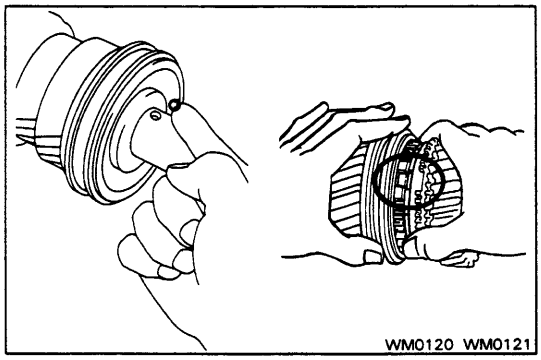


ZM0159

3. INSTALL NO. 1 CLUTCH HUB ASSEMBLY

Using SST and a press, align the synchronizer ring slots with the shifting keys and press in the clutch hub.

SST 09515-30010


WM0120 WM0121

4. ASSEMBLE FIRST GEAR, NEEDLE ROLLER BEARING AND INNER RACE

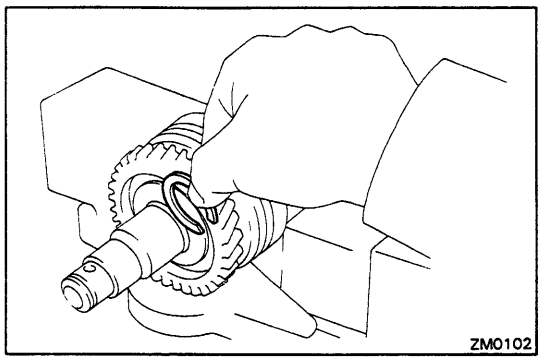
Apply gear oil to the bearing.

5. INSTALL FIRST GEAR ASSEMBLY

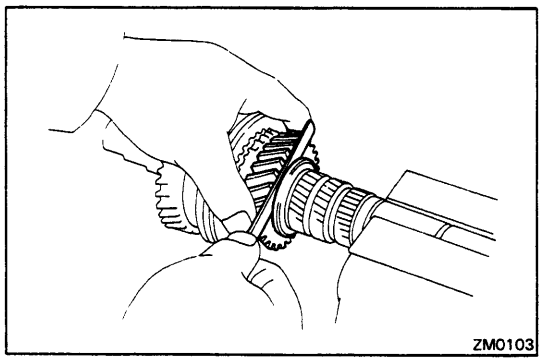
(a) Install the locking ball in the shaft.

(b) Slide the No. 1 synchronizer ring and 1st gear on the output shaft with the synchronizer ring slots aligned with the shifting keys, turn the inner race to align it with the locking ball.

(c) Select a snap ring that will allow minimum axial play and install it on the shaft.


ZM0102

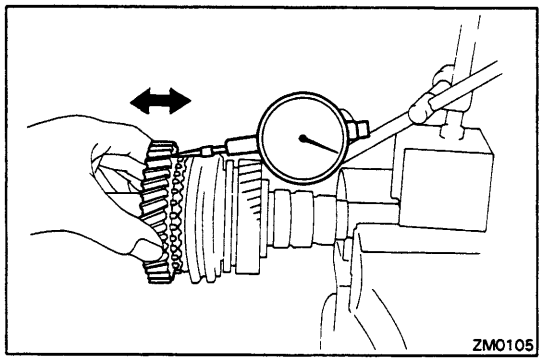
Snap ring thickness mm (in.)	
2.15 – 2.20 (0.0846 – 0.0866)	2.40 – 2.45 (0.0945 – 0.0965)
2.20 – 2.25 (0.0866 – 0.0886)	2.45 – 2.50 (0.0965 – 0.0984)
2.25 – 2.30 (0.0886 – 0.0906)	2.50 – 2.55 (0.0984 – 0.1004)
2.30 – 2.35 (0.0906 – 0.0925)	2.55 – 2.60 (0.1004 – 0.1024)
2.35 – 2.40 (0.0925 – 0.0945)	



6. CHECK SECOND GEAR THRUST CLEARANCE

Using a feeler gauge, measure the 2nd gear thrust clearance.

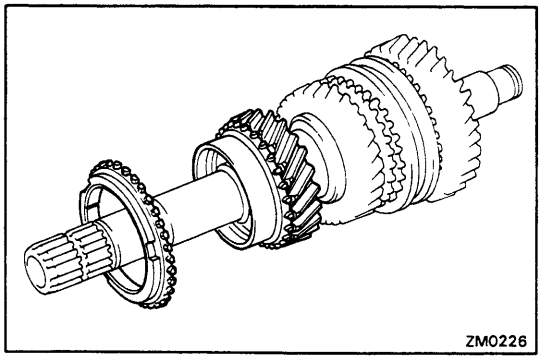
Standard clearance: **0.150 – 0.250 mm (0.0059 – 0.0098 in.)**
Maximum clearance: **0.30 mm (0.0118 in.)**



7. CHECK FIRST GEAR THRUST CLEARANCE

Using a dial indicator, measure the 1st gear thrust clearance.

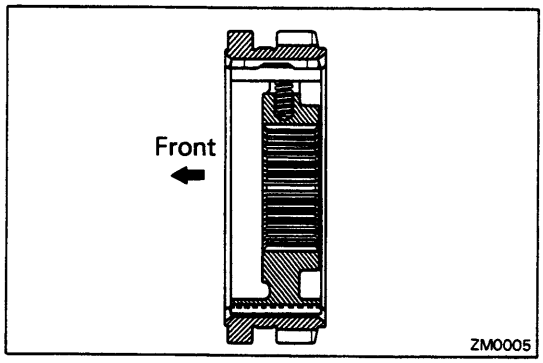
Standard clearance: **0.150 – 0.275 mm (0.0059 – 0.0108 in.)**
Maximum clearance: **0.30 mm (0.0118 in.)**



8. INSTALL THIRD GEAR

(a) Apply gear oil to the output shaft.

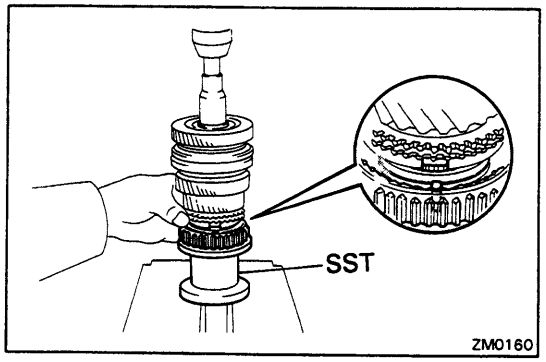
(b) Slide the 3rd gear and No. 2 synchronizer ring onto the output shaft.



9. ASSEMBLE NO. 2 CLUTCH HUB AND HUB SLEEVE

(a) Install the key springs and shifting keys to the clutch hub.

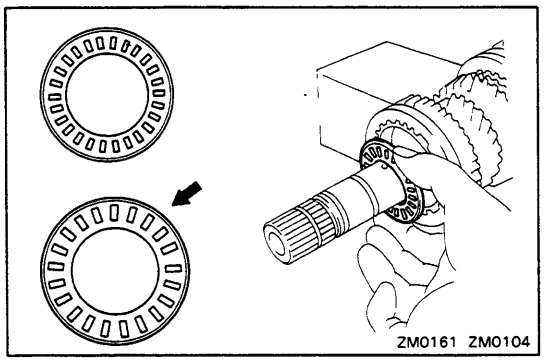
(b) Install the clutch hub to the hub sleeve.



10. INSTALL NO. 2 CLUTCH HUB ASSEMBLY

Using SST and a press, align the synchronizer ring slots with the shifting keys and press in the clutch hub.

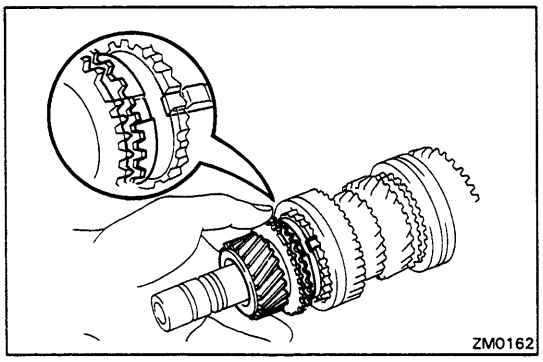
SST 09515-30010



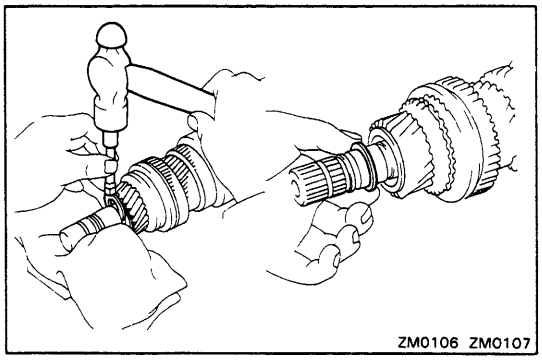
11. INSTALL FOURTH GEAR

(a) Apply gear oil to the output shaft.

(b) Slide the large thrust bearing onto the output shaft.

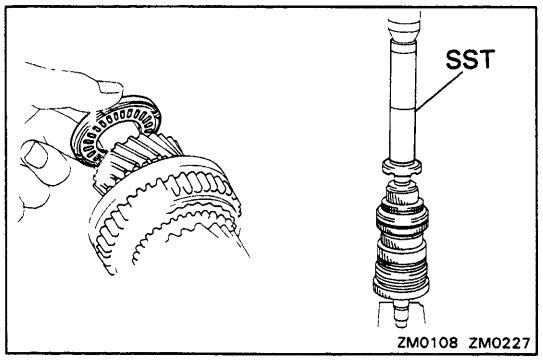


(c) Slide the No. 2 synchronizer ring, needle roller bearing and 5th gear onto the output shaft.
Align the synchronizer ring slots with the shifting keys.



(d) Slide the thrust washer onto the output shaft.

(e) Using a plastic-faced hammer, tap in the snap ring.

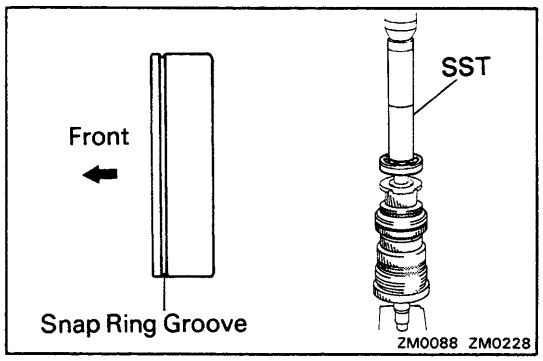


12. INSTALL FOURTH GEAR SMALL THRUST BEARING AND SPACER

(a) Stick the thrust bearing onto the spacer with MP grease.

(b) Using SST and a press, press in the spacer.

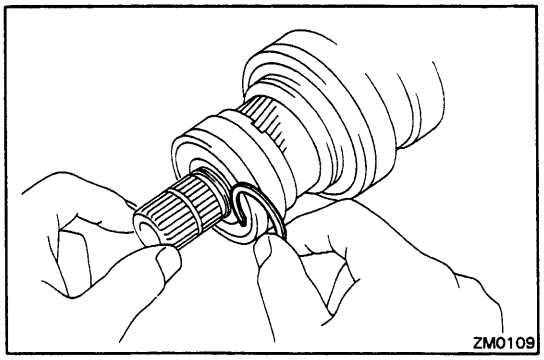
SST 09612-22011



13. INSTALL OUTPUT SHAFT FRONT BEARING

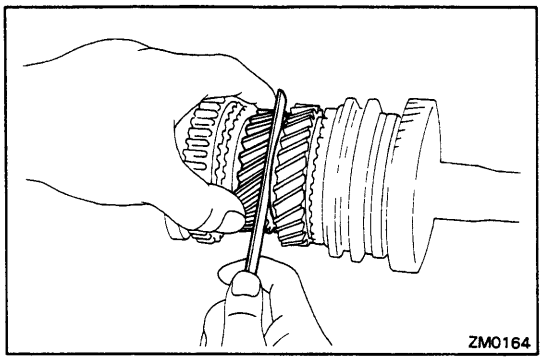
(a) Using SST and a press, press in the bearing.

SST 09612-22011



(b) Select a snap ring that will allow minimum axial play and install it on the shaft.

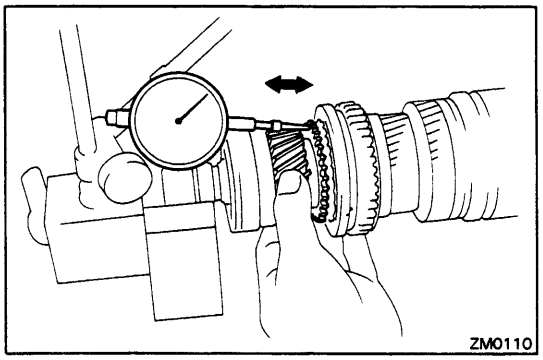
Snap ring thickness mm (in.)	
2.10 – 2.15 (0.0827 – 0.0846)	2.35 – 2.40 (0.0925 – 0.0945)
2.15 – 2.20 (0.0846 – 0.0866)	2.40 – 2.45 (0.0945 – 0.0965)
2.20 – 2.25 (0.0866 – 0.0886)	2.45 – 2.50 (0.0965 – 0.0984)
2.25 – 2.30 (0.0886 – 0.0906)	2.50 – 2.55 (0.0984 – 0.1004)
2.30 – 2.35 (0.0906 – 0.0925)	



14. CHECK THIRD GEAR THRUST CLEARANCE

Using a feeler gauge, measure the 3rd gear thrust clearance.

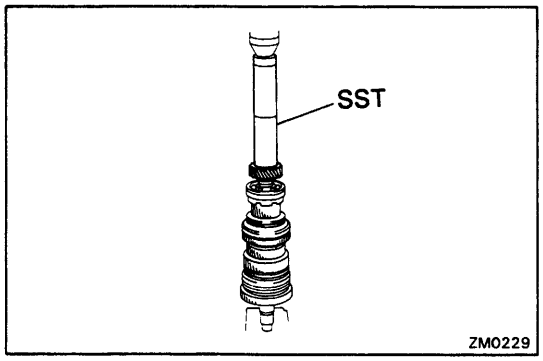
Standard clearance: 0.150 – 0.250 mm (0.0059 – 0.0098 in.)
Maximum clearance: 0.30 mm (0.0118 in.)



15. CHECK FOURTH GEAR THRUST CLEARANCE

Using a dial indicator, measure the 4th gear thrust clearance.

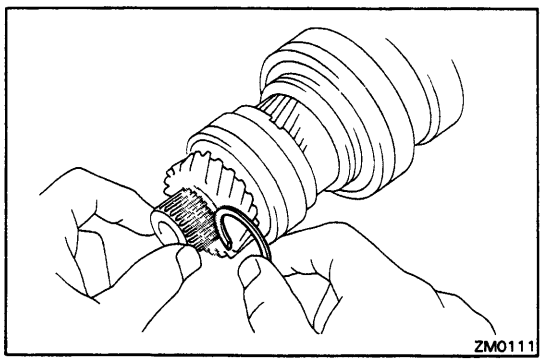
Standard clearance: 0.020 – 0.240 mm (0.0008 – 0.0094 in.)
Maximum clearance: 0.30 mm (0.0118 in.)



16.-1 (Z53, 54F)
INSTALL FIFTH GEAR

(a) Using SST and a press, press in the 5th gear.

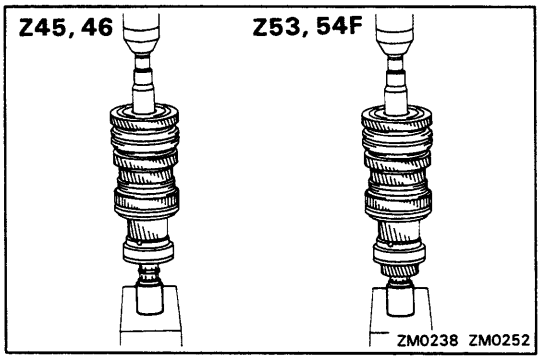
SST 09612-22011



(b) Select a snap ring that will allow minimum axial play and install it on the shaft.

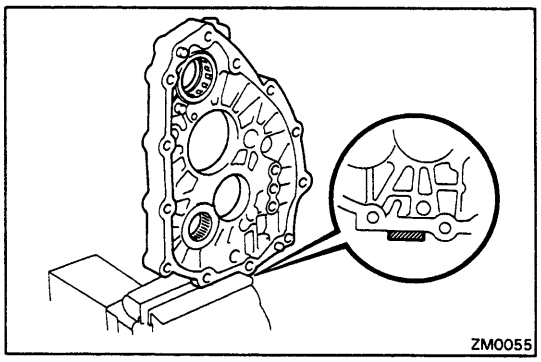
Snap ring thickness mm (in.)	
2.10 – 2.15 (0.0827 – 0.0846)	2.25 – 2.30 (0.0886 – 0.0906)
2.15 – 2.20 (0.0846 – 0.0866)	2.30 – 2.35 (0.0906 – 0.0925)
2.20 – 2.25 (0.0866 – 0.0886)	2.35 – 2.40 (0.0925 – 0.0945)

16.-2 (Z45, 46)
INSTALL SNAP RING



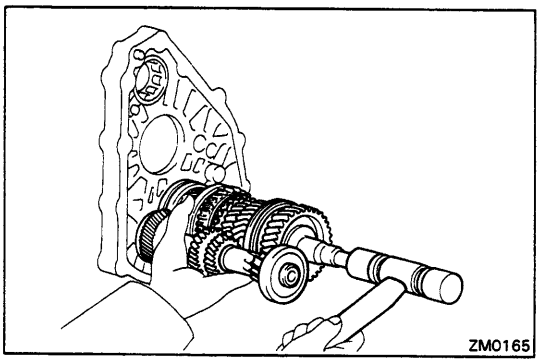
17. INSTALL SLEEVE YOKE

Using a press, press in the sleeve yoke.



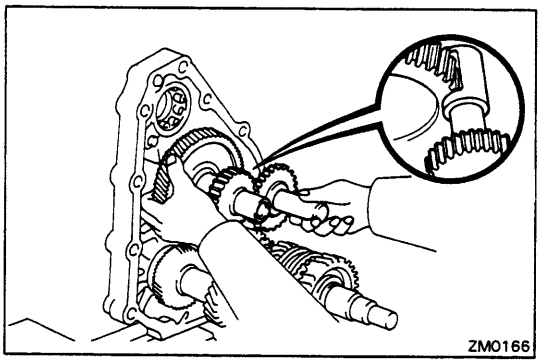
18. MOUNT INTERMEDIATE PLATE IN VISE

Secure the protusion on the lower part of the intermediate plate.

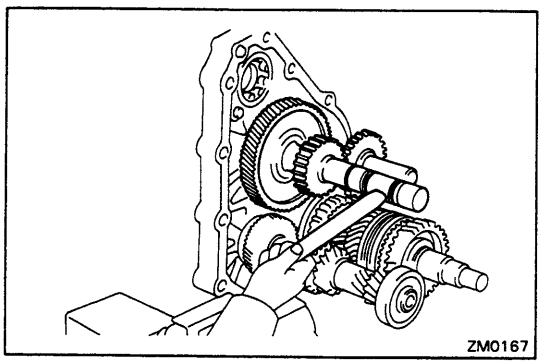


19. INSTALL OUTPUT SHAFT, COUNTER GEAR, IDLER GEAR AND REVERSE IDLER GEAR

(a) Using a plastic-faced hammer, tap in the output shaft and counter gear together about halfway.

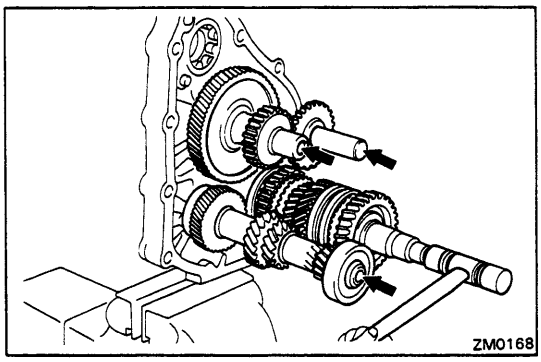


(b) Align the idler gear with the notched portion of the reverse idler gear shaft.

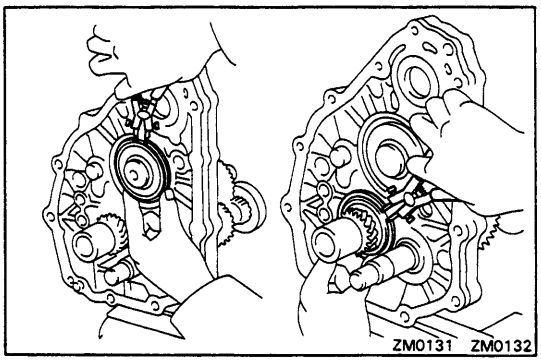


(c) Using a plastic-faced hammer, tap in the idler gear shaft bearing about halfway.

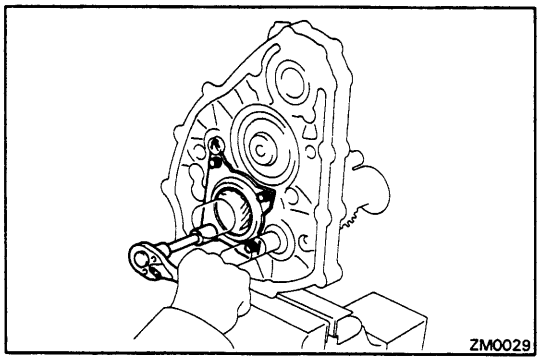
CAUTION: Insure that the idler gear and output shaft spacer do not contact each other.



(d) Using a plastic-faced hammer, tap each gear shaft until the bearing is in as far as it will go.

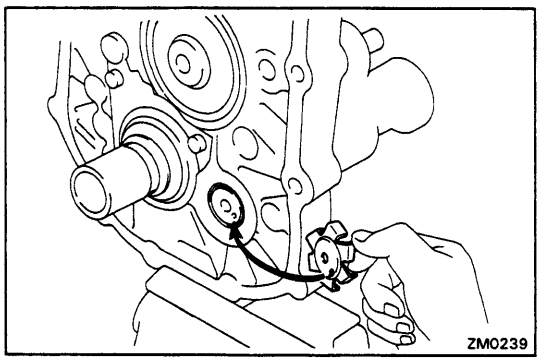


(e) Using snap ring pliers, install the two snap rings.



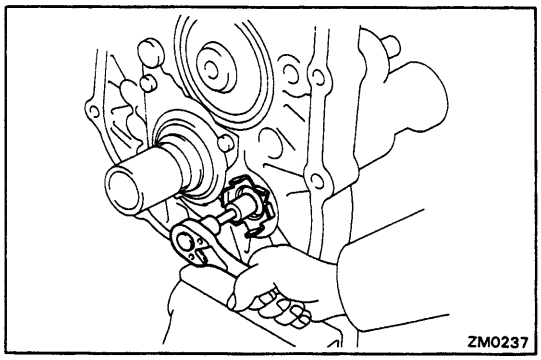
(f) Install the output shaft front bearing retainer with the four nuts. Torque the nuts.

Torque: 130 kg-cm (19 ft-lb, 13 N·m)



20. (Z45, 46)
INSTALL COUNTER GEAR PLATE

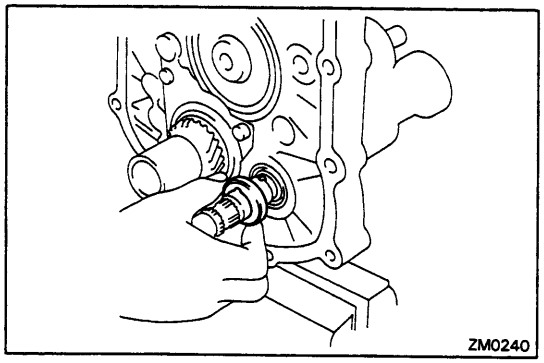
(a) Align the plate protrusion with the shaft cutout.



(b) Install the gear plate with the bolt. Torque the bolt.

Torque: 130 kg-cm (9 ft-lb, 13 N·m)

NOTE: Mesh the gears and lock the counter gear.



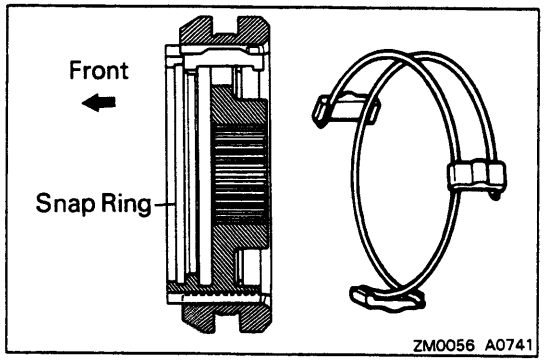
21.-1 (Z53, 54F)
INSTALL COUNTER FIFTH GEAR

(a) Apply geal oil to the shaft of the counter gear.

(b) Install the locking ball in the shaft.

(c) Slide the thrust washer onto the output shaft. Align the locking ball groove of the thrust washer with the locking ball.

(d) Slide the needle roller bearing, counter 5th gear and No. 3 synchronizer ring.

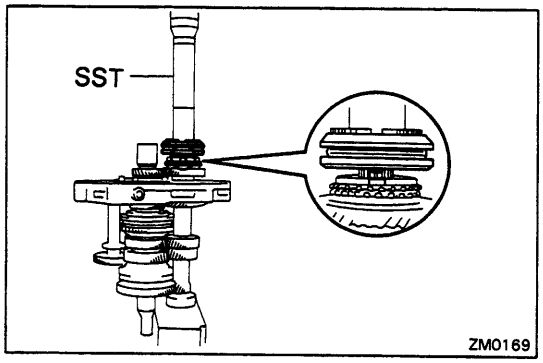


21.-2 (Z53, 54F)
ASSEMBLE NO. 3 CLUTCH HUB AND HUB SLEEVE

(a) Install the clutch hub and shifting keys to the hub sleeve.

(b) Install the shifting key springs under the shifting keys.

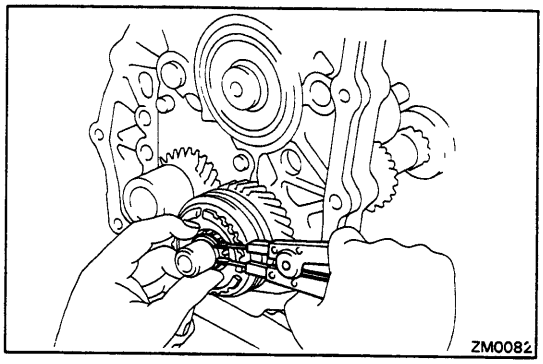
CAUTION: Install the key springs positioned to that their end gaps are not in line.



21.-3 (Z53, 54F)
INSTALL NO. 3 CLUTCH HUB ASSEMBLY

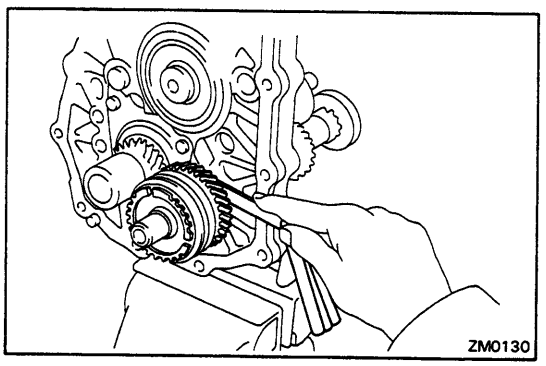
(a) Using SST and a press, align the synchronizer ring slots with the shifting keys and press in the clutch hub.

SST 09612-22010



(b) Select a snap ring that will allow minimum axial play and install it on the shaft.

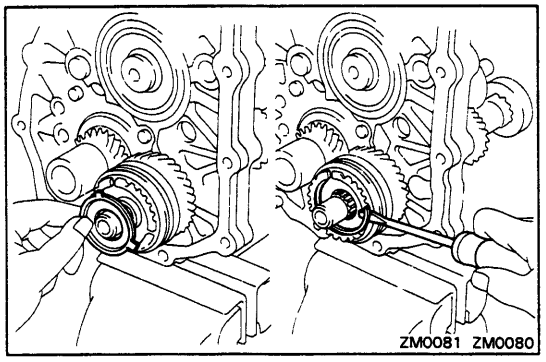
Snap ring thickness mm (in.)	
1.80 – 1.85 (0.0709 – 0.0728)	2.00 – 2.05 (0.0787 – 0.0807)
1.85 – 1.90 (0.0728 – 0.0748)	2.05 – 2.10 (0.0807 – 0.0827)
1.90 – 1.95 (0.0748 – 0.0768)	2.10 – 2.15 (0.0827 – 0.0846)
1.95 – 2.00 (0.0768 – 0.0787)	



21.-4 (Z53, 54F)
CHECK COUNTER FIFTH GEAR THRUST CLEARANCE

Using a feeler gauge, measure the 5th gear thrust clearance.

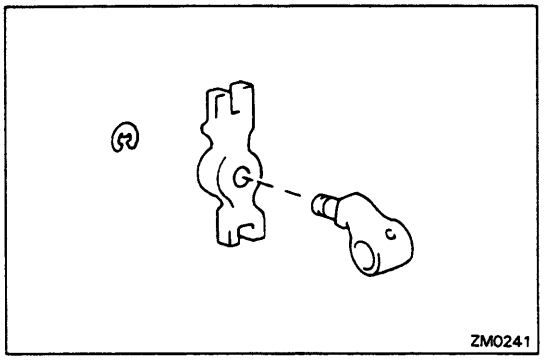
Standard clearance: 0.150 – 0.325 mm (0.0059 – 0.0128 in.)
Maximum clearance: 0.40 mm (0.0157 in.)



21.-5 (Z53, 54F)
INSTALL SHIFTING KEY RETAINER FOR FIFTH GEAR

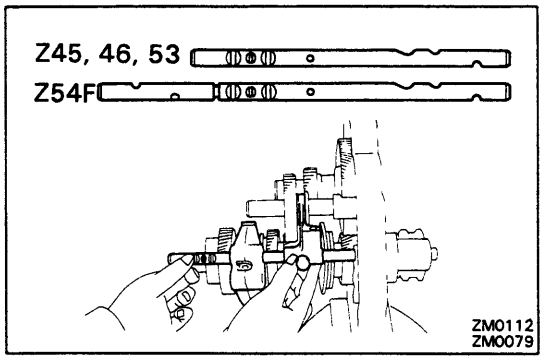
(a) Align the claws of the key retainer with the key groove of the clutch hub.

(b) Install the key retainer with the snap ring.



22. INSTALL SHIFT FORKS, SHIFT ARM AND SHIFT FORK SHAFTS

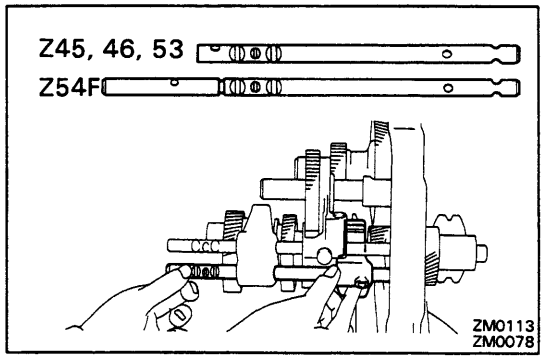
(a) Assemble the reverse shift arm and shift head with the E-Ring.



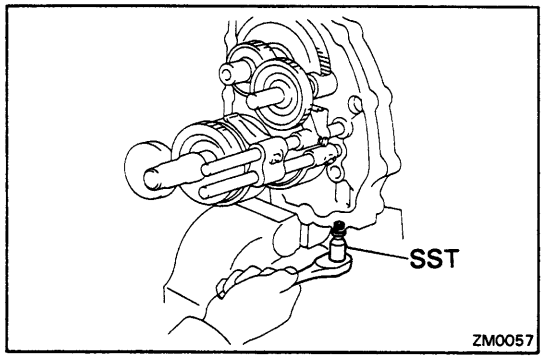
(b) Install the No. 1 shift fork, reverse shift fork and No. 1 shift fork shaft.

(1) Align the No. 1 shift fork with the No. 1 hub sleeve groove.

(2) Align the reverse shift fork with the reverse gear groove.

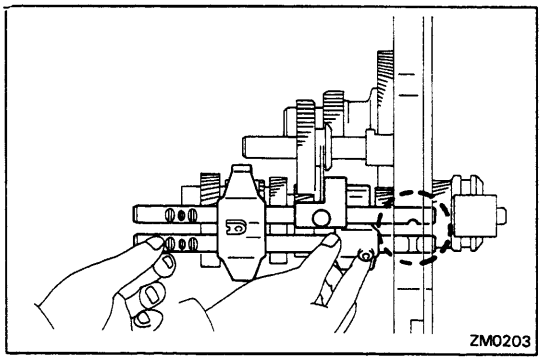


(c) Install the No. 2 shift fork and No. 2 shift fork shaft. Align the No. 2 shift fork with the No. 2 hub sleeve groove.



(d) Using SST, remove the screw plug (for interlock pin).

SST 09313-30021

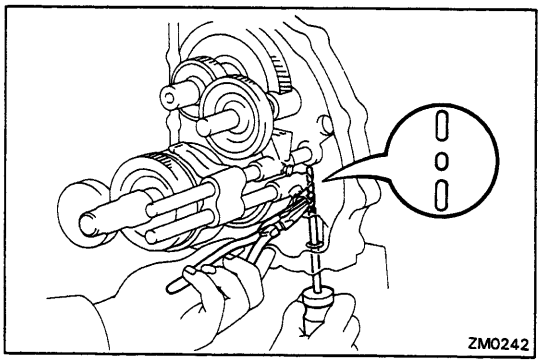


(e) Align the interlock pin groove of the No. 1 shift fork shaft with the interlock pin hole of the No. 2 shift fork shaft.

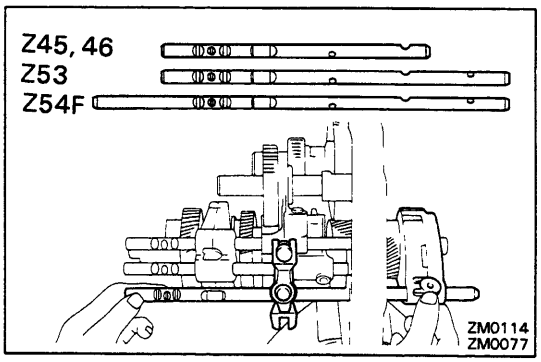
(1) Place the No. 1 and No. 2 hub sleeve in the neutral position.

(2) Align the mount bolt holes of the No. 1 shift fork and No. 1 shift fork shaft.

(3) Align the mount bolt holes of the No. 2 shift fork and No. 1 shift fork shaft.



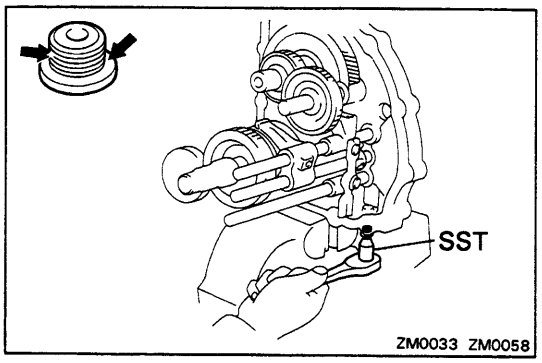
(f) Install the three interlock pins.
Coat MP grease to the interlock pin.



(g) Install the reverse shift arm, No. 3 shift fork (Z53, 54F) and No. 3 shift fork shaft.

(1) Connect the reverse shift arm and reverse shift fork.

(2) (Z53, 54F)
Align the No. 3 shift fork with the No. 3 hub sleeve groove.

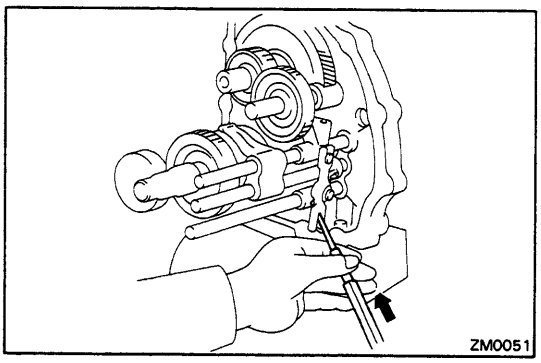


(h) Apply MP grease on the threads and under the screw plug head.

(i) Using SST, install and torque the screw plug.

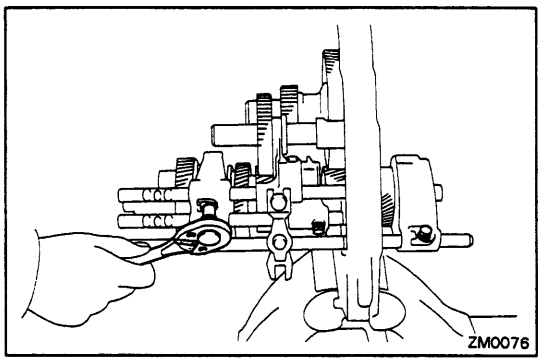
SST 09313-30021

Torque: 220 kg-cm (16 ft-lb, 22 N·m)



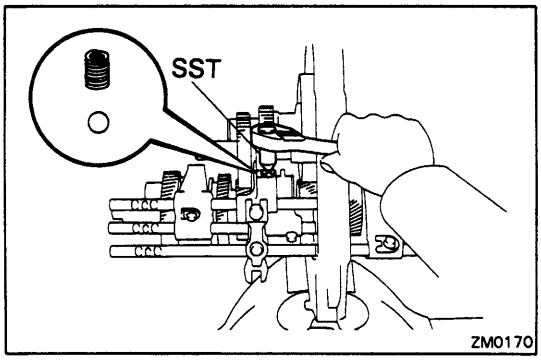
(j) Align the pin holes of the reverse shift arm and No. 3 shift fork shaft.

(k) Using a pin punch and hammer, tap in the slotted spring pin until it is flush with the shift fork.



(l) Install and torque the shift fork mount bolts.

Torque: 185 kg-cm (13 ft-lb, 18 N·m)



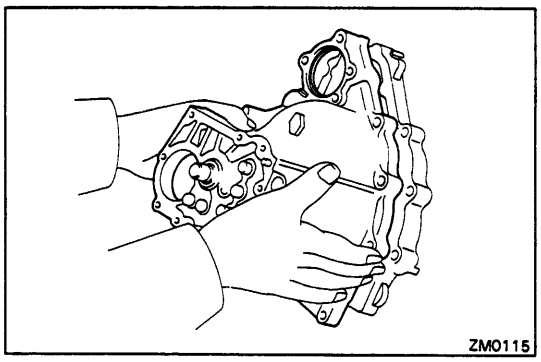
(m) Install the detent ball and spring into the reverse shift fork hole.

(n) Using SST, install and torque the screw plug.

SST 09313-30021

Torque: 220 kg-cm (16 ft-lb, 22 N·m)

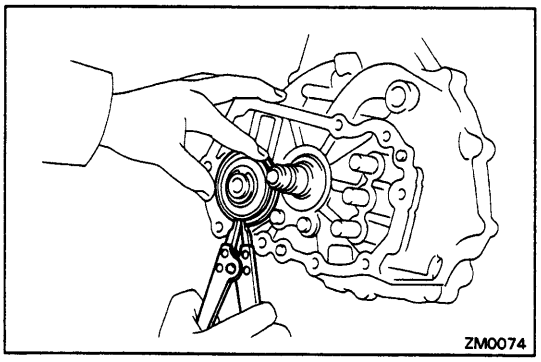
23. DISMOUNT INTERMEDIATE PLATE FROM VISE



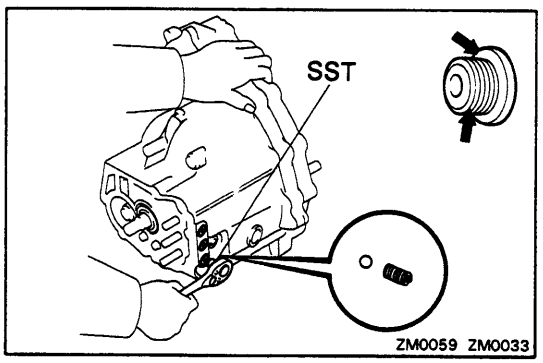
24. INSTALL TRANSMISSION CASE

(a) Place a new gasket in position on the intermidiate plate.

(b) Assemble the transmission case and intermidiate plate.



(c) Using snap ring pliers, install the snap ring.



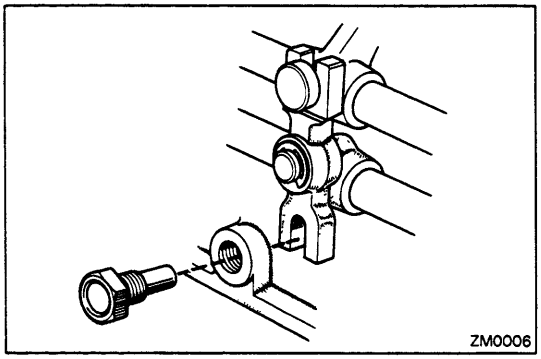
(d) Install the detent ball and spring into each hole.

(e) Apply liquid sealer on the threads and under the screw plug heads.

(f) Using SST, install and torque the three screw plugs.

SST 09313-30021

Torque: 220 kg-cm (16 ft-lb, 22 N·m)



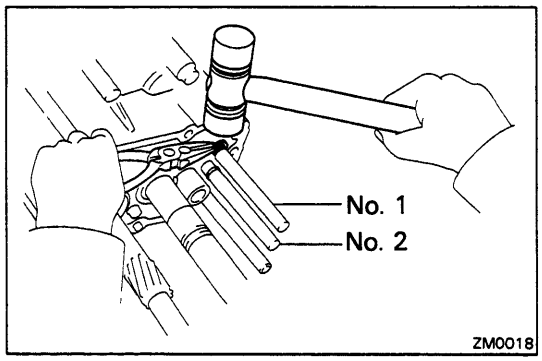
25. INSTALL REVERSE SHIFT ARM PIVOT

(a) Install a new gasket to the shift arm pivot.

(b) Insert the shift arm pivot through the reverse shift arm.

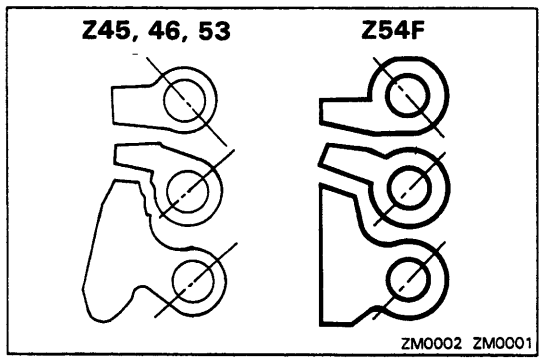
(c) Torque the shift arm pivot.

Torque: 300 kg-cm (22 ft-lb, 29 N·m)



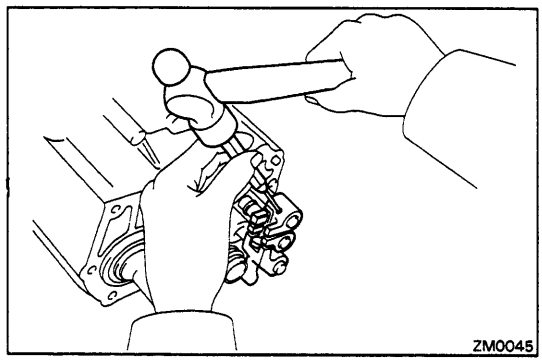
26. (Z54F)
INSTALL SNAP RINGS

Using a plastic-faced hammer, tap the snap ring on the No. 1 and No. 2 shift fork shafts.



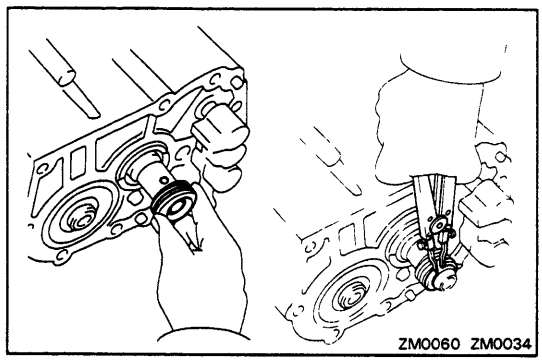
27. INSTALL SHIFT HEADS (NO. 1, NO. 2, AND NO. 3)

(a) Slide the shift head onto each shift fork shaft.



(b) Align the pin holes of the shift head and shift fork shaft.

(c) Using a pin punch and hammer, tap in the slotted spring pin until it is flush with the shift fork. Install the three slotted spring pins.

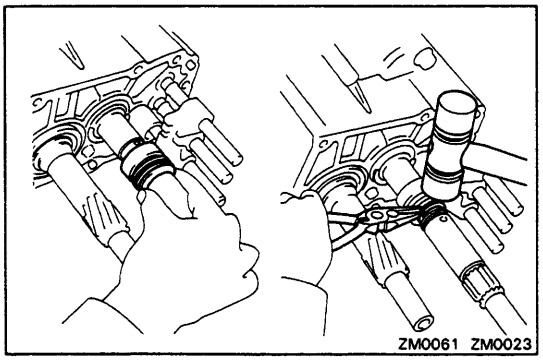


28. INSTALL SPEEDOMETER DRIVE GEAR
(Z45, 46, 53)

(a) Install the locking ball in the output shaft.

(b) Slide the drive gear onto the shaft.
Align the locking ball groove of the drive gear with the locking ball.

(c) Using snap ring pliers, install the snap ring.

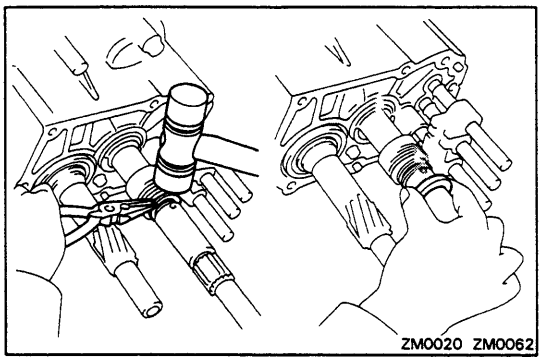


(Z54F)

(a) Install the locking ball in the output shaft.

(b) Slide the drive gear onto the output shaft.
Align the locking ball groove of the drive gear with the locking ball.

(c) Using a plastic-faced hammer, tap in the snap ring.

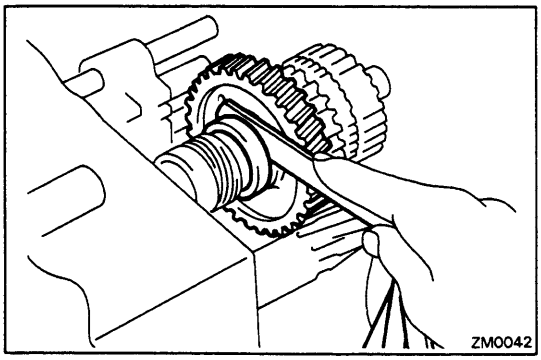


29. (Z54F)
INSTALL THRUST WASHER OF EXTRA LOW GEAR

(a) Using a plastic-faced hammer, tap in the snap ring.

(b) Install the locking ball in the output shaft.

(c) Slide the thrust washer onto the output shaft.
Align the locking ball groove of the thrust washer with the locking ball.



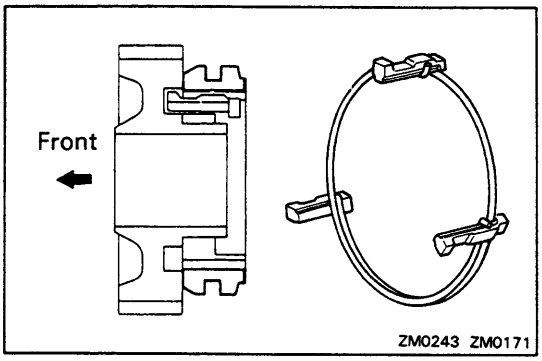
30. (Z54F)
CHECK EXTRA LOW GEAR THRUST CLEARANCE

(a) Install the needle roller bearings, extra low gear and transfer clutch hub with the snap ring.

(b) Using a feeler gauge, measure the extra low gear thrust clearance.

Standard clearance: **0.180 – 0.430 mm (0.0070 – 0.0169 in.)**
Maximum clearance: **0.50 mm (0.0197 in.)**

(c) Remove the snap ring, transfer clutch hub, extra low gear and needle roller bearing.

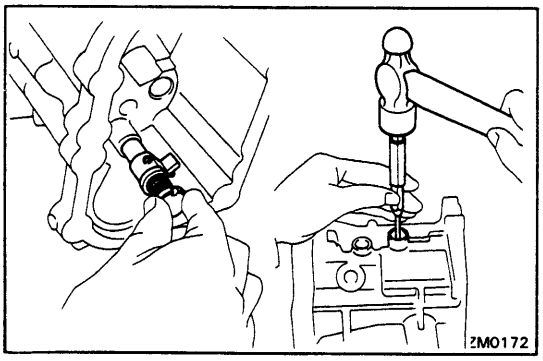


31. (Z54F)
ASSEMBLE EXTRA LOW GEAR AND NO. 4 HUB SLEEVE

(a) Install the extra low gear and shifting keys to the hub sleeve.

(b) Install the shifting key springs under the shifting keys.

CAUTION: Install the key springs positioned so that their end gaps are not in line.

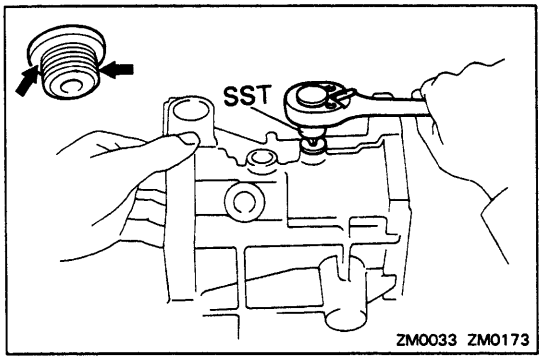


32. (Z54F)
INSTALL REVERSE RESTRICT PIN

(a) Install the reverse restrict pin to the transfer adaptor.

(b) Align the pin holes of the reverse restrict pin and transfer adaptor.

(c) Using a pin punch and hammer, tap in the slotted spring pin.

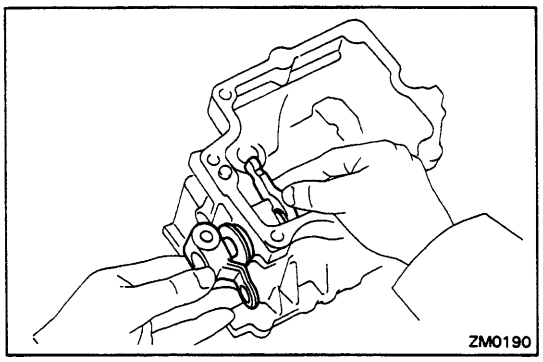


(d) Apply liquid sealer on the threads and under the screw plug head.

(e) Using SST, install and torque the screw plug.

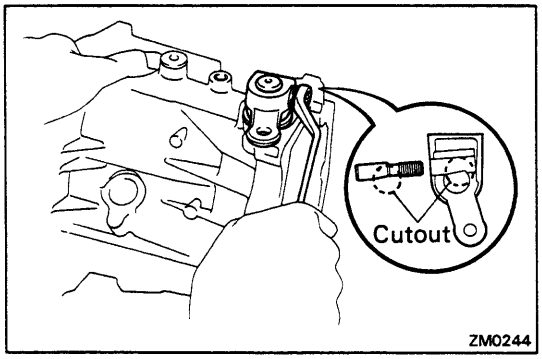
SST 09313-30021

Torque: 220 kg-cm (16 ft-lb, 22 N·m)



33. (Z54F)
INSTALL TRANSFER SHIFT LEVER SHAFT AND REAR DRIVE SHIFT LINK LEVER

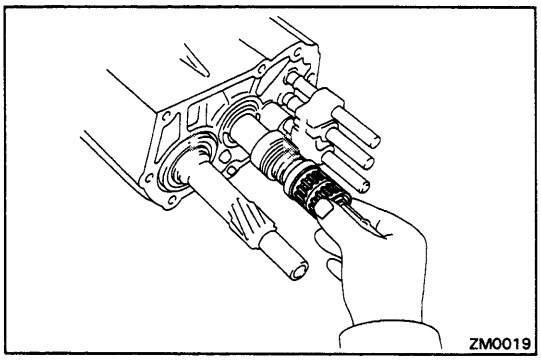
(a) Install the shift lever shaft and shift link lever together with the plate washer.



(b) Align the cutouts of the lever lock pin and shift lever shaft.

(c) Install the lever lock pin, spring washer and nut. Torque the nut.

Torque: 130 kg-cm (9 ft-lb, 13 N·m)

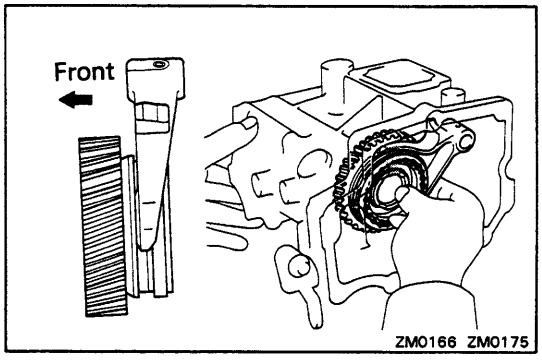


34. (Z54F)
INSTALL TRANSFER ADAPTOR AND EXTRA LOW GEAR

(a) Apply gear oil to the output shaft.

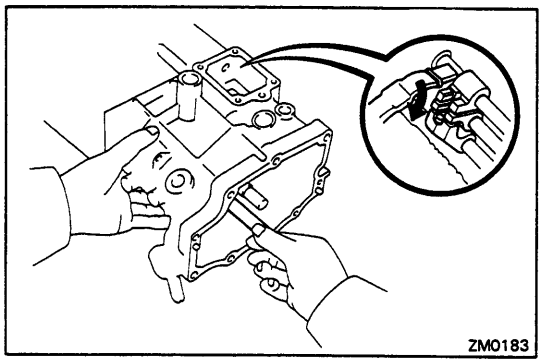
(b) Slide the two needle roller bearings onto the output shaft.

(c) Place a new gasket in position on the transmission case.



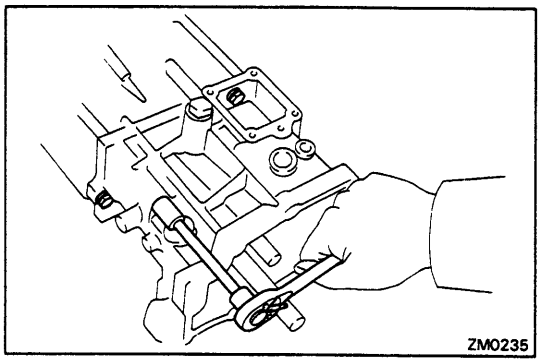
(d) Install the No. 4 shift fork to the No. 4 hub sleeve.

(e) Place the extra low gear assembly and No. 4 hub sleeve into position in the transfer adaptor.



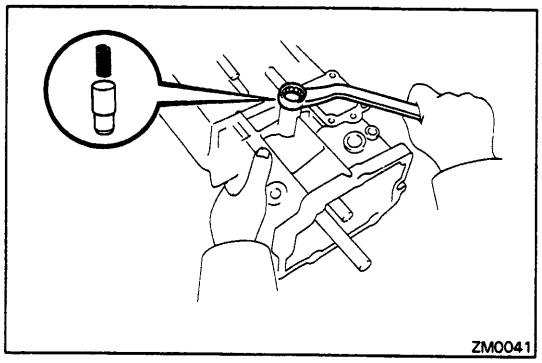
(f) Install the select lever on the transfer adaptor.

(g) Install the transfer adaptor.
Turn the select lever and insert the tip into the shift head groove.

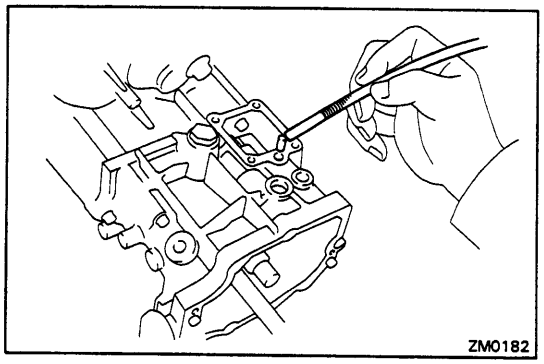


(h) Install and torque the nine bolts.

Torque: 260 kg-cm (19 ft-lb, 25 N·m)

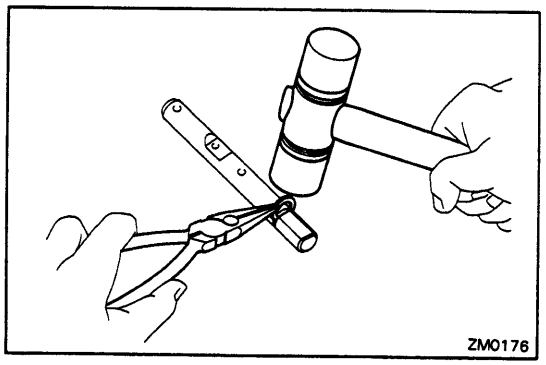


(i) Install the reverse restrict pin and spring with the plug.

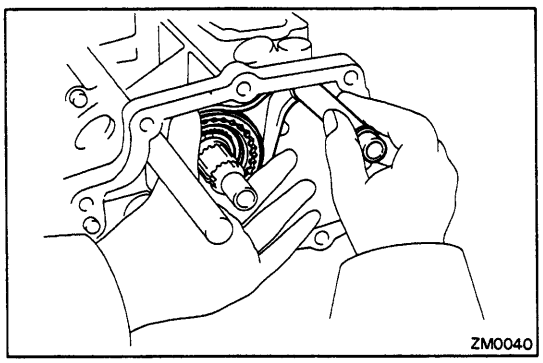


35. INSTALL NO. 4 SHIFT FORK SHAFT AND NO. 4 SHIFT HEAD

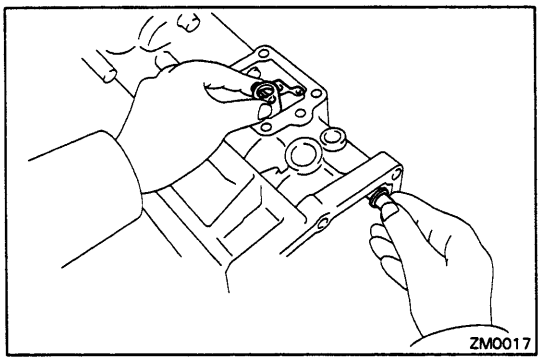
(a) Using a magnetic finger, install the interlock pin.



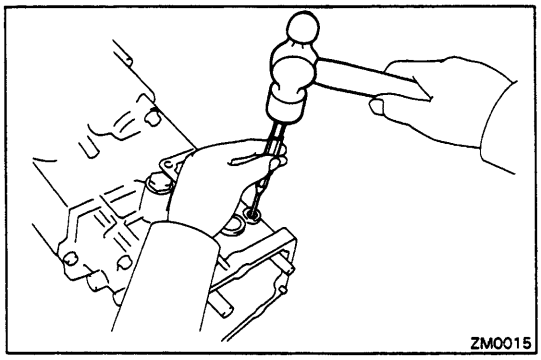
(b) Using a plastic-faced hammer, tap in the snap ring.



(c) Install the No. 4 shift fork shaft.

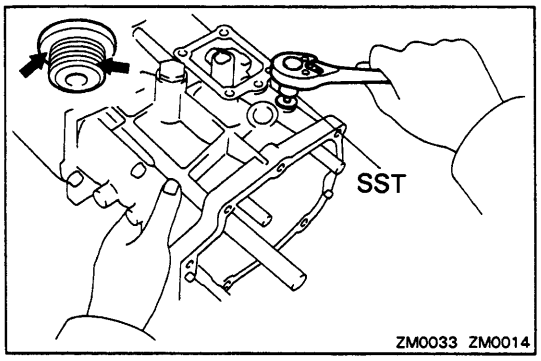


(d) Install the No. 4 shift head.



(e) Align the pin holes of the No. 4 shift fork and No. 4 shift fork shaft.

(f) Using a pin punch and hammer, tap in the slotted spring pin until it is flush with the shift fork.

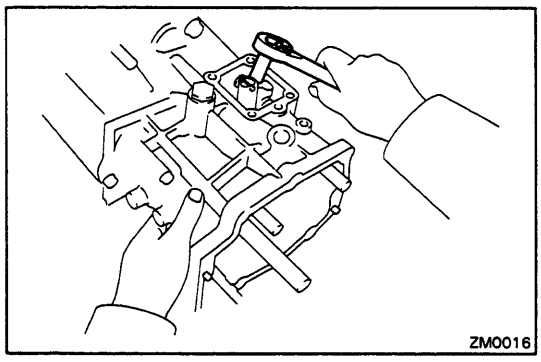


(g) Apply liquid sealer on the threads and under the screw plug head.

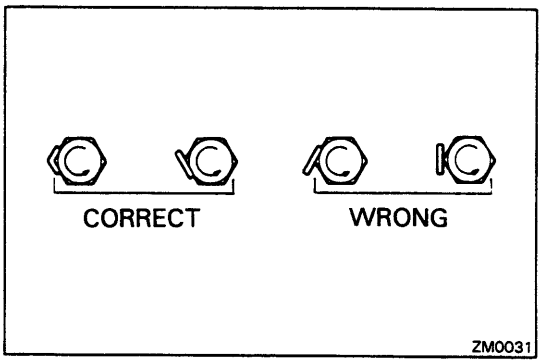
(h) Using SST, install and torque the screw plug.

SST 09313-30021

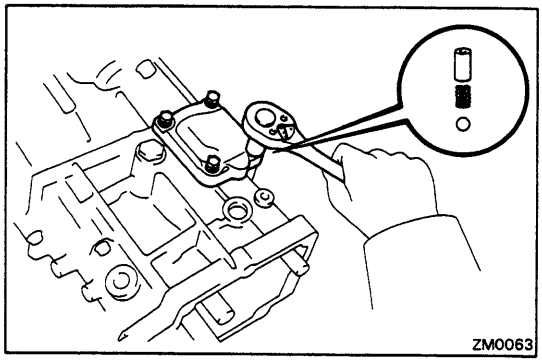
Torque: 250 kg-cm (18 ft-lb, 25 N·m)



(i) Install the No. 4 shift fork mount bolt together with a new lock plate.



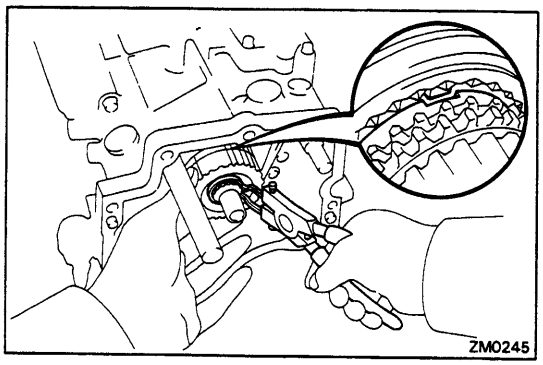
(j) Stake the lock plate.



(k) Install the detent ball, spring and spring seat.

(l) Install a new gasket and the transfer case cover with the four bolts. Torque the bolts.

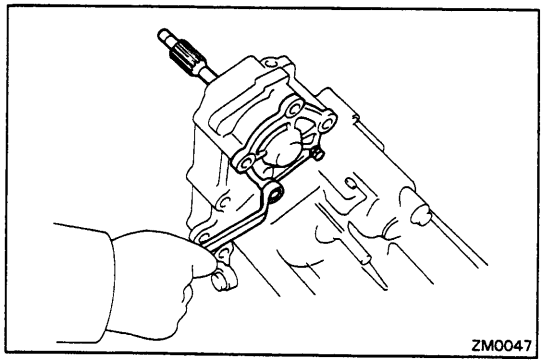
Torque: 195 kg-cm (14 ft-lb, 19 N·m)



36. INSTALL TRANSFER CLUTCH HUB

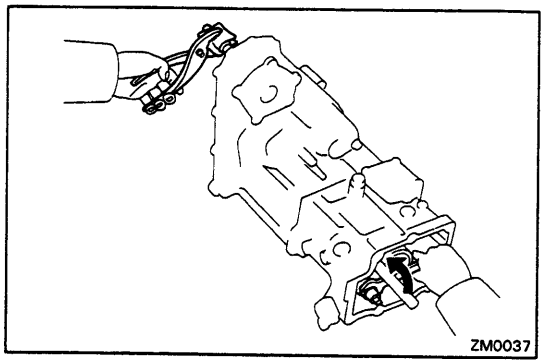
(a) Slide the No. 4 synchronizer ring and transfer clutch hub.
Align the synchronizer ring slots with the shifting keys.

(b) Using snap ring pliers, install the snap ring.



37. INSTALL OIL PUMP DRIVE SHAFT

(a) Temporarily install the input shaft.

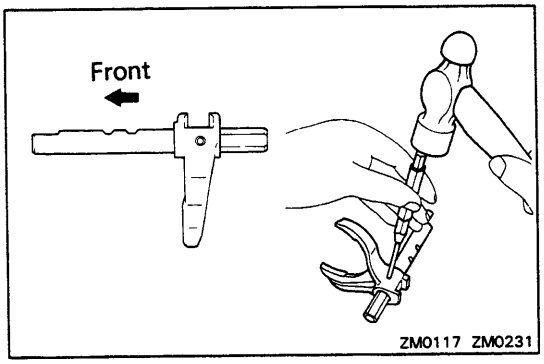


(b) Cover the tip of the input shaft with a shop cloth, and secure it with pliers, then install and torque the oil pump drive shaft.

Torque: 130 kg-cm (9 ft-lb, 13 N·m)

NOTE: The oil pump drive shaft has left-handed threads.

(c) Remove the input shaft.

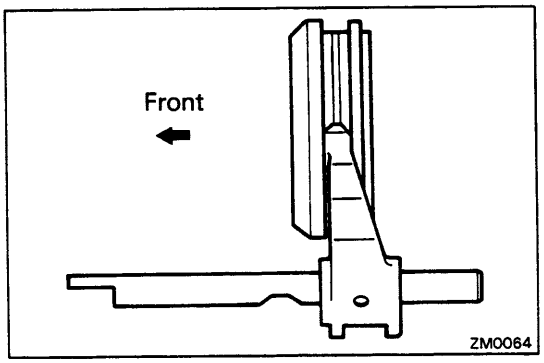


38. ASSEMBLE TRANSFER SHIFT FORK AND TRANSFER SHIFT FORK SHAFT

(a) Assemble the transfer shift fork and transfer shift fork shaft.

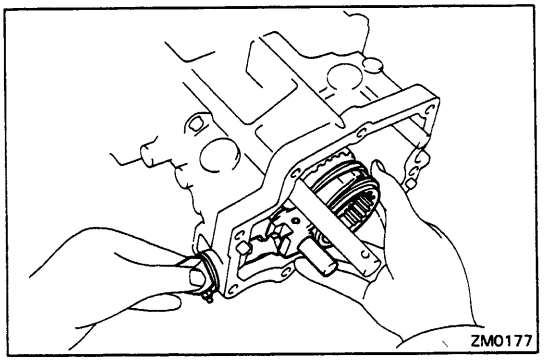
(b) Align the pin holes of the trasfer shift fork and transfer shift fork shaft.

(c) Using a pin punch and hammer, tap in the slotted spring pin.

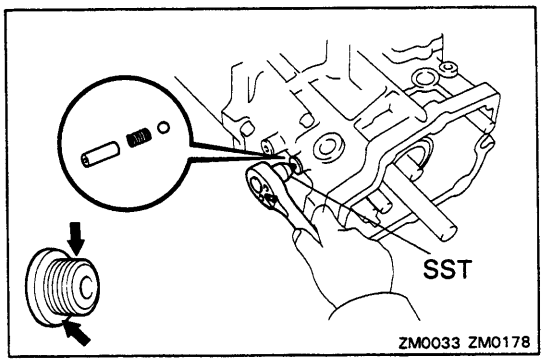


39. INSTALL TRANSFER SHIFT FORK ASSEMBLY AND TRANSFER HUB SLEEVE

(a) Place the transfer shift fork on the tranfer hub sleeve.



(b) Install the transfer shift fork assembly and transfer hub sleeve together.
Connect the transfer shift lever shaft into the transfer shift fork groove.



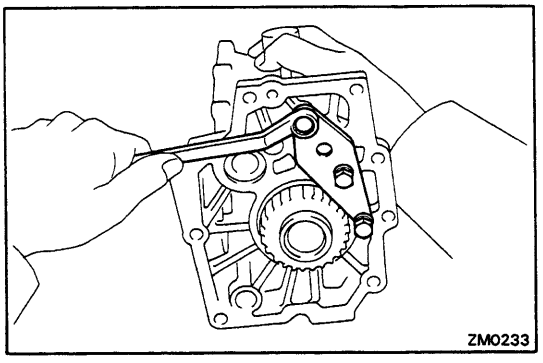
(c) Install the detent ball, spring and spring seat.

(d) Apply liquid sealer on the threads and under the screw plug head.

(e) Using SST, install and torque the screw plug.

SST 09313-30021

Torque: 250 kg-cm (18 ft-lb, 25 N·m)



40. INSTALL TRANSFER OUTPUT SHAFT AND OIL PUMP ROTORS

(a) Install the following parts:

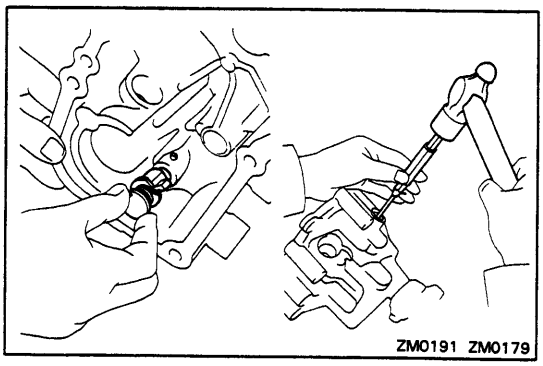
(1) Oil baffle

(2) Transfer output shaft

(3) Oil pump rotors

(b) Install the oil pump cover with the three bolts. Torque the bolts.

Torque: 195 kg-cm (14 ft-lb, 19 N·m)

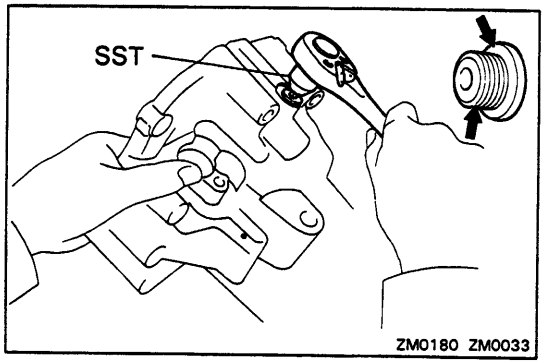

ZM0191 ZM0179

41. (Z45, 46, 53)
INSTALL REVERSE RESTRICT PIN

(a) Install the reverse restrict pin to the extension housing.

(b) Align the pin holes of the reverse restrict pin and extension housing.

(c) Using a pin punch and hammer, drive in the slotted spring pin.



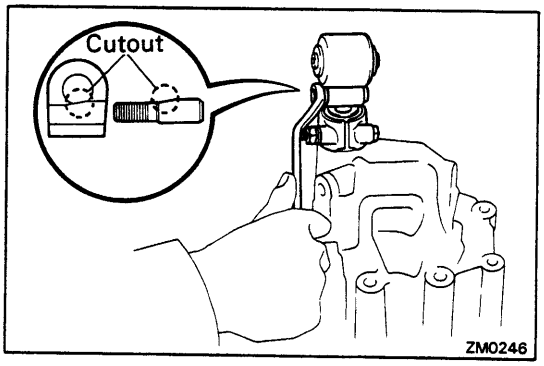
ZM0180 ZM0033

(d) Apply liquid sealer on the threads and under the screw plug head.

(e) Using SST, install and torque the screw plug.

SST 09313-30021

Torque: 220 kg-cm (16 ft-lb, 22 N·m)



ZM0246

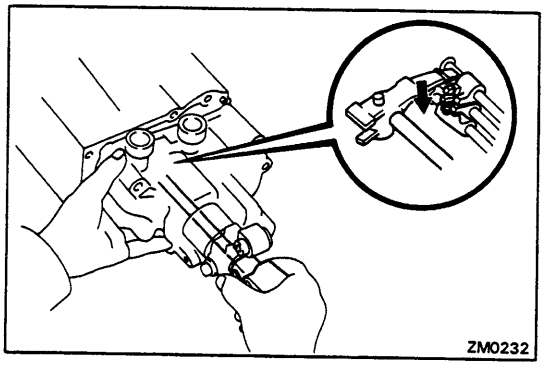
42. (Z45, 46, 53)
INSTALL SELECT LEVER AND SHIFTING ROD END

(a) Install the select lever and shifting rod to the extension housing.

(b) Align the cutouts of the lever lock pin and select lever.

(c) Install the lever lock pin, spring washer and nut. Torque the nut.

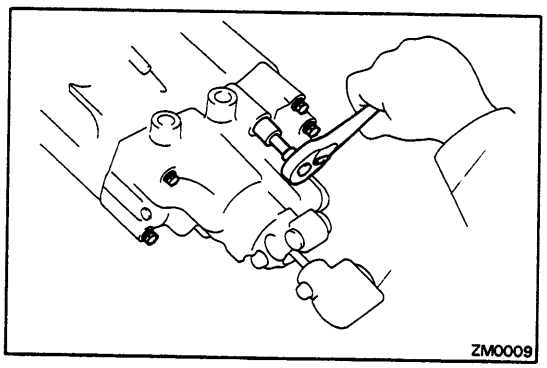
Torque: 195 kg-cm (14 ft-lb, 19 N·m)


ZM0232

43. INSTALL EXTENSION HOUSING (Z45, 46, 53)

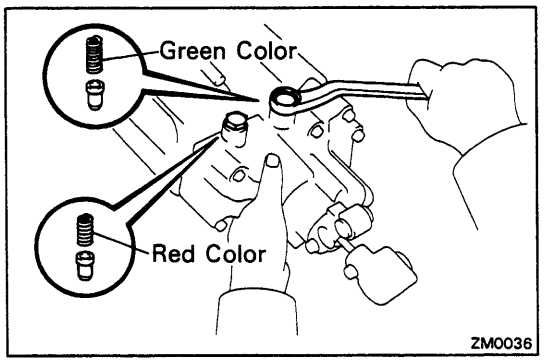
(a) Place a new gasket in position on the transmission case.

(b) Install the extension housing.
Turn the tip into the shift head groove.


ZM0009

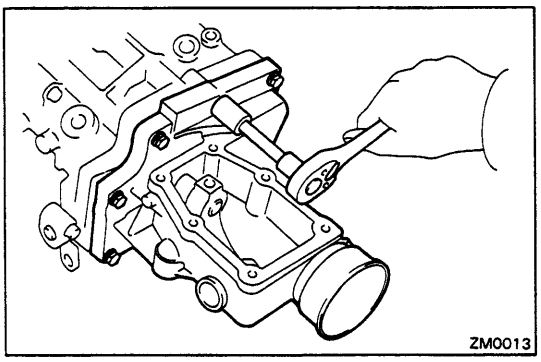
(c) Install and torque the nine bolts.

Torque: 260 kg-cm (19 ft-lb, 25 N·m)



(d) Install two reverse restrict pins, springs and plugs. Torque the plugs.

Torque: 410 kg-cm (30 ft-lb, 40 N·m)



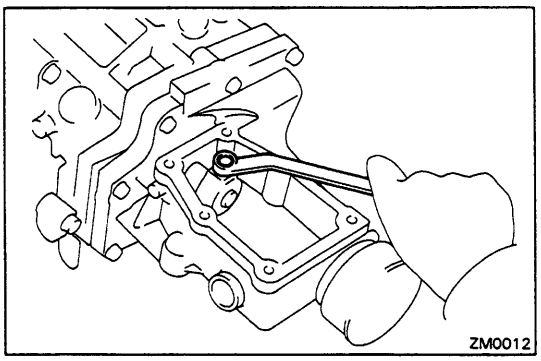
(Z54F)

(a) Place a new gasket in position on the transfer adaptor.

(b) Install the extension housing and select lever housing together.

(c) Install and torque the nine bolts.

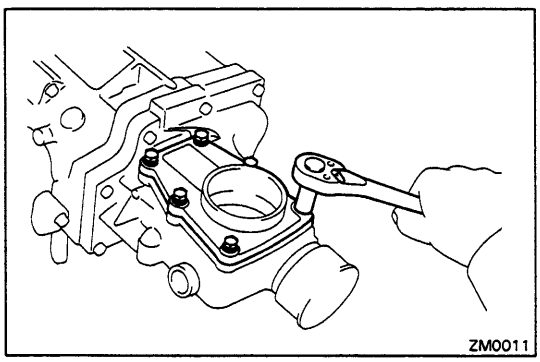
Torque: 260 kg-cm (19 ft-lb, 25 N·m)



(d) Install the mount bolt of the select lever housing together with a new lock plate. Torque the bolt.

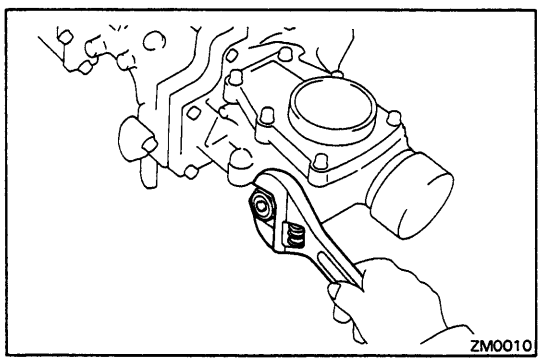
Torque: 340 kg-cm (25 ft-lb, 33 N·m)

(e) Stake the lock plate. (See page MT-60)



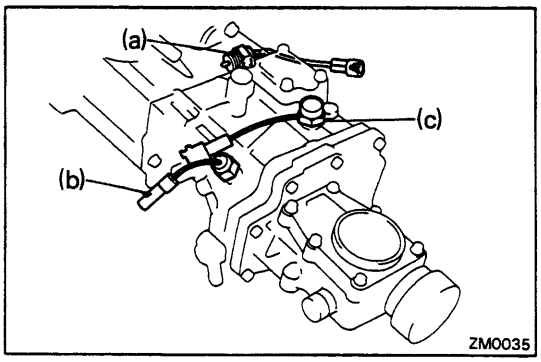
(f) Install a new gasket and the shift lever retainer with the six bolts. Torque the bolts.

Torque: 195 kg-cm (14 ft-lb, 19 N·m)



(g) Install a new gasket and reverse restrict pin. Torque the restrict pin.

Torque: 410 kg-cm (30 ft-lb, 40 N·m)



44. INSTALL FOLLOWING SWITCH:

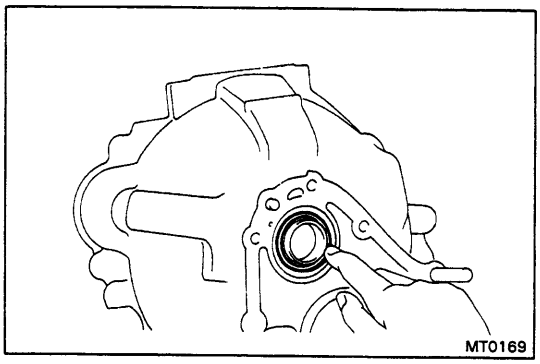
(a) Back-up light switch (brass color).

(b) (Z54F)
4WD indicator switch (chrome color).

(c) (Z54F)
Extra low gear (EL) indicator switch.

45. INSTALL SPEEDOMETER DRIVE GEAR

46. INSTALL MOUNTING INSULATOR



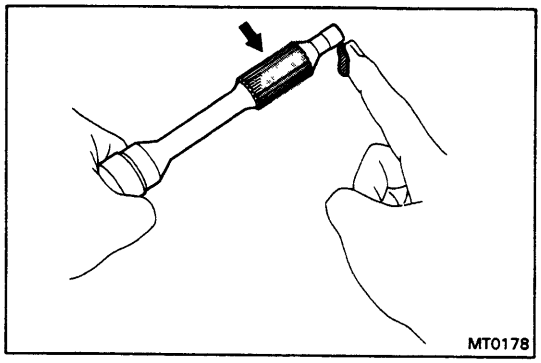
INSTALLATION OF TRANSMISSION (FWD)

1. **INSTALL O-RING**

   Place a new O-ring in position on the transaxle case groove.

2. **INSTALL TRANSMISSION CASE GASKET**

   Place a new gasket in position on the transaxle case.



3. **APPLY MOLYBDENUM DISULPHIDE LITHIUM BASE GREASE (NLGI NO. 2) OR MP GREASE TO INPUT SHAFT**

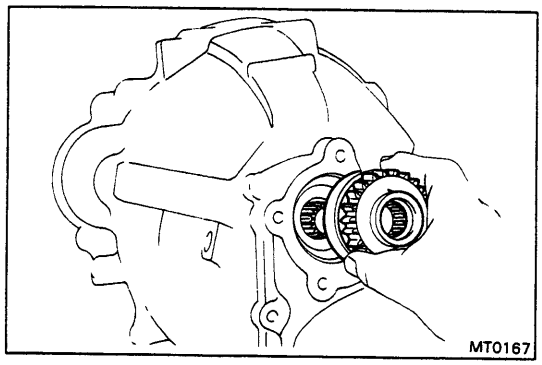
   (a) Apply molybdenum disulphide lithium base grease to the input shaft spline.

   (b) Apply MP grease to the input shaft end.

4. **ALIGN TRANSMISSION AT INSTALLATION POSITION**

5. **CONNECT TRANSMISSION TO DIFFERENTIAL CARRIER**

   Align the splines of the sleeve yoke and differential drive pinion.



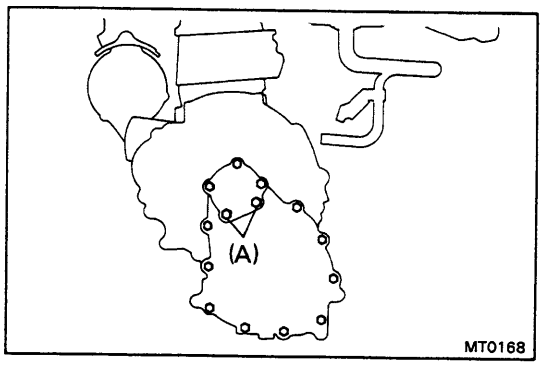
6. **INSTALL INPUT SHAFT**

   (a) Align the splines of the input shaft and clutch disc.

   (b) Insert the input shaft into transmission case.

7. **INSTALL TRANZMISSION CASE COVER**

   Place the case cover together with a new gasket in position on the transmission case.



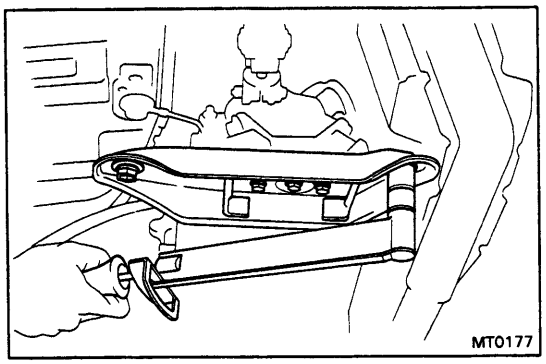
8. **INSTALL TRANSMISSION MOUNT BOLTS AND NUTS**

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

9. **INSTALL INPUT SHAFT MOUNT BOLTS (A)**

   Apply liquid sealer on the threads and under the bolt heads.

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

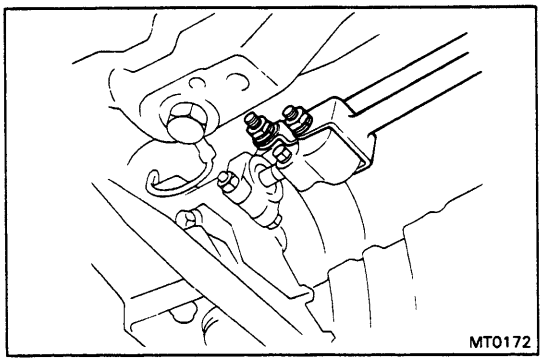


10. INSTALL REAR SUPPORT MEMBER

Torque: 970 kg-cm (70 ft-lb, 95 N·m)

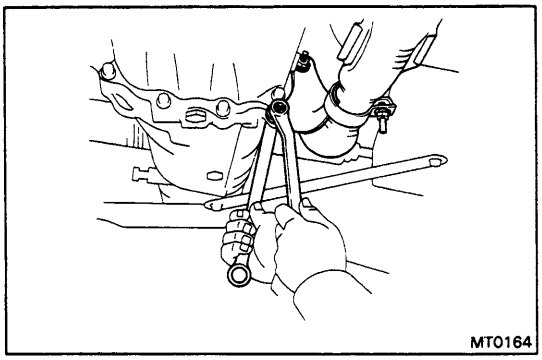
11. CONNECT SPEEDOMETER CABLE

12. CONNECT BACK-UP LIGHT SWITCH



13. CONNECT SHIFT LEVER HOUSING ROD

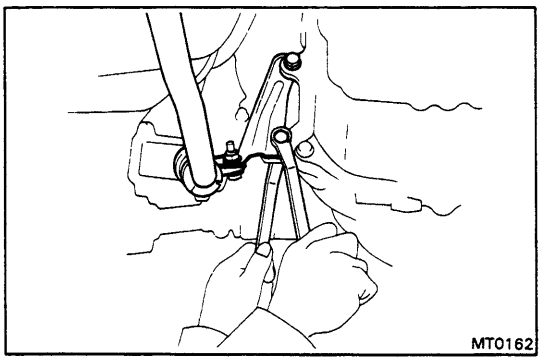
14. CONNECT GEAR SHIFTING ROD



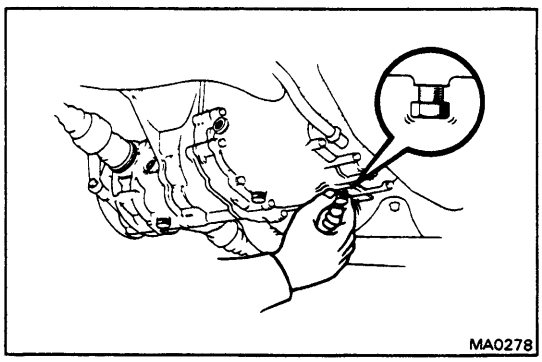
15. INSTALL EXHAUST FRONT PIPE

Torque the two nuts holding the front pipe to the exhaust manifold.

Torque: 630 kg-cm (46 ft-lb, 62 N·m)

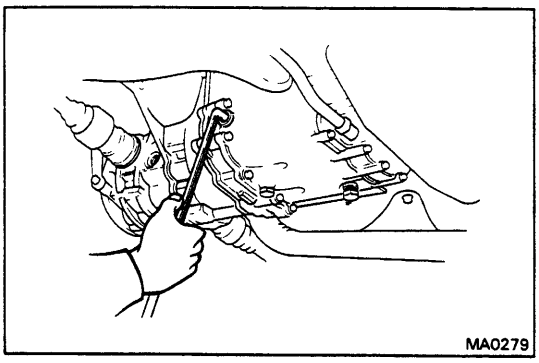


16. (Fed.)
INSTALL CONVERTER AIR INLET PIPE



17. FILL WITH GEAR OIL

(a) Loosen the transmission case rear drain plug by eight turns.



(b) 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 (o°F)
SAE 75W-90, 80W-90 or 90
Below −18°C (0°F)
SAE 75W-90, 80W-90 or 80W

Oil capacity (transmission and diffrential):
3.3 liters (3.5 USqts, 2.9 Imp.qts)

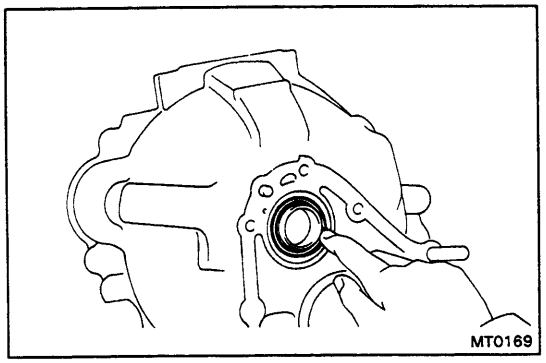
(c) Torque the drain and filler plugs.

Torque: 410 kg-cm (30 ft-lb, 40 N·m)

18. CONNECT CABLE TO NEGATIVE TERMINAL OF BATTERY

19. REFORM ROAD TEST

Check for abnormal noise and smooth operation.


MT0169

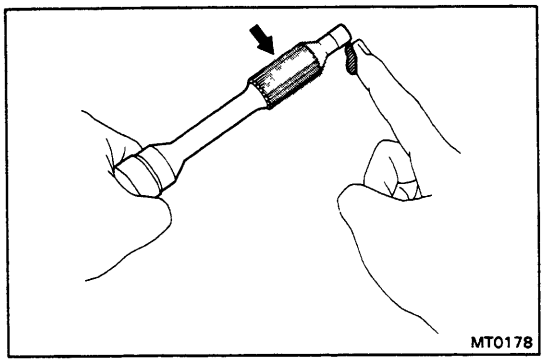
INSTALLATION OF TRANSMISSION (4WD)

1. **INSTALL O-RING**

   Place a new O-ring in position on the transaxle case groove.

2. **INSTALL TRANSMISSION CASE GASKET**

   Place a new gasket in position on the transaxle case.


MT0178

3. **APPLY MOLYBDENUM DISULPHIDE LITHIUM BASE GREASE (NLGI NO. 2) OR MP GREASE TO INPUT SHAFT**

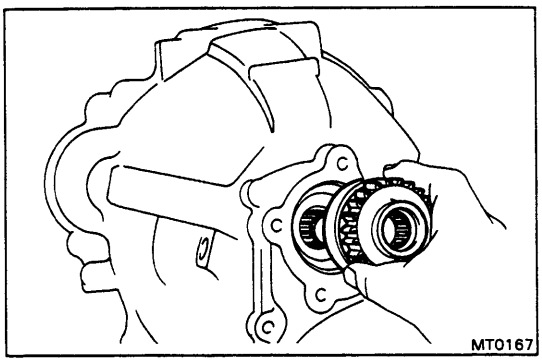
   (a) Apply molybdenum disulphide lithium base grease to the input shaft spline.

   (b) Apply MP grease to the input shaft end.

4. **ALIGN TRANSMISSION AT INSTALLATION POSITION**

5. **CONNECT TRANSMISSION TO DIFFERENTIAL CARRIER**

   Align the splines of the sleeve yoke and differential drive pinion.


MT0167

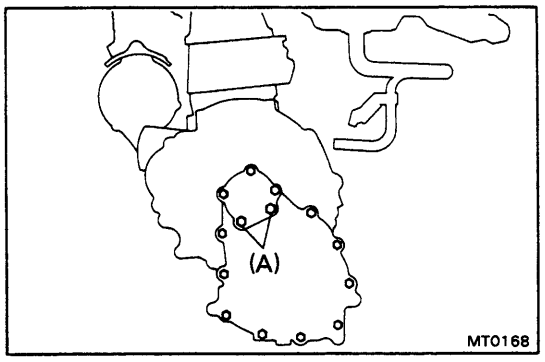
6. **INSTALL INPUT SHAFT**

   (a) Align the splines of the input shaft and clutch disc.

   (b) Insert the input shaft into transmission case.

7. **INSTALL TRANSMISSION CASE COVER**

   Place the case cover together with a new gasket in position on the transmission case.



MT0168

8. **INSTALL TRANSMISSION MOUNT BOLTS AND NUTS**

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

9. **INSTALL INPUT SHAFT MOUNT BOLTS (A)**

   Apply liquid sealer on the threads and under the bolt heads.

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

10. INSTALL REAR SUPPORT MEMBER

Torque: 970 kg-cm (70 ft-lb, 95 N·m)

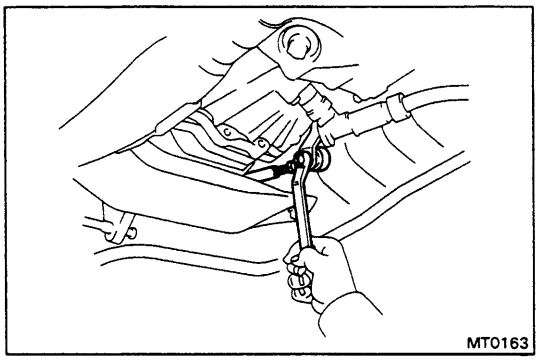
11. CONNECT SPEEDOMETER CABLE

12. CONNECT FOLLOWING CONNECTOR:

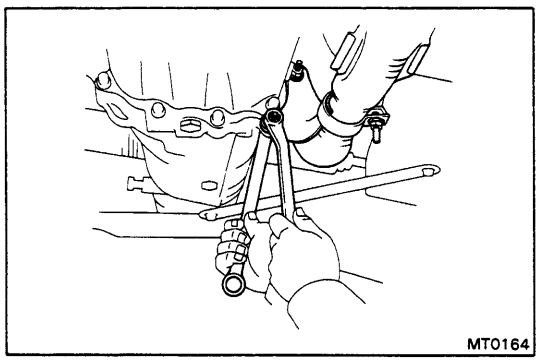
(a) Back-up light connector.

(b) 4WD indicator switch connector.

(c) Extra low gear (EL) indicator switch connector.



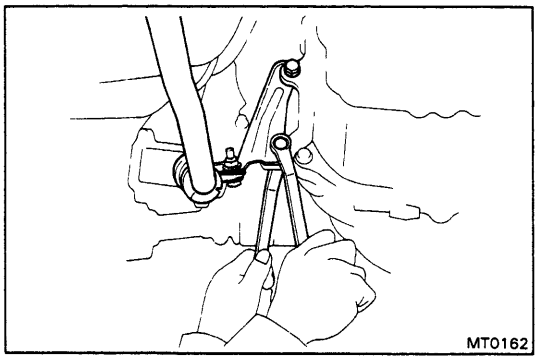
13. CONNECT SELECTING ROD



14. INSTALL EXHAUST FRONT PIPE

Torque the two nuts holding the front pipe to the exhaust manifold.

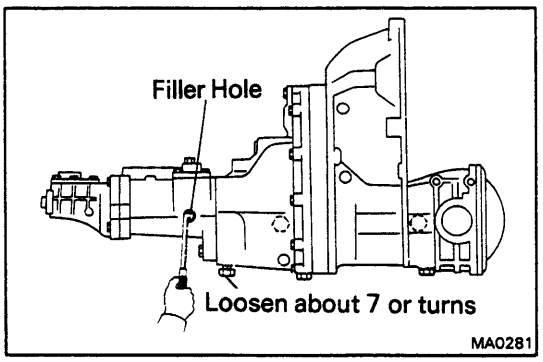
Torque: 630 kg-cm (46 ft-lb, 62 N·m)



15. (Fed.)
INSTALL CONVERTER AIR INLET PIPE

16. INSTALL PROPELLER SHAFT (See page PR-6)

Torque: 430 kg-cm (31 ft-lb, 42 N·m)



17. FILL WITH GEAR OIL

(a) Loosen the transmission case rear drain plug by eight turns.

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

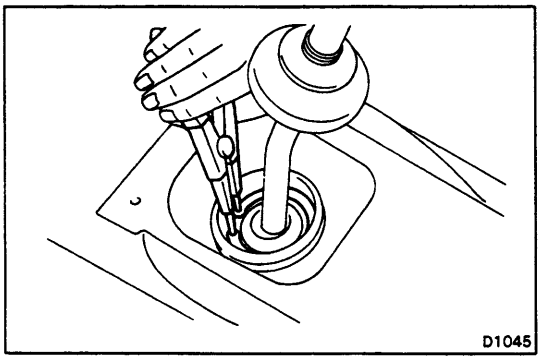
Transmission and differential oil –
Oil grade: API GL-4 or GL-5
Viscosity: Above −18°C (0°F)
SAE 75W-90, 80W-90 or 90
Below −18°C (0°F)
SAE 75W-90, 80W-90 or 80W

Oil capacity (transmission and differential):
3.9 liters (4.1 US qts, 3.4 Imp.qts)

NOTE: Always fill from the transfer adaptor filler plug.

(c) Torque the drain and filler plugs.

Torque: 410 kg-cm (30 ft-lb, 40 N·m)



18. INSTALL SHIFT LEVER

19. INSTALL CONSOLE BOX

20. CONNECT CABLE TO NEGATIVE TERMINAL OF BATTERY

21. PERFORM ROAD TEST

Check for abnormal noise or faulty operation.

DIFFERENTIAL

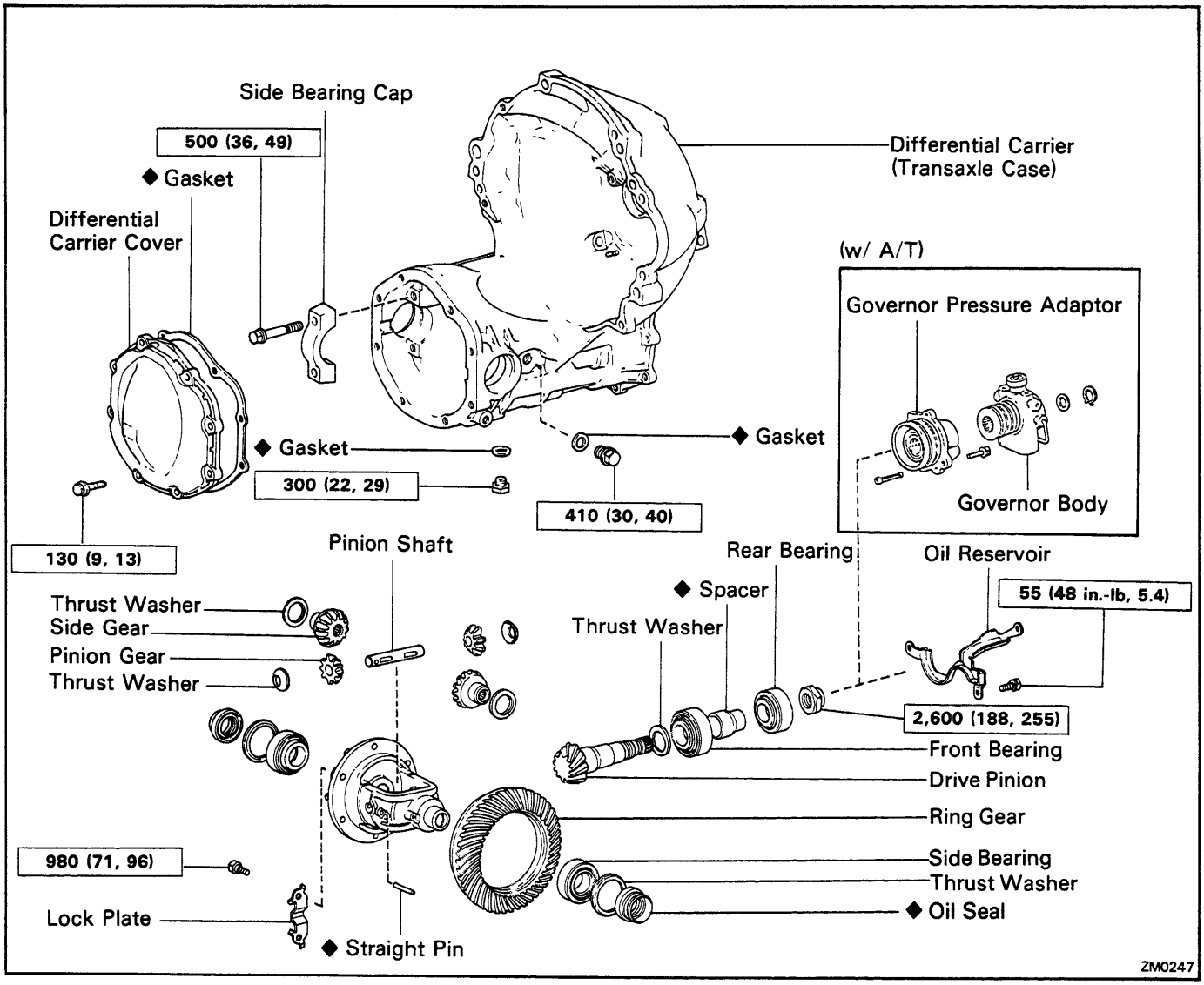
REMOVAL OF TRANSAXLE

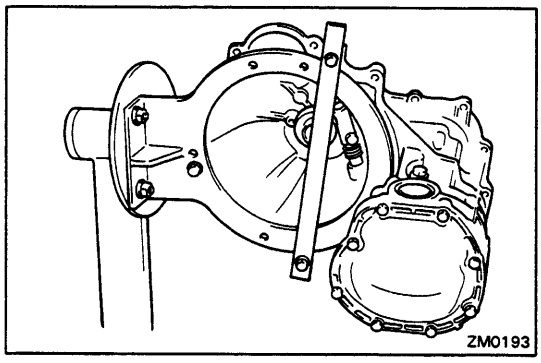
FWD (See page MT-3)

4WD (See page MT-7)

NOTE: Explanation of the automatic transaxle is included.

COMPONENTS



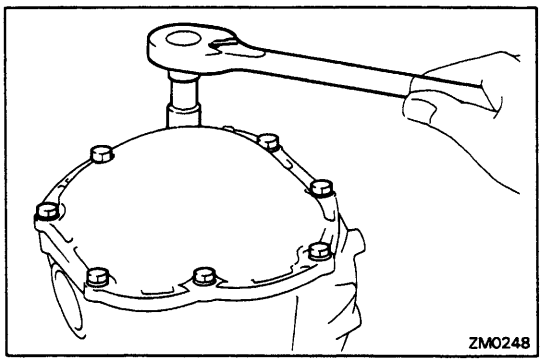


DISASSEMBLY OF DIFFERENTIAL

1. **SEPARATE DIFFERENTIAL CARRIER AND TRANSMISSION**

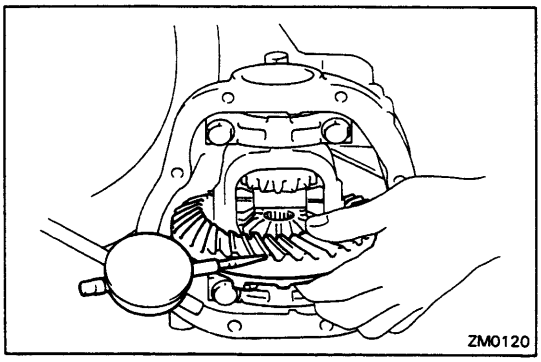
2. **MOUNT DIFFERENTIAL CARRIER TO WORK STAND**

   NOTE: Set it so that the ring gear is faced in the horizontal position.



3. REMOVE DIFFERENTIAL CARRIER COVER

Remove the eight bolts, differetial carrier cover and gasket.



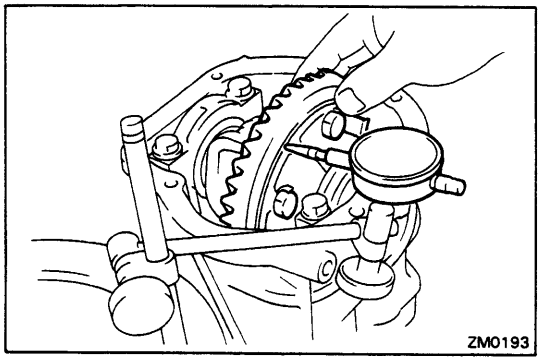
4. PERFORM DIFFERENTIAL PRE-INSPECTION

NOTE: If the differential is noisy, perform the following pre-inspection before disassembly to determine the cause of the noise.

(a) Check the ring gear backlash.

Backlash: 0.10 – 0.15 mm (0.0039 – 0.0059 in.)

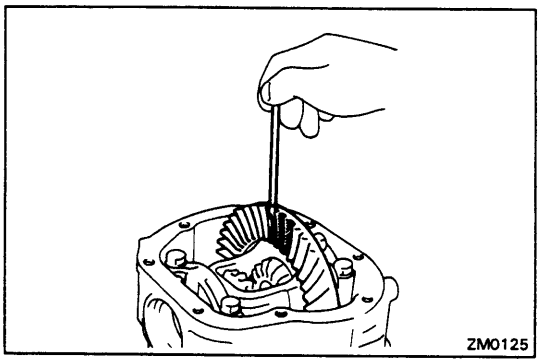
If the backlash is not within specification, adjust the side bearing preload or repair as necessary
(See step 5 on page MT-82)



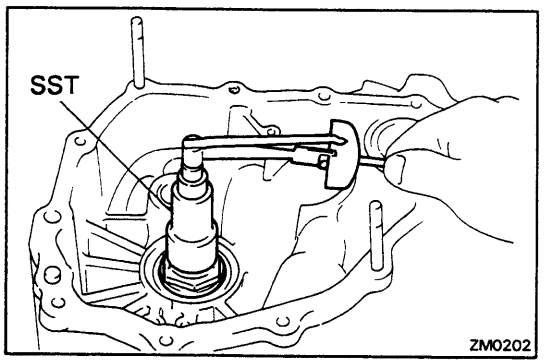
(b) Check the ring gear runout.

Maximum runout: 0.07 mm (0.0028 in.)

If the runout is greater than maximum, install a new ring gear.



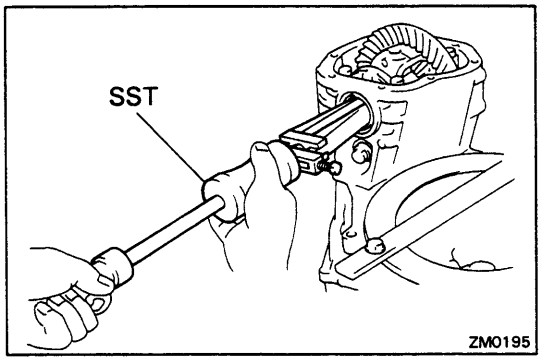
(c) Check the teeth contact.
(See step 7 on page MT-84)



(d) Using SST and a torque wrench, measure the total preload.

SST 09556-16010 for M/T
09556-16020 for A/T

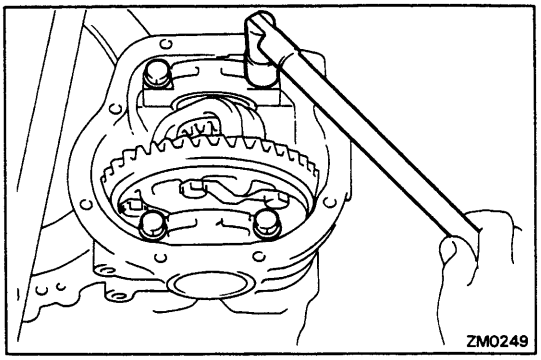
Total preload (starting): 6 – 10 kg-cm (5.2 – 8.7 in.-lb) (0.6 – 1.0 N·m)



5. REMOVE OIL SEALS FROM DIFFERENTIAL CARRIER

Using SST, remove the two oil seals from the differential carrier.

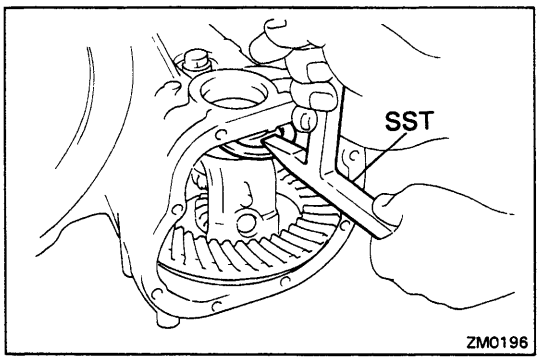
SST 09308-00010



6. REMOVE DIFFERENTIAL CASE FROM CARRIER

(a) Put matchmarks on the bearing cap and differential carrier.

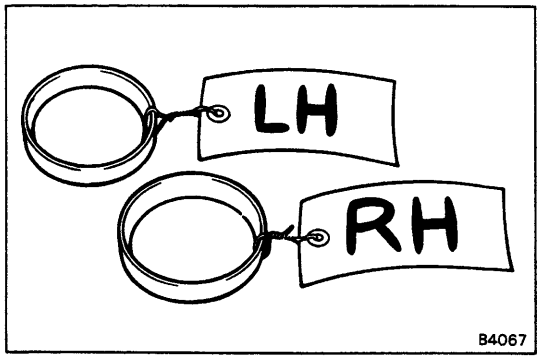
(b) Remove the four bolts and two side bearing caps.



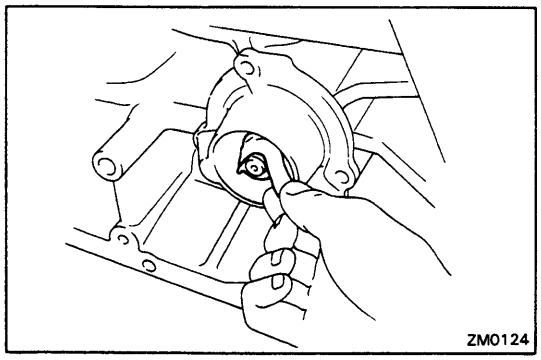
(c) Using SST, remove the side bearing thrust washer on the ring gear teeth side.

SST 09504-22010

(d) Remove the differential case, bearing outer races and thrust washer.



NOTE: Tag the disassembled parts to show the location for reassembly.



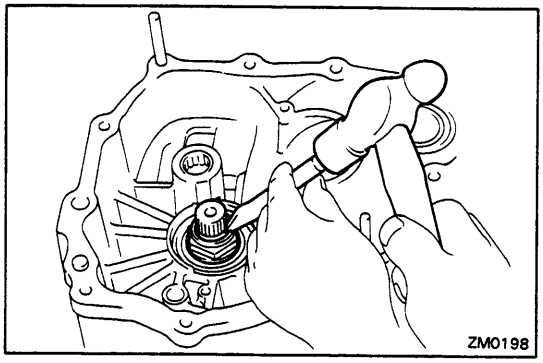
7. (w/ M/T)
REMOVE OIL RESERVOIR

8. (w/ A/T)
REMOVE GOVERNOR BODY AND GOVERNOR PRESSURE ADAPTOR

(a) Using snap ring pliers, remove the snap ring.

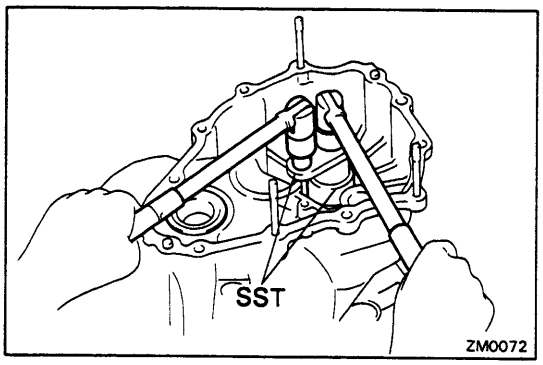
(b) Remove the governor body.

(c) Wrap the spline with tape and remove the governor pressure adaptor.



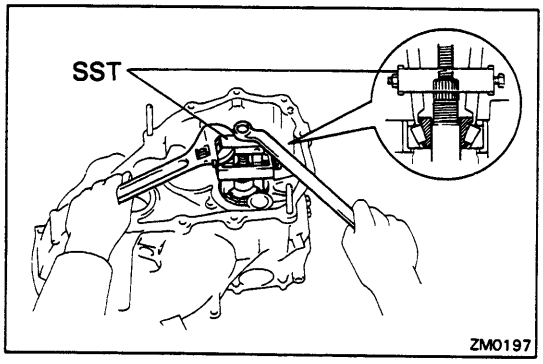
9. REMOVE REAR BEARING

(a) Loosen the staked part of the nut.



(b) Using SST to loosen the nut, turn the drive pinion clockwise.

SST 09564-16010
09556-16010 for M/T
09556-16020 for A/T

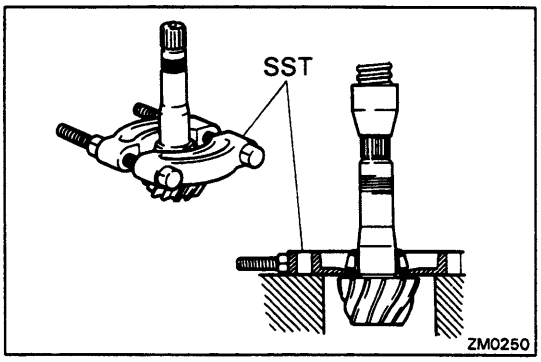


(c) Using SST, remove the rear bearing from the drive pinion.

SST 09556-12010

If the bearing is damaged or worn, replace the bearing.

10. REMOVE DRIVE PINION AND SPACER



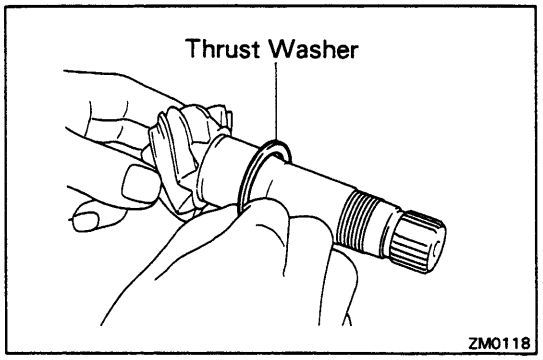
INSPECTION AND REPAIR OF DIFFERENTIAL

1. IF NECESSARY, REPLACE DRIVE PINION BEARING AND OUTER RACE

(a) Using SST and a press, press out the rear bearing from the drive pinion.

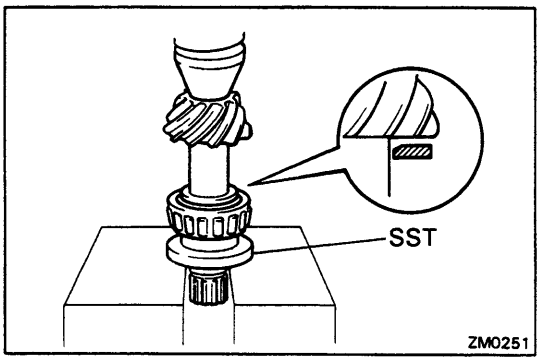
SST 09950-00020

NOTE: If the drive pinion or ring gear is damaged, replace them as a set.



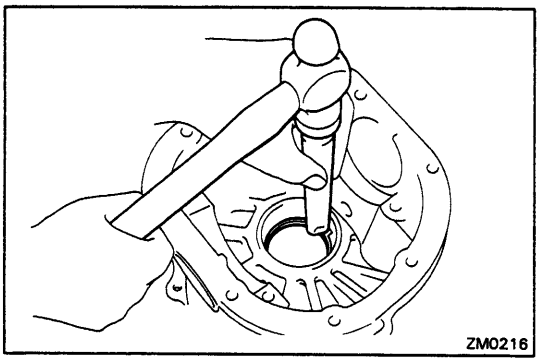
(b) Install the thrust washer with one of the same thickness as was assembled.

NOTE: Select a thrust washer of the proper thickness in accordance with the teeth contact inspected before disassembly.

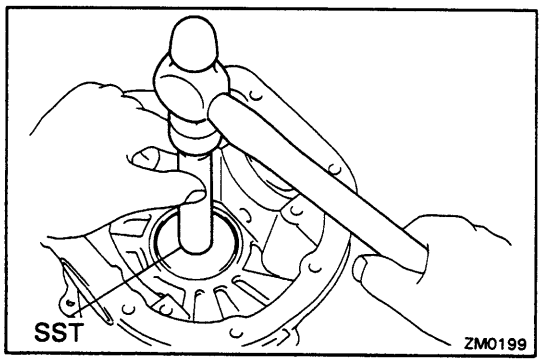


(c) Using SST and a press, press in a new bearing.

SST 09608-20011

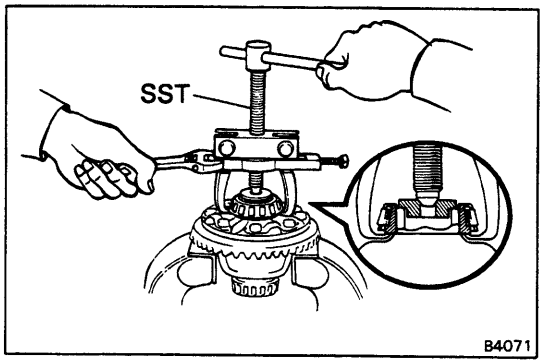


(d) Using a brass bar and hammer, drive out a new outer race by tapping on the notched portion.



(e) Using SST and a hammer, drive in a new outer race.

SST 09608-30011 for front side
09608-30021 for rear side

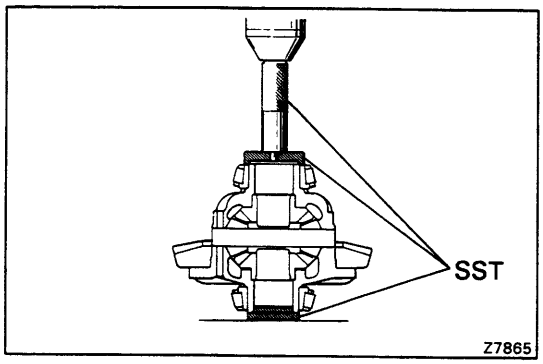


2. IF NECESSARY, REPLACE SIDE BEARINGS

(a) Using SST, remove the side bearing from the differential case.

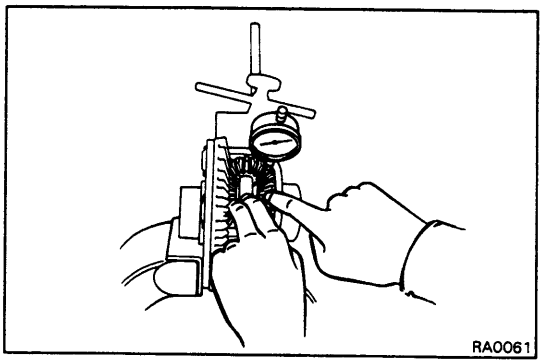
SST 09502-10012

NOTE: On the differential case there are indentations into which the SST fits.



(b) Using SST and a press, press in a new bearing.

SST 09608-20011



3. INSPECT SIDE GEAR BACKLASH

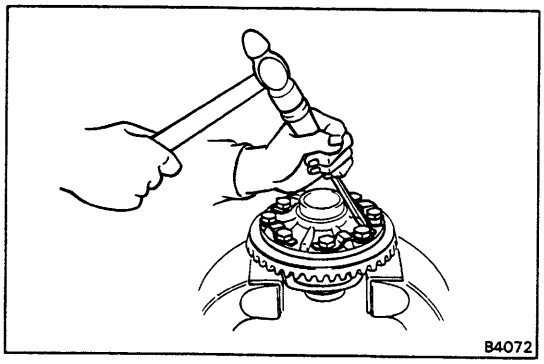
Measure the side gear backlash while holding the other side gear toward the case.

Standard backlash: 0.04 – 0.24 mm (0.0016 – 0.0094 in.)

4. IF NECESSARY, REPLACE RING GEAR, SIDE GEARS AND PINION GEARS

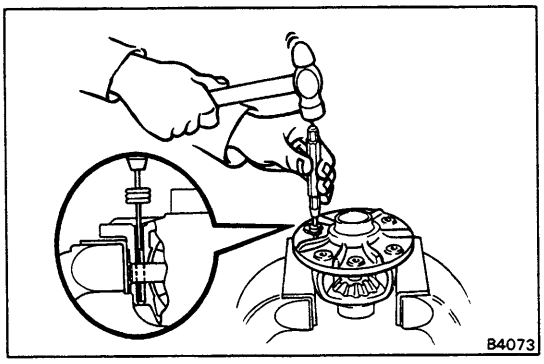
NOTE:

- If the ring gear is to be used again, place matchmarks before separating it.
- If the ring gear or drive pinion are damaged, replace them as a set.



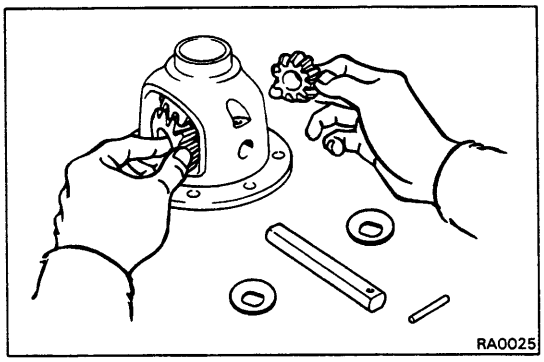
(a) Lift the lock plates and remove the mount bolts.

(b) Using a plastic-faced hammer, tap on the ring gear to separate it from the differential case.



(c) Using a pin punch and hammer, drive out the straight pin foward the ring gear installation surface.

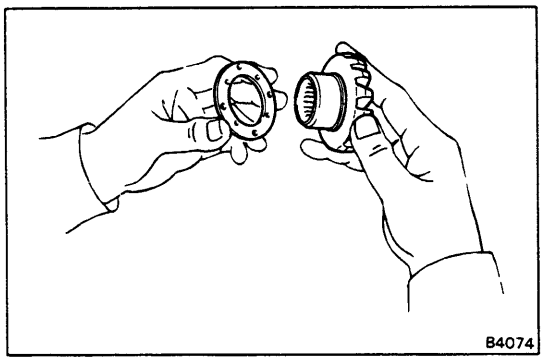
(d) Remove the pinion shaft, pinion gears, side gears and thrust washers.



(e) Install the side gears, thrust washers, pinion gears and shaft.

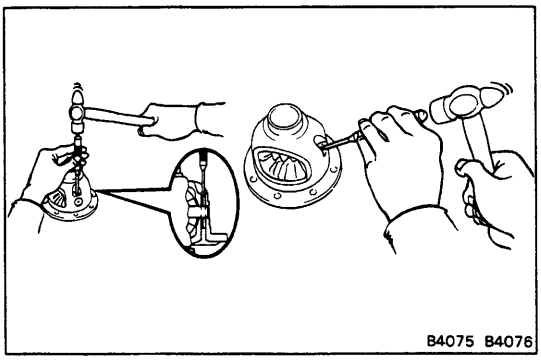
(f) Check the side gear backlash. (See page MT-72)

Standard backlash: 0.04 – 0.24 mm (0.0016 – 0.0094 in.)



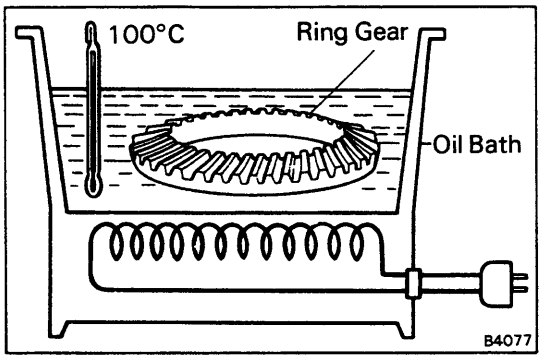
(g) If the backlash is not within specification, use thrust washer of a different thickness.

Thrust washer thickness	mm (in.)
1.48 – 1.52	(0.0583 – 0.0598)
1.53 – 1.57	(0.0602 – 0.0618)
1.58 – 1.62	(0.0622 – 0.0638)
1.63 – 1.67	(0.0642 – 0.0657)
1.68 – 1.72	(0.0661 – 0.0677)
1.73 – 1.77	(0.0681 – 0.0697)



(h) Using a pin punch and hammer, tap a new straight pin through the case and hole in the pinion shaft.

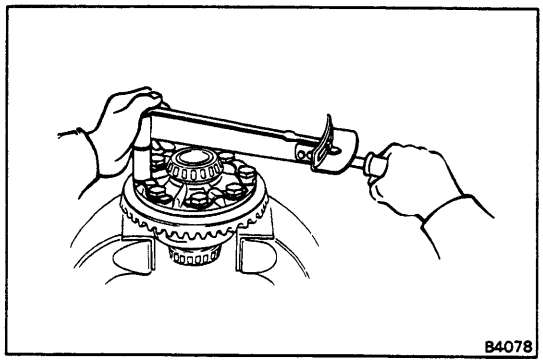
(i) Stake the pin and differential case.



(j) Clean the contact surface of the differential case.

(k) Gradually heat the ring gear to about 100°C (212°F) in an oil bath.

CAUTION: Do not heat the ring gear above 110°C (230°F).


B4078

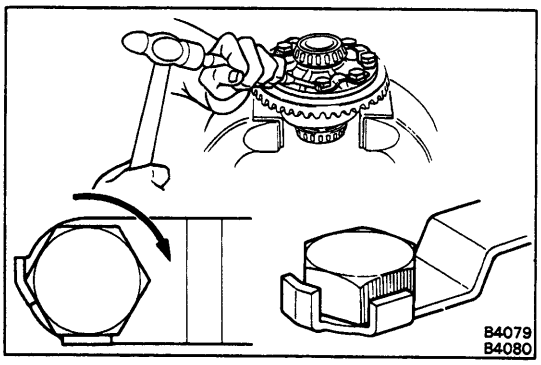
(l) Clean the contact surface of the ring gear with cleaning solvent.

(m) Then quickly install the ring gear on the differential case.

(n) Coat the ring gear mount bolts with gear oil.

(o) Install new lock plates and the mount bolts. Tighten the mount bolts uniformly and a little at a time. Torque the bolts.

Torque: 980 kg-cm (71 ft-lb, 96 N·m)

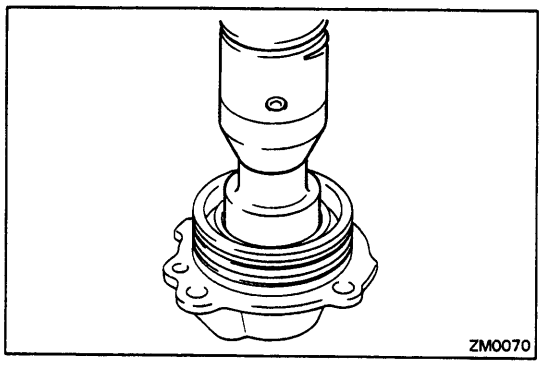

B4079
B4080

(p) Check the ring gear runout.

Maximum runout: 0.07 mm (0.0028 in.)

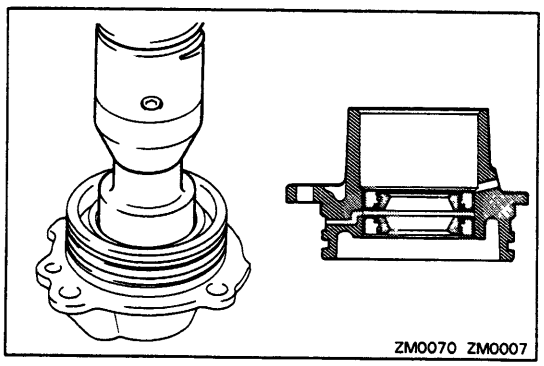
(q) Stake the lock plate.

NOTE: Stake one claw flush with the flat surface of the nut. For the claw contacting the protruding portion of the nut, stake (bend) only the half on the tightening side.


ZM0070

5. IF NECESSARY, REPLACE GOVERNOR PRESSURE ADAPTOR OIL SEALS

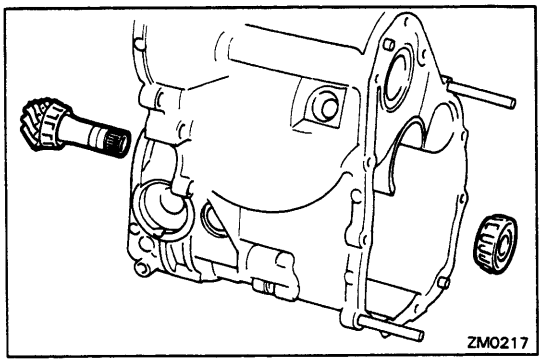
(a) Using a press and 29 mm socket wrench, remove the oil seals.


ZM0070 ZM0007

(b) Press in a new oil seal on the transmission side.

(c) Press in a new oil seal on the differential side.

CAUTION: Be sure that the oil seal is positioned correctly.



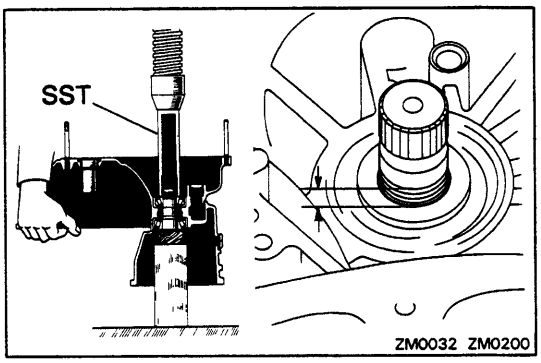
ASSEMBLY OF DIFFERENTIAL

(See page MT-71)

1. TEMPORARILY ADJUST DRIVE PINION PRELOAD

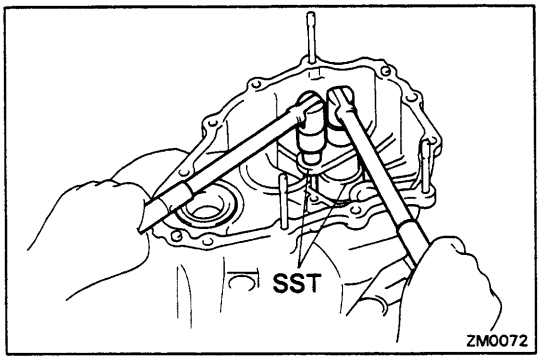
(a) Install the drive pinion and rear bearing.

NOTE: Do not install the spacer.



(b) Using SST and a press, press in the bearing until the threaded portion is protruding 3 mm (0.12 in.).

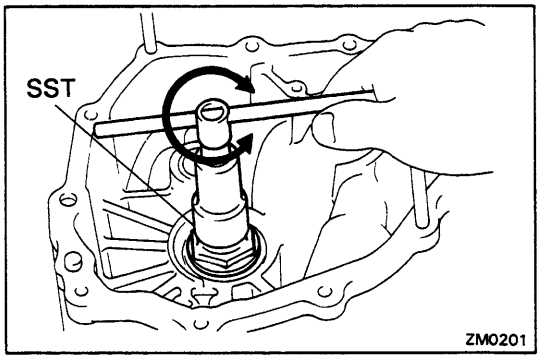
SST 09612-22010



(c) Using SST, adjust the drive pinion preload by tightening the lock nut.

SST 09564-16010
09556-16010 for M/T
09556-16020 for A/T

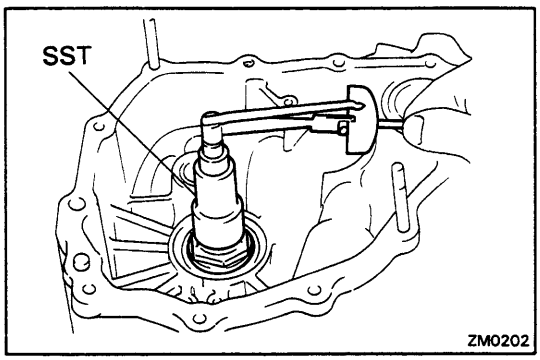
CAUTION: As there is no spacer, tighten a little at a time, being careful not to overtighten it.



(d) Apply gear oil to the bearings.

(e) Using SST, snug down the bearing by turning the drive pinion several times.

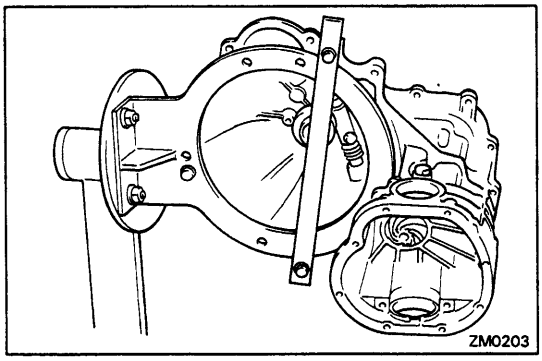
SST 09556-16010 for M/T
09556-16020 for A/T



(f) Using SST and a torque wrench, measure the drive pinion preload.

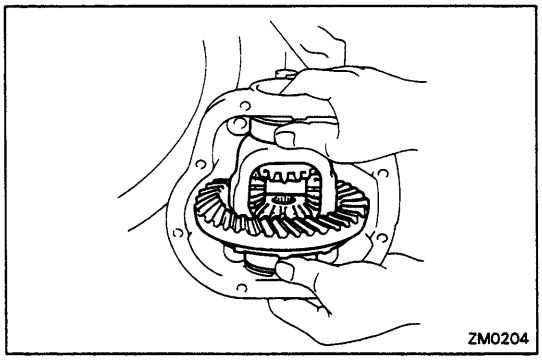
SST 09556-16010 for M/T
09556-16020 for A/T

Preload:	**New bearing**	**5 – 10 kg-cm (4.3 – 8.7 in.-lb) (0.5 – 1.0 N·m)**
	Reused bearing	**3 – 5 kg-cm (2.6 – 4.3 in.-lb) (0.3 – 0.5 N·m)**



2. MOUNT TRANSAXLE CASE TO WORK STAND

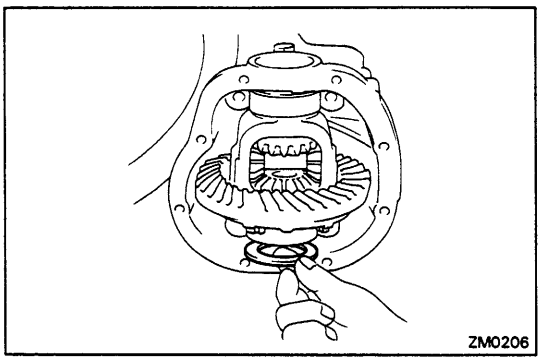
Set the transaxle case so that the back side of the ring gear is facing downward.



3. INSTALL DIFFERENTIAL CASE IN CARRIER

(a) Place the bearing outer races on their respective bearings. Make sure the left and right outer races are not interchanged.

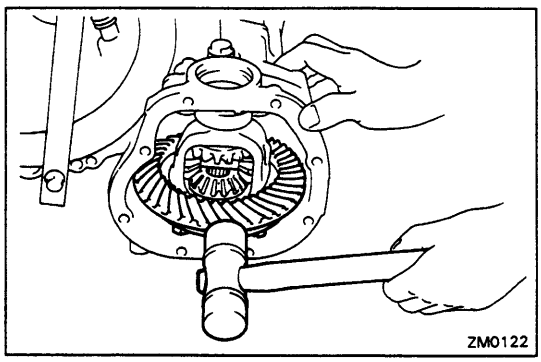
(b) Install the differential case in the carrier.



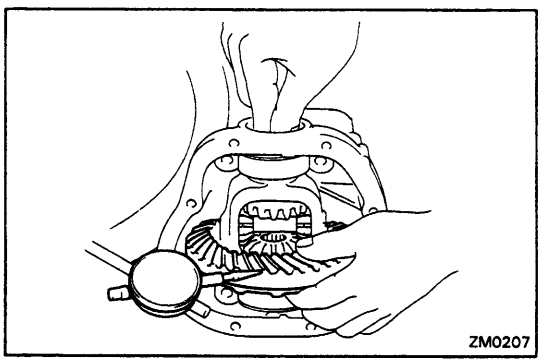
4. ADJUST RING GEAR BACKLASH

(a) Install only the thrust washer on the ring gear back side.

NOTE: Insure that the ring gear has a backlash.

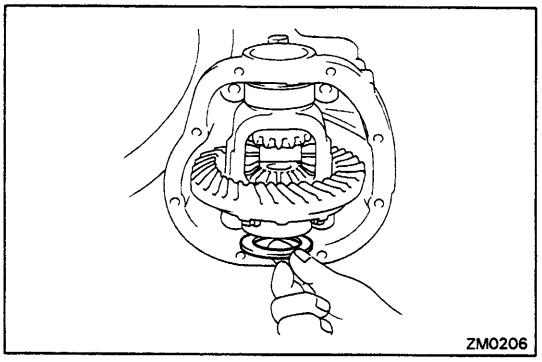


(b) Snug down the thrust washer and bearing by tapping on the ring gear with a plastic-faced hammer.

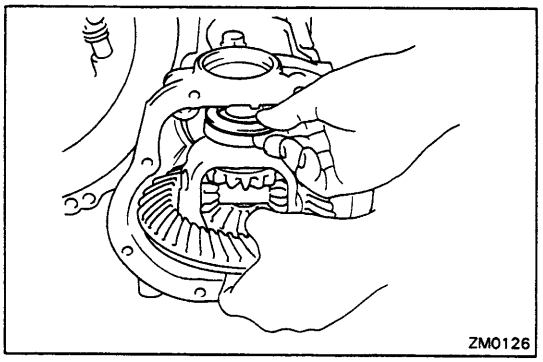


(c) Hold the side bearing boss on the teeth surface of the ring gear and measure the backlash.

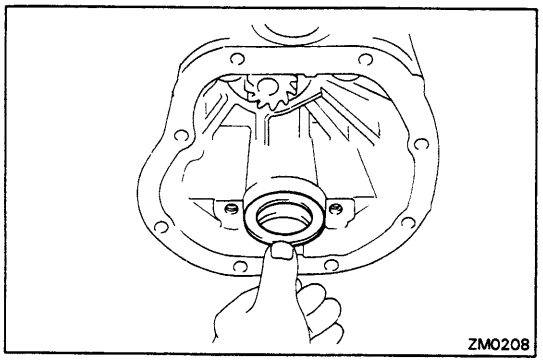
Backlash (reference): 0.10 mm (0.0039 in.)



(d) Select a back side thrust washer for the ring gear using the backlash as reference. (See page MT-85)

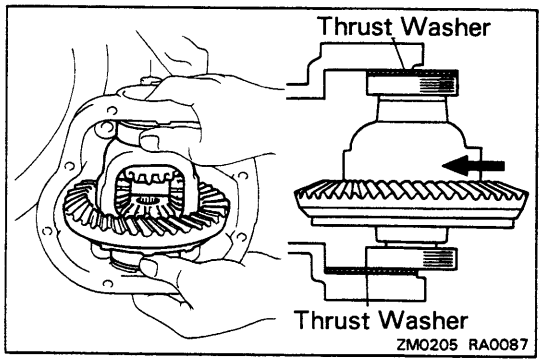


(e) Select a thrust washer for the ring gear teeth of a thickness which eliminates any clearance between the outer race and case.

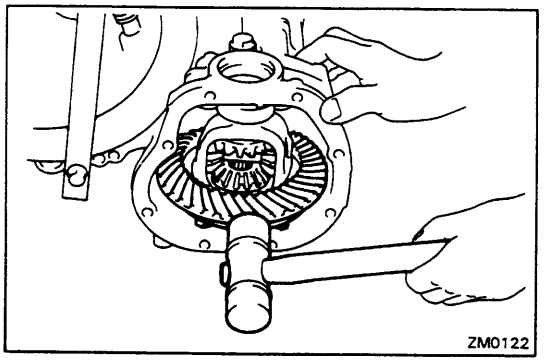


(f) Remove the thrust washers and differential case.

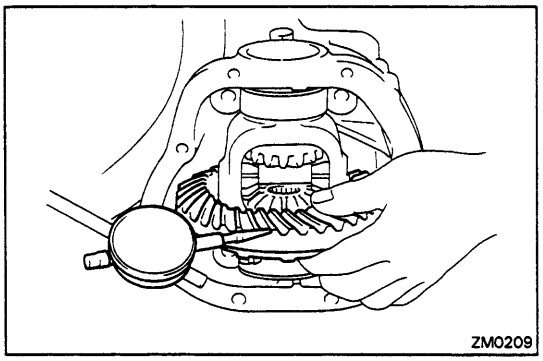
(g) Install the thrust washer into the lower part of the carrier.



(h) Place the other thrust washer onto the differential case together with the outer race, and install the differential case with the outer race into the carrier.

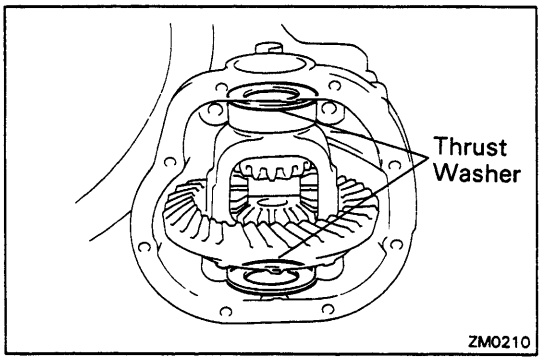


(i) Using a plastic-faced hammer, snug down the thrust washer and bearing by tapping the ring gear.



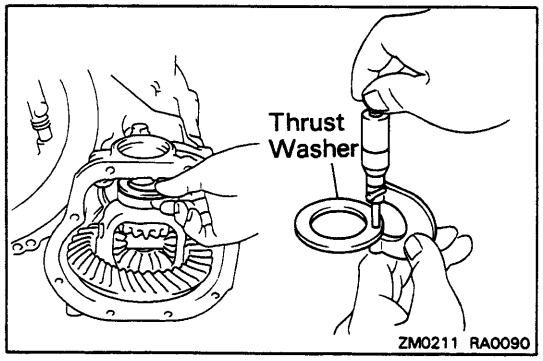
(j) Using a dial indicator, measure the ring gear backlash.

Backlash: 0.10 – 0.15 mm (0.0039 – 0.0059 in.)



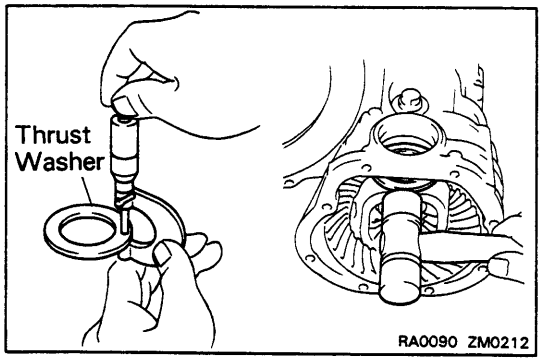
(k) If the backlash is not within specification, adjust by either increasing and decreasing the thrust washers on both sides by an equal amount.

NOTE: The backlash will change about 0.02 mm (0.0008 in.) with a 0.03 mm (0.0012 in.) variation of the thrust washer.



5. ADJUST SIDE BEARING PRELOAD

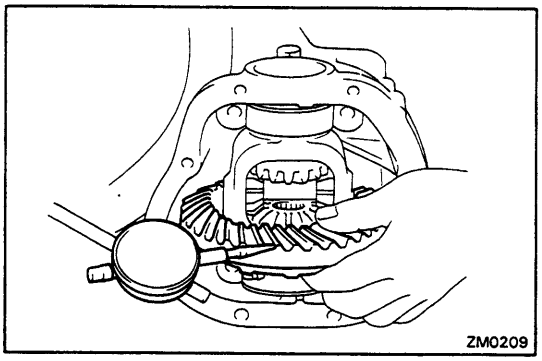
(a) After adjustment with the backlash as reference, remove the thrust washer of the ring gear teeth side and measure the thickness.



(b) Install a new thrust washer of 0.06 – 0.09 mm (0.0024 – 0.0035 in.) thicker than the thrust washer removed.

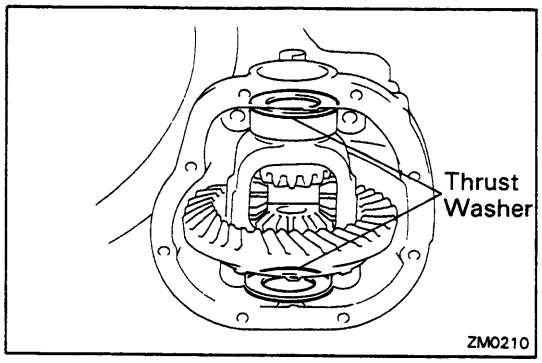
NOTE: Select a thrust washer which can be pressed in 2/3 of the way by finger.

(c) Using plastic-faced hammer, tap in the thrust washer.



(d) Recheck the ring gear backlash.

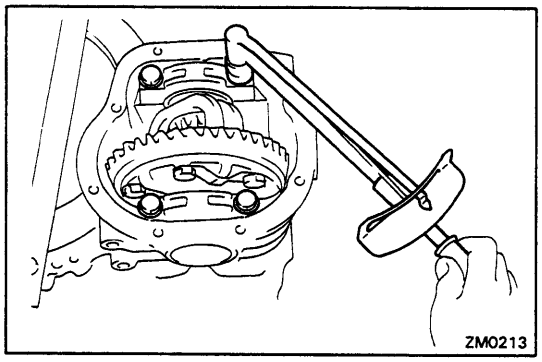
Backlash: 0.10 – 0.15 mm (0.0039 – 0.0059 in.)



(e) If the backlash is not within specification, adjust by either increasing or decreasing the thrust washers on both sides by equal amount.

NOTE: The backlash will change about 0.02 mm (0.0008 in.) with 0.03 mm (0.0012 in.) alteration of the thrust washer.

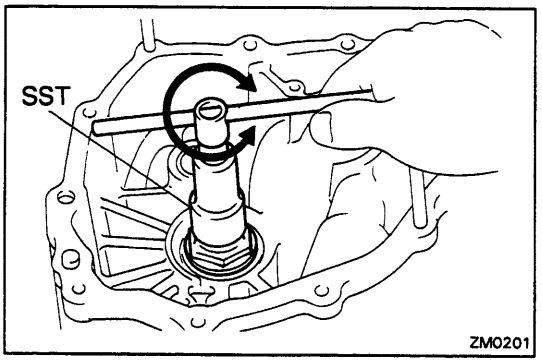
Thrust washer thickness		mm (in.)	
2.62	(0.1031)	2.98	(0.1173)
2.65	(0.1043)	3.01	(0.1185)
2.68	(0.1055)	3.04	(0.1197)
2.71	(0.1067)	3.07	(0.1209)
2.74	(0.1079)	3.10	(0.1220)
2.77	(0.1091)	3.13	(0.1232)
2.80	(0.1102)	3.16	(0.1244)
2.83	(0.1114)	3.19	(0.1256)
2.86	(0.1126)	3.22	(0.1268)
2.89	(0.1138)	3.25	(0.1280)
2.92	(0.1150)	3.28	(0.1291)
2.95	(0.1161)		



6. INSTALL SIDE BEARING CAPS

Install the side bearing caps, and install and torque the bolts.

Torque: 500 kg-cm (36 ft-lb, 49 N·m)

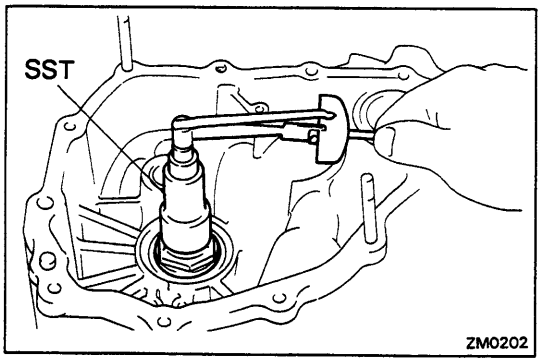


7. INSPECT TOTAL PRELOAD

(a) Apply gear oil on the bearings.

(b) Using SST, turn the drive pinion left and right several times.

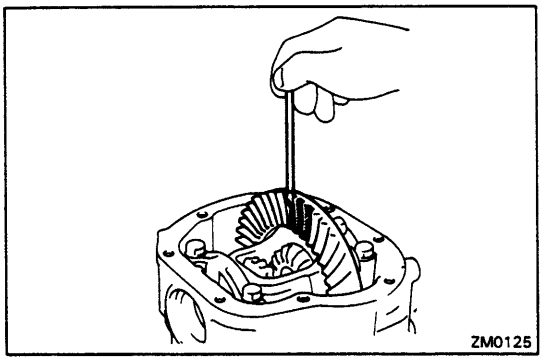
SST 09556-16010 for M/T
09556-16020 for A/T



(c) Using SST and a torque wrench, measure the total preload.

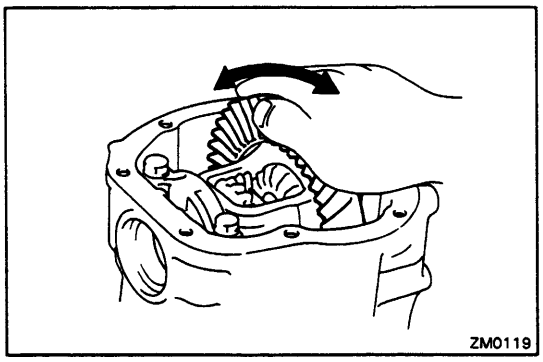
SST 09556-16010 for M/T
09556-16020 for A/T

Preload (starting): 3 – 5 kg-cm
(2.6 – 4.3 in.-lb, 0.3 – 0.5 N·m)
In addition to drive pinion preload



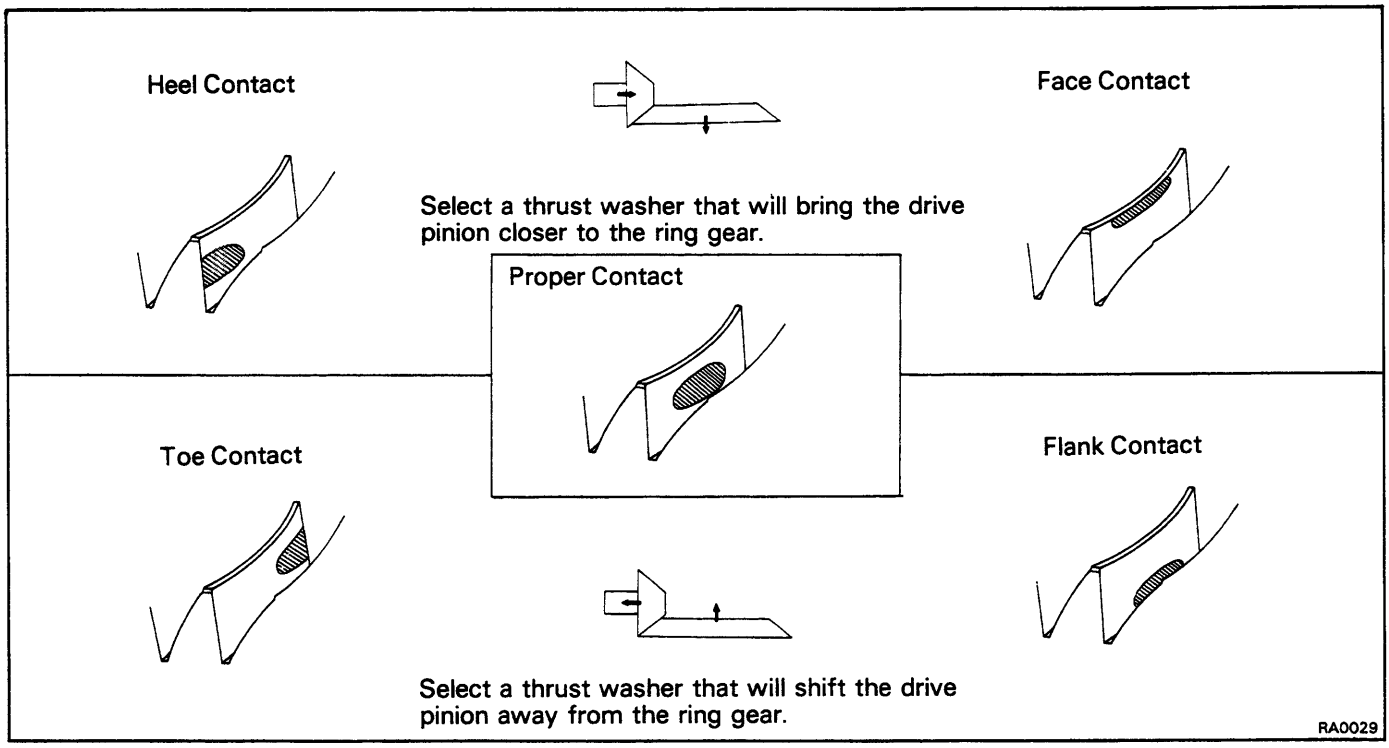
8. INSPECT TOOTH CONTACT BETWEEN RING GEAR AND DRIVE PINION

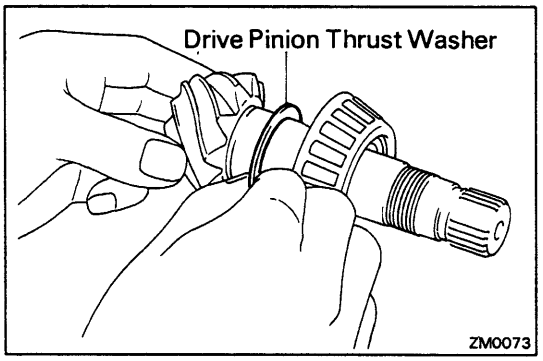
(a) Coat red lead on three or four teeth at three different positions of the ring gear.



(b) Rotate the ring gear both directions.

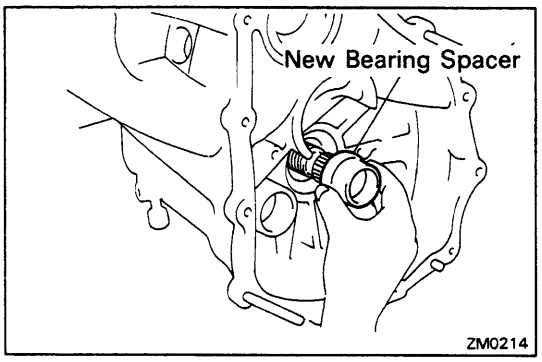
(c) Inspect the teeth pattern.





NOTE: If adjusting the meshing of the teeth of the drive pinion and ring gear by changing the extension of the drive pinion, select a thrust washer of the appropriate thickness from the table below.

Snap ring thickness		mm (in.)	
1.50	(0.0591)	1.74	(0.0685)
1.53	(0.0602)	1.77	(0.0697)
1.56	(0.0614)	1.80	(0.0709)
1.59	(0.0626)	1.83	(0.0720)
1.62	(0.0638)	1.86	(0.0732)
1.65	(0.0650)	1.89	(0.0744)
1.68	(0.0661)	1.92	(0.0756)
1.71	(0.0673)	1.95	(0.0768)

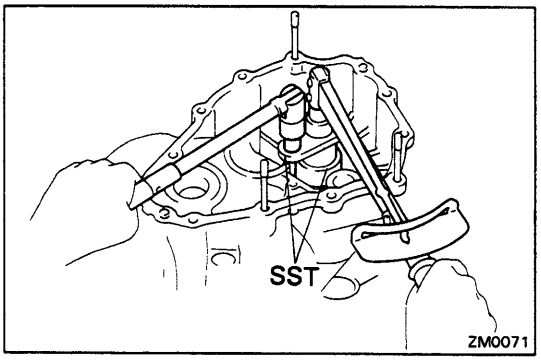


9. REMOVE REAR BEARING (See page MT-74)

10. INSTALL NEW BEARING SPACER

11. INSTALL REAR BEARING

Press in the rear bearing. (See page MT-79)



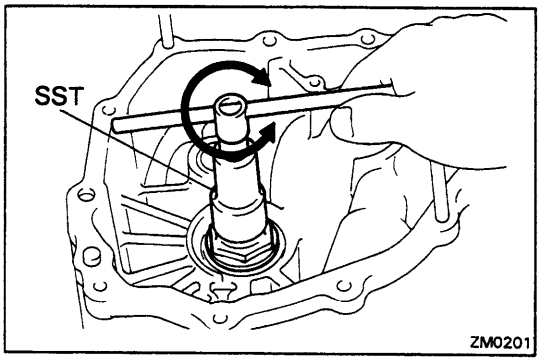
12. INSTALL LOCK NUT

(a) Apply gear oil on the threaded portion of the drive pinion.

(b) Using SST, install and torque the nut.

SST 09564-16010
09556-16010 for M/T
09556-16020 for A/T

Torque: 2,600 kg-cm (188 ft-lb, 255 N·m)

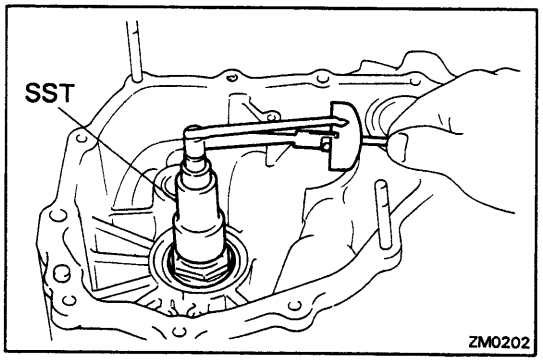


13. ADJUST DRIVE PINION PRELOAD

(a) Apply gear oil on the bearing.

(b) Using SST, snug down the bearing by turning the drive pinion several times.

SST 09556-16010 for M/T
09556-16020 for A/T

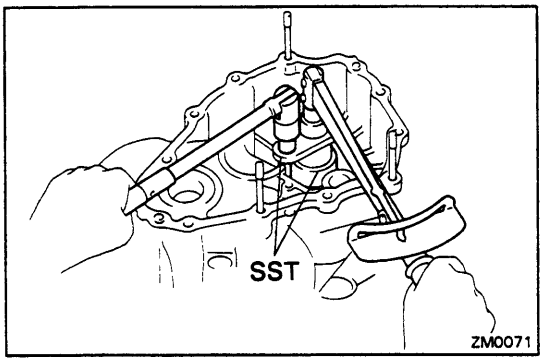


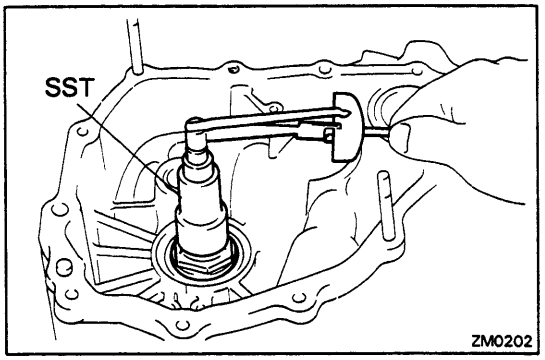
(c) Using SST and a torque wrench, measure the drive pinion preload.

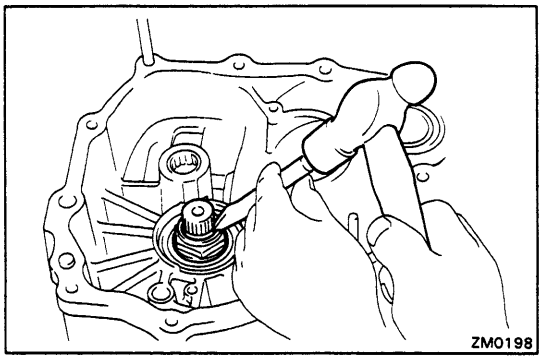
SST 09556-16010 for M/T
09556-16020 for A/T

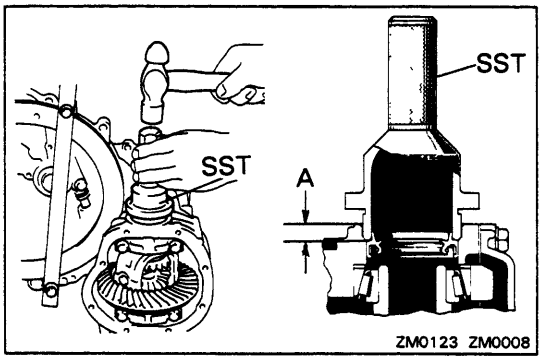
Preload: New bearing 5 – 10 kg-cm (4.3 – 8.7 in.-lb) (0.5 – 1.0 N·m)

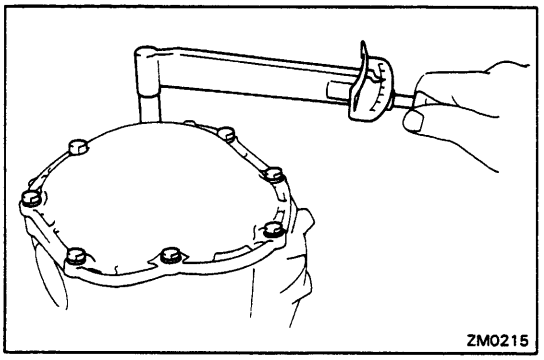
Reused bearing 3 – 5 kg-cm (2.6 – 4.3 in.-lb) (0.3 – 0.5 N·m)





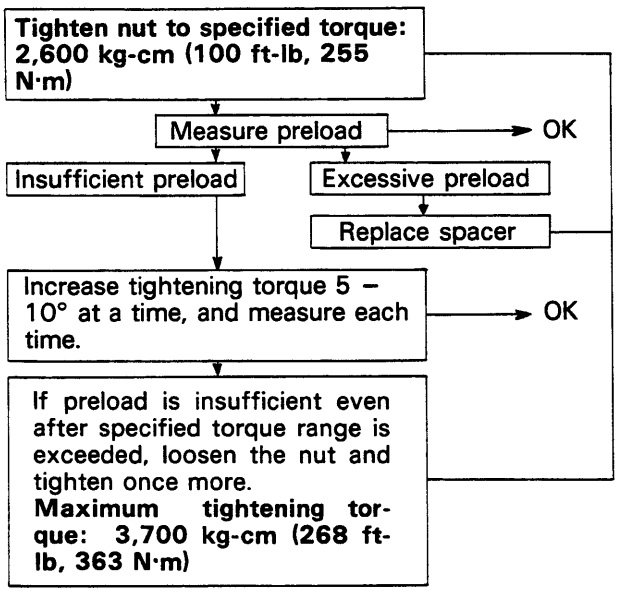






If the preload is not within specification, adjust it in the following procedure.

Preload Adjusting Procedure



NOTE: If the preload is not within specification even after retightening the nut to 3,700 kg-cm (268 ft-lb, 363 N·m), a new spacer must be used.

14. STAKE DRIVE PINION NUT

Using a chisel and hammer, stake the lock nut.

15. INSTALL DIFFERENTIAL CARRIER OIL SEAL

Using SST and a hammer, install a new oil seal.

SST 09223-46011

Distance A: 8.4 – 9.0 mm (0.331 – 0.354 in.)

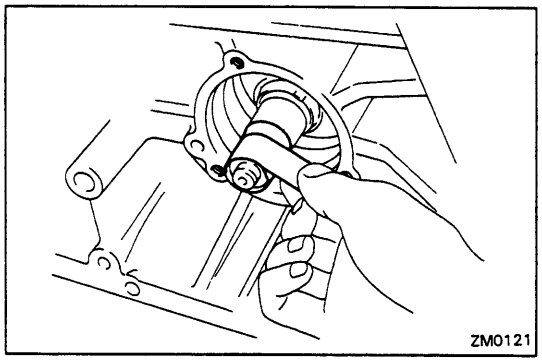
16. INSTALL DIFFERENTIAL CARRIER COVER

Install a new gasket and differential case cover with the eight bolts. Torque the bolts.

Torque: 130 kg-cm (9 ft-lb, 13 N·m)

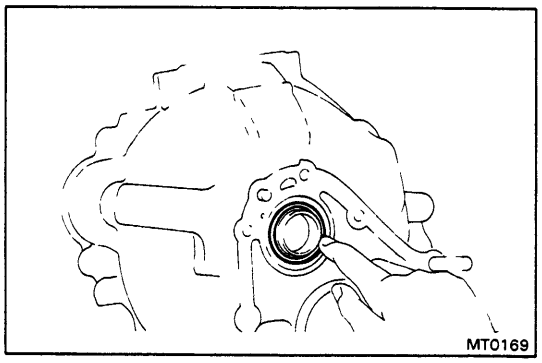
17. (w/ M/T)
INSTALL OIL RESERVOIR

Torque: 55 kg-cm (48 in.-lb, 5.4 N·m)



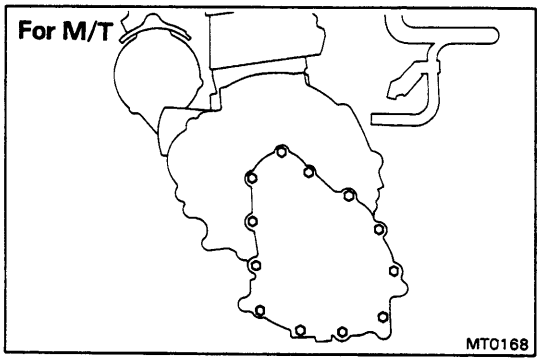
18. (w/ A/T)
INSTALL GOVERNOR PRESSURE ADAPTOR AND GOVERNOR BODY

Before installing the governor pressure adaptor, wrap the spline with tape.



19. ASSEMBLE DIFFERENTIAL CARRIER AND TRANSMISSION

(a) (w/ M/T)
Place a new O-ring in position on the transaxle case groove.



(b) Place a new gasket in position on the transaxle case.

(c) Assemble the differential carrier and transmission.

(d) Install and torque the bolts and nuts.

Torque:
w/ M/T 250 kg-cm (18 ft-lb, 25 N·m)
w/ A/T 195 kg-cm (14 ft-lb, 19 N·m)

INSTALLATION OF TRANSAXLE

FWD (See page MT-5)

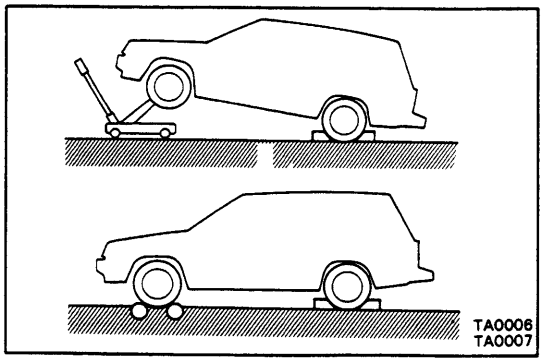
4WD (See page MT-9)

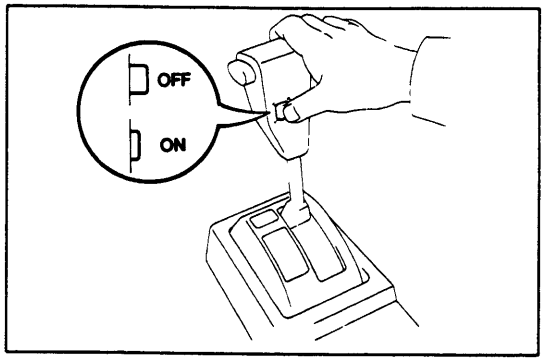
AUTOMATIC TRANSAXLE

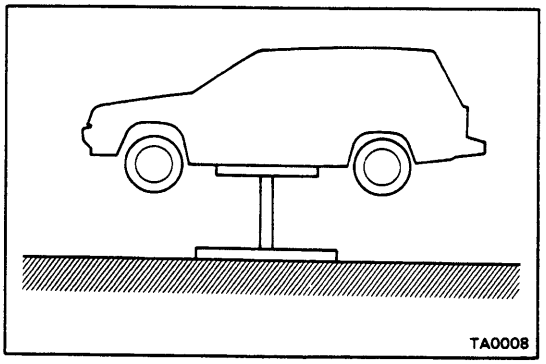
	Page
PRE-INSPECTION PRECAUTIONS	AT-2
TROUBLESHOOTING	AT-3
ATF INSPECTION	AT-5
ADJUSTMENTS	AT-5
TESTS	AT-7
AUTOMATIC SHIFT DIAGRAM	AT-17
ELECTRIC CONTROL	AT-18
REMOVAL OF TRANSAXLE (FWD)	AT-24
INSTALLATION OF TRANSAXLE (FWD)	AT-27
REMOVAL OF TRANSAXLE (4WD)	AT-31
INSTALLATION OF TRANSAXLE (4WD)	AT-34
DISASSEMBLY OF TRANSMISSION	AT-38
COMPONENT GROUP DISASSEMBLY, INSPECTION AND ASSEMBLY	AT-44
Oil Pump and Front Support	AT-45
Front Clutch	AT-49
Output Shaft and Front Planetary Gear	AT-53
Rear Clutch	AT-54
Center Support Assembly	AT-57
Rear No.2 One Way Clutch and Planetary Gear	AT-63
Transmission Case and Rear Brake Piston	AT-65
Valve Body	AT-68
Governor Body	AT-76
Speedometer Gear	AT-78
Torque Converter	AT-79
Electric Parts	AT-79
4WD CHANGE-OVER MECHANISM	AT-80
Disassembly of 4WD change-over Mechanism	AT-81
Rear Servo Piston Assembly	AT-84
Rear Valve Body	AT-87
Assembly of 4WD Change-over Mechanism	AT-89
ASSEMBLY OF TRANSMISSION	AT-92
DIFFERENTIAL	AT-106

PRE-INSPECTION PRECAUTIONS

To avoid accidental change-over from front-wheel drive to four-wheel drive while the engine is running, the following precautions should be observed during inspection or adjustment.







1. **When near wheels are on the ground and the front wheels are raised or placed on a drum tester:**
   (a) When not actually performing inspection or making adjustment, the engine should be turned OFF and the 4WD change-over switch in the OFF position.
   (b) Be sure the tires are chocked and the body secured with a chassis hook.
   (c) When not rotating the tires, place the transmission in "P" range.
   (d) Be sure the parking brake is applied fully.
   (e) Before inspection and adjustment, place the select lever in "N" range and start and run the engine at idle. Then, with the front wheels off the ground, rotate them both in the same direction and confirm that they do not lock. If the wheels lock, they are in four-wheel drive.

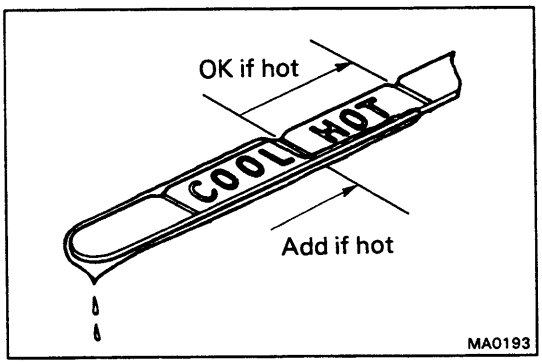
2. **When all four-wheels are jacked up:**
   (a) When not actually performing inspection or making adjustment, the engine should be OFF.
   (b) If four-wheel drive is not necessary, the change-over switch should be in the OFF position.
   (c) When not rotating the tires, place the transmission in "P" range.
   (d) Be sure the parking brake is applied fully.

TROUBLESHOOTING

Problem	Possible cause	Remedy	Page
Fluid discolored or smells burnt	Fluid contaminated	Replace fluid	MA-16
	Torque converter faulty	Replace torque converter	AT-106
	Transmission faulty	Disassemble and inspect transmission	AT-38
Vehicle does not move in any forward range or reverse	Manual linkage out of adjustment	Adjust linkage	AT-6
	Valve body or primary regulator faulty	Inspect valve body	AT-68
	Transmission faulty	Disassemble and inspect transmission	AT-38
Vehicle does not move in any range	Park lock pawl faulty	Inspect park lock pawl	AT-101
	Valve body or primary regulator faulty	Inspect valve body	AT-68
	Torque converter faulty	Replace torque converter	AT-106
	Converter drive plate broken	Replace torque converter	AT-106
	Oil pump intake strainer blocked	Clean strainer	
	Transmission faulty	Disassemble and inspect transmission	AT-38
Shift lever position incorrect	Manual linkage out of adjustment	Adjust linkage	AT-6
	Manual valve and lever faulty	Inspect valve body	AT-68
	Transmission faulty	Disassemble and inspect transmission	AT-38
Harsh engagement into any drive range	Throttle linkage out of adjustment	Adjust throttle linkage	AT-5
	Valve body or primary regulator faulty	Inspect valve body	AT-38
	Accumulator pistons faulty	Inspect accumulator pistons	AT-101
	Transmission faulty	Disassemble and inspect transmission	AT-38
Delayed 1-2 or 2-3 up-shift, or down-shifts from 3-2 then shifts back to 3	Throttle linkage out of adjustment	Adjust throttle linkage	AT-5
	Governor faulty	Inspect governor	AT-76
	Valve body faulty	Inspect valve body	AT-68
Slips on 1-2 or 2-3 up-shift, or slips or shudders on take-off	Manual linkage out of adjustment	Adjust linkage	AT-6
	Throttle linkage out of adjustment	Adjust throttle linkage	AT-5
	Valve body faulty	Inspect valve body	AT-68
	Transmission faulty	Disassemble and inspect transmission	AT-38
Drag, binding or tie-up on 1-2 or 2-3 up-shift	Manual linkage out of adjustment	Adjust linkage	AT-6
	Valve body faulty	Inspect valve body	AT-68
	Transmission faulty	Disassemble and inspect transmission	AT-38

TROUBLESHOOTING (Cont'd)

Problem	Possible cause	Remedy	Page
Harsh down-shift	Throttle linkage out of adjustment	Adjust throttle linkage	AT-5
	Accumulator pistons faulty	Inspect accumulator pistons	AT-101
	Valve body faulty	Inspect valve body	AT-68
	Transmission faulty	Disassemble and inspect transmission	AT-38
No down-shift when coasting	Governor faulty	Inspect governor	AT-76
	Valve body faulty	Inspect valve body	AT-68
Down-shift occurs too quick or too late while coasting	Throttle linkage out of adjustment	Adjust throttle linkage	AT-5
	Governor faulty	Inspect governor	AT-76
	Valve body faulty	Inspect valve body	AT-68
	Transmission faulty	Disassemble and inspect transmission	AT-38
No. 3-2 or 2-1 kick-down	Throttle linkage out of adjustment	Adjust throttle linkage	AT-5
	Governor faulty	Inspect governor	AT-76
	Valve body faulty	Inspect valve body	AT-68
No engine braking in "2" range	Valve body faulty	Inspect valve body	AT-68
	Transmission faulty	Disassemble and inspect transmission	AT-38
Vehicle does not hold in "P"	Manual linkage out of adjustment	Adjust linkage	AT-6
	Parking lock pawl cam and spring faulty	Inspect cam and spring	AT-101



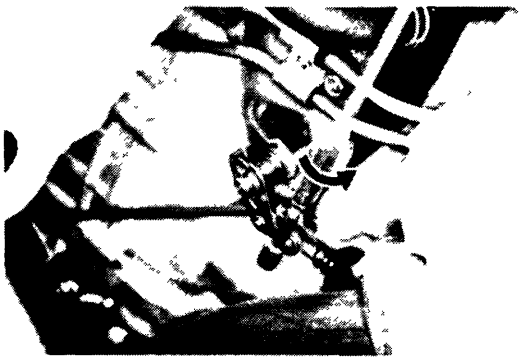
ATF INSPECTION

1. **CHECK FLUID LEVEL (See page MA-20)**
2. **CHECK FLUID CONDITION**
   If the fluid smells burnt or is black, replace it.
3. **REPLACE FLUID (See page MA-16)**

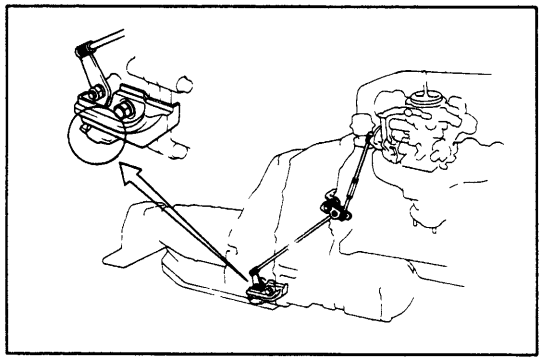
ADJUSTMENTS

ADJUSTMENT OF THROTTLE LINK

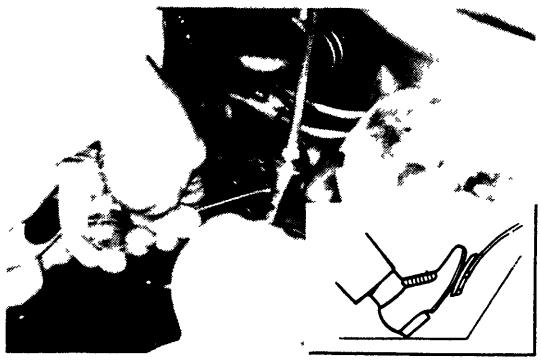
1. **REMOVE AIR CLEANER**
2. **CHECK THAT CARBURETOR THROTTLE LEVER AND THROTTLE LINK BRACKET ARE NOT BENT**
3. **PUSH ON CARBURETOR THROTTLE LEVER AND CHECK THAT THROTTLE VALVE OPENS FULLY**
   If the throttle valve does not open fully, adjust the accelerator cable.



4. **FULLY DEPRESS ACCELERATOR**
   Using a pedal jack, fully depress and hold the accelerator pedal.
5. **ADJUST THROTTLE LINK**
   (a) Loosen the turnbuckle lock nut and adjust the linkage length by turning the turnbuckle.



   (b) When the carburetor throttle valve is fully open, the throttle valve lever indicator should line up with the mark on the transmission case.

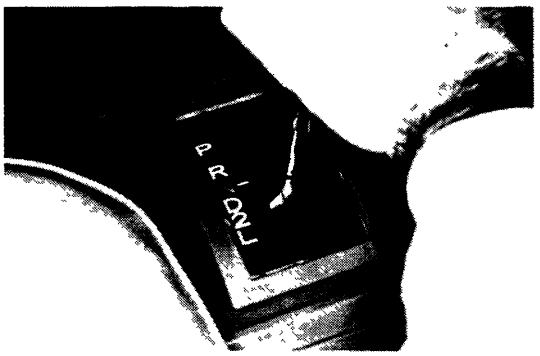


   (c) Tighten the turnbuckle lock nut.
   (d) Recheck the adjustments.
6. **INSTALL AIR CLEANER**



ADJUSTMENT OF FLOOR SHIFT LINKAGE

1. **INSPECT CONNECTING ROD BUSHING FOR WEAR OR DEFORMATION**
2. **LOOSEN NUT ON CONNECTING ROD**

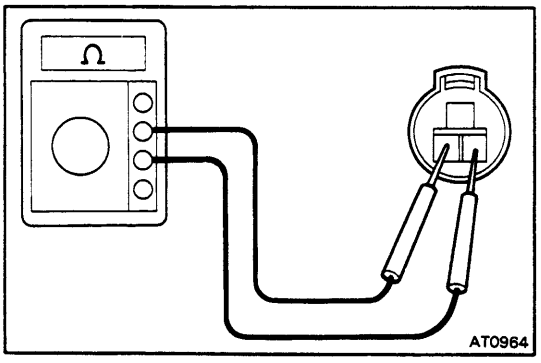


3. **ADJUST SHIFT LINKAGE**
   (a) Push the manual lever fully rearward.
   (b) Return the lever two notches to the NEUTRAL position.
   (c) Set the shift selector to "N".
   (d) While holding the selector slightly toward the "R" range, tighten the connecting rod nut.

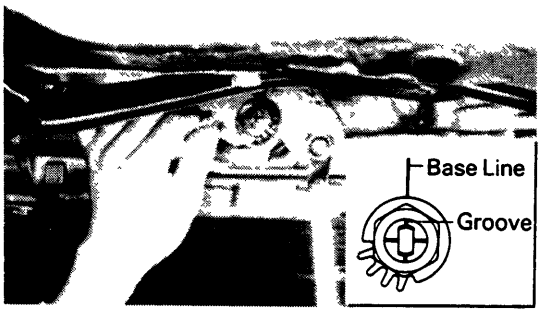
ADJUSTMENT OF NEUTRAL START SWITCH

If the engine will start with the shift selector in any range other than "N" or "P" range, adjustment is required.

1. **LOOSEN NEUTRAL START SWITCH BOLT**
2. **SET SHIFT SELECTOR IN "N"**



3. **ADJUST NEUTRAL START SWITCH**
   (a) Disconnect the neutral start switch connector.
   (b) Connect the ohmmeter between the terminals.
   (c) Adjust the switch to the point where there is continuity between terminals 2 and 3.
   (d) Connect the neutral start switch connector.



4. **TORQUE NEUTRAL START SWITCH BOLT**
   Torque: 130 kg-cm (9 ft-lb, 13 N·m)

TESTS

STALL TEST

The object of this test is to check the overall performance of the transmission and engine by measuring the maximum engine speeds in the "D" and "R" ranges.

CAUTION:

(a) Perform this test with fluid at normal operating temperature (50 — 80°C or 122 — 176°F).

(b) Do not perform this test for longer than 5 seconds.

MEASURE STALL SPEED

(a) Chock the front and rear wheels.

(b) Mount an engine tachometer.

(c) Fully apply the parking brake.

(d) Step down strongly on the brake pedal with your left foot.

(e) Turn off the 4WD change-over switch.

(f) Start the engine.

(g) Shift into "D" range. Step all the way down on the accelerator pedal with your right foot.
Quickly read the highest engine rpm at this time.

Stall speed: 3A-C 2,200 ± 150 rpm
3A 2,250 ± 150 rpm

(g) Perform the same test in the "R" range.

EVALUATION

(a) If the engine speed is the same for both ranges but lower than specified value:

- Engine output may be insufficient.
- Stator one-way clutch may not be operating properly.

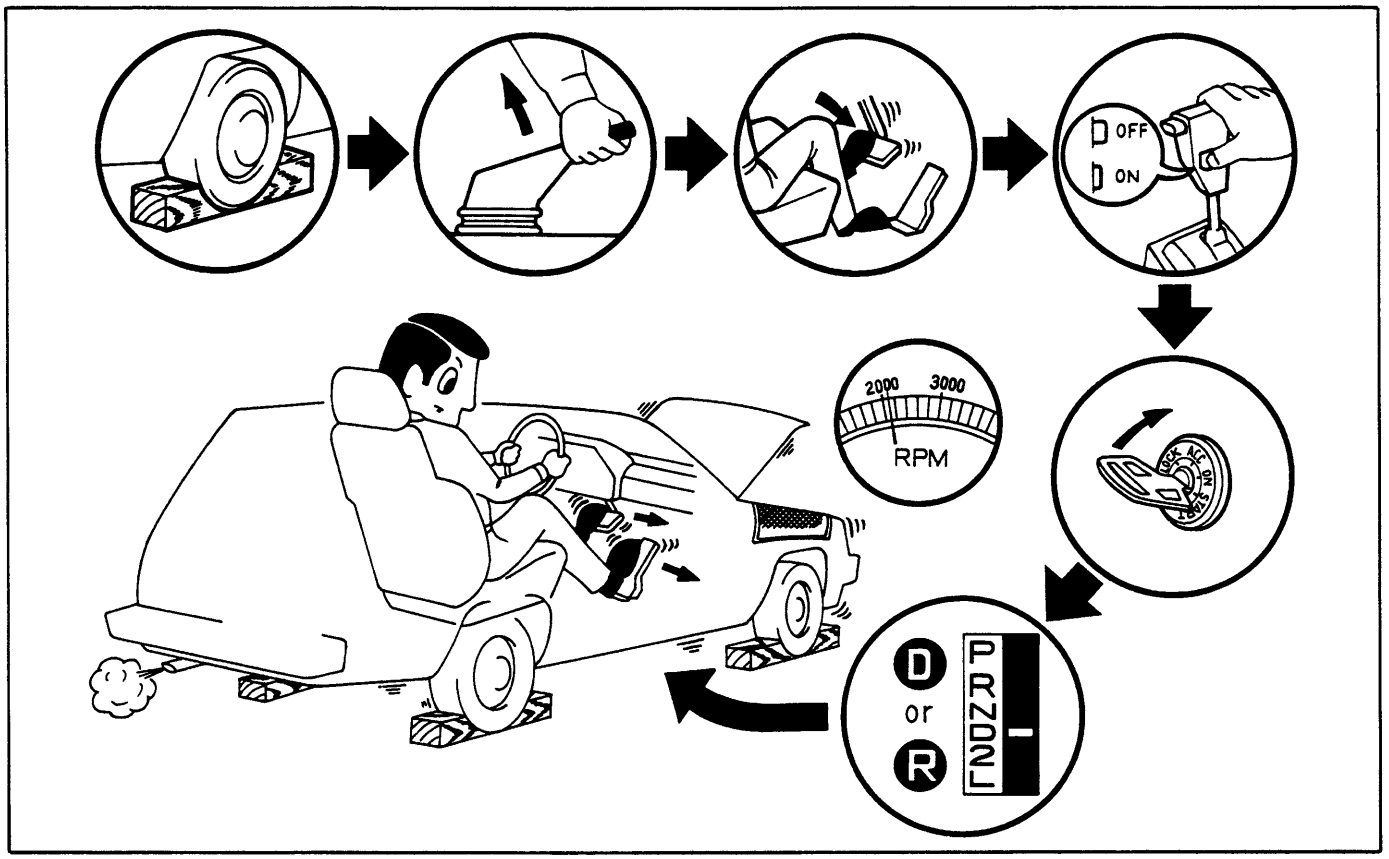
NOTE: If more than 600 rpm below the specified value, the torque converter could be at fault.

(b) If the stall speed in "D" range is higher than specified:

- Line pressure too low
- Front clutch slipping
- One-way clutch No. 2 not operating properly

(c) If the stall speed in "R" range is higher than specified,

- Line pressure too low
- Rear clutch slipping
- Brake No. 3 slipping



TIME LAG TEST

If the shift lever is shifted while the engine is idling, there will be a certain time elapse or lag before the shock can be felt. This is used for checking the condition of the front clutch, rear clutch and brake No. 3.

MEASURE TIME LAG

(a) Fully apply the parking brake.

(b) Turn off the 4WD change-over switch.

(c) Start the engine.

Idle speed (cooling fan and A/C OFF):
w/o PS "N" range 800 rpm
w/ PS "N" range 900 rpm

(d) Shift the shift lever from "N" to "D" range.
Using a stop watch, measure the time it takes from shifting the lever until the shock is felt.

Time lag: Less than 1.2 seconds

(e) In same manner, measure the time lag for "N" → "R".

Time lag: Less than 1.5 seconds

CAUTION:

(a) Perform this test with the fluid at normal operating temperature (50 – 80°C or 122 – 176°F).

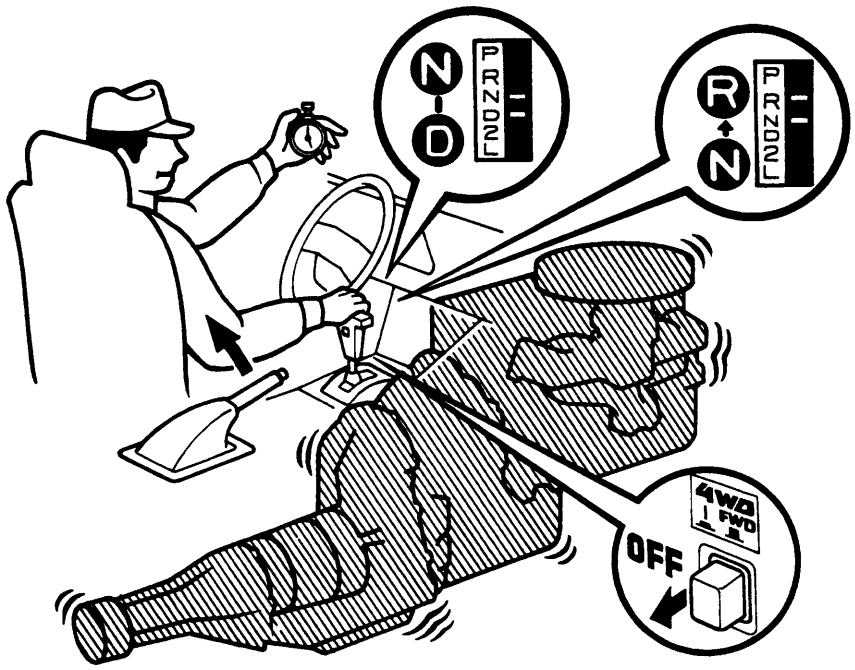
(b) Allow a one minute interval between tests.

(c) Make three measurements and calculate the average value.

EVALUATION

(a) If "N" → "D" time lag is longer than specified,
- Line pressure too low
- Front clutch worn

(b) If "N" → "R" time lag is longer than specified,
- Line pressure too low
- Rear clutch worn
- Brake No. 3 worn



TE0049

HYDRAULIC TEST

1. PREPARATION

(a) Warm up the transmission fluid.

(b) Turn off the 4WD change-over switch.

(c) Chock the rear wheels.

(d) Jack up the vehicle and support it on stands.

(d) Remove the transmission case test plugs and mount the hydraulic pressure gauges.

SST 09992-00093 and 09992-00130

CAUTION:

(a) Perform this test with the fluid at normal operating temperature (50 – 80°C or 122 – 176°F).

(b) Measurement can be made with the 1,000 rpm test, but if tests are to be made at 1,800 and 3,500 rpm, it would be safer to test on a road or chassis dynamometer because an on-stand test could be hazardous.

2. MEASURE GOVERNOR PRESSURE

(a) Fully apply the parking brake.

(b) Start the engine.

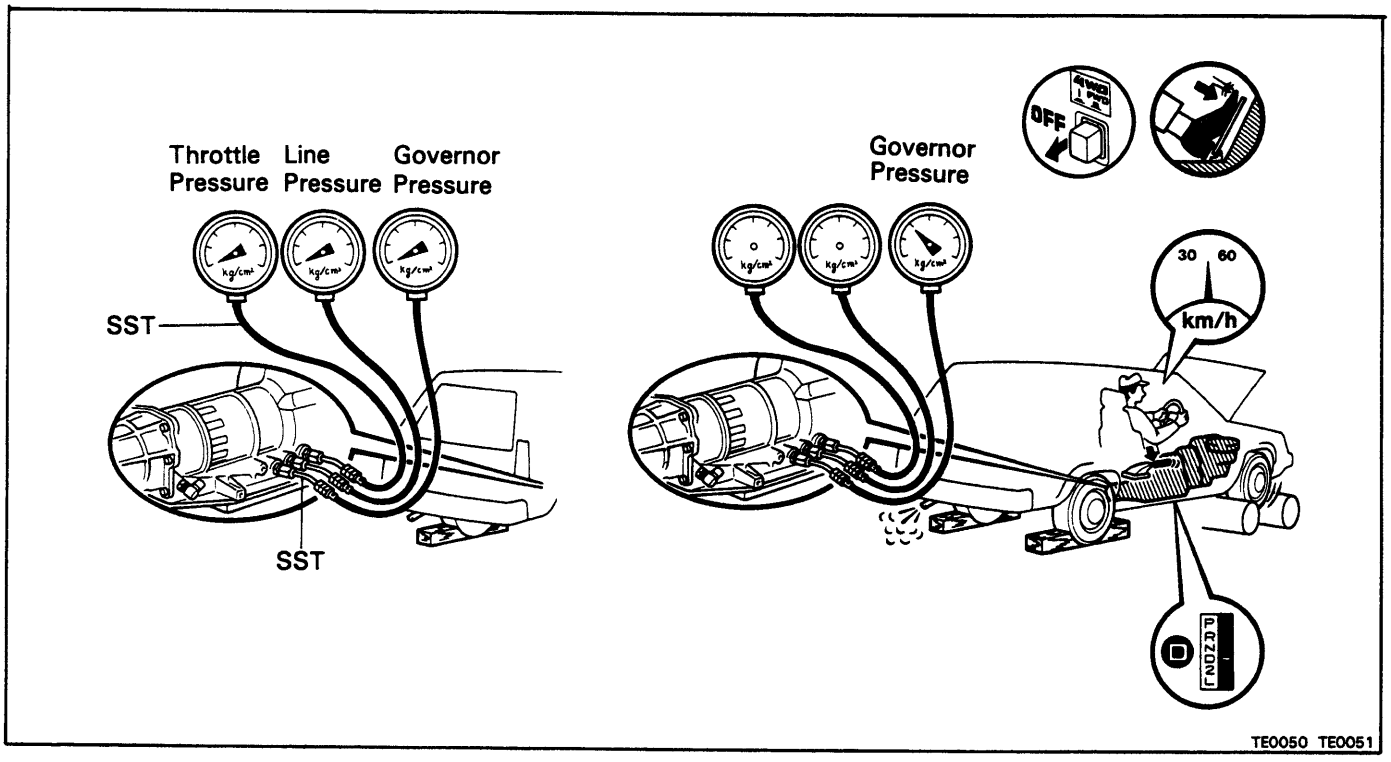
(c) Shift into "D" range and measure the governor pressures at the speeds specified in the table.

EVALUATION

If governor pressure is defective,

- Line pressure defective
- Fluid leakage in governor pressure circuit
- Governor valve operation defective

	Output shaft	Vehicle speed (Reference only)	Governor pressure
A55	1,000 rpm	29 km/h (18 mph)	1.2 – 1.8 kg/cm² (17 – 26 psi, 118 – 177 kPa)
	1,800 rpm	52 km/h (32 mph)	1.8 – 2.4 kg/cm² (26 – 34 psi, 177 – 235 kPa)
	3,500 rpm	101 km/h (63 mph)	3.8 – 5.0 kg/cm² (54 – 71 psi, 373 – 490 kPa)
A55F	1,000 rpm	27 kg/h (17 mph)	1.2 – 1.8 kg/cm² (17 – 26 psi, 118 – 177 kPa)
	1,800 rpm	49 km/h (30 mph)	1.8 – 2.4 kg/cm² (26 – 34 psi, 177 – 235 kPa)
	3,500 rpm	95 km/h (59 mph)	4.2 – 5.0 kg/cm² (60 – 71 psi, 412 – 490 kPa)



TE0050 TE0051

3. MEASURE LINE PRESSURE

(a) Fully apply the parking brake and chock the four wheels.

(b) Turn off the 4WD change-over switch.

(c) Start the engine and shift into "D" range.

(d) Step down strongly on the brake pedal with your left foot and while manipulating the accelerator pedal with the right foot, measure the line pressure at the engine speeds specified in table.

(e) In the same manner, perform the test for "R" range.

Engine speed rpm	Line pressure kg/cm² (psi) (kPa)	
	"D" range	"R" range
Idling	4.0 – 4.6 (57 – 65) (392 – 451)	7.5 – 8.5 (107 – 121) (735 – 834)
Stall	9.3 – 11.3 (132 – 161) (912 – 1,108)	17.7 – 20.2 (252 – 287) (1,736 – 1,981)

(f) If the measured pressures are not up to specified values, recheck the throttle link adjustment and retest.

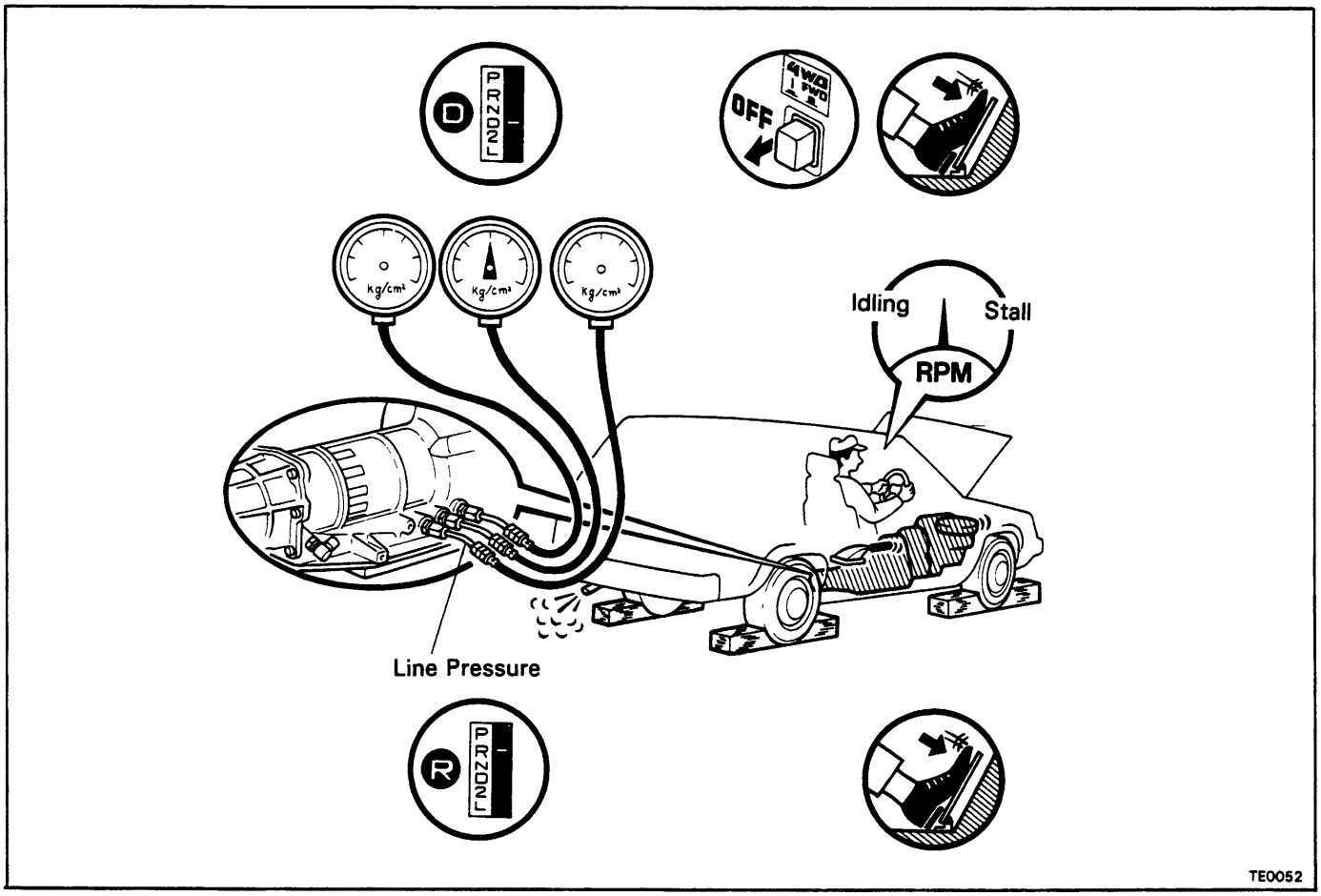
EVALUATION

(a) If the measured values at all ranges are higher than specified:
- Throttle link out-of-adjustment
- Throttle valve defective
- Regulator valve defective

(b) If the measured values at all ranges are lower than specified:
- Throttle link out-of-adjustment
- Throttle valve defective
- Regulator valve defective
- Oil pump defective

(c) If pressure is low in "D" range only:
- "D" range circuit fluid leakage
- Front clutch defective

(d) If pressure is low in "R" range only:
- "R" range circuit fluid leakage
- Rear clutch defective
- Brake No. 3 defective



4. MEASURE THROTTLE PRESSURE

(a) Fully apply the parking brake and chock the four wheels.

(b) Turn off the 4WD change-over switch.

(c) Start the engine and shift into "D" range.

(d) Step down strongly on the brake pedal with your left foot and while manipulating the acceleration pedal with the right foot, measure the throttle pressure at the engine speeds specified in the table below.

(e) In the same manner, perform the test for "R" range.

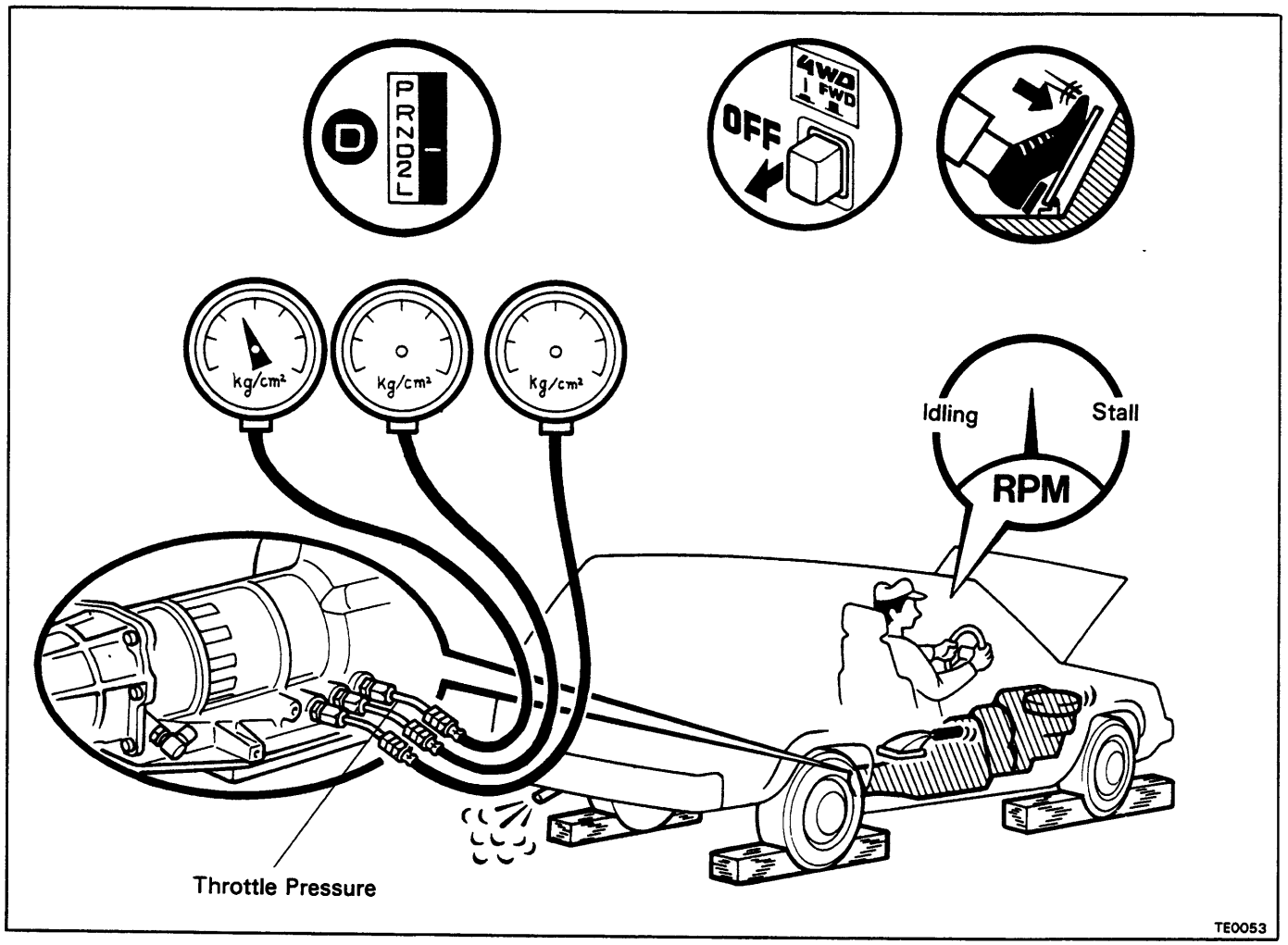
Engine speed rpm	Throttle pressure kg/cm² (psi, kPa)
	"D", "R" range
Idling	0 – 0.3 (0 – 4.3, 0 – 29)
Stall	7.7 – 8.3 (110 – 118, 755 – 814)

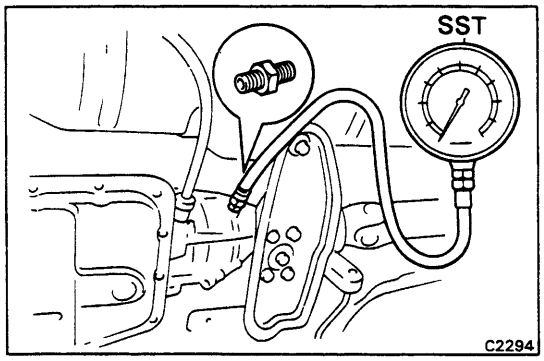
(f) If the measured pressures are not up to specified values, recheck the throttle link adjustment and retest.

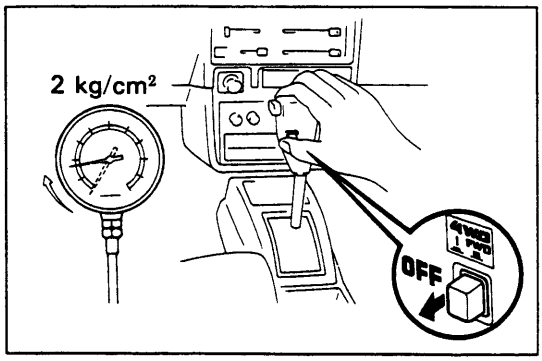
EVALUATION

(a) If the measured values are higher than specified:
- Throttle valve defective.
- Throttle circuit orifice clogged

(b) If the measured values are lower than specified:
- Throttle valve defective
- Regulator valve defective
- Oil pump defective







5. MEASURE REAR SERVO PISTON PRESSURE (4WD)

(a) Remove the test plug from the extension housing and mount the hydraulic pressure gauges. (SST).

SST 09992-00093

(b) Fully apply the parking brake. Shift into "P" range and start the engine.

(c) Measure the fluid pressure when the 4WD change-over switch operates.

Switch position	Fluid pressure
OFF	0 kg/cm² (0 psi, 0 kPa)
ON	2 kg/cm² (28 psi, 196 kPa)

ROAD TEST

CAUTION: Perform this test with fluid at normal operating temperature (50 – 80°C or 122 – 176°F).

1. "D" RANGE TEST

Shift into "D" range and while driving with the accelerator pedal held constant at a specified point (throttle valve opening 50% and 100%), check on the following points:

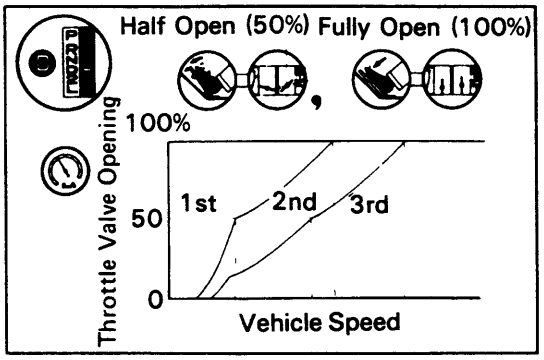
(a) At each of the above throttle openings, check to see that 1 → 2 and 2 → 3 up-shift take place and that the shift points conform to those shown in the automatic shift diagram.

EVALUATION

(1) If there is no 1 → 2 up-shift:
- Governor valve is defective
- 1-2 shift valve is stuck

(2) If there is no 2 → 3 up-shift:
- 2-3 shift valve is stuck

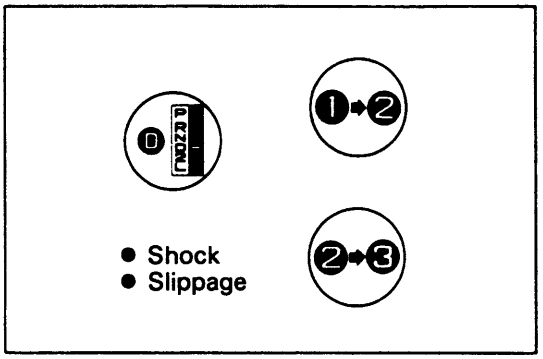
(3) If the shift point is defective:
- Throttle link is out-of-adjustment
- Throttle valve, 1-2 shift valve, 2-3 shift valve, etc., are defective.



(b) In the same manner, check the shock and the slip at 1 → 2 and 2 → 3 up-shifts.

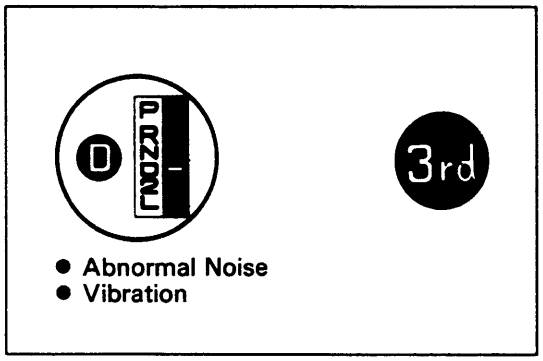
EVALUATION

If the shock is severe,
- Line pressure is too high
- Accumulator is defective
- Check ball is defective



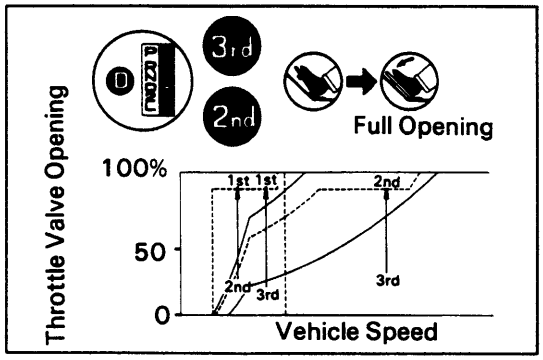
(c) In "D" range 3rd gear and check for abnormal noise and vibration.

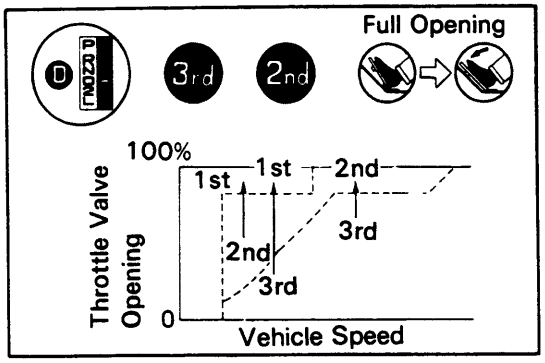
NOTE: Check for cause of abnormal noise and vibration must be made with extreme care as they could also be due to unbalance in the differential, tires, torque converter, etc. or insufficient bending rigidity, etc., in the power train.



(d) While running in "D" range 2nd and 3rd gears check to see that the possible kick-down vehicle speed limits for 2 → 1, 3 → 1 and 3 → 2 kick-downs conform to those indicated in the automatic shift diagram.

(e) Check for abnormal shock and slip at kick-down.



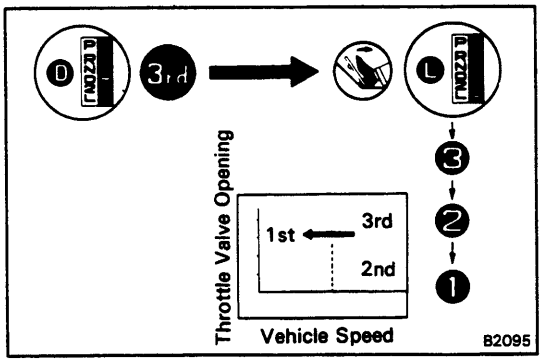


(f) While running in "D" range 3rd gear shift to "2" and "L" ranges and check the engine braking effect in each of these ranges.

EVALUATION

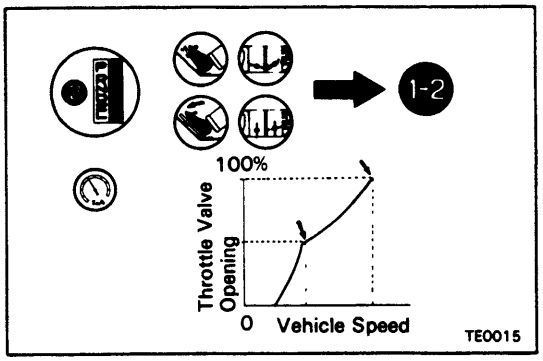
(1) If there is no engine braking effect in "2" range,
- Brake No. 1 is defective

(2) If there is no engine braking effect in "L" range,
- Brake No. 3 is defective

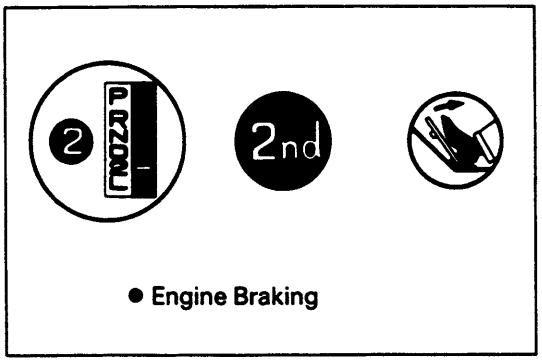


(g) While running in "D" range, release your foot from the accelerator pedal and shift into "L" range. Then check to see if the 3 → 2 and 2 → 1 down-shift points conform to those indicated in the automatic shift diagram.

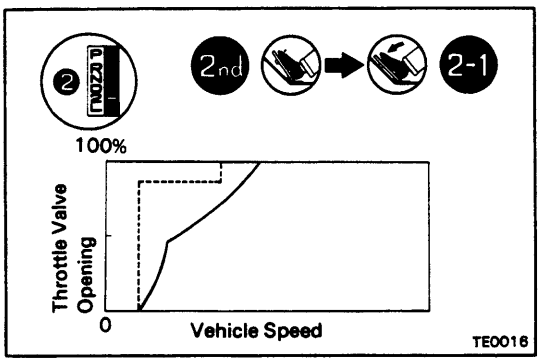
2. "2" RANGE TEST



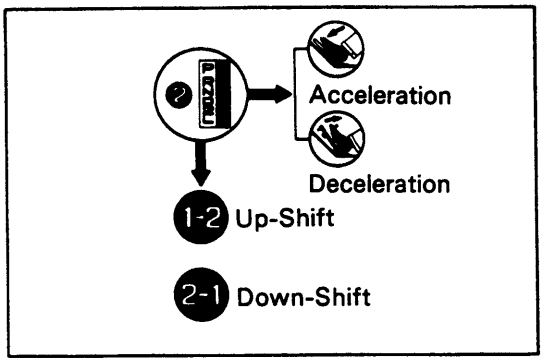
(a) Shift to "2" range and run with the throttle valve opening at 50% and 100% respectively. Then check the 1 → 2 up-shift points at each of the throttle valve openings to see that it conforms to those indicated in the automatic shift diagram.



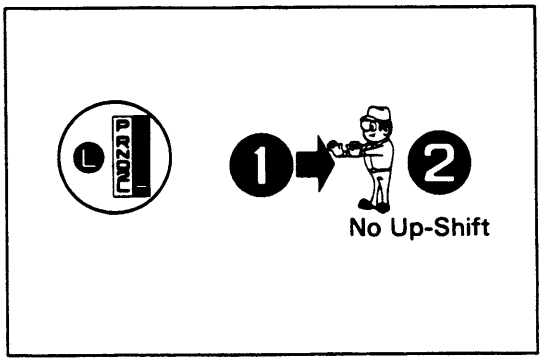
(b) While running in "2" range, 2nd gear, release the accelerator pedal and check the engine braking effect.



(c) Perform a kick-down from the "2" range and check the possible 2 → 1 kick-down vehicle speed limit to see if it conforms to that indicated in the automatic shift diagram.

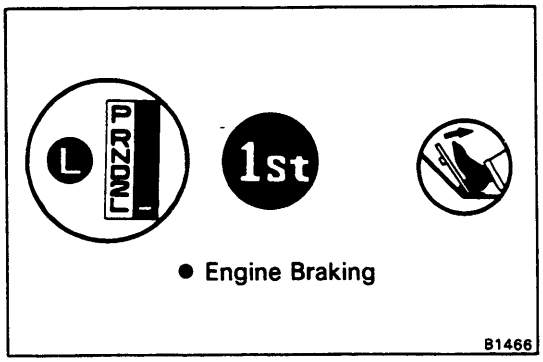


(d) Check for abnormal noise at acceleration and deceleration, and for shock at up-shift and down-shift.

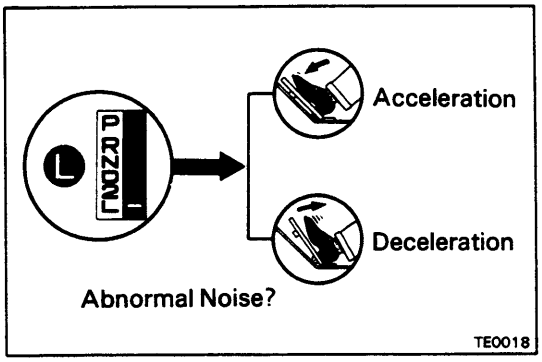


3. "L" RANGE TEST

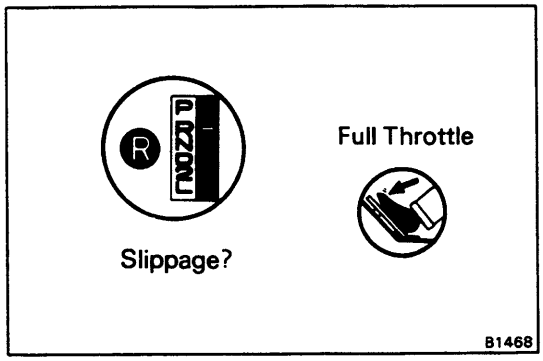
(a) While running in "L" range, check to see that there is no up-shift to 2nd gear.



(b) While running in "L" range, release the accelerator pedal and check the engine braking effect.

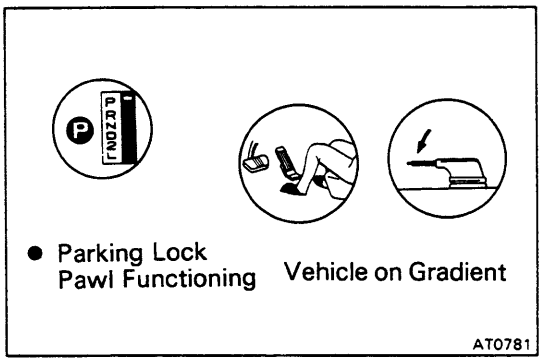


(c) Check for abnormal noise at acceleration and deceleration.



4. "R" RANGE TEST

Shift into "R" range and, while running at full throttle, check for slipping.



5. "P" RANGE TEST

Stop the vehicle on a gradient (more than 9%) and, after shifting into "P" range, release the parking brake. Then check that the parking lock pawl prevents the vehicle from moving.

6. INSPECT 4WD CHANGE-OVER OPERATION

(a) On a paved surface, drive in a circle with the steering wheel fully turned to either the right or left.

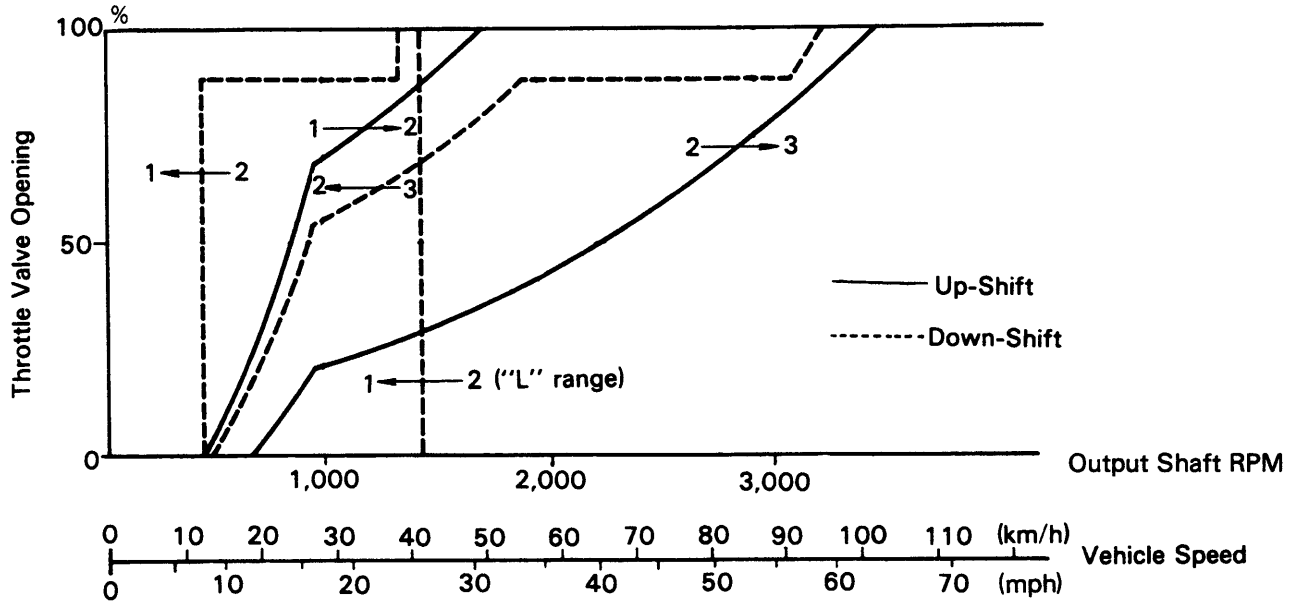
(b) Place the 4WD change-over switch at ON, and check that the 4WD indicator lamp light and there is a slight drap as if the brakes were applied.

(c) Place the change-over switch at OFF and drive in a straight line. Check that there is a slight shock sensation during change-over to front-wheel drive.

NOTE: During acceleration, etc. when there is a drive force applied to the drive axis, there will be no immediate change-over to front-wheel drive even wheen the switch is placed at OFF.

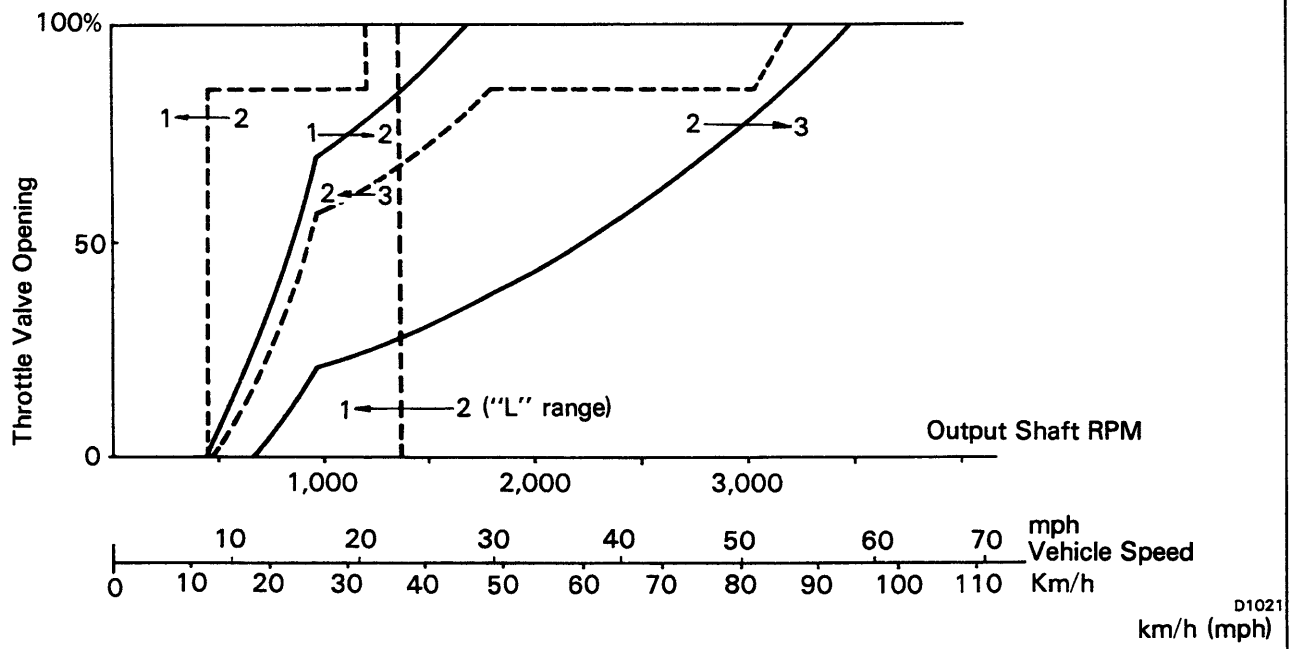
AUTOMATIC SHIFT DIAGRAM

A55



Differential gear ratio		"D" range (throttle valve fully open)				"L" range
		1 → 2	2 → 3	3 → 2	2 → 1	2 → 1
A55	3.583	42 – 58 (26 – 36)	96 – 110 (60 – 68)	88 – 103 (55 – 64)	33 – 49 (21 – 30)	35 – 51 (22 – 32)

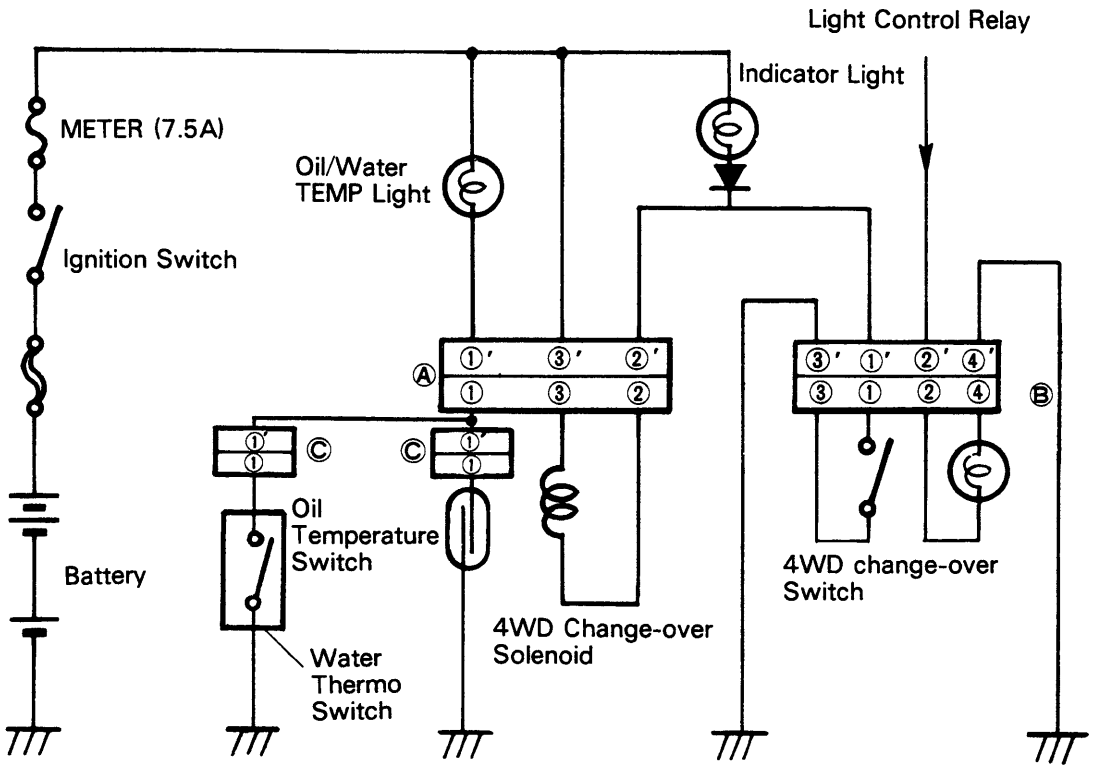
A55F



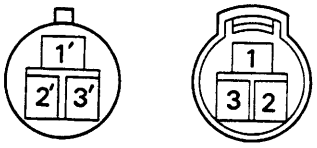
Differential gear ratio		"D" range (throttle valve fully open)				"L" range
		1 → 2	2 → 3	3 → 2	2 → 1	2 → 1
A55F	3.909	37 – 53 (23 – 33)	86 – 101 (53 – 63)	81 – 96 (50 – 60)	32 – 48 (20 – 30)	29 – 45 (18 – 28)

ELECTRIC CONTROL

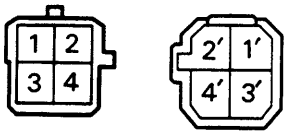
CIRCUIT



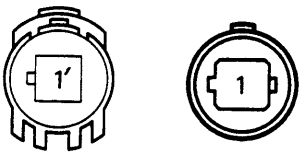
Ⓐ 4WD Change-over Solenoid

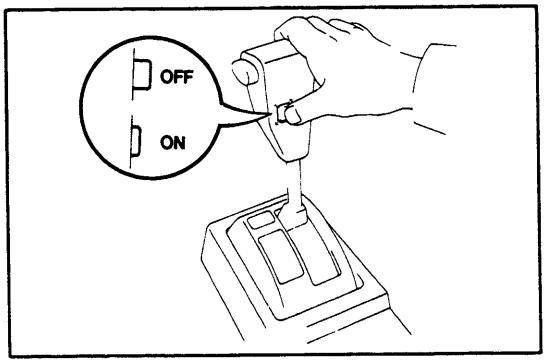


Ⓑ 4WD Change-over Switch



Ⓒ Oil Temperature Switch
Water Thermo Switch



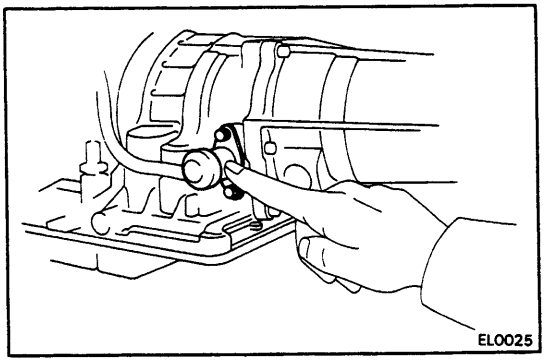


INSPECTION OF ELECTRIC CONTROL COMPONENTS

1. INSPECT FOUR-WHEEL DRIVE CHANGE-OVER ELECTRIC SYSTEM

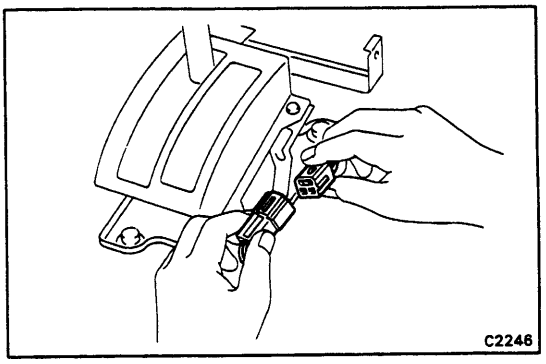
(a) Turn on the ignition switch.

(b) Turn on the 4WD change-over switch.



(c) At this time confirm that there is an operation sound from the 4WD change-over solenoid.

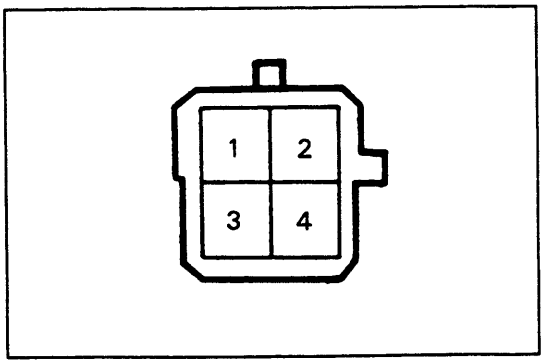
If there is no sound, check the 4WD change-over switch, solenoid and circuit.



2. INSPECT FOUR-WHEEL DRIVE CHANGE-OVER SWITCH

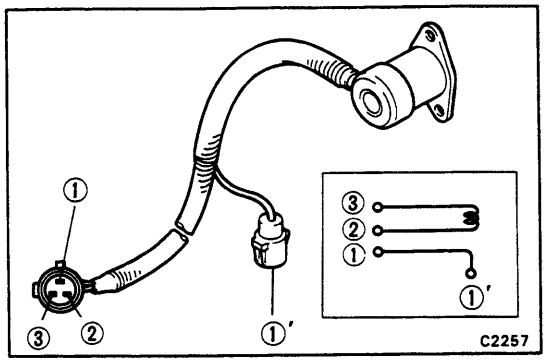
(a) Disconnect the 4WD change-over switch connector.

(b) Using an ohmmeter, check the continuity of the terminals for each switch position.



Switch position \ Terminal	1	2	3	4
ON	○		○	
		○		○
OFF		○		○

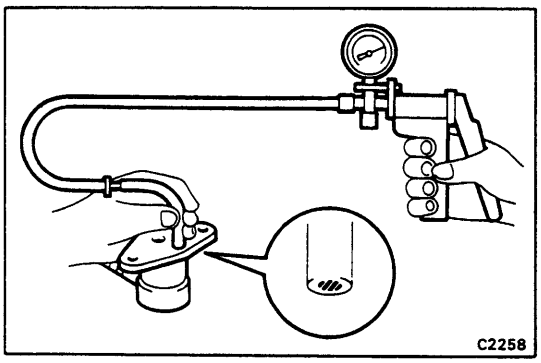
(c) Connect the 4WD change-over switch connector.



3. INSPECT FOUR-WHEEL DRIVE CHANGE-OVER SOLENOID

(a) Disconnect the solenoid connector. Using an ohmmeter, measure the solenoid coil resistance between terminal 2 and 3 .

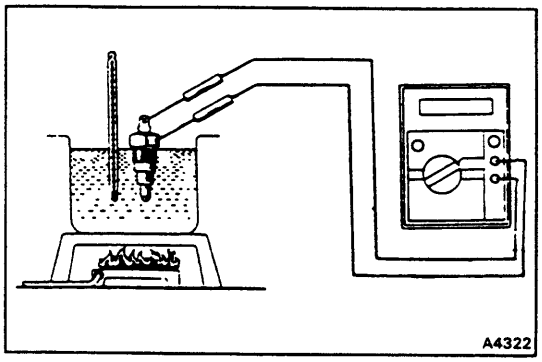
Resistance: 13 Ω



(b) Connect the battery positive (+) lead to terminal 3 and the negative lead to terminal 2 , and check for a solenoid operation sound.

(c) Remove the solenoid valve and place a Mighty-Vac hose over solenoid valve hole. Apply vacuum and check for leaks.

(d) Install the solenoid.



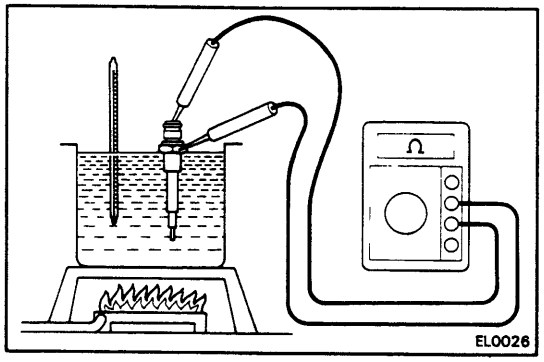
4. INSPECT WATER THERMO SWITCH

(a) Remove the water thermo switch.

(b) Using an ohmmeter, measure the resistance between the terminal and ground.

Coolant temperature	Resistance (Ω)
Below 103°C (217°F)	∞
Above 110°C (230°F)	6.6 – 9.8

(c) Install the thermo switch.



5. INSPECT OIL TEMPERATURE SWITCH

(a) Remove the oil temperature switch.

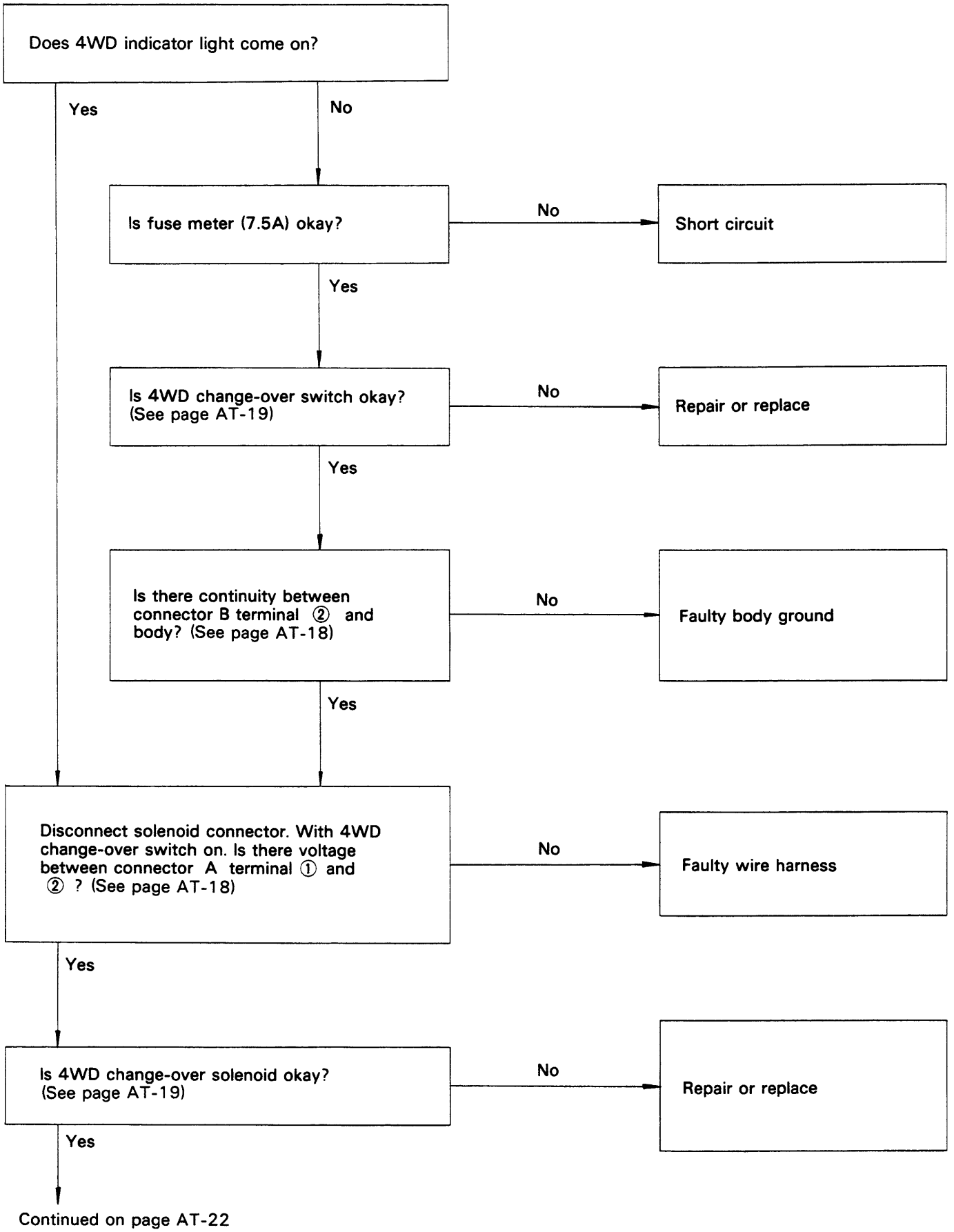
(b) Using an ohmmeter, measure the resistance between the terminal and ground.

Oil tempreture	Resistance (Ω)
Below 125°C (257°F)	∞
Above 132°C (270°F)	6.6 – 9.8

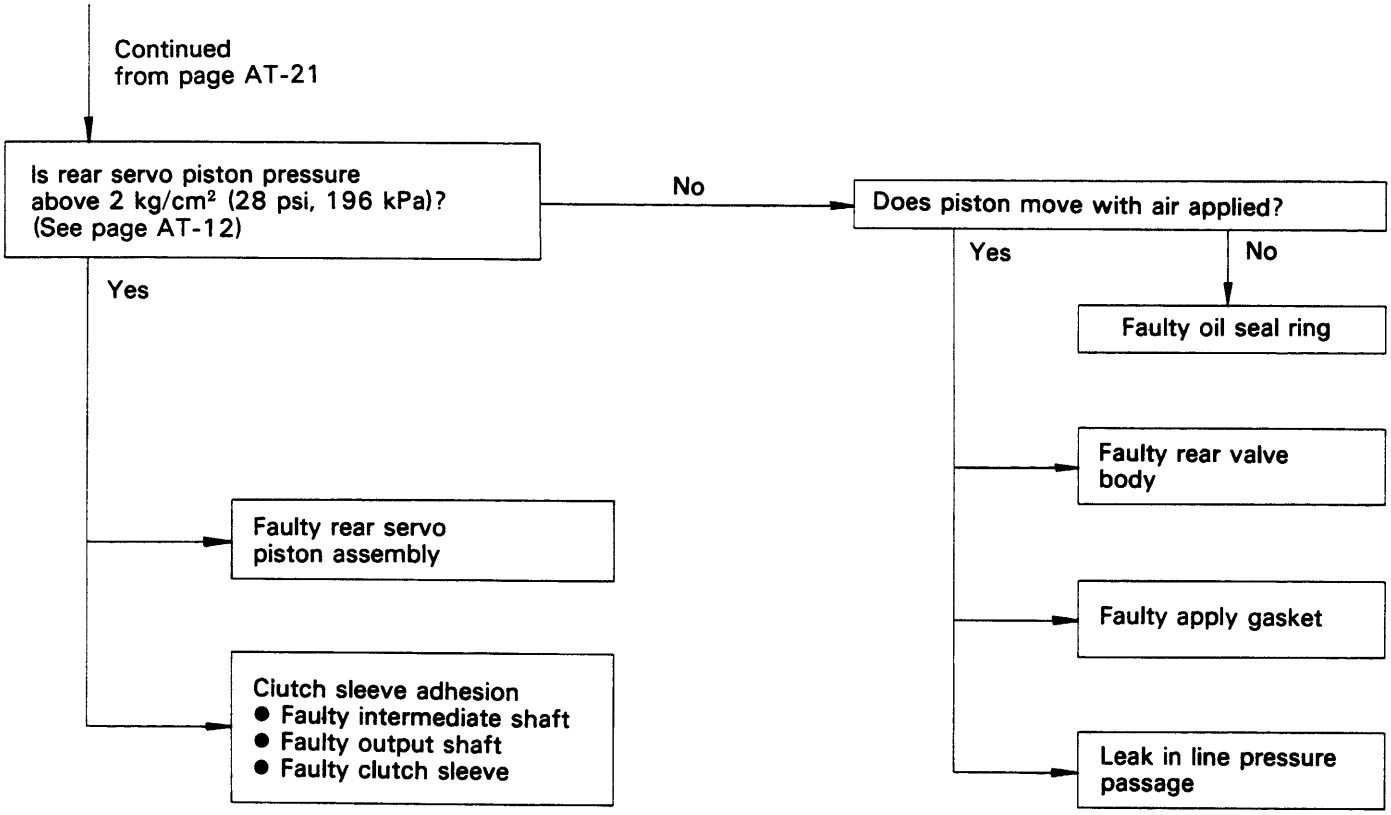
(c) Install the oil temperature switch.

TROUBLESHOOTING OF ELECTRIC CONTROL

Trouble 1. No 4WD change-over

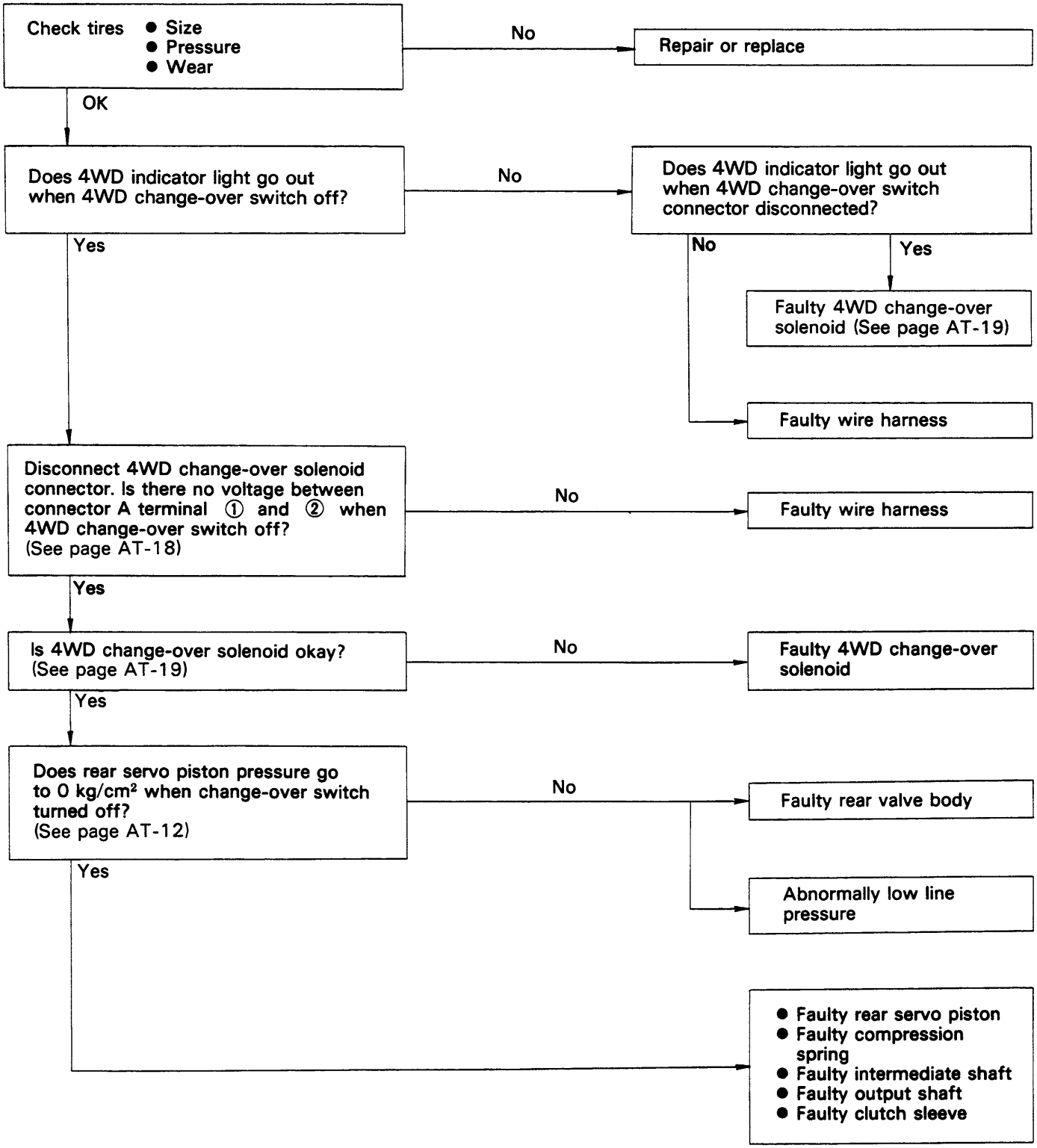


Continued on page AT-22


Continued
from page AT-21
Is rear servo piston pressure
above 2 kg/cm² (28 psi, 196 kPa)?
(See page AT-12)
No
Does piston move with air applied?
Yes
No
Yes
Faulty oil seal ring
Faulty rear valve
body
Faulty rear servo
piston assembly
Faulty apply gasket
Clutch sleeve adhesion
● Faulty intermediate shaft
● Faulty output shaft
● Faulty clutch sleeve
Leak in line pressure
passage

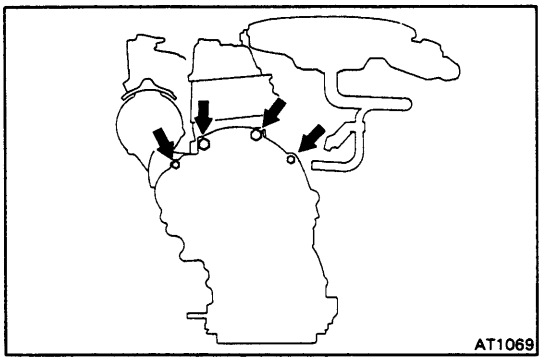
Trouble 2. No return to front-wheel drive

NOTE: During acceleration, etc. when drive force is applied to the drive axis, there will be no immediate change-over to front-wheel drive even when the switch is turned off.

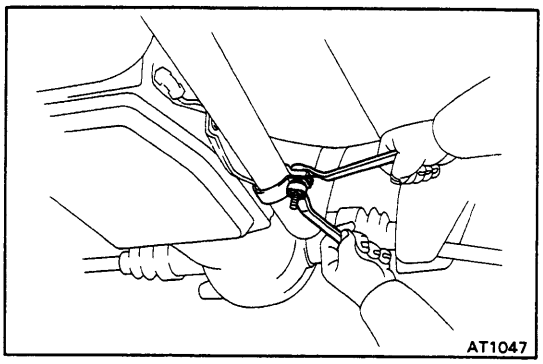


REMOVAL OF TRANSAXLE (FWD)

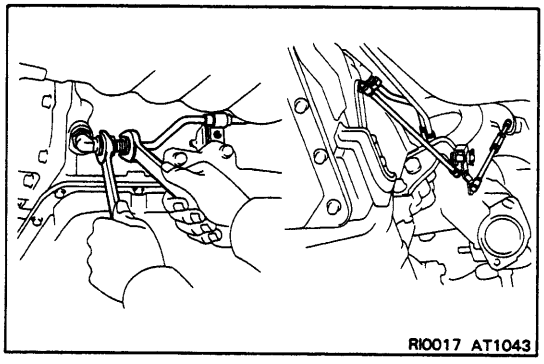
1. **DISCONNECT CABLE FROM NEGATIVE TERMINAL OF BATTERY**
2. **DISCONNECT FOLLOWING CONNECTOR:**
   (a) Neutral start switch connector
   (b) Back-up light switch connector
3. **REMOVE AIR CLEANER ASSEMBLY (See page FU-7)**
4. **REMOVE TRANSAXLE UPPER MOUNT BOLTS**


AT1069

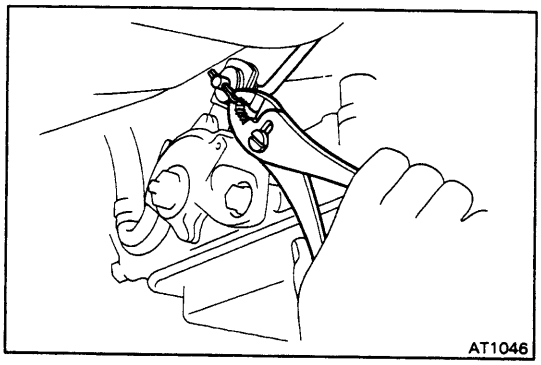
5. **REMOVE BOTH DRIVE SHAFTS (See page FA-13)**
6. **RAISE VEHICLE**
   CAUTION: Be sure the vehicle is securely supported.
7. **(Fed.)**
   REMOVE CONVERTER AIR INLET PIPE
   (See page MT-3)


AT1047

8. **REMOVE EXHAUST FRONT PIPE**

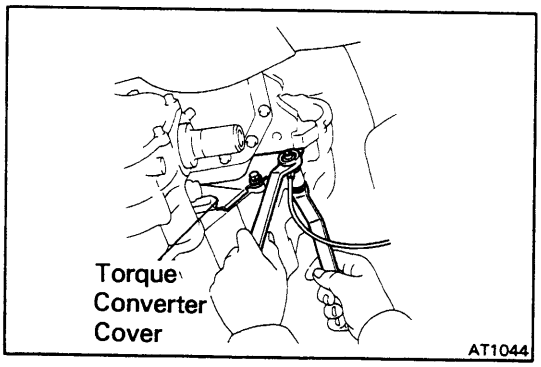

RI0017 AT1043

9. **DISCONNECT OIL COOLER INLET AND OUTLET PIPES**
10. **REMOVE THROTTLE LINKAGE**



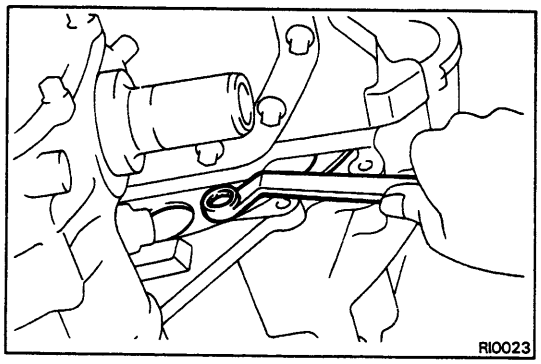
11. DISCONNECT SHIFT CONTROL ROD

12. REMOVE RIGHT STIFFENER PLATE



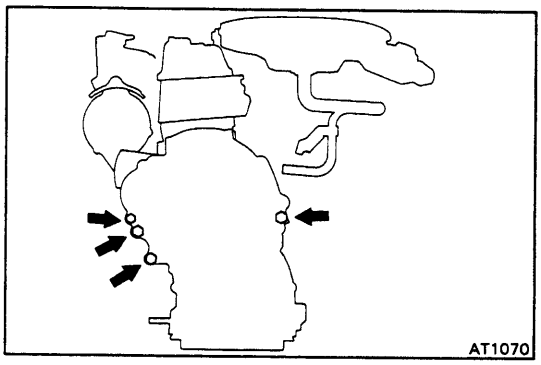
13. REMOVE TORQUE CONVERTER COVER

Remove the three bolts, dust cover and converter cover.

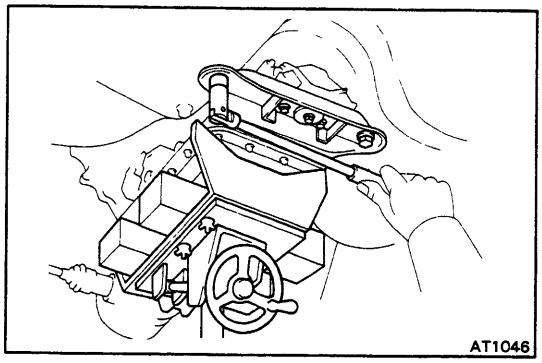


14. REMOVE TORQUE CONVERTER MOUNT BOLTS

Turn the crankshaft to again access to each bolt. Remove the six bolts.



15. REMOVE TRANSAXLE LOWER MOUNT BOLTS



16. REMOVE REAR SUPPORT MEMBER

(a) Put a wooden block between the engine and dash panel because the IIA will make contact with the brake booster when the rear support member is removed.

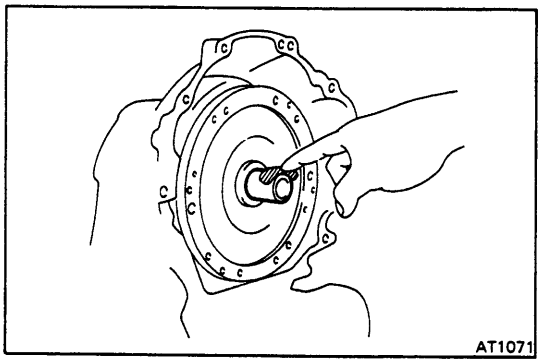
(b) Support the transaxle with the jack and remove the engine rear support member.

17. DISCONNECT SPEEDOMETER CABLE

18. REMOVE TRANSAXLE ASSEMBLY

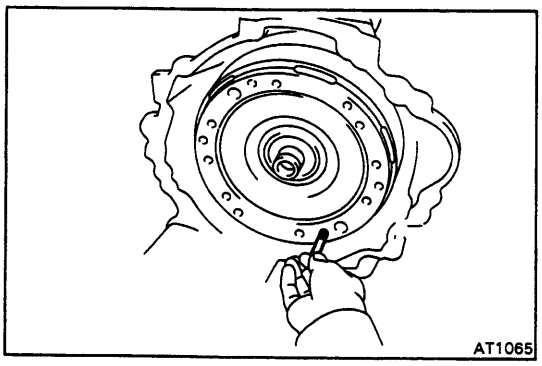
Draw out the transaxle down and toward the rear.

CAUTION: Be careful not to catch the neutral start switch cable, back-up light switch cable or 4WD change-over solenoid cable. keep the oil pan positioned downward.

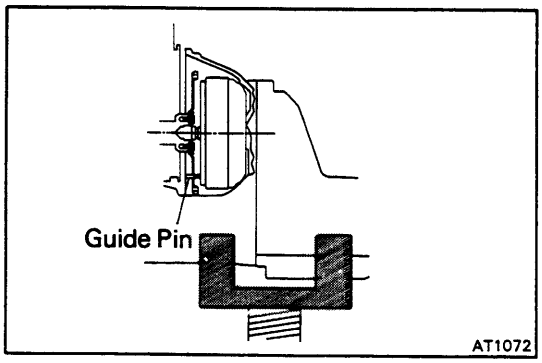


INSTALLATION OF TRANSAXLE (FWD)

1. **APPLY MP GREASE TO CENTER HUB OF TORQUE CONVERTER**



2. **INSTALL GUIDE PIN IN TORQUE CONVERTER**

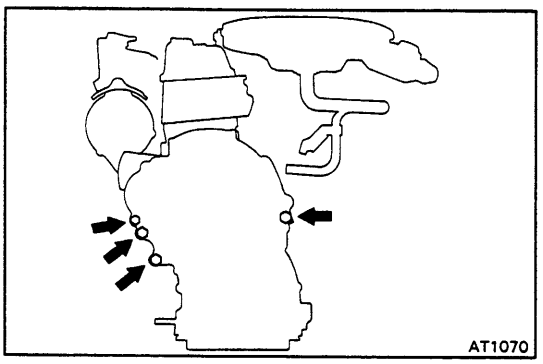


3. **PLACE TRANSAXLE IN INSTALLATION POSITION**

CAUTION: Be careful not to tilt the transaxle forward because the torque converter could slide out.

(a) Align the guide pin with one of the drive plate holes.

(b) Connect the transaxle and engine.



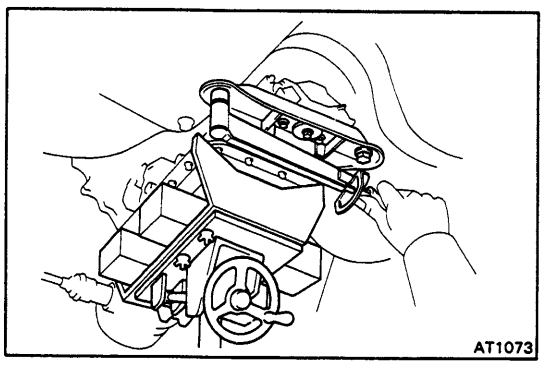
4. **INSTALL STARTER AND TRANSAXLE LOWER MOUNT BOLTS**

(a) Place the starter in position.

(b) Install and torque the lower mount bolts.

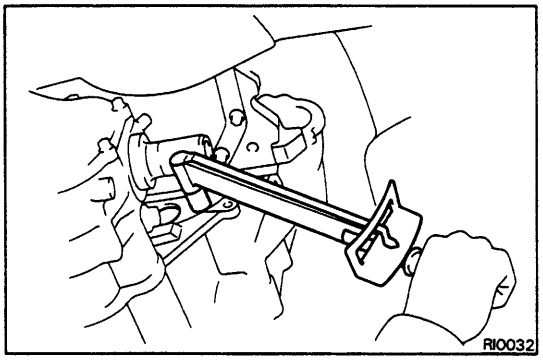
Torque: 10 mm bolt 400 kg-cm (29 ft-lb, 39 N·m)
12 mm bolt 600 kg-cm (43 ft-lb, 59 N·m)

5. **REMOVE GUIDE PIN**



6. **INSTALL REAR SUPPORT MEMBER**

Torque: 970 kg-cm (70 ft-lb, 95 N·m)

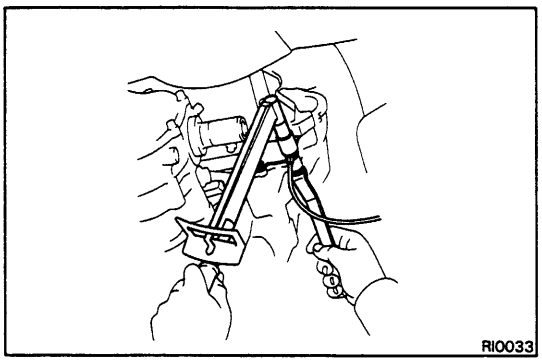


7. INSTALL TORQUE CONVERTER MOUNT BOLTS

(a) Install the six bolts finger tight. Turn the crankshaft to gain access.

(b) Uniformly torque the bolts.

Torque: 185 kg-cm (13 ft-lb, 18 N·m)



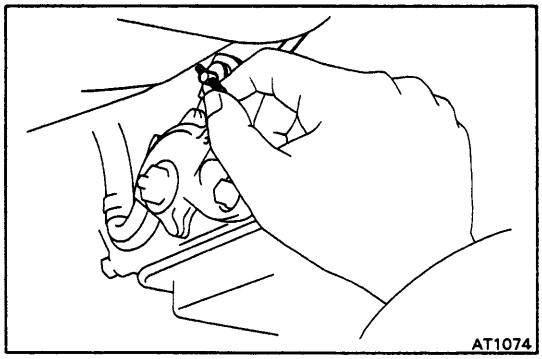
8. INSTALL TORQUE CONVERTER COVER

Install the converter cover and dust seal with the three bolts. Connect the ground wire.

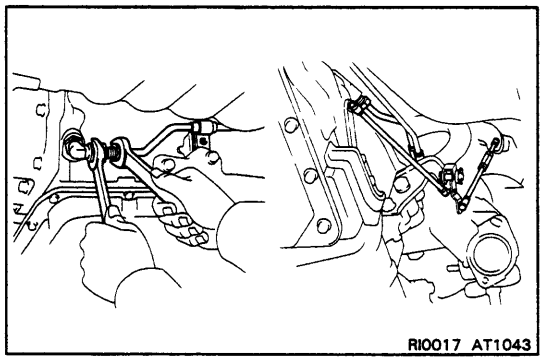
Torque:
14 mm bolt head 240 kg-cm (17 ft-lb, 24 N·m)
17 mm bolt head 55 kg-cm (48 in.-lb, 5.4 N·m)

9. INSTALL RIGHT STIFFENER PLATE

Torque: 400 kg-cm (29 ft-lb, 39 N·m)



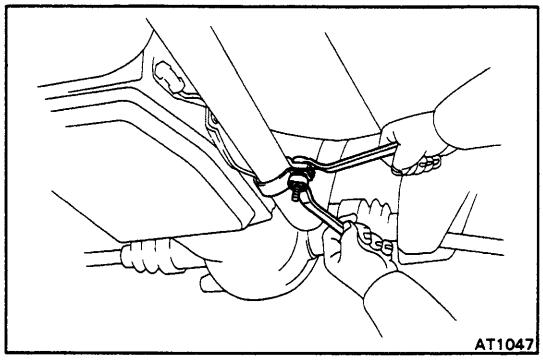
10. INSTALL SHIFT CONTROL ROD



11. CONNECT OIL COOLER INLET AND OUTLET TUBES

Torque: 350 kg-cm (25 ft-lb, 34 N·m)

12. INSTALL THROTTLE LINKAGES



13. INSTALL EXHAUST FRONT PIPE

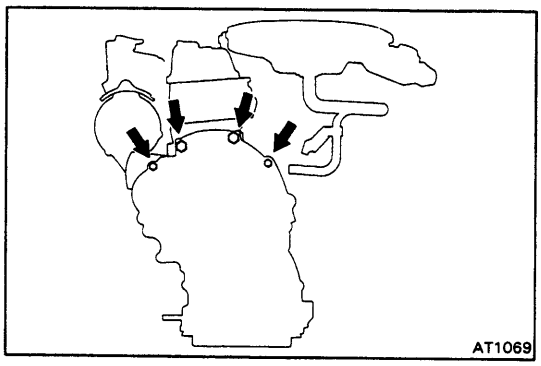
Torque the two nuts holding the front pipe to the exhaust manifold.

Torque: 630 kg-cm (46 ft-lb, 62 N·m)

14. **(Fed.)**
INSTALL CONVERTER AIR INLET PIPE

15. **LOWER VEHICLE**

16. **INSTALL BOTH DRIVE SHAFTS (See page FA-18)**



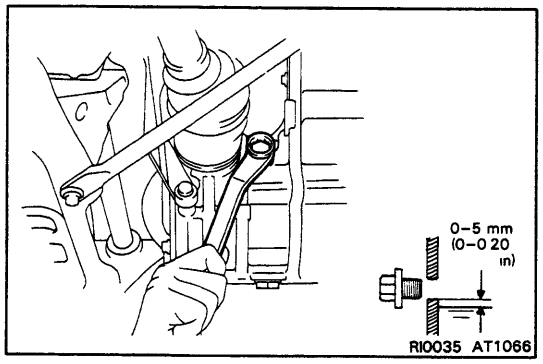
17. **INSTALL TRANSAXLE UPPER MOUNT BOLTS**
14 mm bolt head 400 kg-cm (29 ft-lb, 39 N·m)
17 mm bolt head 600 kg-cm (43 ft-lb, 59 N·m)

18. **CONNECT FOLLOWING CONNECTORS:**
(a) Neutral start switch connector
(b) Back-up switch connector

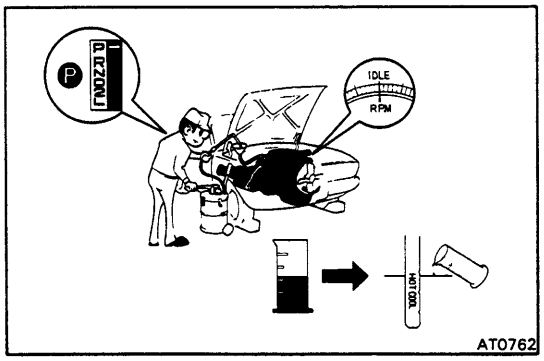
19 **ADJUST THROTTLE LINKAGE (See page AT-5)**

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

21. **CONNECT CABLE TO NEGATIVE TERMINAL OF BATTERY**



22. **FILL DIFFERENTIAL WITH GEAR 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)
Torque the drain and filler plugs.
Torque:
Drain plug 300 kg-cm (22 ft-lb, 29 N·m)
Filler plug 410 kg-cm (30 ft-lb, 40 N·m)
Check for fluid leakage.



23. FILL TRANSMISSION WITH ATF (DEXRON II)

(a) Add about 3.5 liters (3.7 US qts, 3.1 Imp. qts).

(b) Start the engine, shift into each gear and put it into "P" range.

(c) Check the fluid level and add ATF to the upper mark.

Fluid grade: ATF DEXRON II

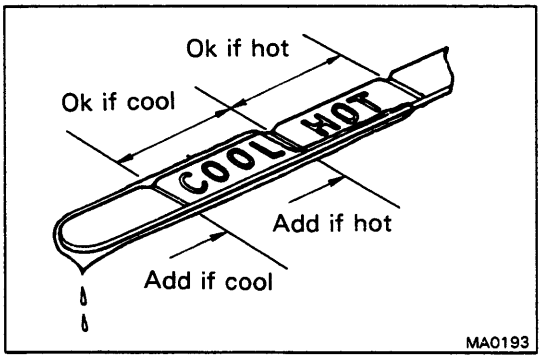
Drain and refill capacity:
2.2 liters (2.3 US qts, 1.9 Imp. qts)

Dry fill capacity:
4.5 liters (4.8 US qts, 4.0 Imp. qts)

(d) Check for fluid leakage.

24. CHECK FRONT ALIGNMENT (See page FA-3)

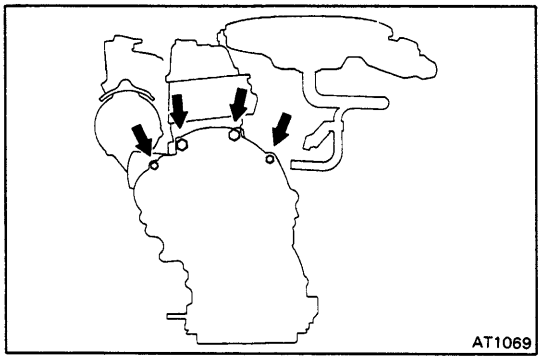
25. PERFORM ROAD TEST (See page AT-7)



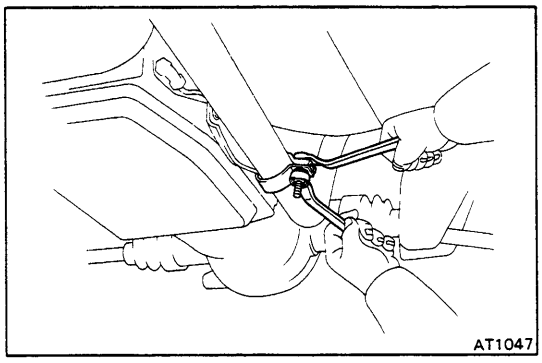
26. CHECK TRANSMISSION FLUID LEVEL (See page MA-20)

REMOVAL OF TRANSAXLE (4WD)

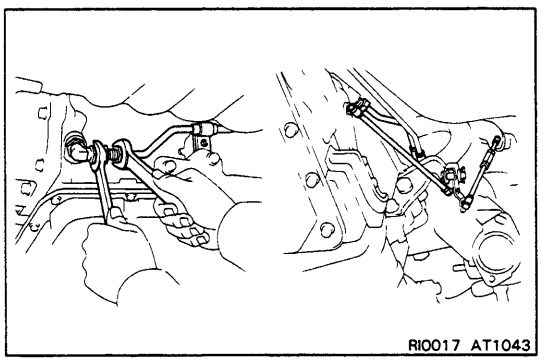
1. **DISCONNECT CABLE FROM NEGATIVE TERMINAL OF BATTERY**
2. **DISCONNECT FOLLOWING CONNECTOR:**
   (a) Neutral start switch connector
   (b) Back-up light switch connector
   (c) 4WD solenoid connector
3. **REMOVE AIR CLEANER ASSEMBLY (See page FU-7)**
4. **REMOVE TRANSAXLE UPPER MOUNT BOLTS**


AT1069

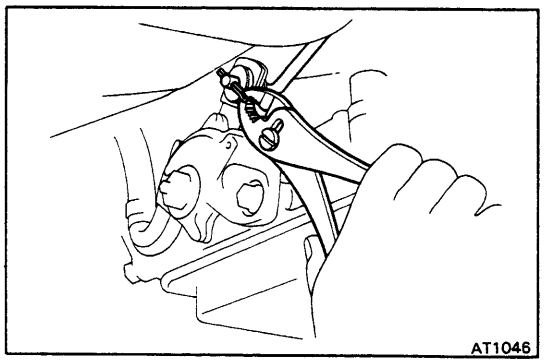
5. **REMOVE BOTH DRIVE SHAFTS (See page FA-13)**
6. **RAISE VEHICLE**
   CAUTION: Be sure the vehicle is securely supported.
7. **(Fed.)**
   REMOVE CONVERTER AIR INLET PIPE
   (See page MT-3)


AT1047

8. **REMOVE EXHAUST FRONT PIPE**


RI0017 AT1043

9. **DISCONNECT OIL COOLER INLET AND OUTLET PIPES**
10. **REMOVE THROTTLE LINKAGE**



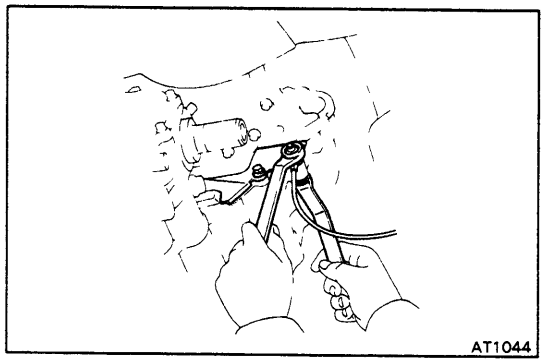
11. DISCONNECT SHIFT CONTROL ROD

12. DISCONNECT SPEEDOMETER CABLE

13. DISCONNECT FLUID TEMPERATURE WARNING SWITCH CONNECTOR

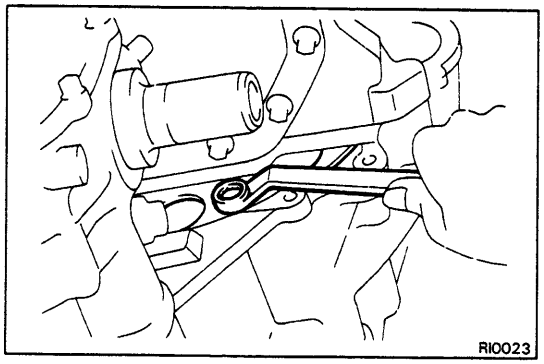
14. REMOVE PROPELLER SHAFT (See page PR-3)

15. REMOVE RIGHT STIFFENER PLATE



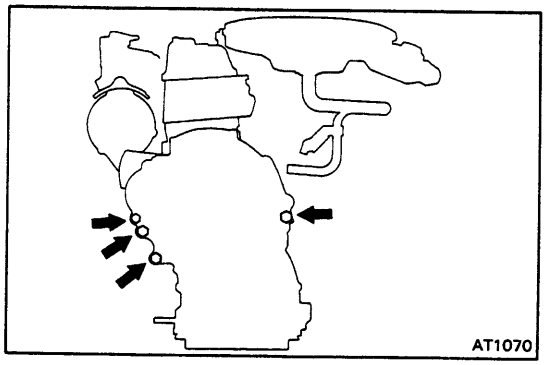
16. REMOVE TORQUE CONVERTER COVER

Remove the three bolts, dust cover and converter cover.

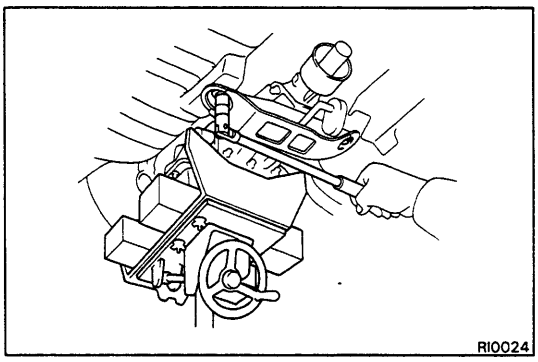


17. REMOVE TORQUE CONVERTER MOUNT BOLTS

Turn the crankshaft to again access to each bolt. Remove the six bolts.



18. REMOVE TRANSAXLE LOWER MOUNT BOLTS



19. REMOVE REAR SUPPORT MEMBER

(a) Put a wooden block between the engine and dash panel because the IIA will make contact with the brake booster when the rear support member is removed.

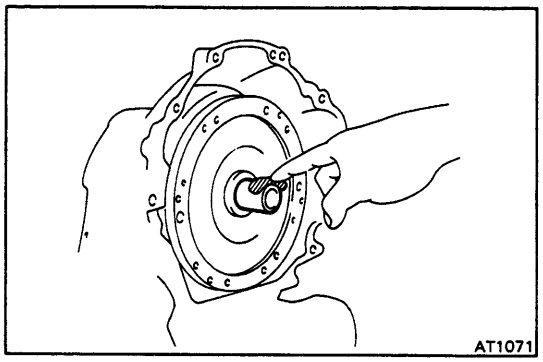
(b) Support the transaxle with the jack and remove the engine rear support member.

20. REMOVE TRANSAXLE ASSEMBLY

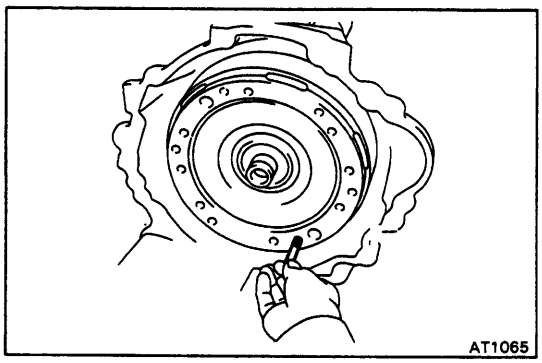
Draw out the transaxle down and toward the rear.

CAUTION: Be careful not to catch the neutral start switch cable, back-up light switch cable or 4WD change-over solenoid cable. Keep the oil pan positioned downward.

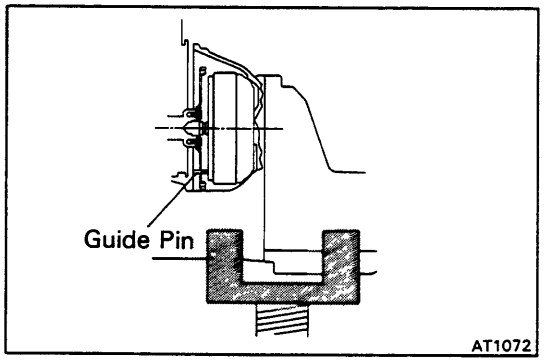
INSTALLATION OF TRANSAXLE (4WD)



1. APPLY MP GREASE TO CENTER HUB OF TORQUE CONVERTER



2. INSTALL GUIDE PIN IN TORQUE CONVERTER

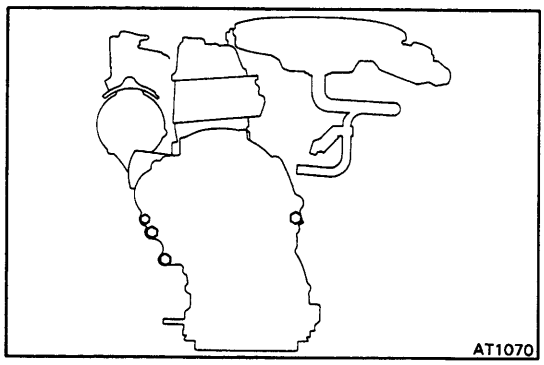


3. PLACE TRANSAXLE IN INSTALLATION POSITION

CAUTION: Be careful not to tilt the transaxle forward because the torque converter could slide out.

(a) Align the guide pin with one of the drive plate holes.

(b) Connect the transaxle and engine.



4. INSTALL STARTER AND TRANSAXLE LOWER MOUNT BOLTS

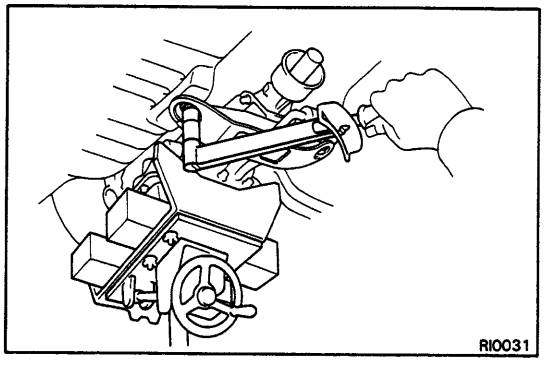
(a) Place the starter in position.

(b) Install and torque the lower mount bolts.

Torque:

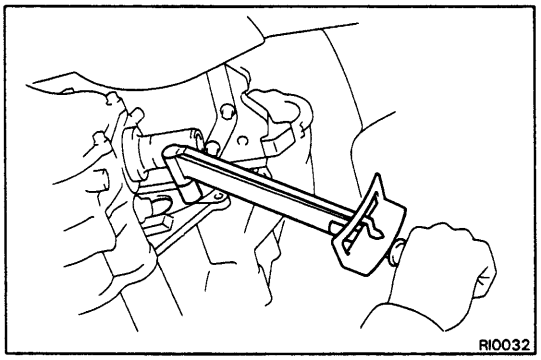
14 mm bolt head 400 kg-cm (29 ft-lb, 39 N·m)
17 mm bolt head 600 kg-cm (43 ft-lb, 59 N·m)

5. REMOVE GUIDE PIN



6. INSTALL REAR SUPPORT MEMBER

Torque: 970 kg-cm (70 ft-lb, 95 N·m)

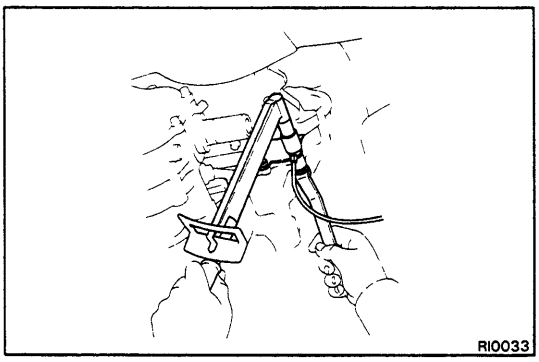


7. INSTALL TORQUE CONVERTER MOUNT BOLTS

(a) Install the six bolts finger tight. Turn the crankshaft to gain access.

(b) Uniformly torque the bolts.

Torque: 185 kg-cm (13 ft-lb, 18 N·m)



8. INSTALL TORQUE CONVERTER COVER

Install the converter cover and dust seal with the three bolts. Connect the ground wire.

Torque:
14 mm bolt head 240 kg-cm (17 ft-lb, 24 N·m)
17 mm bolt head 55 kg-cm (4.8 in.-lb, 5.4 N·m)

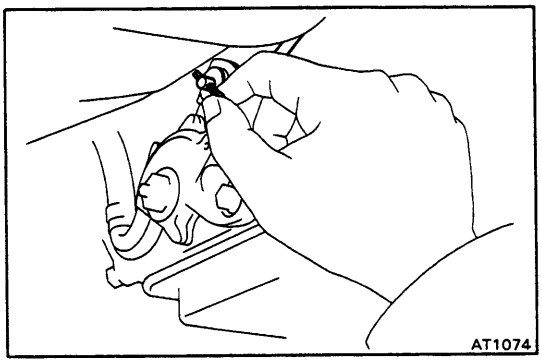
9. INSTALL RIGHT STIFFENER PLATE

Torque: 400 kg-cm (29 ft-lb, 39 N·m)

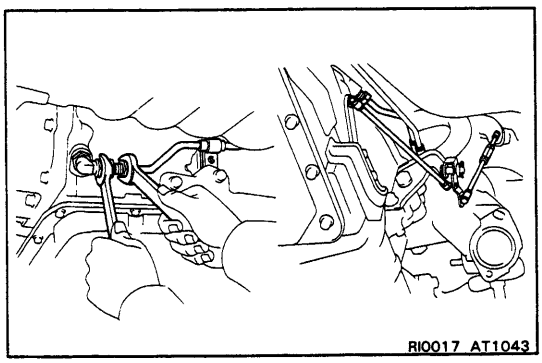
10. INSTALL PROPELLER SHAFT (See page PR-6)

11. CONNECT FLUID TEMPERATURE WARNING SWITCH

12. CONNECT SPEEDOMETER CABLE



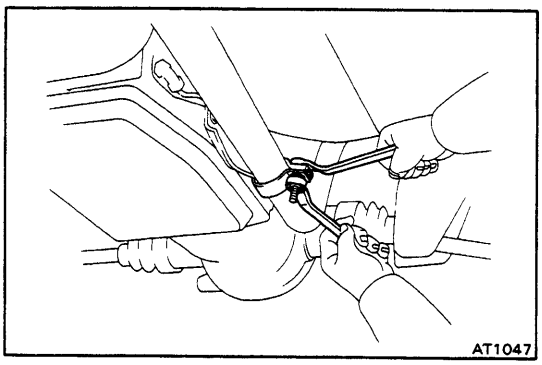
13. CONNECT SHIFT CONTROL ROD



14. CONNECT OIL COOLER INLET AND OUTLET TUBES

Torque: 350 kg-cm (25 ft-lb, 34 N·m)

15. INSTALL THROTTLE LINKAGES



16. **INSTALL EXHAUST FRONT PIPE**

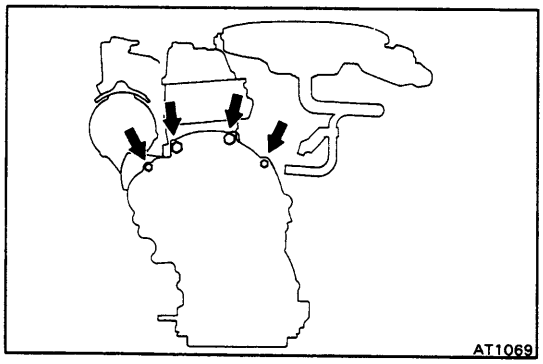
Torque the two nuts holding the front pipe to the exhaust manifold.

Torque: 630 kg-cm (46 ft-lb, 62 N·m)

17. **(Fed.)**
INSTALL CONVERTER AIR INLET PIPE

18. **LOWER VEHICLE**

19. **INSTALL BOTH DRIVE SHAFTS (See page FA-18)**



20. **INSTALL TRANSAXLE UPPER MOUNT BOLTS**

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)

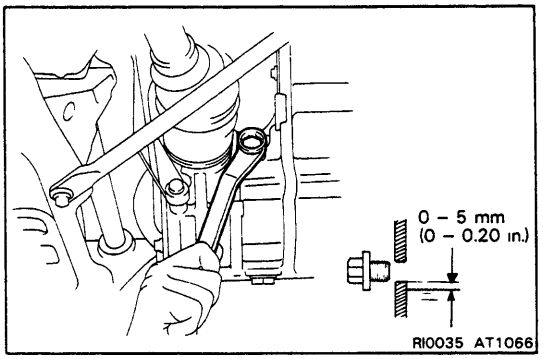
21. **CONNECT FOLLOWING CONNECTORS:**

(a) Neutral start switch connector
(b) Back-up switch connector
(c) 4WD solenoid connector

22. **ADJUST THROTTLE LINKAGE (See page AT-5)**

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

24. **CONNECT CABLE TO NEGATIVE TERMINAL OF BATTERY**



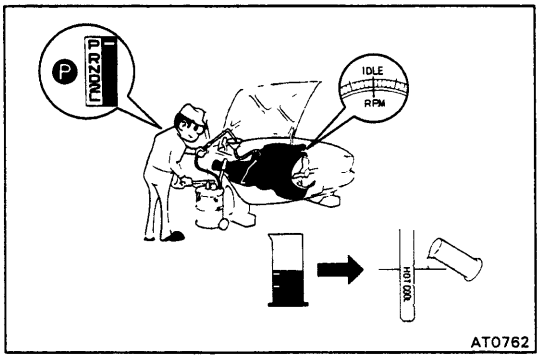
25. FILL DIFFERENTIAL WITH GEAR OIL

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)

Torque the drain and filler plugs.

Torque:
Drain plug 300 kg-cm (22 ft-lb, 29 N·m)
Filler plug 410 kg-cm (30 ft-lb, 40 N·m)

Check for fluid leakage.



26. FILL TRANSMISSION WITH ATF

(a) Add about 4.2 liters (4.4 US qts, 3.7 Imp. qts).

(b) Start the engine, shift into each gear and put it into "P" range.

(c) Check the fluid level and add ATF to the upper mark.

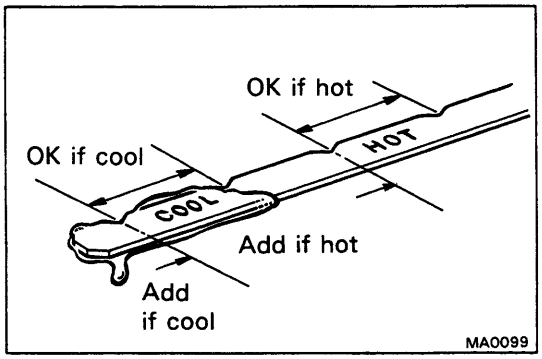
Fluid grade: ATF DEXRON II

Drain and refill capacity:
4.2 liters (4.4 US qts, 3.7 Imp. qts)
Dry fill capacity:
6.5 liters (6.9 US qts, 5.7 Imp. qts)

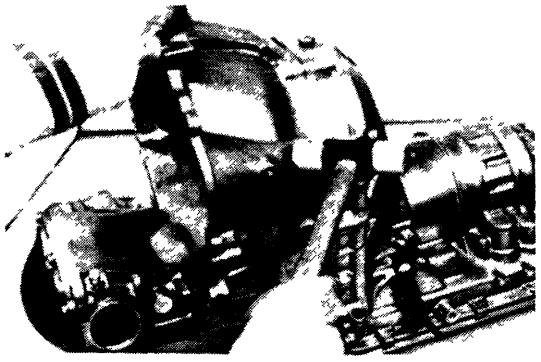
(d) Check for fluid leakage.

27. CHECK FRONT ALIGNMENT (See page FA-3)

28. PERFORM ROAD TEST (See page AT-7)



29. CHECK TRANSMISSION FLUID LEVEL (See page MA-20)



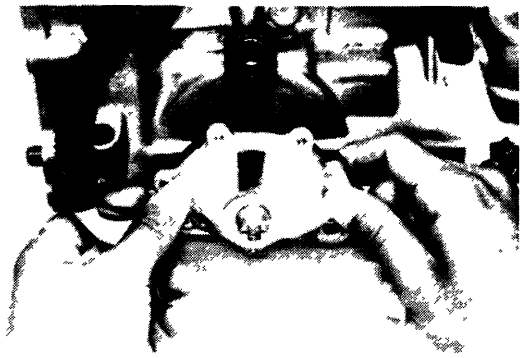
REMOVAL OF TRANSAXLE

(See pages AT-24 or 31)

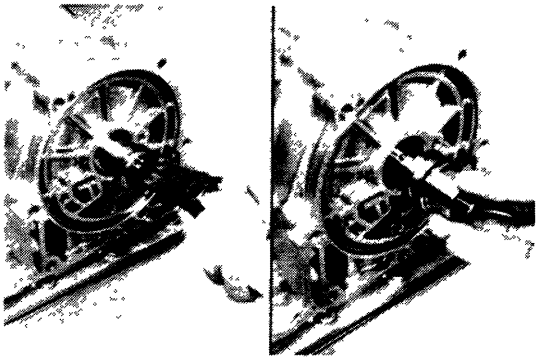
DISASSEMBLY OF TRANSMISSION

SEPARATE BASIC SUBASSEMBLY

1. **REMOVE TRANSMISSION FROM TRANSAXLE**

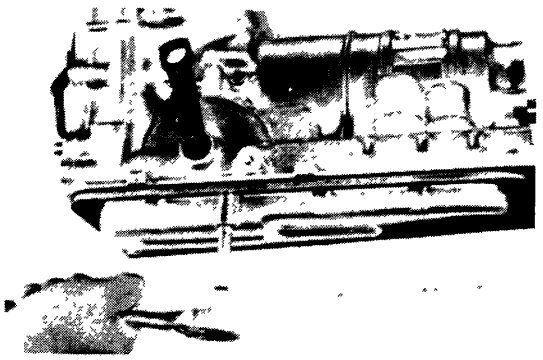


2. **REMOVE NEUTRAL START SWITCH**



3. **REMOVE SPEEDOMETER DRIVEN GEAR HOUSING**
4. **REMOVE EXTENSION HOUSING AND GASKET**
5. **REMOVE SPEEDOMETER DRIVE GEAR**
6. **REMOVE OUTPUT SHAFT SLEEVE**

   NOTE: Be careful not to lose the locking balls.



7. **REMOVE PAN AND GASKET**

   (a) Remove the seventeen bolts.

   (b) Remove the pan from the transmission case.

   CAUTION: Do not turn the transmission over as this will contaminate the valve body with foreign materials in the bottom of the pan.

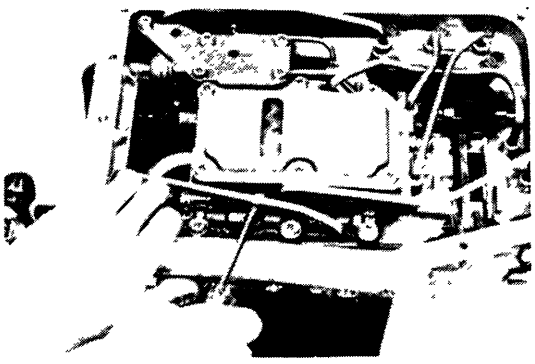


8. **EXAMINE PARTICLES IN PAN**

   Remove the magnet and use it to collect any steel chips. Look carefully at the chips and particles in the pan and on the magnet to anticipate what type of wear you will find in the transmission:

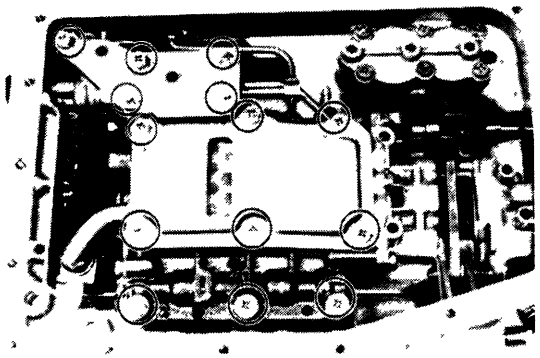
   Steel (magnetic) = bearing, gear and clutch plate wear.

   Brass (nonmagnetic) = bushing wear.



9. TURN TRANSMISSION OVER AND REMOVE TUBES

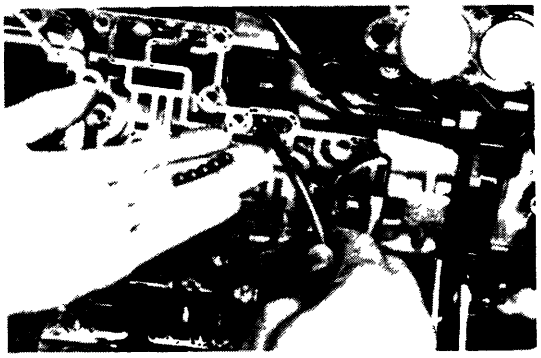
Pry up both tube ends with a large screwdriver and remove the tubes.



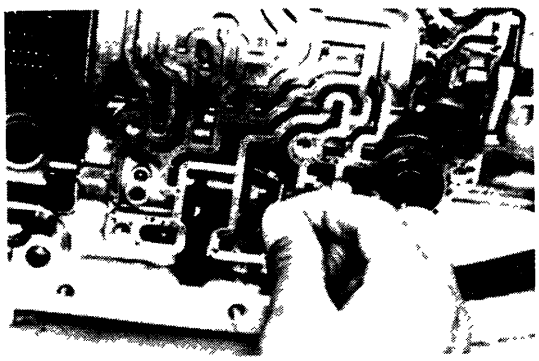
10. REMOVE STRAINER

11. REMOVE VALVE BODY

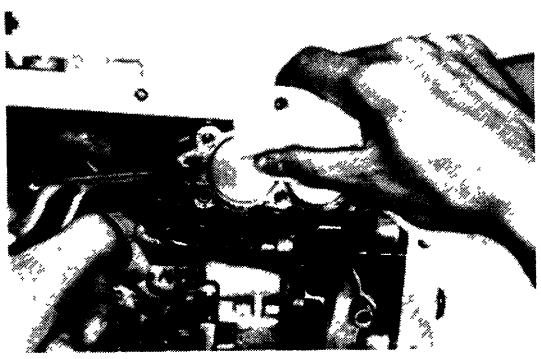
(a) Remove the fourteen botls.



(b) Remove the six steel balls.



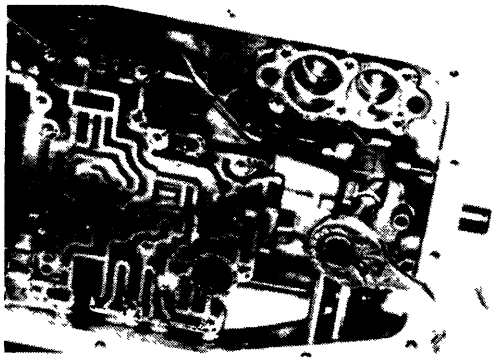
(c) Remove the valve vibrating stopper.



12. REMOVE ACCUMULATOR PISTONS AND SPRINGS

WARNING: Keep face away to avoid injury. Do not use regular high-pressure air.

Position a rag to catch each piston. Using low-pressure compressed air (1 kg/cm^2 , 14 psi or 98 kPa max.) pop each piston into the rag. Force air into holes shown, and remove the pistons and springs.



13. REMOVE PARKING LOCK ROD

14. REMOVE SPRING, PIVOT PIN AND PARKING LOCK PAWL



15. REMOVE SPACER

Unstake the spacer and turn the ring 90°.

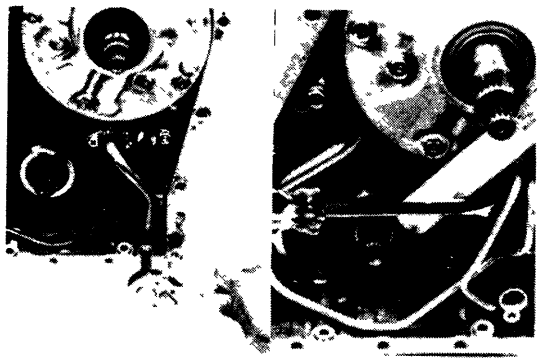
16. DRIVE OUT SLOTTED SPRING PIN AND REMOVE MANUAL VALVE LEVER SHAFT

Using a hammer and punch, drive out the slotted spring pin.



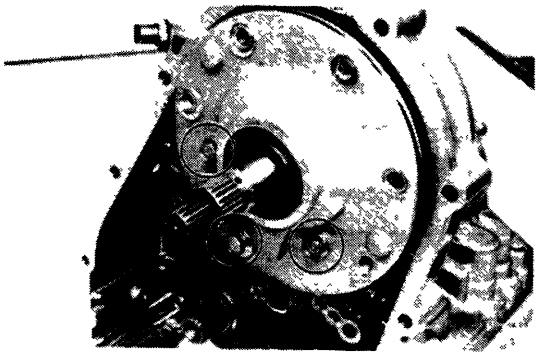
17. REMOVE OIL PUMP SUCTION TUBE

After removing the bracket bolt, remove the pump suction tube.



18. REMOVE OIL PUMP DELIVERY TUBE AND PRESSURE TUBE

Pry up both tube ends with a large screwdriver and remove the tubes.

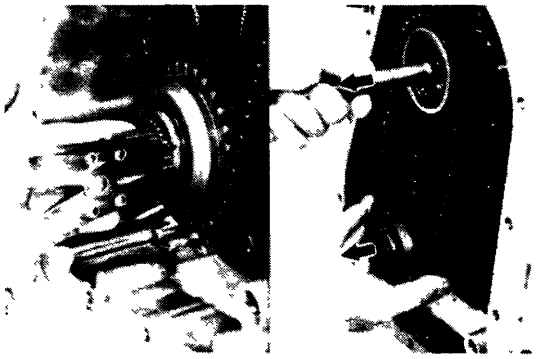


19. REMOVE OIL PUMP

(a) Loosen the three bolts, but do not remove them.



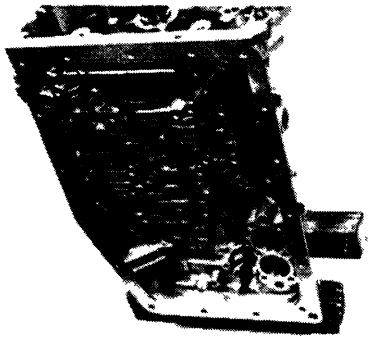
(b) Remove the seven bolts and pull out the oil pump.



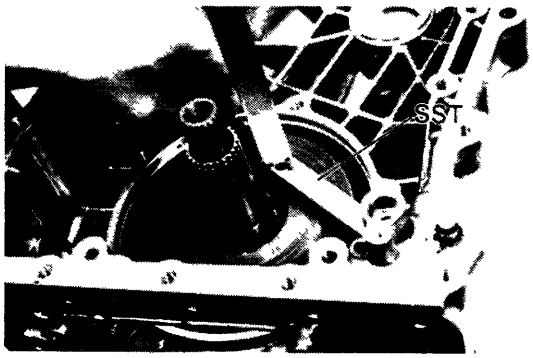
20. REMOVE INPUT SHAFT, DRIVEN SPROCKET AND CHAIN

(a) Remove the snap ring.

(b) Remove both sprockets, pulling them out uniformly.



21. PLACE CYLINDER ON WOODEN BLOCK AND REMOVE FRONT SUPPORT

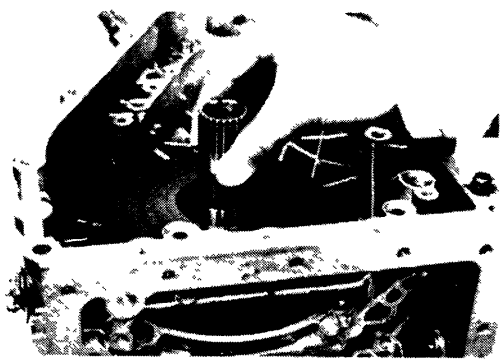


22. MEASURE DISTANCE BETWEEN TOP OF CASE AND FRONT CLUTCH

Make a note of the distance for reassembly.

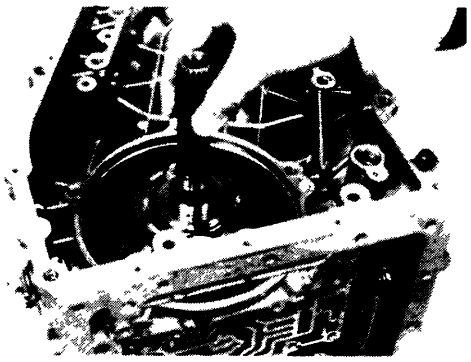
SST 09350-20013

Height: 0.6 – 1.6 mm (0.024 – 0.063 in.)

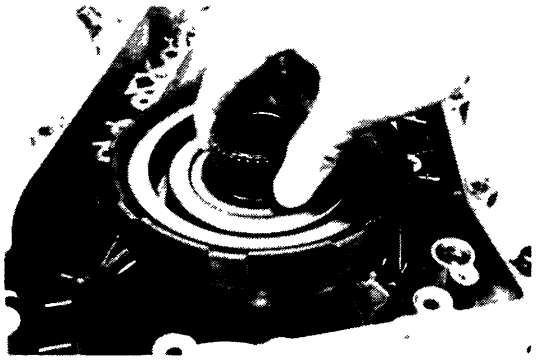


23. REMOVE FRONT CLUTCH AND BEARINGS

Grasp the shaft and pull out the front clutch assembly. Be careful of bearings and races on both sides of the assembly.

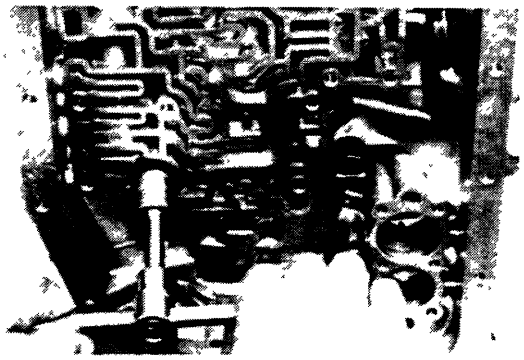


24. REMOVE OUTPUT SHAFT AND FRONT PLANETARY GEAR



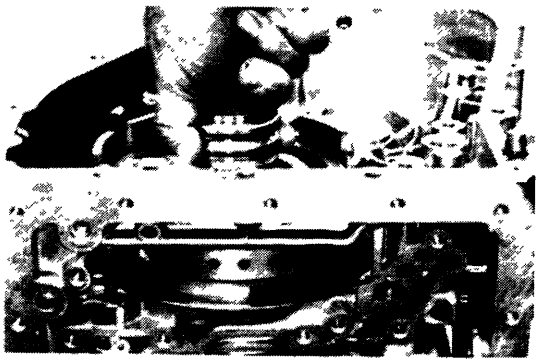
25. REMOVE REAR CLUTCH

Grasp the clutch hub and pull it out from the case.



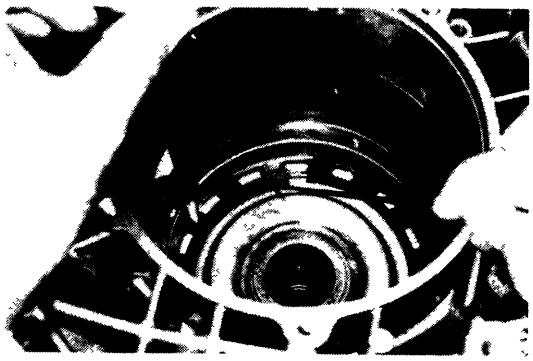
26. REMOVE CENTER SUPPORT BOLTS

Remove the two center support bolts.



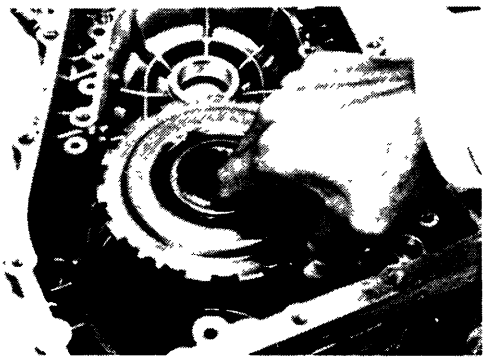
27. REMOVE CENTER SUPPORT AND SUN GEAR ASSEMBLY

From the case front opening, grasp the assembly and pull it out.

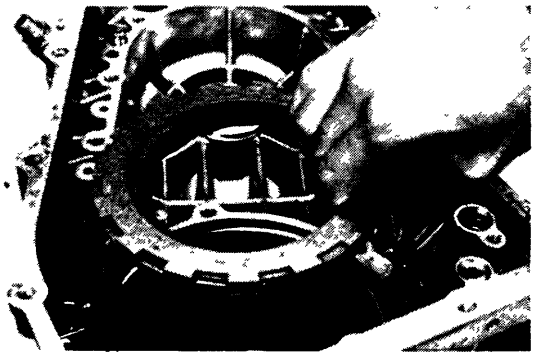


28. REMOVE REACTION PLATE RETAINING RING

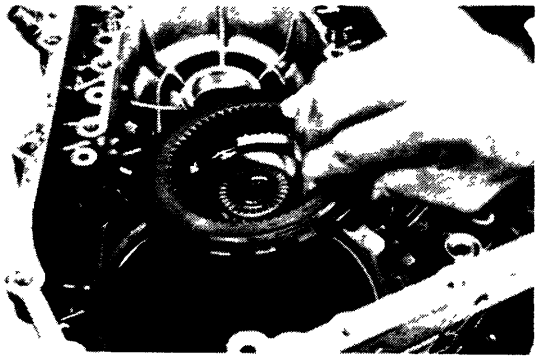
Using a long screwdriver, compress the snap ring and lift it above the groove with a wire hook.



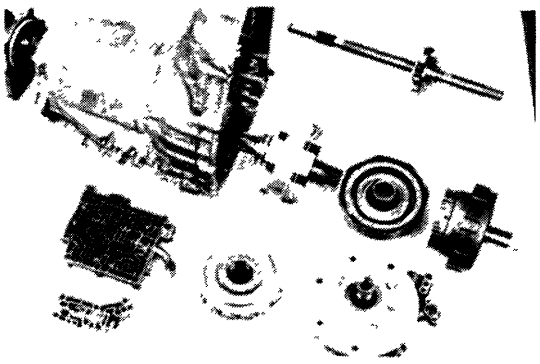
29. REMOVE REAR NO. 2 ONE-WAY CLUTCH AND REAR PLANETARY GEAR



30. REMOVE BRAKE NO. 3 DISC, PLATE AND CUSHION PLATE



31. REMOVE REAR PLANETARY RING GEAR



32. BASIC DISASSEMBLY IS COMPLETE

The transmission in now in basic component subassemblies. Next, you will disassemble, clean, inspect, repair and assemble each of these component groups.

COMPONENT GROUP DISASSEMBLY, INSPECTION AND ASSEMBLY

The instructions here are organized so that you work on only one component group at a time. This will help avoid confusion of similar-looking parts from different subassemblies being on your workbench at the same time.
The component groups are inspected and repaired from the bell housing side.

As much as possible, complete the inspection, repair, assembly before proceeding to the next component group. If a component group cannot be assembled because parts are being ordered, be sure to keep all parts of that group in a separate container while proceeding with disassembly, inspection, repair and assembly of other component groups.

GENERAL CLEANING

1. All disassembled parts should be washed clean and the fluid passages and holes blown through with compressed air to make sure that they are not clogged.
2. Use a recommeded automatic transmission fluid or kerosene for cleaning solvent.
3. When using compressed air to dry parts, keep face away to avoid spraying ATF or kerosene in your face.

   NOTE: However, do not use kerosene to clean rubber parts or gaskets.

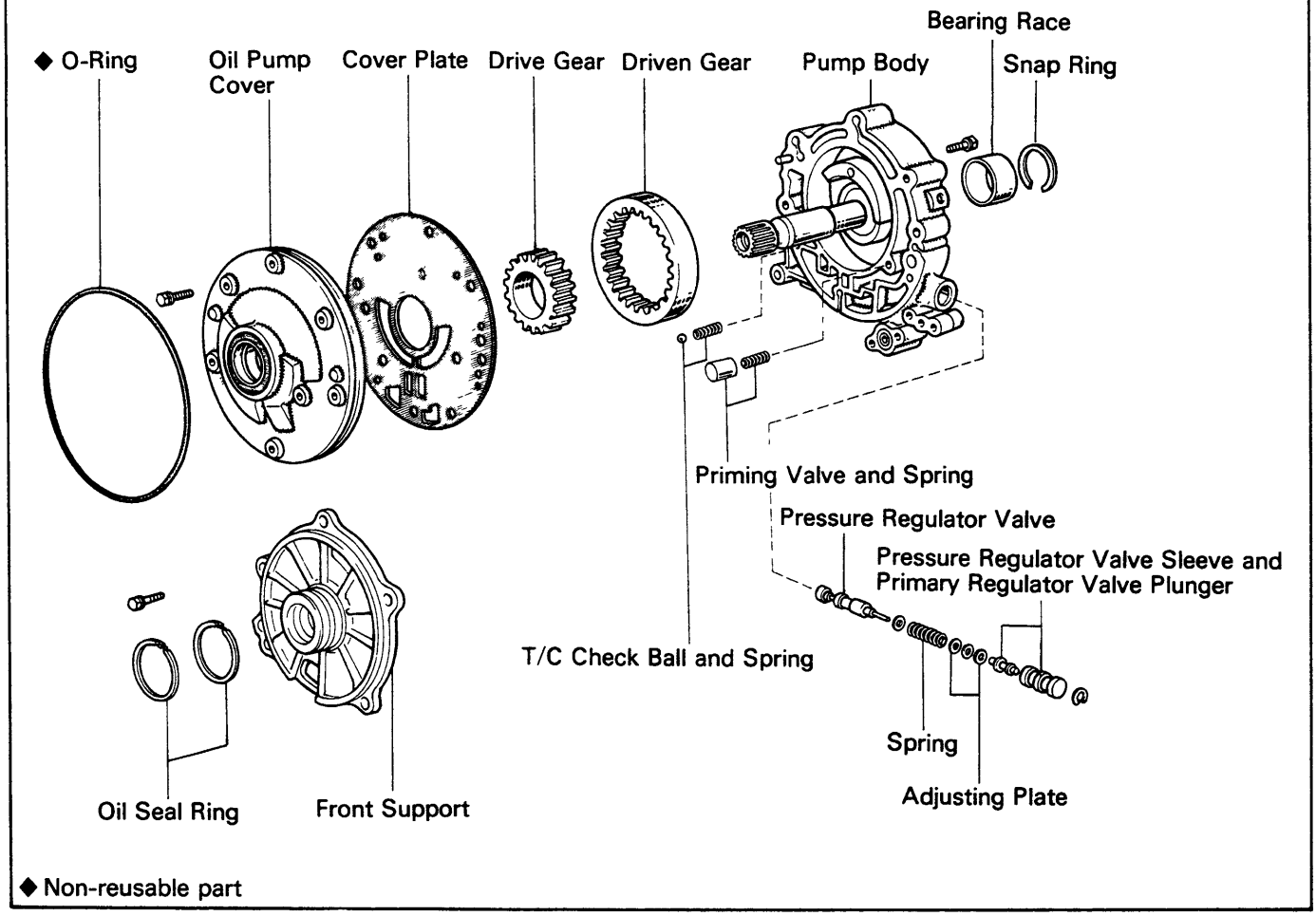
PARTS ARRANGEMENT

1. After cleaning, the parts should be arranged in proper order to allow performing the inspection, repairs, and reassembly with efficiency.
2. When disassembling a valve body, be sure to keep each valve together with its corresponding spring.
3. New brakes and clutches that are to be used for replacement must be soaked in transmission fluid for at least two hours before assembly.

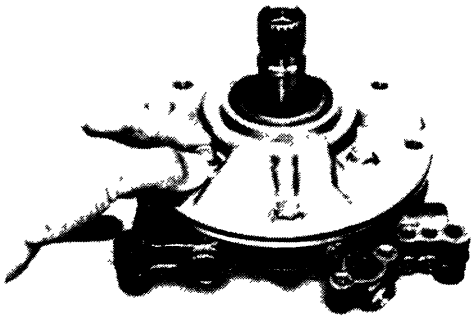
GENERAL ASSEMBLY

1. All oil seal rings, clutch discs, clutch plates, rotating parts, and sliding surfaces should be coated with transmission fluid prior to reassembly.
2. All gaskets and rubber O-rings should be replaced.
3. Make sure that the ends of a snap ring are not aligned with one of the cutouts and are installed in the groove correctly.
4. If a worn bushing is to be replaced, the replacement must be made with the subassembly containing that bushing.
5. Check thrust bearings and races for wear or damage. Replace if necessary.
6. Use petroleum jelly to keep parts in their places.

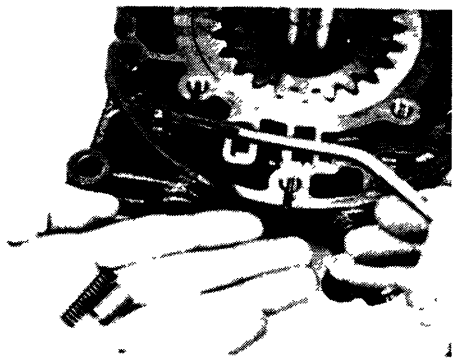
Oil Pump and Front Support



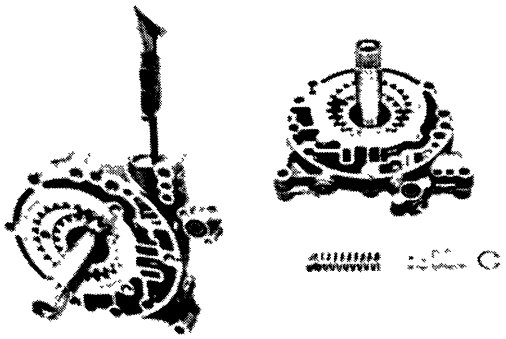
DISASSEMBLY OF OIL PUMP



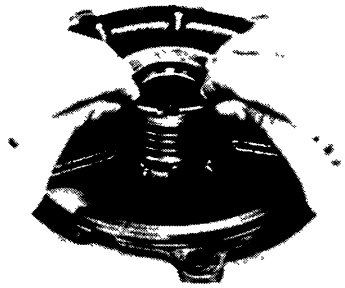
1. REMOVE PUMP COVER



2. REMOVE CHECK BALL, PRIMING VALVE AND SPRING

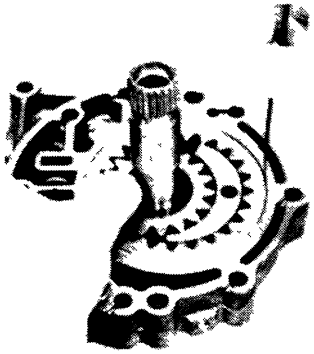


3. **REMOVE PRESSURE REGULATOR VALVE ASSEMBLY**



4. **REMOVE TWO OIL SEAL RINGS FROM FRONT SUPPORT**

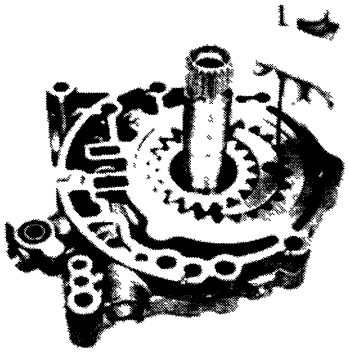
INSPECTION OF OIL PUMP



1. **CHECK BODY CLEARANCE OF DRIVEN GEAR**

   Pull the driven gear to one side of the body. Using a feeler gauge, measure the clearance.

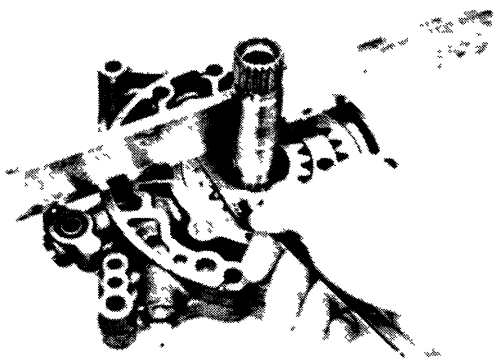
   Standard body clearance: 0.07 – 0.15 mm (0.0028 – 0.0059 in.)



2. **CHECK TIP CLEARANCE OF BOTH GEARS**

   Measure between the gear teeth and the cresent-shaped part of the pump body.

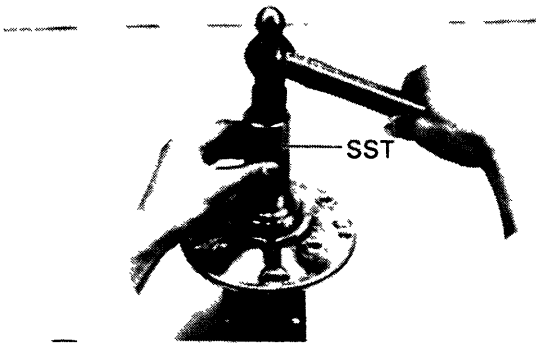
   Standard tip clearance: 0.11 – 0.14 mm (0.0043 – 0.0055 in.)



3. **CHECK SIDE CLEARANCE OF BOTH GEARS**

   Using a steel straightedge and a feeler gauge, measure the side clearance of both gears.

   Standard side clearance: 0.02 – 0.05 mm (0.0008 – 0.0020 in.)



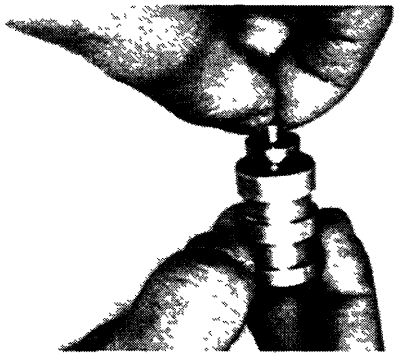
4. INSPECT FRONT OIL SEAL

Check for wear, damage or cracks.
If necessary, replace the oil seal as follows.

(a) Pry off the oil seal with a screwdriver.

(b) Using SST and hammer, install a new oil seal. The seal end should be flush with the outer edge of the pump cover.

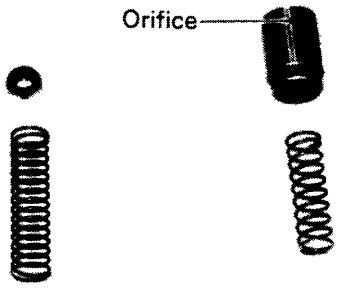
SST 09350-20013



5. INSPECT OF REGULATOR VALVE AND PLUNGER

(a) Pull out the plunger about half way and release it.

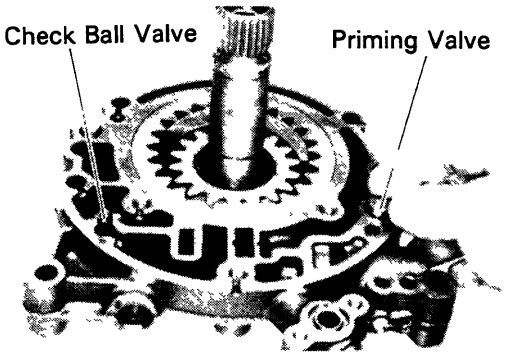
(b) The plunger should sink down into the sleeve by its own weight.



6. INSPECT OF PRIMING VALVE, CHECK BALL VALVE AND SPRING

Check for a clogged priming valve orifice.

	Free length mm (in.)
Check ball valve spring	26.20 (1.0315)
Priming valve spring	19.20 (0.7559)

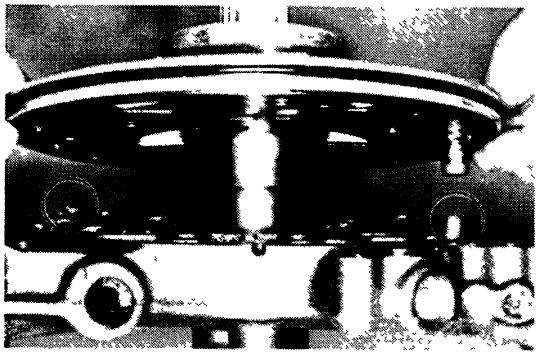


ASSEMBLY OF OIL PUMP

(See page AT-45)

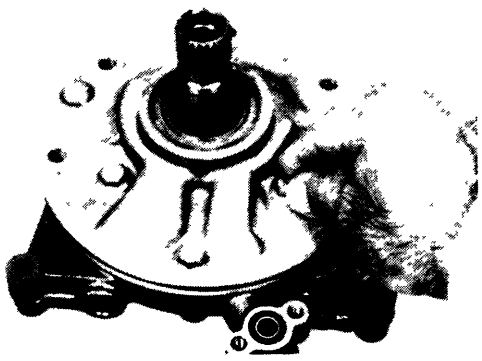
1. INSTALL DRIVEN GEAR AND DRIVE GEAR

2. INSTALL PRIMING VALVE AND CHECK BALL VALVE

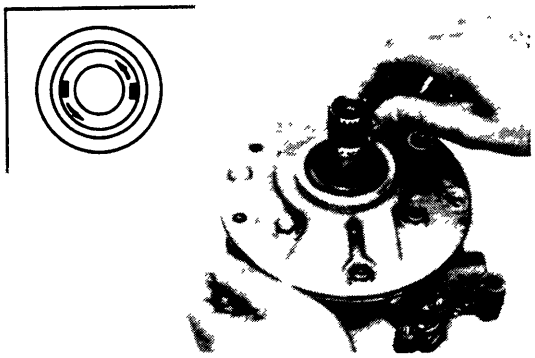


3. INSTALL OIL PUMP COVER

NOTE: Wrap the stator shaft spline with vinyl tape to protect the oil seal from damage.



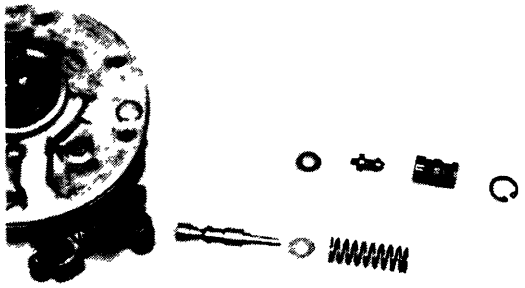
4. TEMPORARILY TIGHTEN PUMP COVER BOLTS



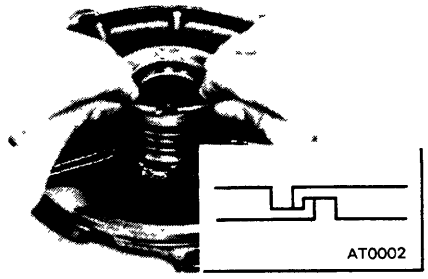
5. CHECK DRIVE GEAR ROTATION

Turn the drive gear with a screwdriver and make sure that it rotates smoothly.

NOTE: Be careful not to damage the oil seal.



6. INSTALL PRESSURE REGULATOR VALVE ASSEMBLY



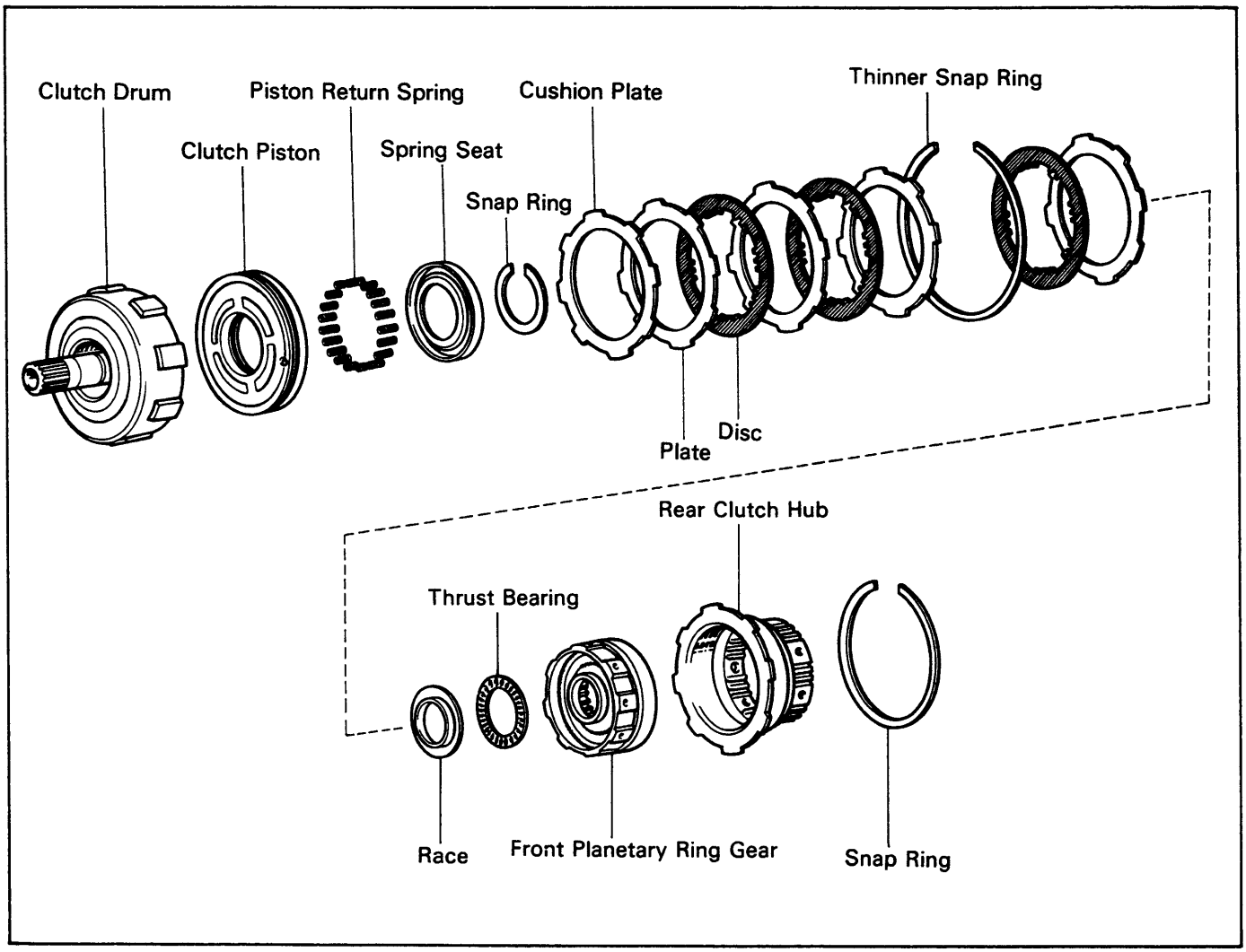
7. INSTALL TWO OIL SEAL RINGS ON FRONT SUPPORT

Spread apart and slide the rings into the groove.
Hook both ends by hand.
Wipe off any excess petroleum jelly.

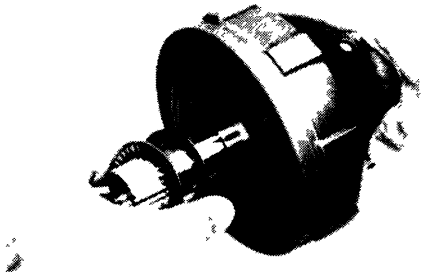
8. INSTALL NEW O-RING ON PUMP

Make sure the O-ring is not twisted and is fully seated in the groove.

Front Clutch

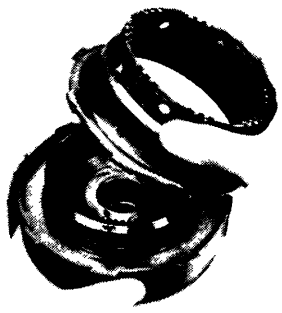


DISASSEMBLY OF FRONT CLUTCH



1. **REMOVE THRUST BEARING AND RACE FROM FRONT SIDE OF CLUTCH**

   Note the position of the races.



2. **REMOVE SNAP RING FROM FRONT CLUTCH DRUM**

3. **REMOVE FRONT PLANETARY RING GEAR AND REAR CLUTCH HUB**



4. REMOVE THRUST BEARING AND RACES

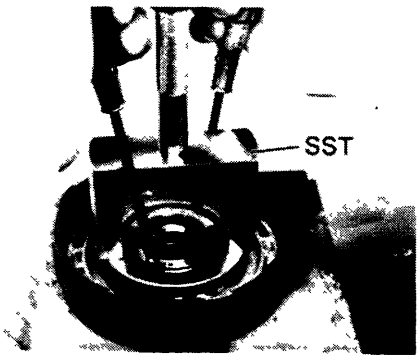
Note the position of the races.

5. REMOVE CLUTCH PLATE AND DISC

6. REMOVE THINNER SNAP RING



7. REMOVE REMAINING CLUTCH PLATES AND DISCS

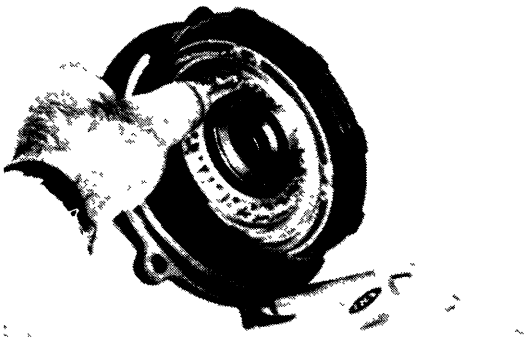


8. COMPRESS PISTON RETURN SPRINGS AND REMOVE SNAP RING

Place SST on the spring seat and compress the springs with a shop press.
Using a screwdriver, remove the snap ring.

SST 09350-20013

9. REMOVE SPRING SEAT AND TWENTY SPRINGS



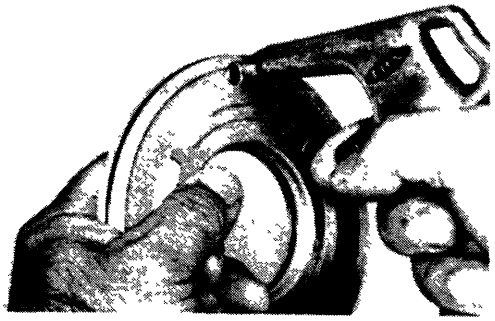
10. ASSEMBLE FRONT CLUTCH ON FRONT SUPPORT AND BLOW OUT PISTON

(a) Slide the front clutch onto the front support.

(b) Apply compressed air to the front support to remove the piston. If the piston does not come out completely, use pliers to remove it.

(c) Remove the front clutch from the front support.

INSPECTION OF FRONT CLUTCH



1. INSPECT FRONT CLUTCH PISTON

(a) Check that check ball is free by shaking the piston.

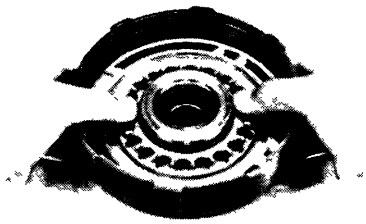
(b) Check that valve does not leak by appplying low-pressure compressed air.

2. INSPECT DISC, PLATE, RETURN SPRING AND CLUTCH DRUM

NOTE: Do not allow the discs to dry out.
Prepare new discs by soaking them at least two hours in ATF.

ASSEMBLY OF FRONT CLUTCH

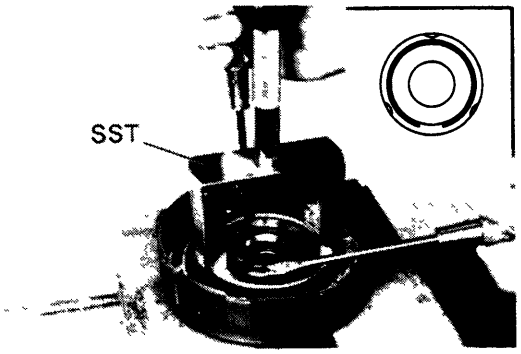
(See page AT-45)



1. INSTALL NEW O-RINGS ON PISTON

2. INSTALL PISTON IN FRONT CLUTCH DRUM

Press into the housing with the cup side up (check ball down).
Be careful not to damage the O-rings.



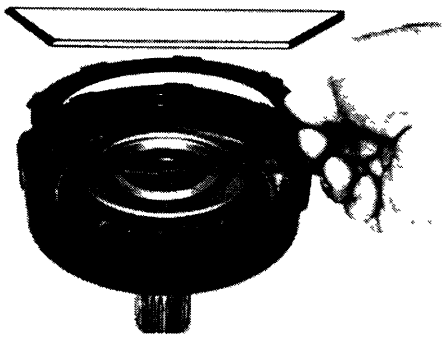
3. INSTALL TWENTY PISTON RETURN SPRINGS, SPRING SEAT AND SNAP RING IN PLACE

4. COMPRESS RETURN SPRINGS AND INSTALL SNAP RING IN GROOVE

(a) Place SST on the spring retainer, and compress the springs with a shop press.

SST 09350-20013

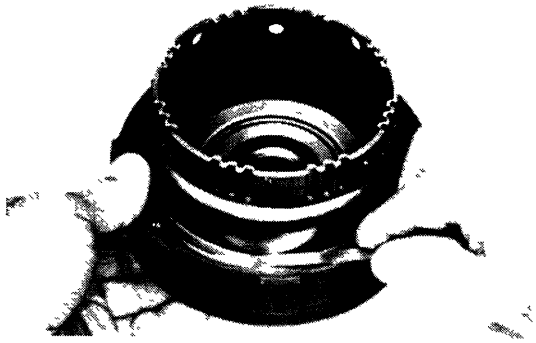
(b) Install the snap ring using a screwdriver.



5. INSTALL DISCS AND PLATES WITHOUT ASSEMBLING THINNER SNAP RING

Using low-pressure compressed air, (4 – 5 kg/cm^2, 57 – 71 psi or 392 – 490 kPa) blow all excess ATF from the discs. For measurement of the clutch pack, install all plates and discs (temporarily without the thinner snap ring).

In following order: Cushion plate-plate-disc-plate-disc-plate-dise-plate



6. MEASURE CLEARANCE OF FRONT CLUTCH

Standard clearance: 0.30 – 1.49 mm (0.0118 – 0.0587 in.)

NOTE: Measure completely around the circumference.



7. INSTALL THINNER SNAP RING

Remove the snap ring, rear clutch hub and one plate and disc to allow installation of the thinner snap ring.

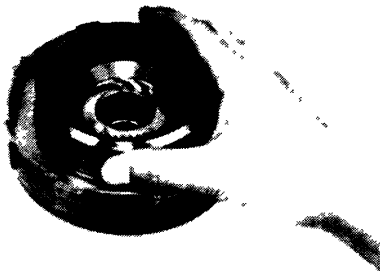


8. INSTALL INNER THRUST BEARING AND RACE

IMPORTANT: Coat the parts with petroleum jelly to keep them in place.

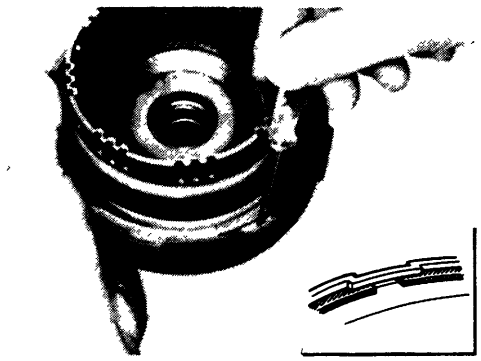
Install the inner race, and needle bearing. Press into place.

NOTE: Face the lip of the race toward the front clutch body.



9. INSTALL PLANETARY RING GEAR

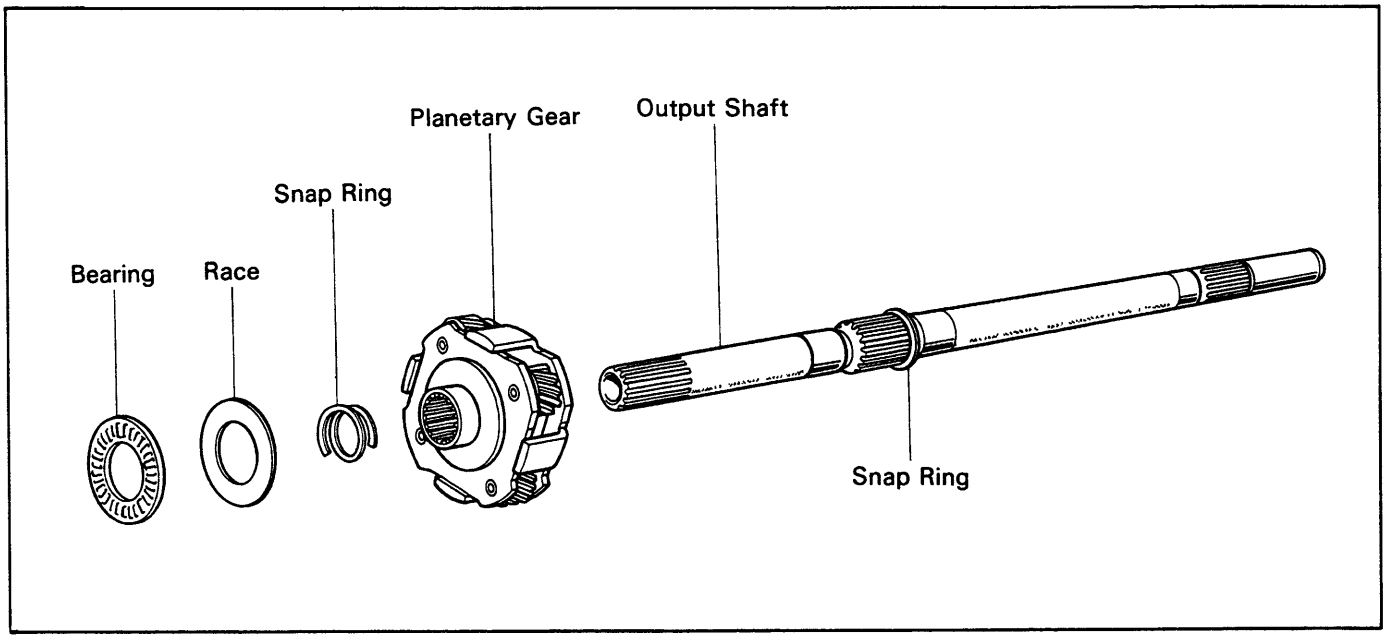
Align the disc lugs with the hub teeth. Make sure the hub meshes with all discs and is fully inserted.

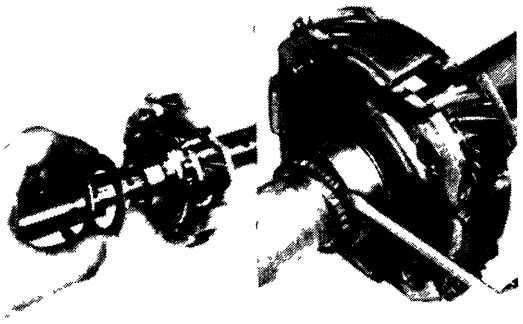


10. INSTALL REAR CLUTCH HUB AND OUTER SNAP RING

Check that the snap ring ends are not aligned with one of the cutouts.

Output Shaft and Front Planetary Gear





DISASSEMBLY OF OUTPUT SHAFT AND FRONT PLANETARY GEAR

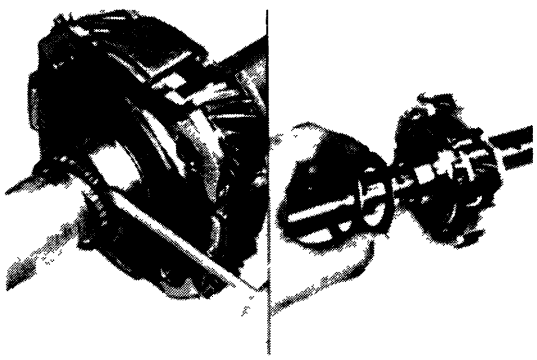
1. **REMOVE THRUST BEARING AND RACE FROM FRONT SIDE OF PLANETARY GEAR**
2. **REMOVE PLANETARY GEAR SNAP RING**
   Pull out the planetary gear from the output shaft.



INSPECTION OF PLANETARY GEAR

MEASURE OF PLANETARY GEAR THRUST CLEARANCE

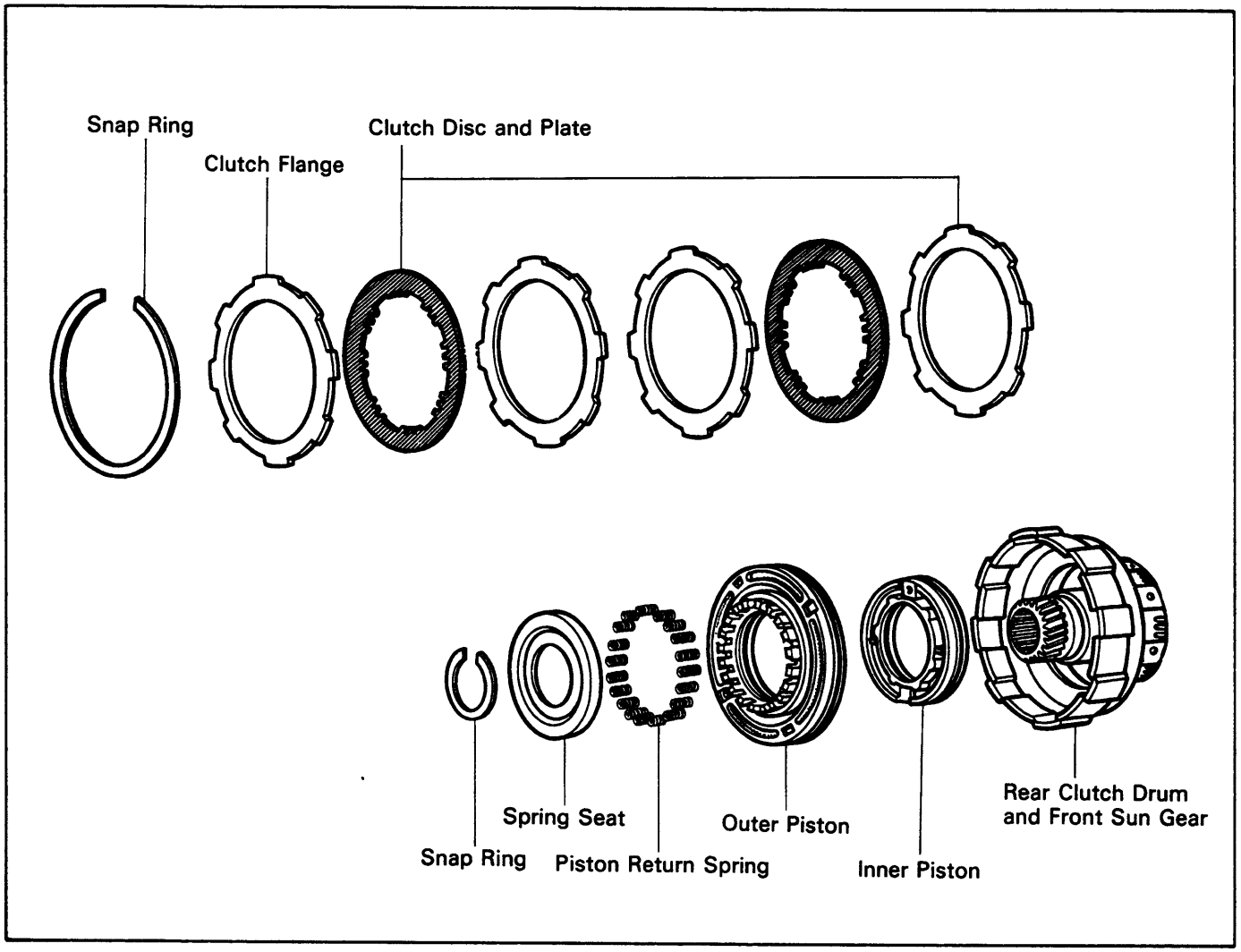
Standard clearance: 0.20 – 0.50 mm (0.0079 – 0.0197 in.)



ASSEMBLY OF OUTPUT SHAFT AND FRONT PLANETARY GEAR

1. **INSTALL PLANETARY GEAR SNAP RING**
2. **INSTALL THRUST BEARING AND RACE**

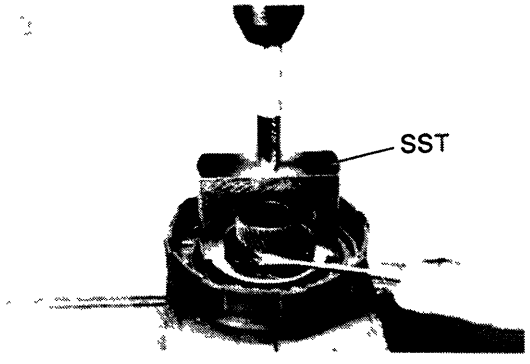
Rear Clutch



DISASSEMBLY OF REAR CLUTCH



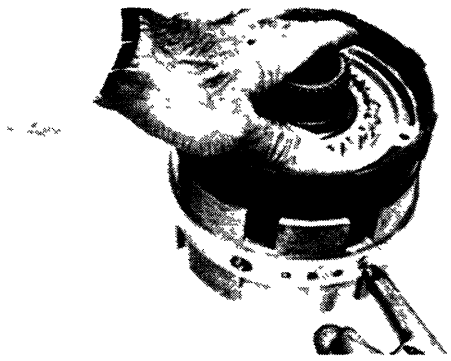
1. **REMOVE OUTER CLUTCH PACK RETAINING SNAP RING FROM DRUM**
2. **REMOVE CLUTCH FLANGE, DISCS AND PLATES**



3. **COMPRESS PISTON RETURN SPRINGS AND REMOVE SNAP RING**

   Place SST on the spring seat and compress the springs with a shop press.
   Using a screwdriver, remove the snap ring.
   SST 09350-20013

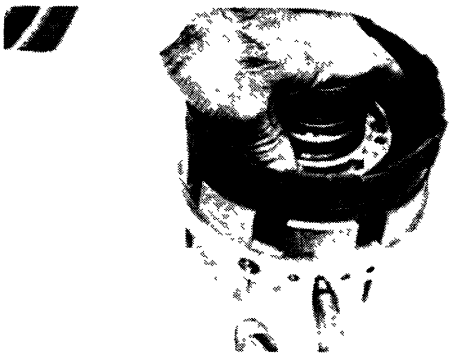
4. **REMOVE SPRING SEAT, SNAP RING AND TWENTY RETURN SPRINGS**



5. ASSEMBLE REAR CLUTCH ON CENTER SUPPORT AND BLOW

(a) Slide the rear clutch onto the center support.

(b) Apply compressed air to the center support to remove the piston. If the piston does not come out completely, use pliers to remove it.



(c) Remove the rear clutch from the center support.

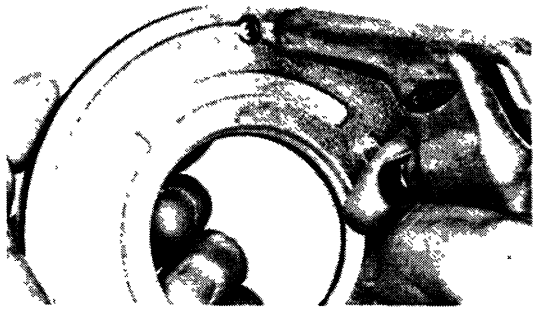
6. REMOVE O-RINGS FROM REAR CLUTCH PISTON

INSPECTION OF REAR CLUTCH

INSPECT REAR CLUTCH PISTON

(a) Check that the check ball is free by shaking each piston.

(b) Check that the valve does not leak by applying low-pressure compressed air.



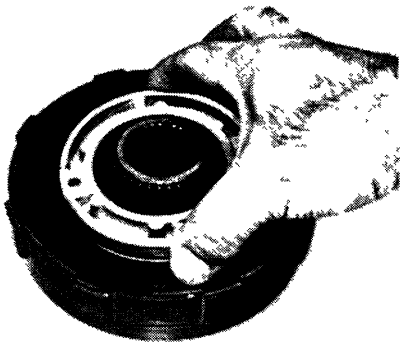
NOTE: Do not allow the discs to dry out. Prepare new discs by soaking them at least two hours in ATF.

ASSEMBLY OF REAR CLUTCH

(See page AT-54)

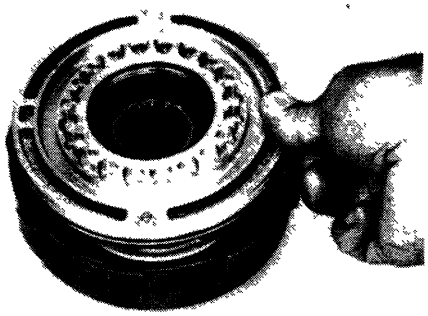
1. INSTALL NEW O-RINGS ON PISTONS

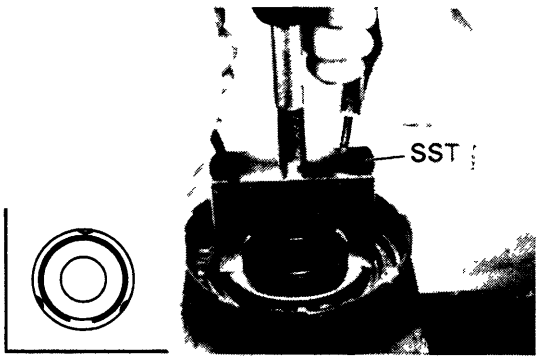
2. INSTALL REAR CLUTCH INNER AND OUTER PISTON IN DRUM



(a) Press the inner piston into the drum with cup side up, being careful not to damage the O-rings.

(b) Press the outer piston on the inner one with cup side up, being careful not to damage the O-rings.





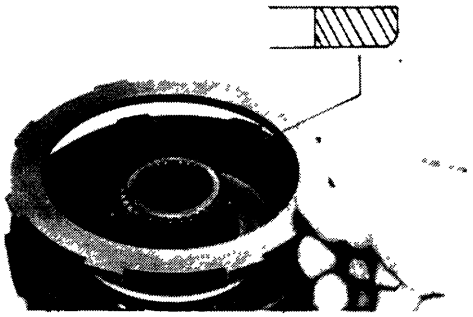
3. INSTALL TWENTY PISTON RETURN SPRINGS AND SET SEAT WITH SNAP RING IN PLACE

4. COMPRESS RETURN SPRINGS AND INSTALL SNAP RING IN GROOVE

(a) Place SST on the spring seat, and compress the springs with a shop press.

SST 09350-20013

(b) Using a screwdriver, install the snap ring.



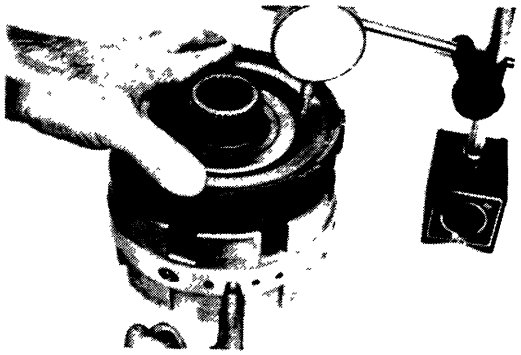
5. INSTALL DISCS, PLATES AND FLANGE

Using low-pressure compressed air (4 – 5 kg/cm², 57 – 71 psi or 392 – 490 kPa), blow all excess ATF from the discs.

Install in order: Plate-disc-plate-plate-disc-flange (rounded edge down)

6. INSTALL SNAP RING

Check that snap ring ends are not aligned with one of the cutouts.



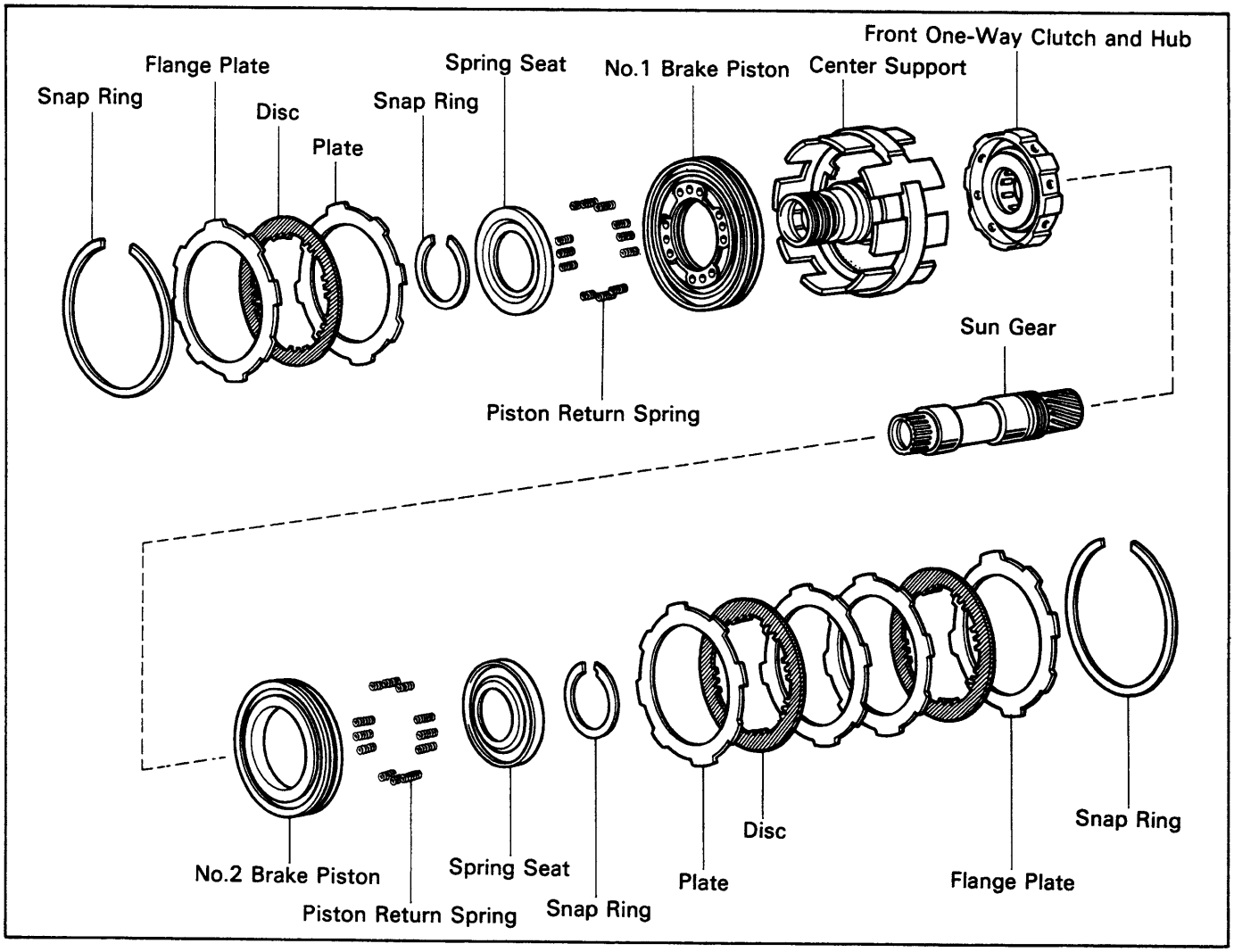
7. CHECK PISTON STROKE OF REAR CLUTCH

Install the rear clutch onto the center support. With a dial indicator, measure the stroke applying and releasing compressed air (4 – 8 kg/cm², 57 – 114 psi or 392 – 785 kPa) as shown.

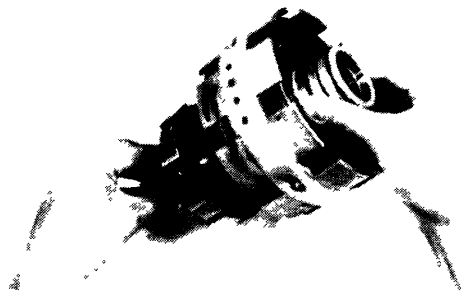
Standard piston stroke: 0.98 – 1.90 mm (0.0386 – 0.0748 in.)

If the stroke exceeds limit, the clutch pack is probably worn. If the stroke is less than the limit, parts may be misassembled or there may be excess ATF on the discs.

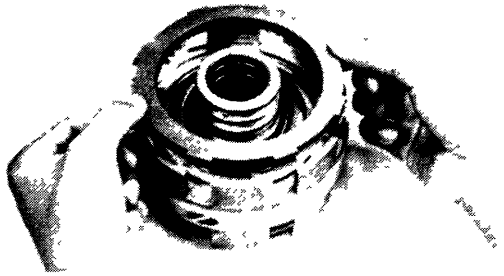
Center Support Assembly



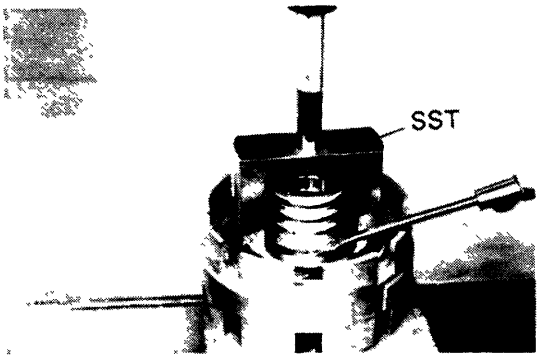
DISASSEMBLY OF CENTER SUPPORT ASSEMBLY



1. PULL CENTER SUPPORT ASSEMBLY FROM SUN GEAR



2. REMOVE SNAP RING FROM FRONT OF CENTER SUPPORT ASSEMBLY (NO. 1 BRAKE)
3. REMOVE CLUTCH FLANGE, DISC AND PLATE (NO. 1 BRAKE)



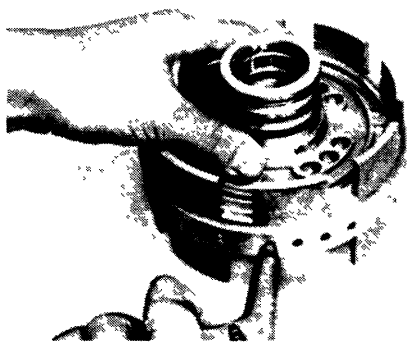
4. COMPRESS PISTON RETURN SPRINGS AND REMOVE SNAP RING

Place SST on spring retainer and compress the springs with a shop press.

Using a screwdriver, remove the snap ring.

SST 09350-20013

5. REMOVE SPRING RETAINER AND TWELVE SPRINGS



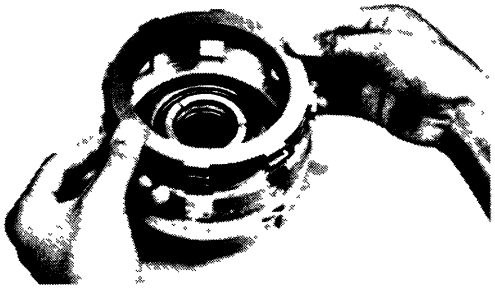
6. REMOVE NO. 1 BRAKE PISTON

Blow compressed air through the center support oil hole to remove the No. 1 brake piston.

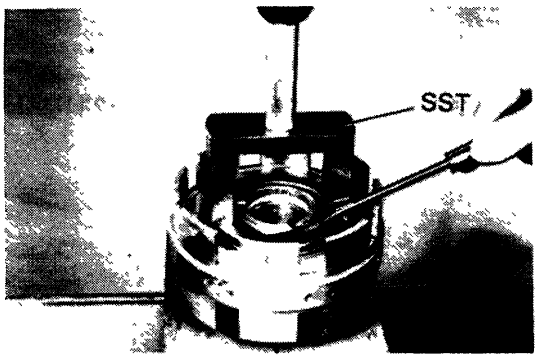
If the piston does not pop out, lift it out with needle-nose pliers.

7. REMOVE NO. 1 BRAKE PISTON O-RINGS

8. TURN CENTER SUPPORT ASSEMBLY OVER AND REMOVE REAR SNAP RING (NO. 2 BRAKE)



9. REMOVE CLUTCH FLANGE, DISCS AND PLATES (NO. 2 BRAKE)



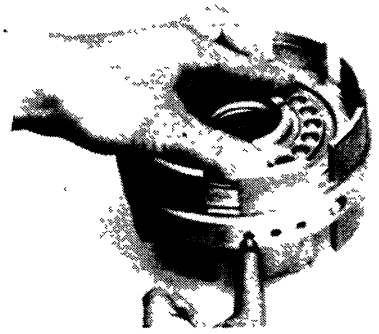
10. COMPRESS PISTON RETURN SPRINGS AND REMOVE SNAP RING

Place SST on spring retainer and compress the springs with a shop press.

Using a screwdriver, remove the snap ring.

SST 09350-20013

11. REMOVE SPRING RETAINER AND TWELVE SPRINGS



12. REMOVE NO. 2 BRAKE PISTON

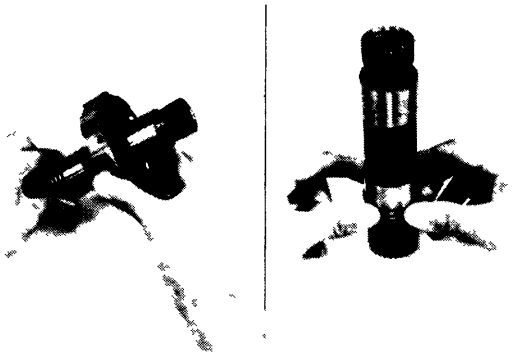
Blow compressed air through the center support oil hole to remove the No. 2 brake piston.

If piston does not pop out, lift it out with needle-nose pliers.

13. REMOVE NO. 2 BRAKE PISTON O-RINGS

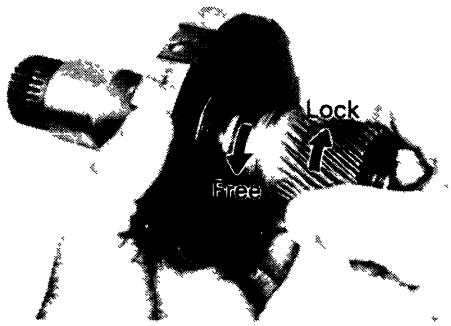


14. REMOVE THREE OIL SEAL RINGS FROM CENTER SUPPORT



15. REMOVE ONE-WAY CLUTCH ASSEMBLY AND OIL SEAL RINGS FROM SUN GEAR

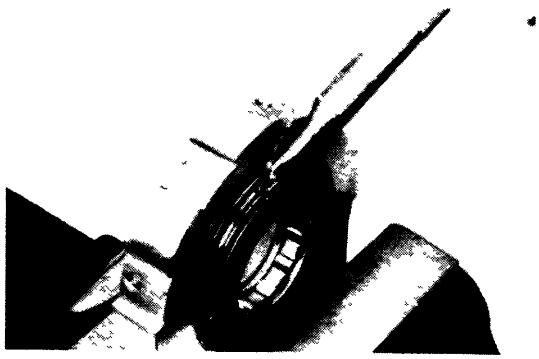
INSPECTION OF CENTER SUPPORT ASSEMBLY



1. CHECK OPERATION OF ONE-WAY CLUTCH

Hold the No. 2 brake hub and turn the sun gear. The sun gear should turn freely counterclockwise and should lock clockwise.

If the one-way clutch does not work properly, replace it.

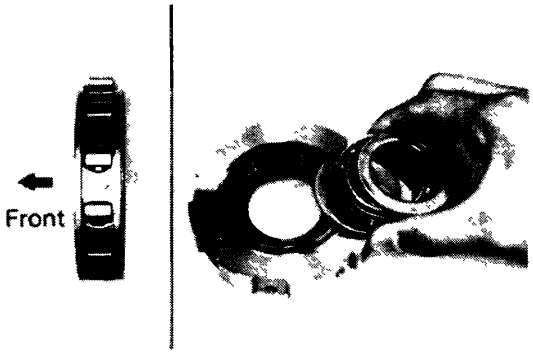


2. IF NECESSARY, REPLACE ONE-WAY CLUTCH

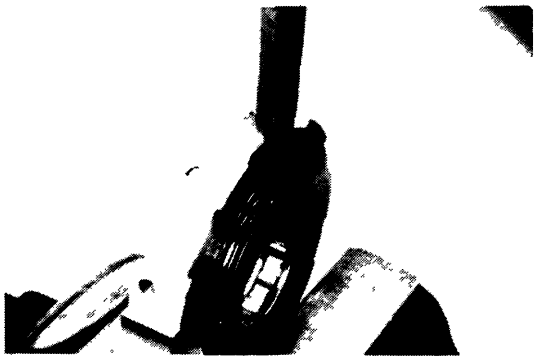
(a) Bend several tabs back with a tapered punch.

(b) Pry off the retainer with a screwdriver. Leave the other retainer on the hub.

(c) Remove the one-way clutch.



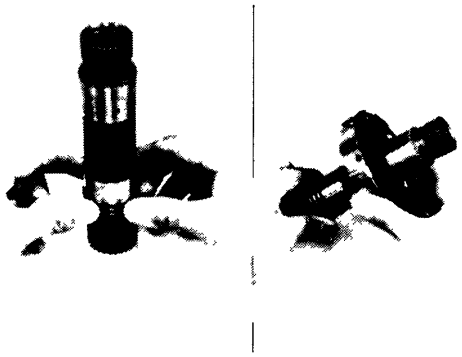
(d) Install the one-way clutch into the brake hub, facing the spring cage toward the front.



(e) Hold the brake hub in a vise with soft jaws, and flatten the ears with a chisel.

(f) Check to make sure the retainer is centered.

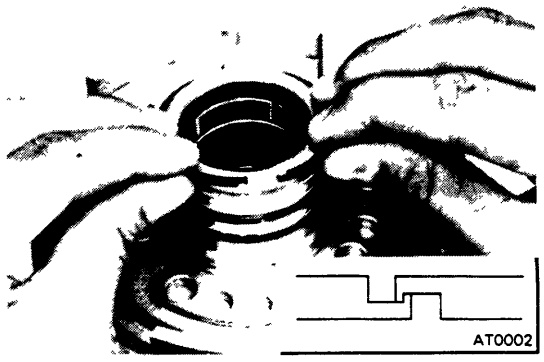
NOTE: Do not allow the discs to dry out. Prepare new discs by soaking them at least two hours in ATF.



ASSEMBLY OF CENTER SUPPORT ASSEMBLY

(See page AT-57)

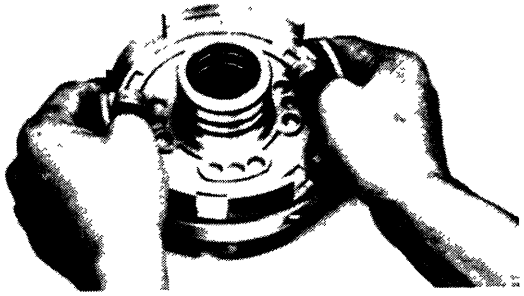
1. INSTALL TWO OIL SEAL RINGS AND ONE-WAY CLUTCH ASSEMBLY ON SUN GEAR



2. INSTALL THREE OIL SEAL RINGS ON CENTER SUPPORT

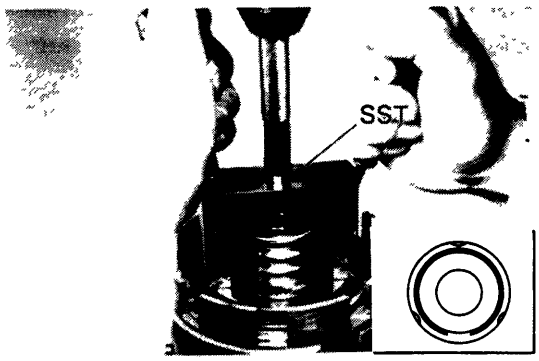
Spread rings apart and slip them into the groove. Hook both ends by hand.

3. INSTALL NEW O-RINGS ON PISTON



4. INSTALL NO. 1 BRAKE PISTON IN CENTER SUPPORT

Press the No. 1 brake piston into the center support with the cup side up, being careful not to damage the O-rings.



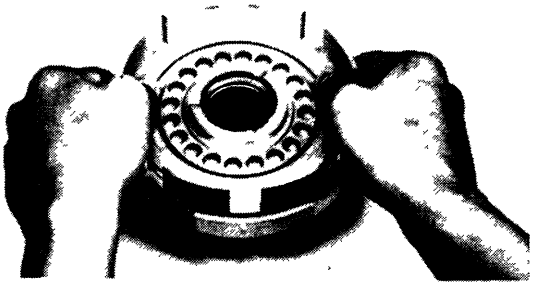
5. INSTALL TWELVE PISTON RETURN SPRINGS AND SET RETAINER WITH SNAP RING IN PLACE

6. COMPRESS RETURN SPRINGS AND INSTALL SNAP RING IN GROOVE

(a) Place SST on the spring retainer, and compress the springs with a shop press.

SST 09350-20013

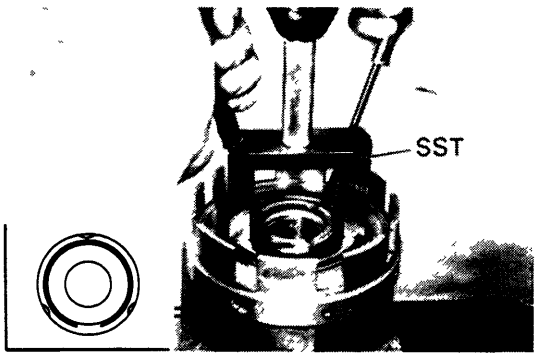
(b) Using a screwdriver, install the snap ring.



7. INSTALL NEW O-RINGS ON PISTON AND CENTER SUPPORT

8. TURN CENTER SUPPORT OVER AND INSTALL NO. 2 BRAKE PISTON

Press the No. 2 brake piston into the center support with the cup side up, being careful not to damage the O-rings.



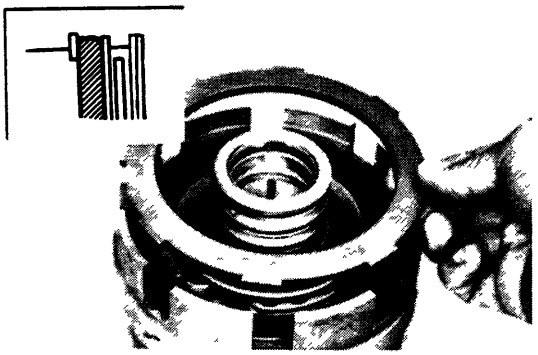
9. INSTALL TWELVE PISTON RETURN SPRINGS AND SET RETAINER WITH SNAP RING IN PLACE

10. COMPRESS RETURN SPRINGS AND INSTALL SNAP RING IN GROOVE

(a) Place SST on the spring retainer, and compress the springs with a shop press.

SST 09350-20013

(b) Using a screwdriver, install the snap ring.



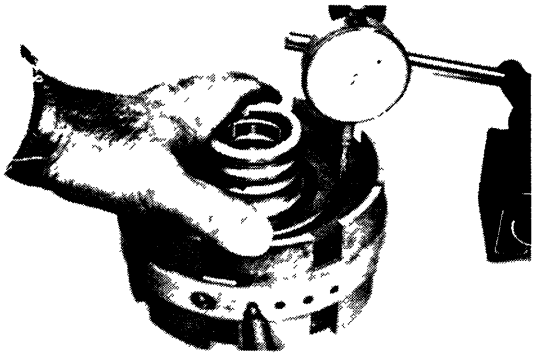
11. TURN CENTER SUPPORT OVER AND INSTALL NO. 1 BRAKE PISTON PLATE, DISC AND FLANGE

Using the low-pressure compressed air (4 – 5 kg/cm², 57 – 71 psi or 392 – 490 kPa), blow all excess ATF from the disc.

Install in order: Plate-disc-flange (rounded edge down)

12. INSTALL SNAP RING IN CENTER SUPPORT

Check that the snap ring ends are not aligned with one of the cutouts.



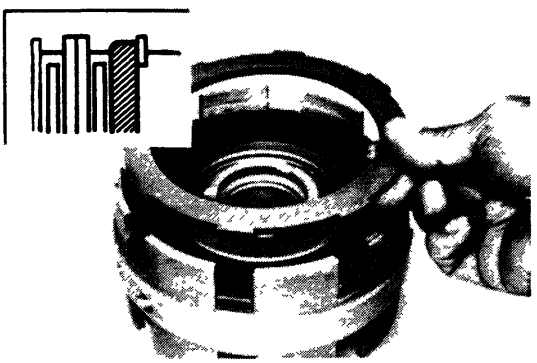
13. CHECK PISTON STROKE OF NO. 1 BRAKE

With a dial indicator, measure the stroke applying and releasing compressed air (4 – 8 kg/cm², 57 – 114 psi or 392 – 785 kPa) as shown.

Standard piston stroke: 0.65 – 1.30 mm (0.0256 – 0.0512 in.)

Maximum piston stroke: 1.30 mm (0.0512 in.)

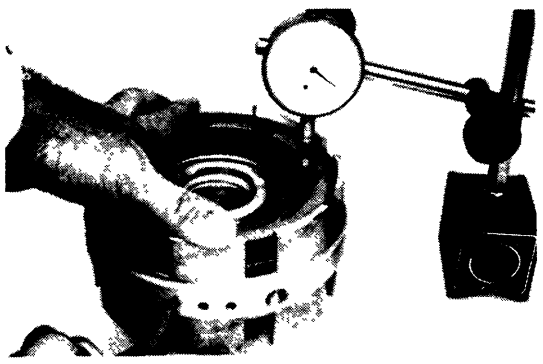
If the stroke exceeds the limit, the clutch pack is probably worn. If the stroke is less than the limit, parts may be misassembled or there may be excess ATF on the discs.



14. TURN CENTER SUPPORT OVER AND INSTALL NO. 2 BRAKE PLATES, DISCS AND FLANGE

Using the low-pressure compressed air (4 – 5 kg/cm², 57 – 71 psi or 392 – 490 kPa), blow all excess ATF from the discs.

Install in order: Plate-disc-plate-plate-disc-flange (rounded edge down)





15. INSTALL SNAP RING IN CENTER SUPPORT

Check that the snap ring ends are not aligned with one of the cutouts.

16. CHECK PISTON STROKE OF NO. 2 BRAKE

With a dial indicator, measure the stroke applying and releasing compressed air (4 – 8 kg/cm², 57 – 114 psi or 392 – 785 kPa) as shown.

Standard piston stroke:
0.93 – 1.72 mm (0.0366 – 0.0677 in.)
Maximum piston stroke: 1.72 mm (0.0677 in.)

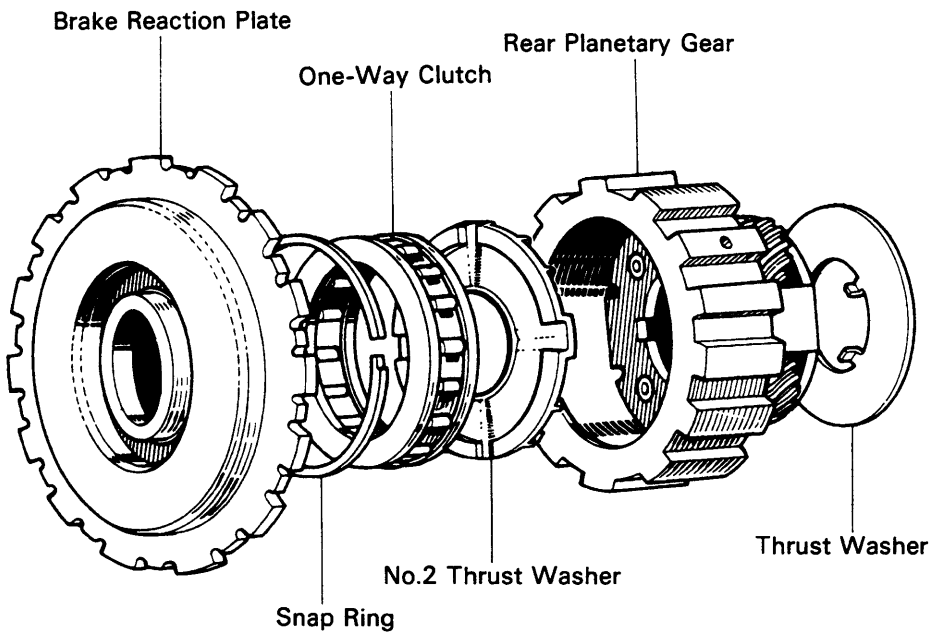
If the stroke exceeds the limit, the clutch pack is probably worn. If the stroke is less than the limit, parts may be misassembled or there may be excess ATF on the discs.

17. ASSEMBLE CENTER SUPPORT AND SUN GEAR SHAFT

(a) Align the brake No. 2 disc flukes.

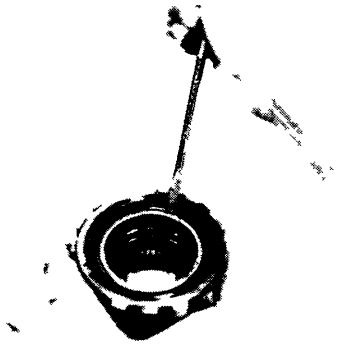
(b) Mesh the brake hub with the discs, twisting and jiggling the hub as required.

Rear No.2 One-Way Clutch and Planetary Gear

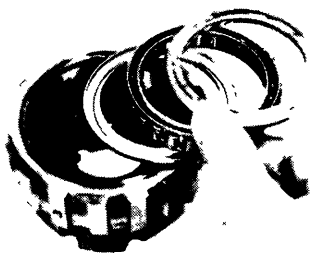


DISASSEMBLY OF REAR PLANETARY GEAR

1. REMOVE SNAP RING



2. REMOVE ONE-WAY CLUTCH

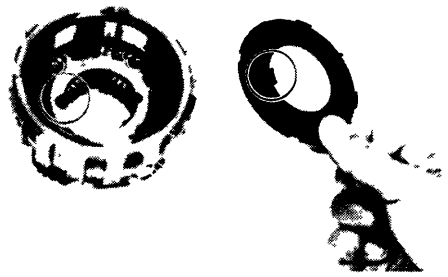




3. **REMOVE NO. 2 THRUST WASHER FROM REAR PLANETARY GEAR**

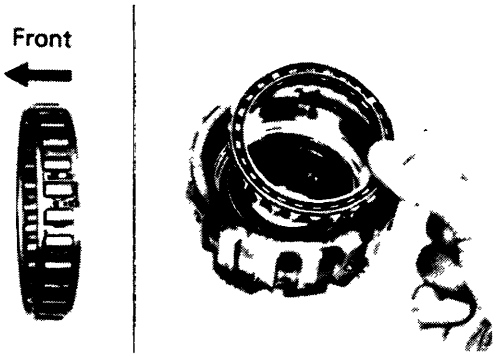
ASSEMBLY OF REAR PLANETARY GEAR

(See page AT-63)



1. **INSTALL NO. 2 THRUST WASHER IN FRONT OF PLANETARY PINION GEAR**

   Face the lugs downward and match them with slots in back of planetary gear.



2. **INSTALL ONE-WAY CLUTCH**

   Install the one-way clutch into the outer race facing the spring cage toward the front.

3. **TEMPORARILY INSTALL REACTION PLATE ON PLANETARY**

   Insert into place for test of the one-way clutch.

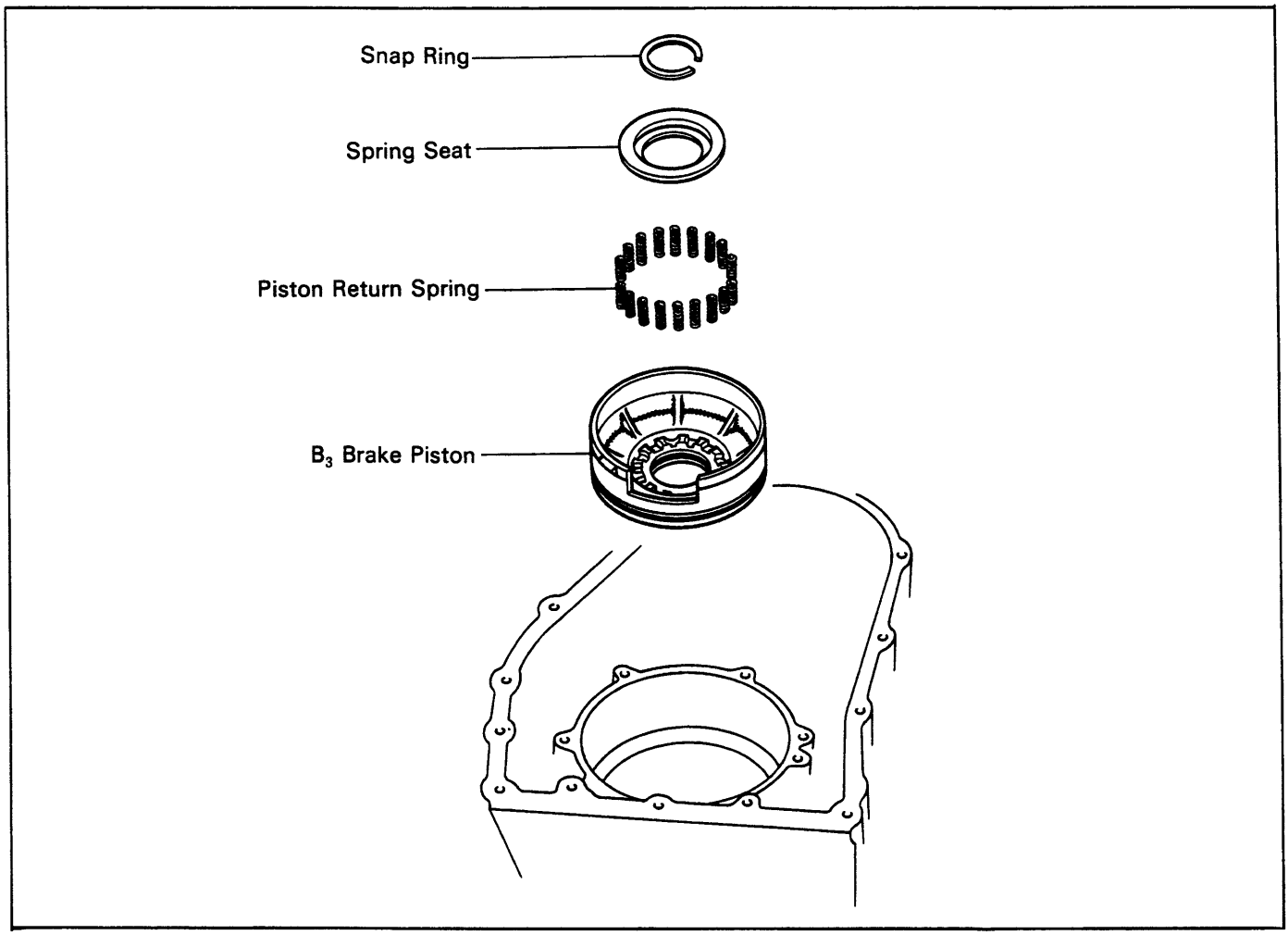


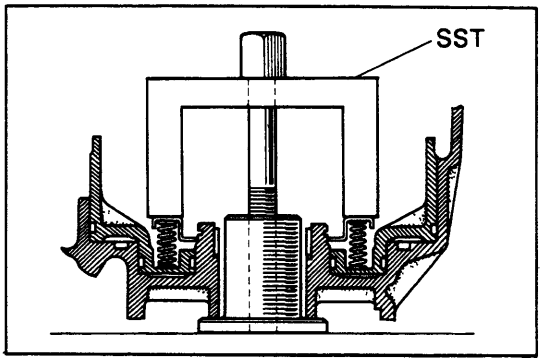
4. **TEST ONE-WAY CLUTCH**

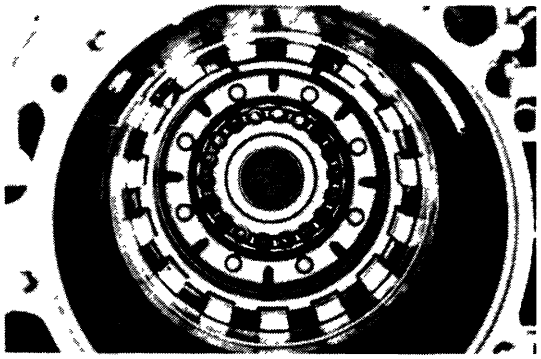
   The planetary gear must rotate freely counterclockwise and lock clockwise.

   If the clutch does not work correctly, it must be replaced.

Transmission Case and Rear Brake Piston







DISASSEMBLY OF TRANSMISSION CASE AND REAR BRAKE PISTONS

1. **COMPRESS RETURN SPRINGS AND REMOVE SPRING RETAINER SNAP RING**

   (a) Install the SST. Gradually and evenly tighten the bolt to compress the springs, being careful not to damage the transmission case with SST.

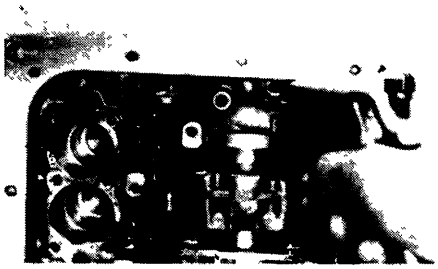
   SST 09350-20013

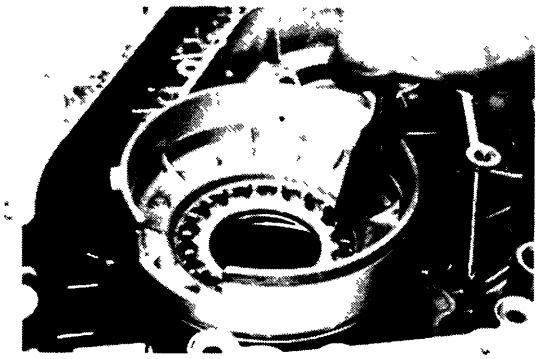
   (b) Using the screwdriver and hook, remove the snap ring.

2. **REMOVE SPRING RETAINER AND EIGHTEEN SPRINGS**

3. REMOVE OUTER PISTON AND REACTION SLEEVE WITH COMPRESSED AIR

Turn the case over face down on a workbench. Place several clean shop rags under the case to catch the piston. To pop them out, apply compressed air into the oil hole.





If the piston do not pop out with the compressed air, use needle-nose pliers to lift the piston from the case.

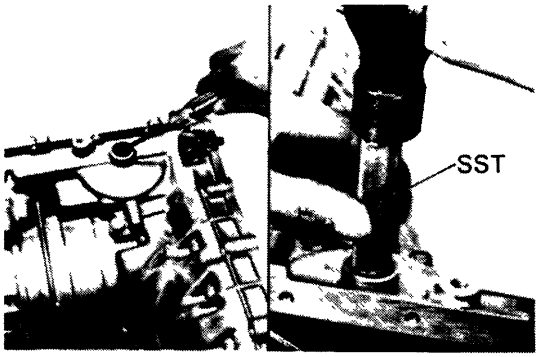
INSPECTION OF CASE COMPONENT GROUP

1. REPLACEMENT OF MANUAL SHAFT OIL SEALS

(a) Remove the manual shaft oil seals with a screwdriver.

(b) Drive in new left and right oil seals with SST.

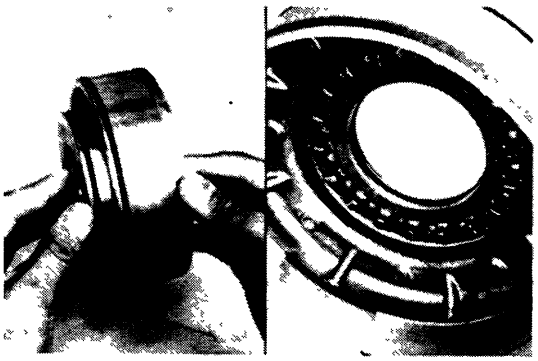
SST 09350-20013



ASSEMBLY OF TRANSMISSION CASE AND REAR BRAKE PISTONS

(See page AT-65)

1. INSTALL NEW O-RINGS ON PISTON

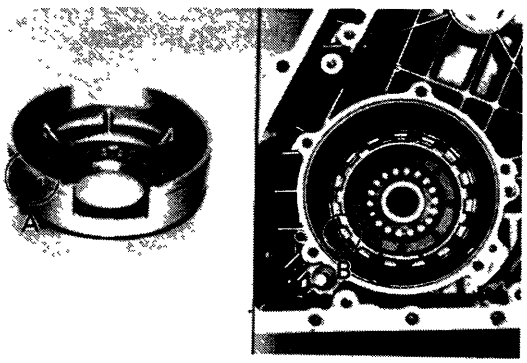


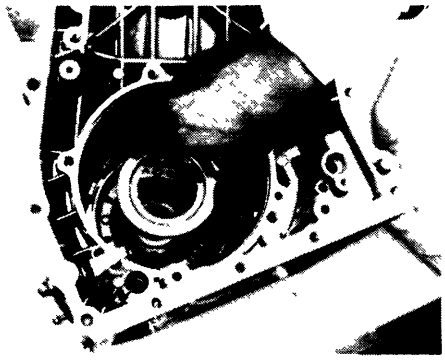
2. INSTALL PISTON IN CASE

Align the portion of the piston marked "A" with the groove on the transmission case.

NOTE: The groove marked "B" is larger than the other grooves.

CAUTION: Be careful not to damage the O-rings.

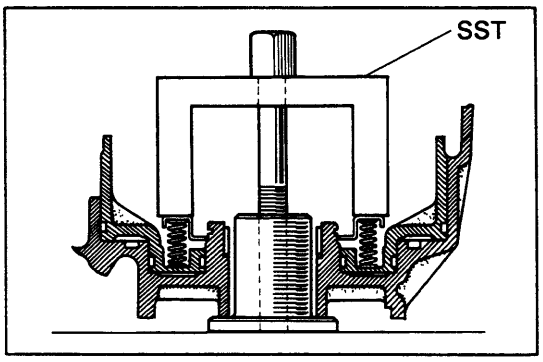




3. INSTALL SST BASE UNDER CASE

4. INSTALL EIGHTEEN PISTON RETURN SPRINGS AND SET RETAINER WITH SNAP RING IN PLACE

NOTE: The springs are visible through the cutout in the case, which helps position them more easily.



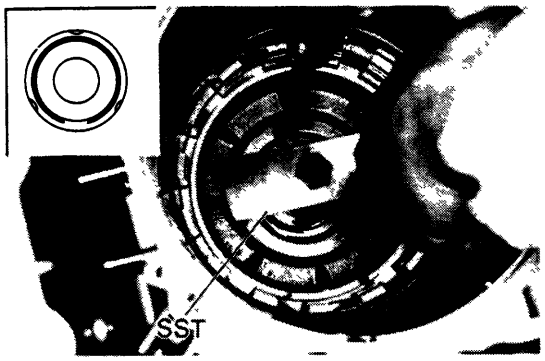
5. COMPRESS PISTON RETURN SPRINGS TO ALLOW INSTALLATION OF SNAP RING

CAUTION: Avoid bending the spring retainer by overtightening the bolts.

(a) Carefully position the spring compressor on the spring retainer.

(b) Gradually and evenly tighten the bolt to compress the springs, being careful not to damage the transmission case with SST.

SST 09350-20013

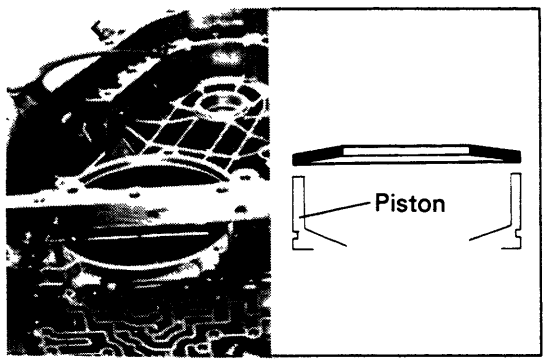


6. INSTALL SNAP RING

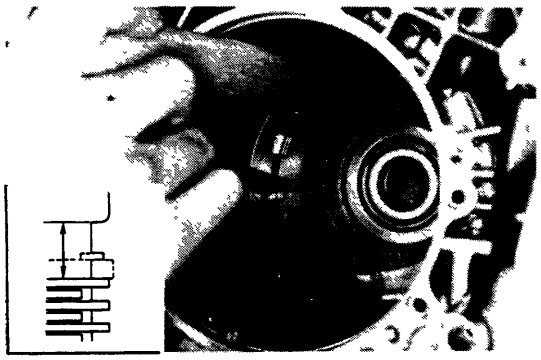
Push the snap ring into place with your fingers. Visually check to make sure it is fully seated and centered by three lugs on the spring retainer.

Remove the SST.

SST 09350-20013



7. INSTALL BRAKE NO. 3 CUSHION PLATE CLUTCH PLATE AND DISC

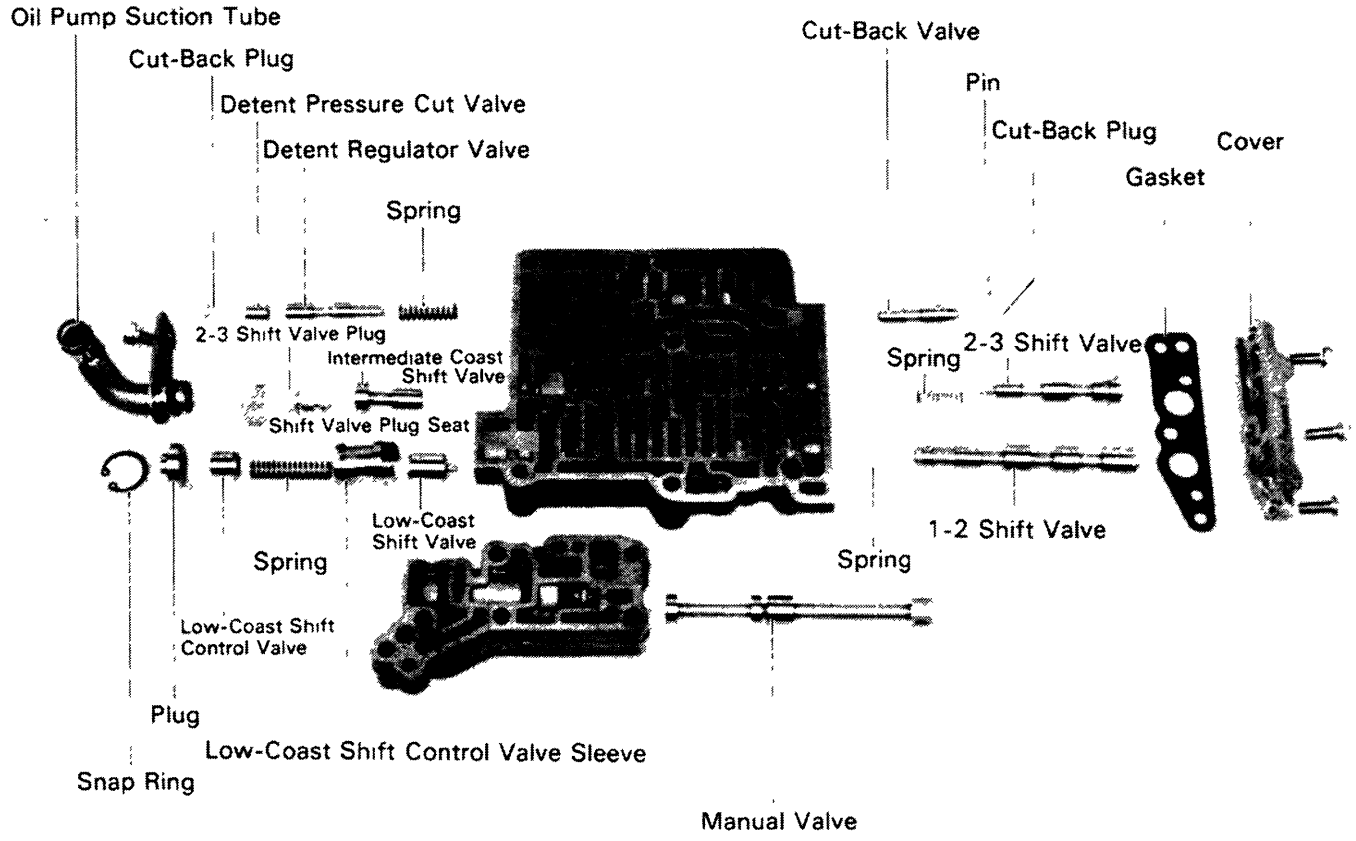


8. MEASURE NO. 3 BRAKE CLEARANCE

To prevent the plate from tilting while measuring, hold it down with two hammer handles.

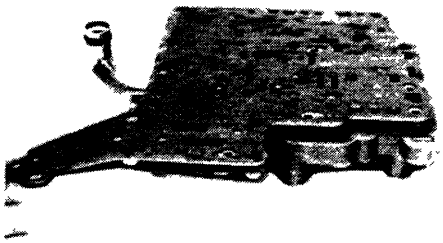
Standard clearance: 10.04 – 11.30 mm (0.3953 – 0.4449 in.)

Valve Body

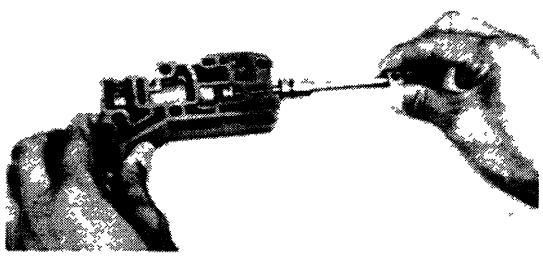


DISASSEMBLY OF VALVE BODY

1. REMOVE VALVE BODY PLATE AND GASKETS



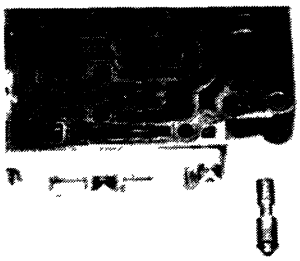
2. REMOVE MANUAL VALVE



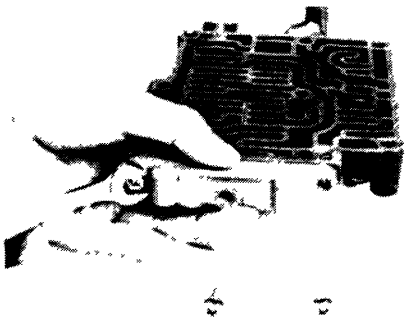


3. REMOVE CUT BACK VALVE

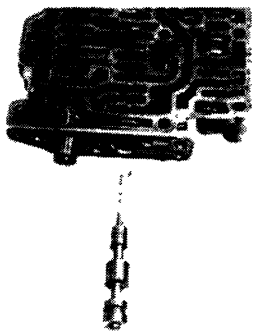
(a) Remove the locating pin for the cut-back plug.



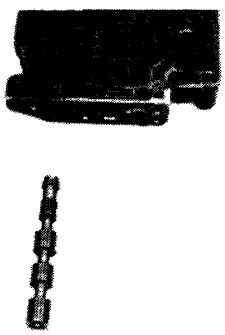
(b) Remove the cut-back valve.



4. REMOVE COVER AND GASKET

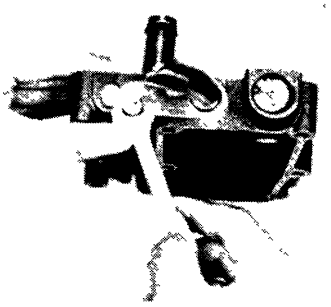


5. REMOVE 2-3 SHIFT VALVE AND SPRING

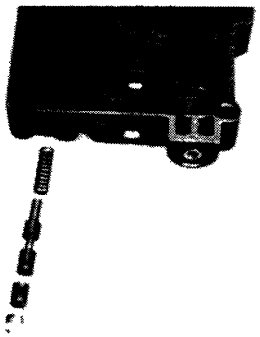


6. REMOVE 1-2 SHIFT VALVE AND SPRING

7. REMOVE OIL PUMP SUCTION TUBE

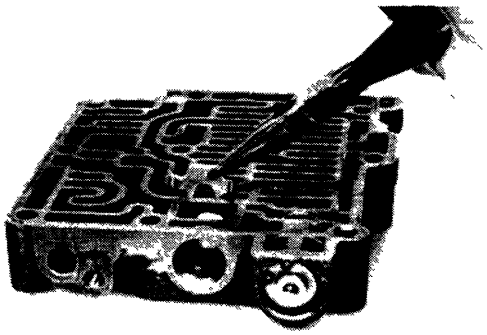


8. REMOVE DETENT PRESSURE CUT VALVE, REGULATOR VALVE AND SPRING

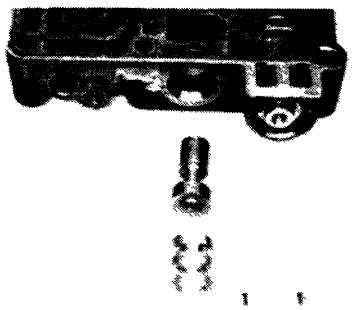


9. REMOVE INTERMEDIATE COAST SHIFT VALVE

(a) Remove the shift valve plug seat for the 2-3 shift valve plug.



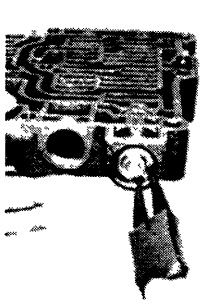
(b) Remove the intermediate coast shift valve.



10. REMOVE SNAP RING

11. REMOVE PLUG

Temporarily install the bolt to the plug and remove the plug.



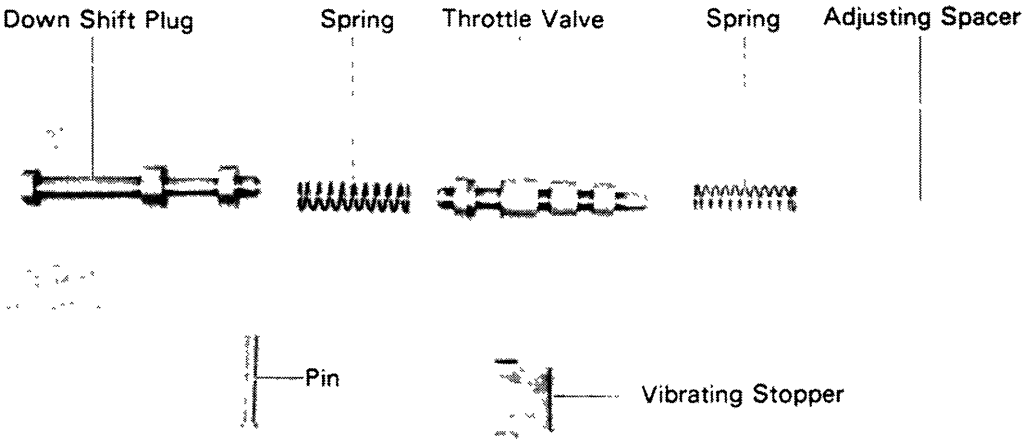


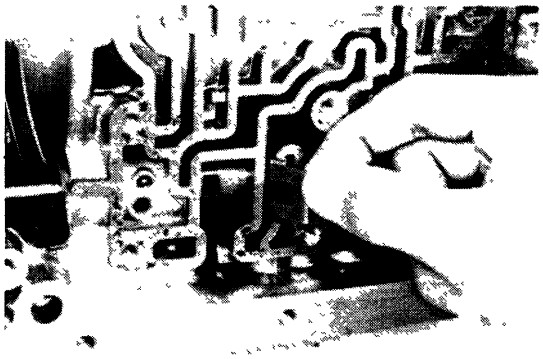


12. REMOVE LOW-COAST SPRING, SLEEVE AND VALVE

Throttle Valve

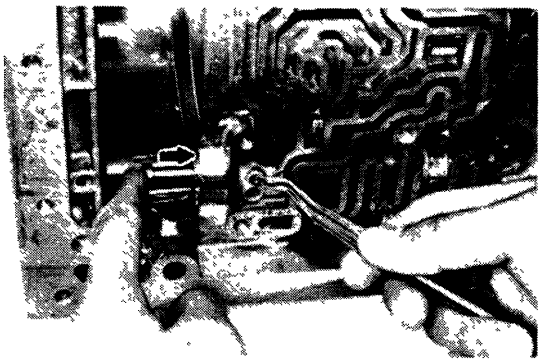






DISASSEMBLY OF THROTTLE VALVE

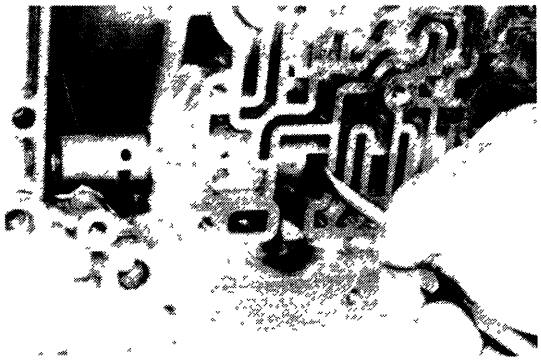
1. REMOVE VIBRATING STOPPER FOR THROTTLE VALVE



2. REMOVE LOCATING PIN FOR DOWN SHIFT PLUG

3. REMOVE THROTTLE VALVE, SPRING AND ADJUSTING SPACER





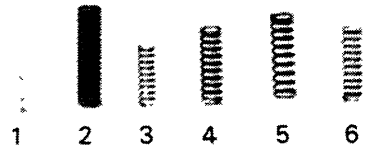
4. REMOVE THROTTLE VALVE SLEEVE

NOTE: Be careful not to damage the case and sleeve.

INSPECTION OF VALVE BODY AND THROTTLE VALVE

INSPECT VALVE SPRINGS

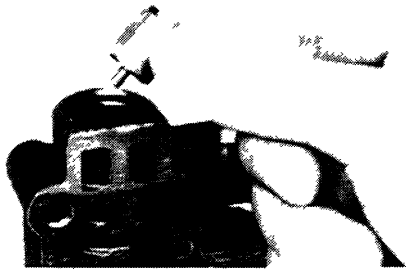
Check for damage, squareness, rust and distorted coils. Measure the spring free height and replace any spring if less than that shown below.



		Free length mm (in.)
1	1-2 shift valve spring	26.00 (1.0236)
2	Low-coast valve spring	36.50 (1.4370)
3	2-3 shift valve spring	22.10 (0.8701)
4	Detent regulator valve spring	27.40 (1.0787)
5	Throttle valve spring (Front)	30.03 (1.1823)
6	Throttle valve spring (Rear)	27.50 (1.0827)

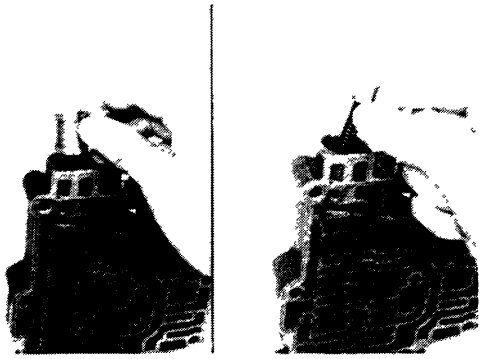
ASSEMBLY OF VALVE BODY

(See page AT-68)



1. **INSTALL LOW-COAST SHIFT VALVE**

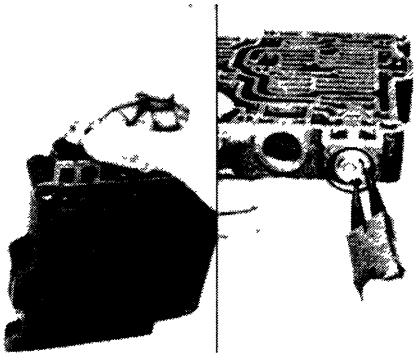
   Insert the low-coast shift valve with the projection downward.



2. **INSTALL LOW-COAST SHIFT CONTROL VALVE**

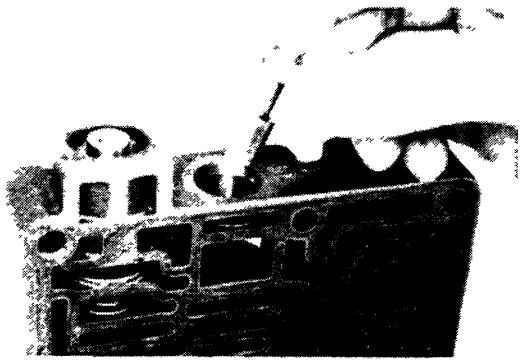
   (a) Insert the low-coast shift valve control sleeve.

   (b) Insert the low-coast shift control valve and spring with the cup side downward.



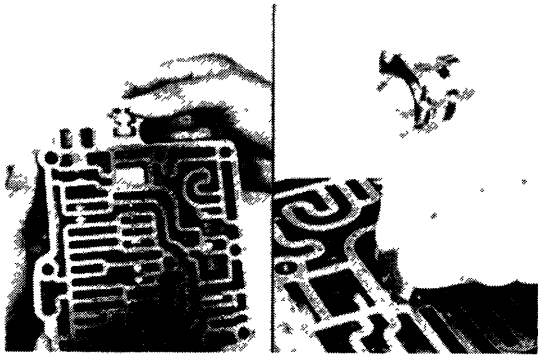
3. **INSTALL 1-2 SHIFT VALVE PLUG**

4. **INSTALL SNAP RING**



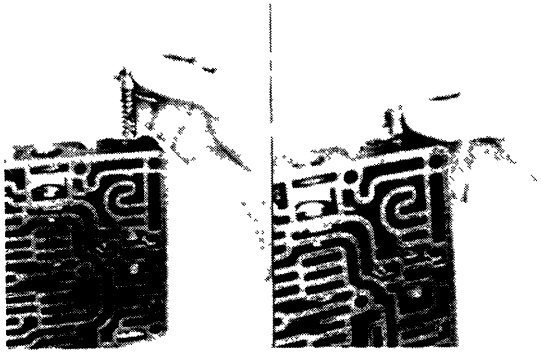
5. **INSTALL INTERMEDIATE COAST SHIFT VALVE**

   Insert the intermediate coast shift valve with the small end downward.



6. **INSTALL 2-3 SHIFT VALVE PLUG**

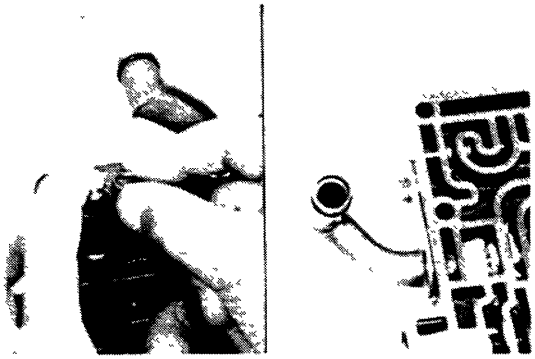
7. **INSTALL 2-3 SHIFT VALVE PLUG SEAT**



8. INSTALL DETENT REGULATOR VALVE AND SPRING

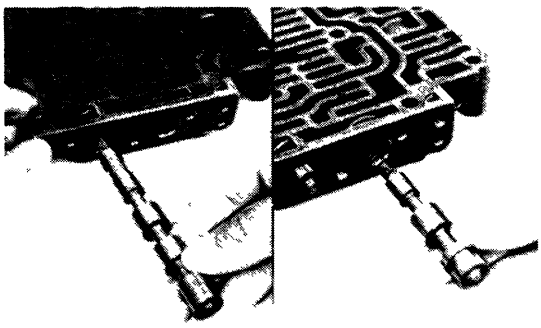
Insert detent regulator valve with the small end downward.

9. INSTALL DETENT PRESSURE CUT VALVE



10. INSTALL OIL PUMP SUCTION TUBE

Secure the cut-back plug with the suction tube bracket.

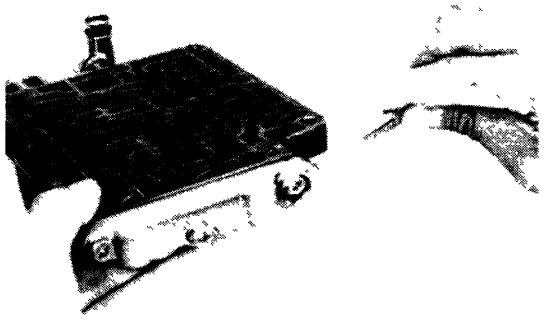


11. INSTALL 1-2 SHIFT VALVE AND SPRING

Insert the 1-2 shift valve with the small end downward.

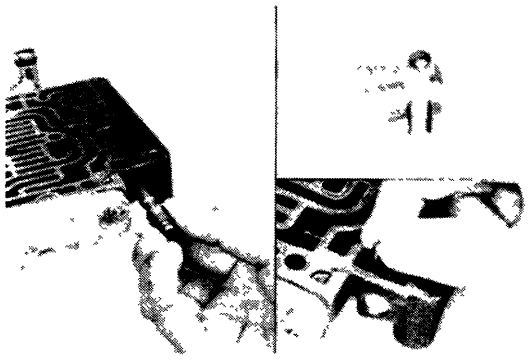
12. INSTALL 2-3 SHIFT VALVE AND SPRING

Insert the 2-3 shift valve with the small end downward.



13. INSTALL VALVE BODY COVER

Torque: 55 kg-cm (48 in.-lb, 5.4 N·m)



14. INSTALL CUT-BACK VALVE AND PLUG

Insert the valve with the small end downward.

15. INSTALL CUT-BACK VALVE RETAINER

Coat the pin with petroleum jelly to keep it in place.

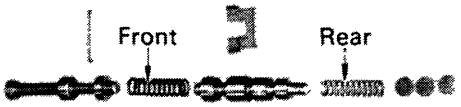




ASSEMBLY OF THROTTLE VALVE

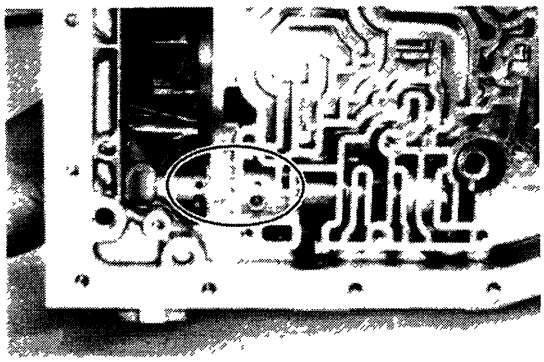
(See page AT-71)

1. **INSTALL SAME NUMBER OF ADJUSTING SPACERS WHICH WERE DISASSEMBLED INTO SLEEVE**



2. **INSTALL THROTTLE VALVE AND SPRING INTO SLEEVE**

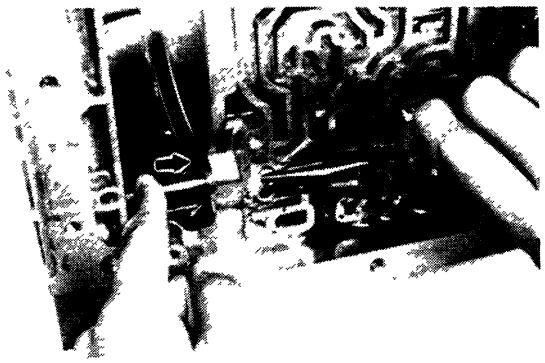




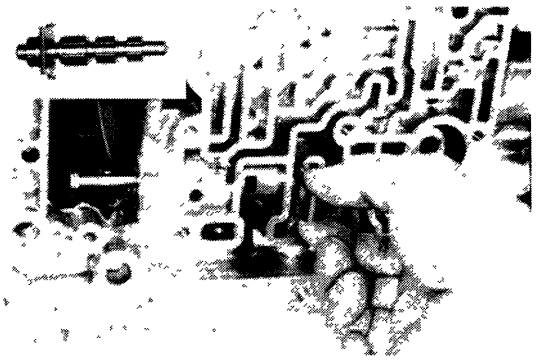
3. **ASSEMBLE SLEEVE TO CASE**

   Align the sleeve center with the case hole.

   NOTE: Do not twist the sleeve.



4. **PUSH DOWN SHIFT PLUG AND INSTALL LOCATING PIN**

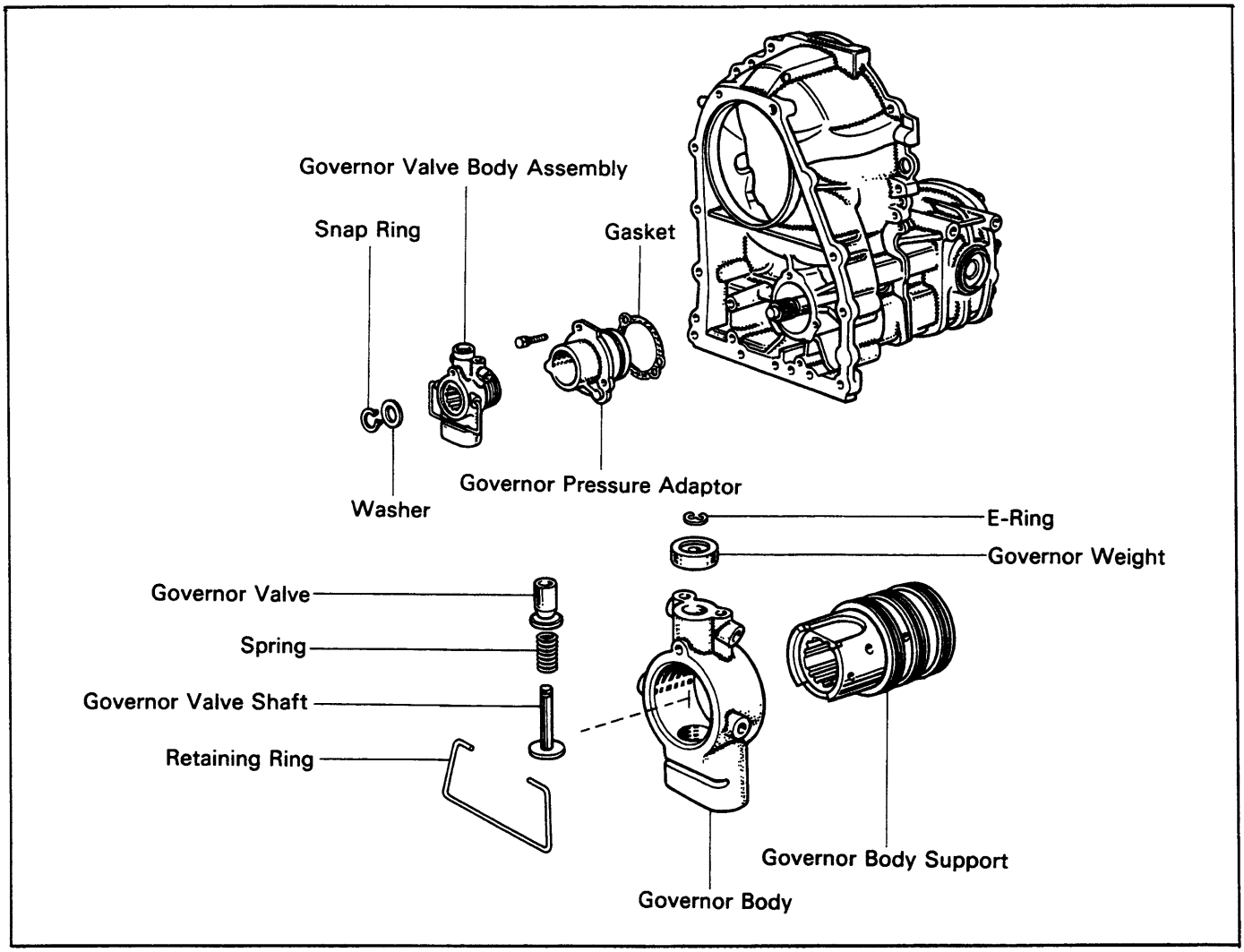


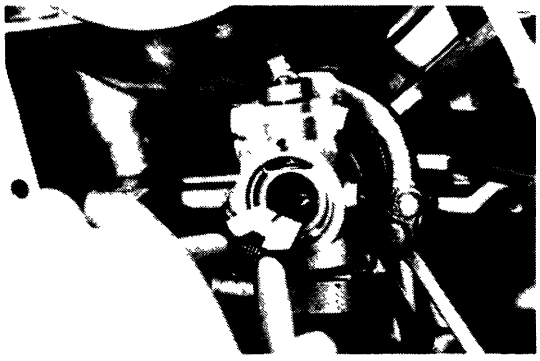
5. **INSTALL VALVE VIBRATING STOPPER**

   NOTE: Apply petroleum jelly to keep it in place.

6. **INSURE THAT VALVE SLIDES SMOOTHLY**

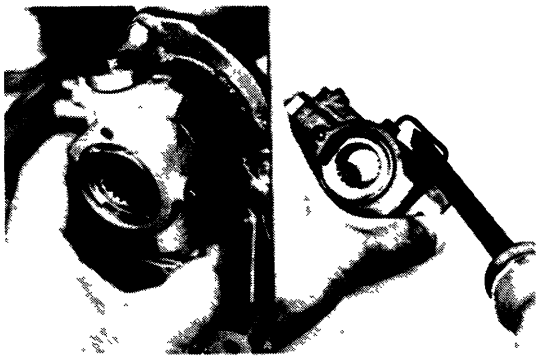
Governor Body





DISASSEMBLY OF GOVERNOR BODY

1. REMOVE SNAP RING



2. REMOVE GOVERNOR BODY SUPPORT

3. REMOVE RETAINING RING

Pry up the retaining ring slightly with a screwdriver and pull out the governor body from the support.

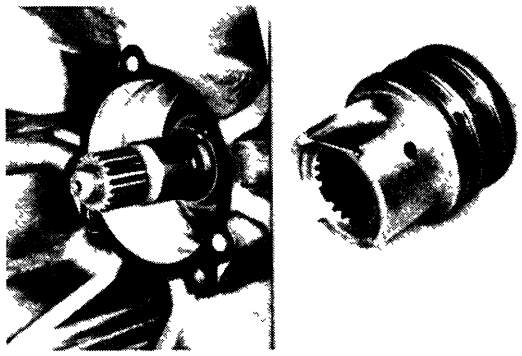


4. REMOVE E-RING AND GOVERNOR WEIGHT

Compress the spring by pushing up on the shaft and down on the weight. Remove the E-ring with a screwdriver. Lift off the governor weight.

5. REMOVE GOVERNOR VALVE

Slide it down through the bore.



INSPECTION OF GOVERNOR BODY

1. INSPECT GOVERNOR SPRING

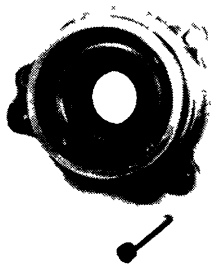
Measure the spring free height and replace if less than that shown below.

Free height: 19.60 mm (0.7717 in.)

2. INSPECT GOVERNOR BODY SUPPORT AND OIL SEAL RING

Check for wear or damage.

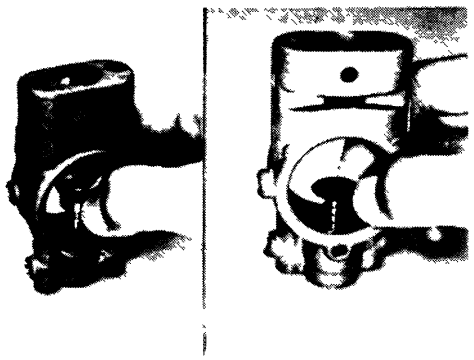
NOTE: Also check the differential drive pinion for wear.



3. INSPECT GOVERNOR PRESSURE ADAPTER AND OIL SEAL

Clean the oil strainer. Check for wear or damage.

Replace the oil seal.



ASSEMBLY OF GOVERNOR BODY

(See page AT-76)

1. INSTALL GOVERNOR VALVE, SPRING AND SHAFT

(a) Slide down the governor valve through the bore.

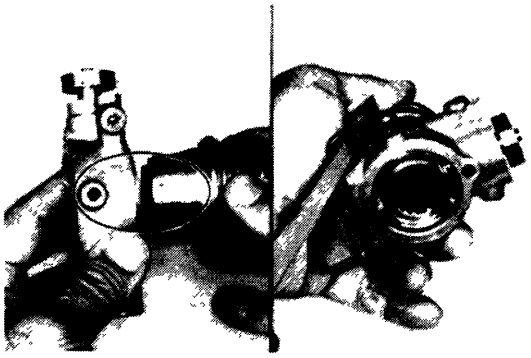
(b) Slide down the spring and shaft through the bore.



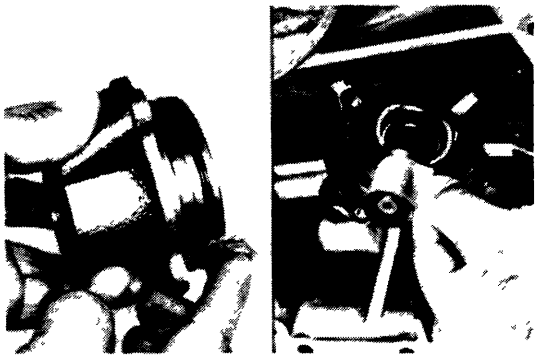
2. INSTALL GOVERNOR WEIGHT AND E-RING ON SHAFT

Compress the spring, and install the E-ring on the shaft with needle-nose pliers. Make sure that it is fully seated in the groove.

NOTE: Make sure that the valve moves smoothly.



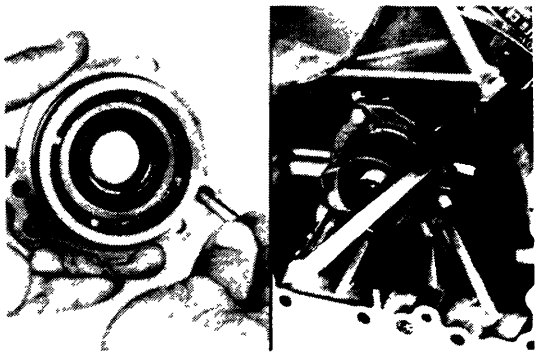
3. **INSTALL GOVERNOR BODY TO SUPPORT**



4. **INSTALL GOVERNOR PRESSURE ADAPTER**

(a) Coat the O-ring and drive pinion with MP grease.

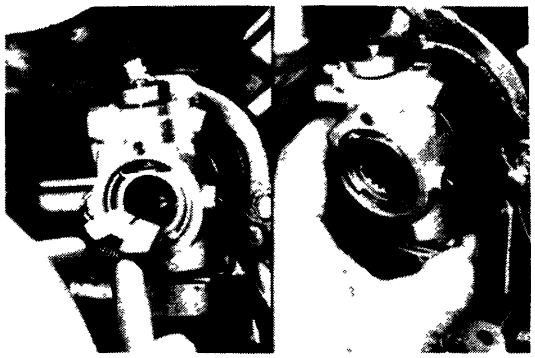
NOTE: Wrap the differential drive pinion with vinyl tape to protect the oil seal from damage.



(b) Insert the oil strainer in the adapter.

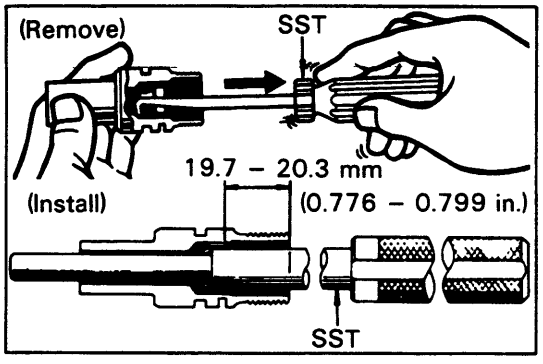
(c) Tighten the set bolts.

Torque: 55 kg-cm (48 in.-lb, 5.4 N·m)



5. **INSTALL GOVERNOR VALVE ASSEMBLY**

NOTE: Confirm proper assembly.



Speedometer Gear

INSPECTION OF SPEEDOMETER GEAR

IF NECESSARY, REPLACE SPEEDOMETER GEAR OIL SEAL

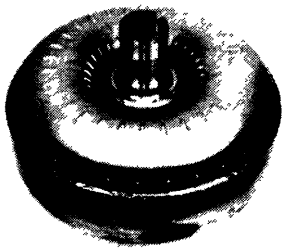
(a) Using SST, remove the oil seal.

SST 09921-00010

(b) Using SST, install the new oil seal.

SST 09201-60011

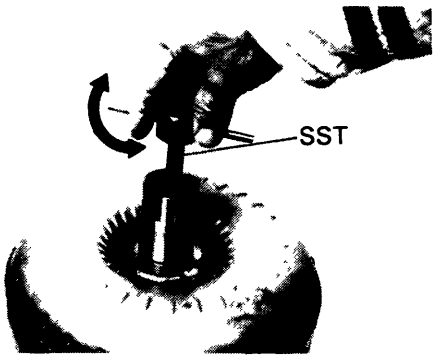
Torque Converter



CLEAN TORQUE CONVERTER

If the transmission is contaminated, the torque converter and transmission cooler should be thoroughly flushed, using Toyota Transmission Cleaner.

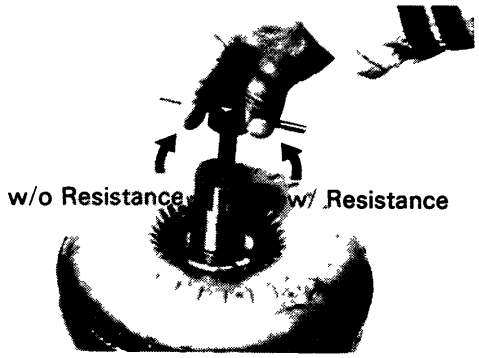
INSPECTION OF TORQUE CONVERTER



1. INSERT SST IN END OF TORQUE CONVERTER

Insert a turning tool in the inner race of the one-way clutch.

SST 09350-20013



2. TEST ONE-WAY CLUTCH

(a) Rapidly turn the SST to the right and left.

(b) At this time, you should feel resistance to the left but not to the right.

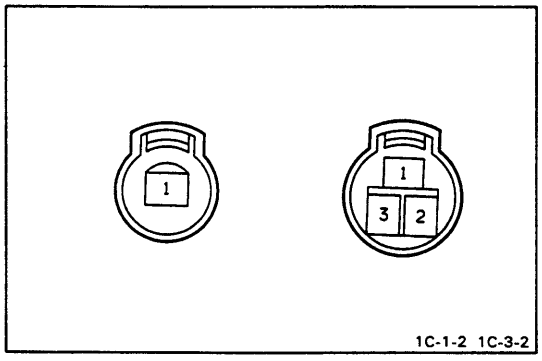
NOTE:

(1) When turning the SST to the left, the one-way clutch is functioning and the stator is turning, creating resistance against the ATF.

(2) When turning the SST to the right, the one-way clutch is sliding freely and the stator is not turning so there is no resistance from the ATF.

(3) The one-way clutch lock test cannot be performed when the converter is not installed. Therefore, it should be checked by performing a stall test after the converter has been properly installed.

SST 09350-20013



Electric Parts

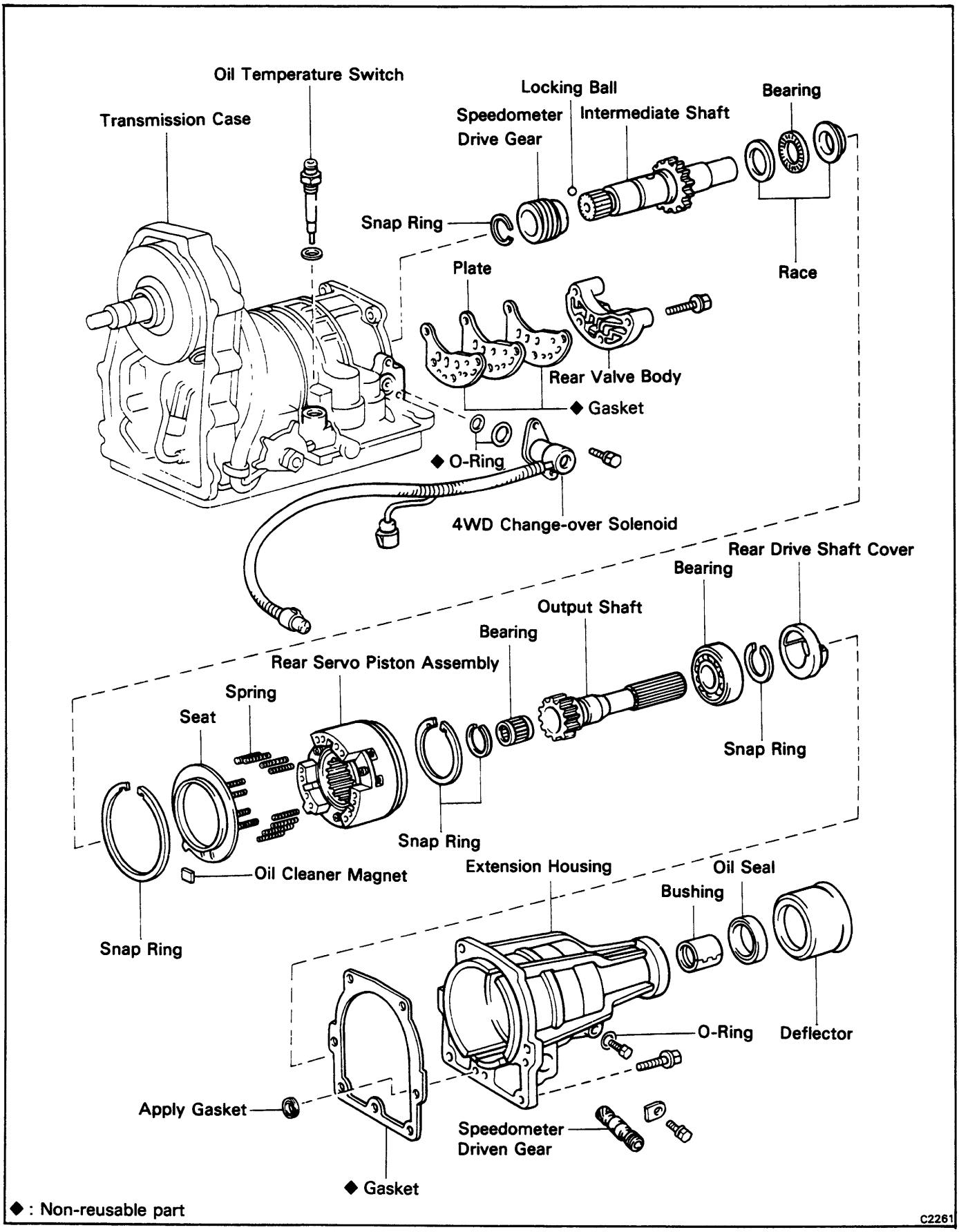
INSPECT NEUTRAL START SWITCH

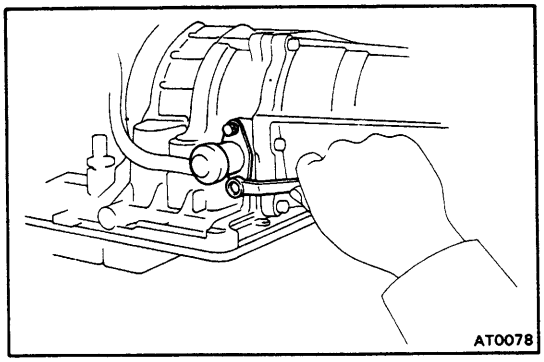
(a) Make sure that there is continuity between terminals 2 and 3 in "P" and "N" ranges.

(b) Make sure that there is continuity between terminals 1 and 1 in "R" range.

FOUR-WHEEL DRIVE CHANGE-OVER MECHANISM

COMPONENT



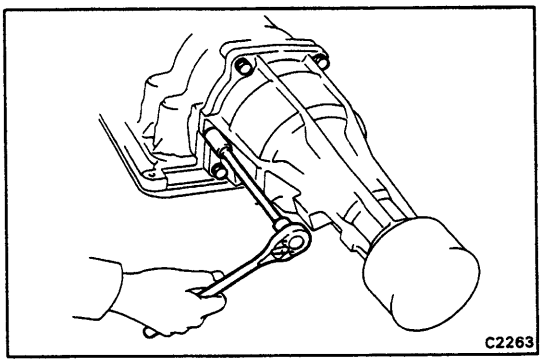


Disassembly of 4WD Change-over Mechanism

1. REMOVE 4WD CHANGE-OVER SOLENOID

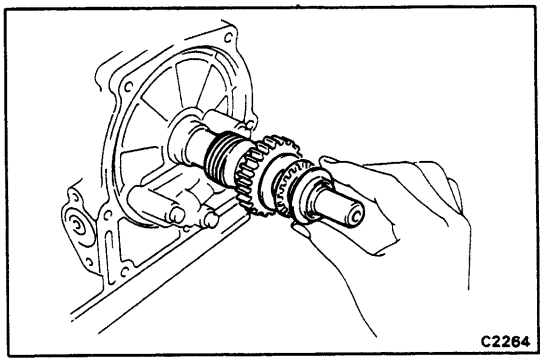
(a) Remove the two bolts and solenoid.

(b) Remove the two O-rings.



2. REMOVE SPEEDOMETER DRIVEN GEAR

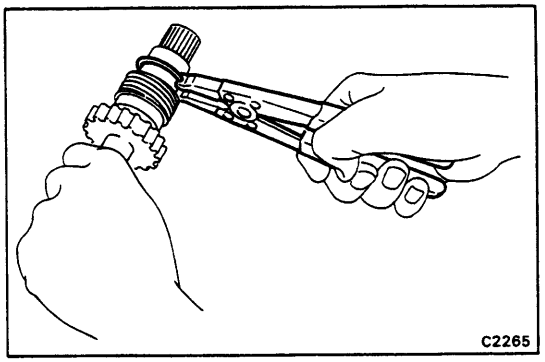
3. REMOVE EXTENSION HOUSING AND GASKET



4. REMOVE INTERMEDIATE SHAFT

(a) Remove the thrust bearing and two races.

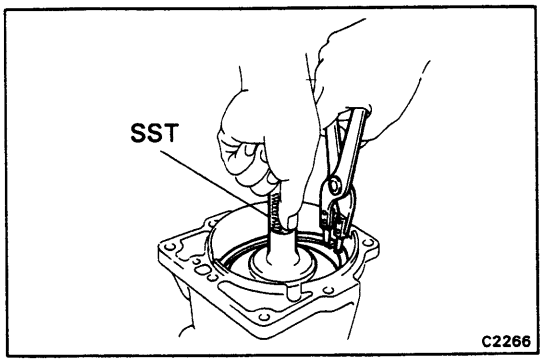
(b) Remove the intermediate shaft.



5. REMOVE SPEEDOMETER DRIVE GEAR

(a) Using snap ring pliers, remove the snap ring from the intermediate shaft.

(b) Remove the speedometer drive gear and locking ball.

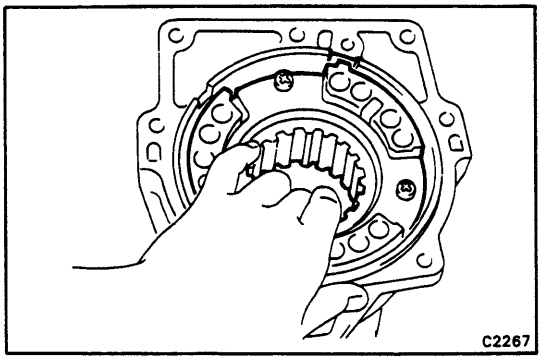


6. REMOVE REAR SERVO PISTON ASSEMBLY

(a) Using SST, push down the piston spring seat and remove the snap ring.

SST 09223-41020

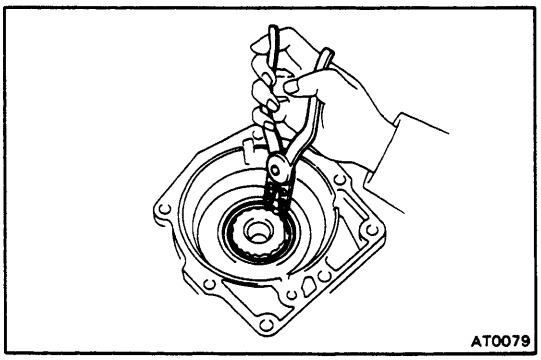
(b) Remove the piston spring seat and twelve springs from the rear servo piston.



(c) Remove the rear servo piston assembly from the extension housing.

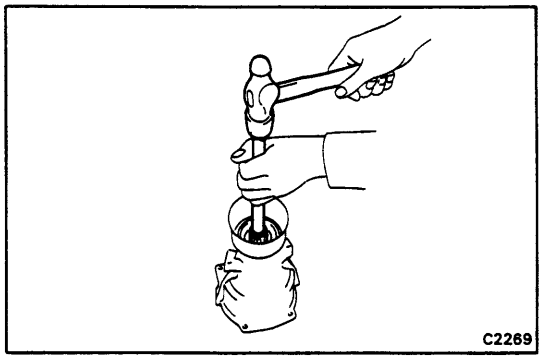
(d) Measure the compression spring free height.

Free height: 56 mm (2.21 in.)

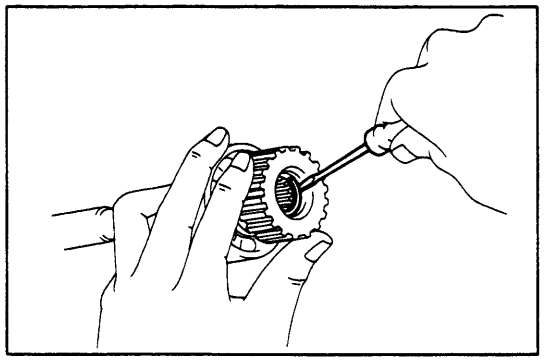


7. REMOVE REAR OUTPUT SHAFT

(a) Using snap ring pliers, remove the snap ring from the extension housing.



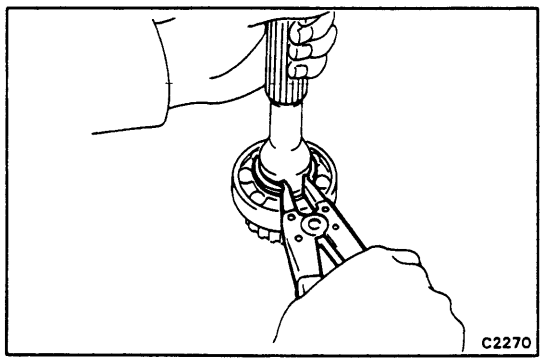
(b) Using a brass-bar and hammer, drive out the rear output shaft.



8. REMOVE NEEDLE ROLLER BEARING

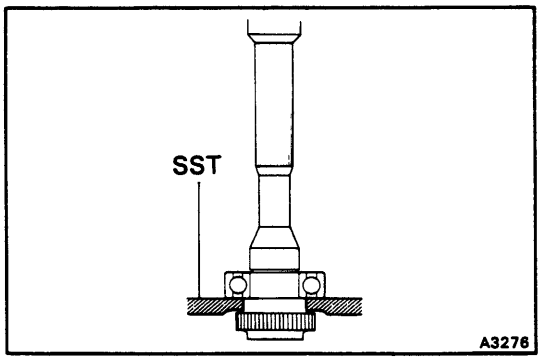
(a) Using a screwdriver, remove the snap ring from the rear output shaft.

(b) Remove the needle roller bearing from the rear output shaft.



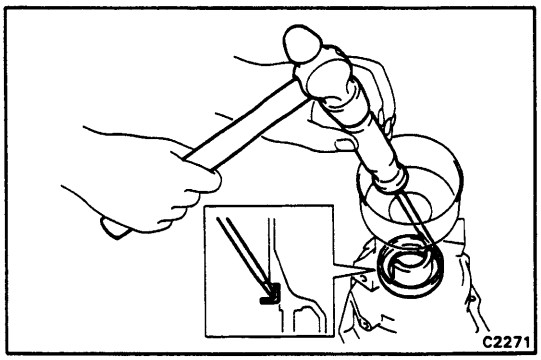
9. REMOVE RADIAL BALL BEARING

(a) Using snap ring pliers, remove the snap ring from the rear output shaft.



(b) Using SST and a press, remove the radial ball bearing from the rear output shaft.

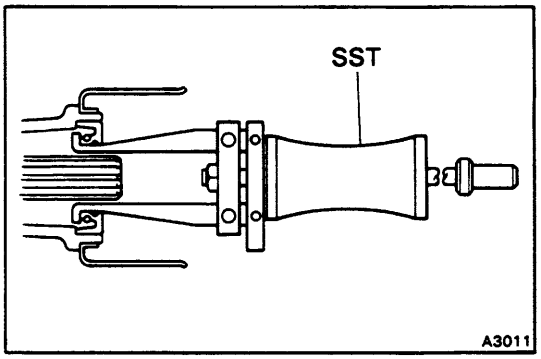
SST 09950-00020



10. REMOVE REAR DRIVE SHAFT COVER

Using a screwdriver and, drive out the rear drive shaft cover from the extension housing.

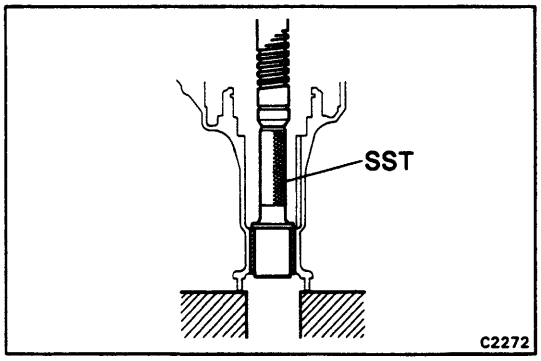
CAUTION: Without deforming the cover, tap the L-shaped circumference level.



11. REMOVE EXTENSION HOUSING OIL SEAL

Using SST, remove the oil seal from the extension housing.

SST 09308-00010



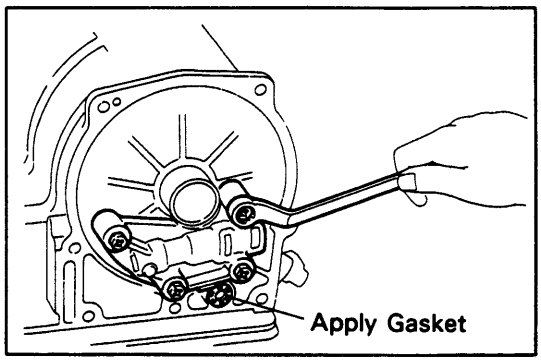
12. REMOVE EXTENSION HOUSING BUSHING

(a) Remove the deflector from the extension housing.

(b) Heat the extension housing to 80° – 100°C (176 – 212°F).

(c) Using SST and a press, remove the bushing.

SST 09307-12010



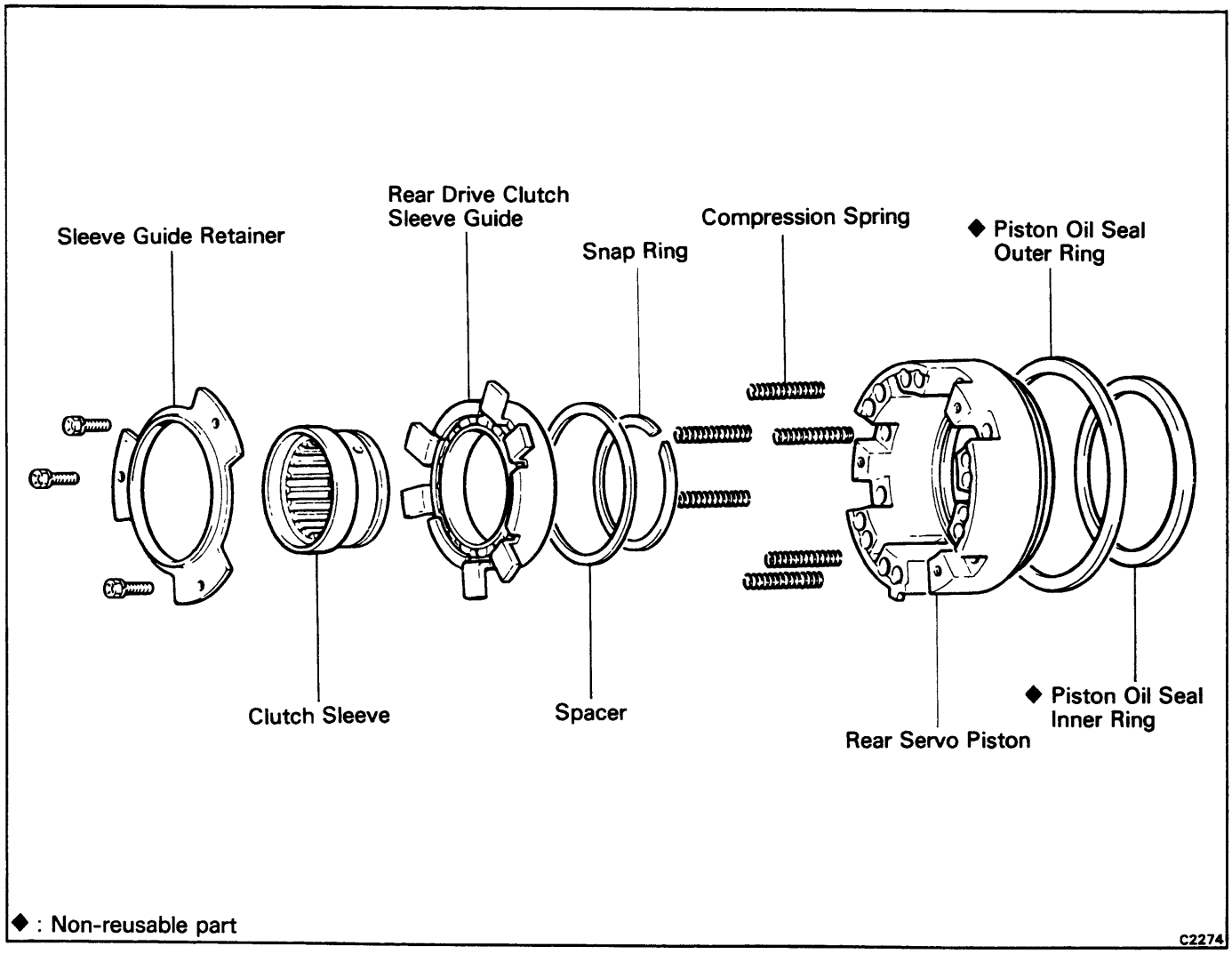
13. REMOVE REAR VALVE BODY

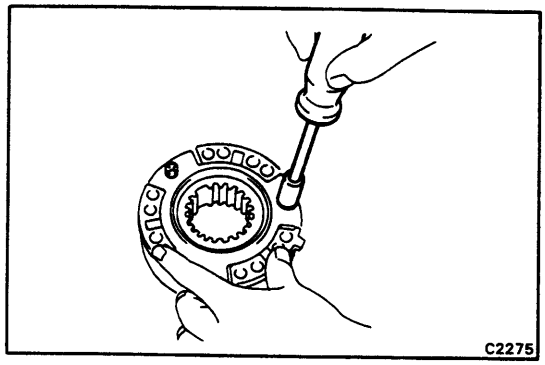
(a) Remove the four bolts.

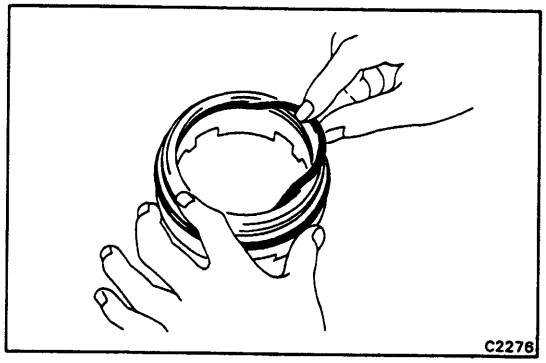
(b) Remove the rear valve body with the plate and two gaskets.

14. REMOVE APPLY GASKET

Rear Servo Piston Assembly







DISASSEMBLY OF REAR SERVO PISTON ASSEMBLY

1. REMOVE REAR SERVO PISTON

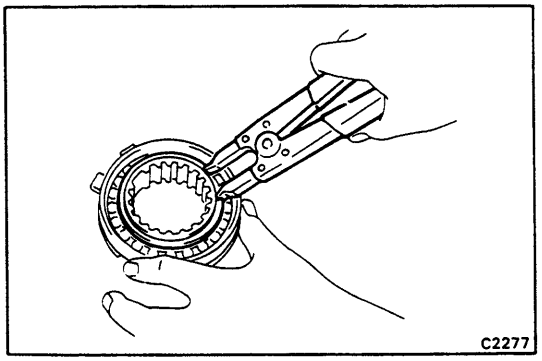
(a) Remove the three bolts and sleeve guide retainer.

(b) Remove the six compression springs.

(c) Remove the rear drive clutch sleeve guide with clutch sleeve from the rear servo piston.

(d) Remove the piston oil seal outer ring.

(e) Remove the piston oil seal inner ring.

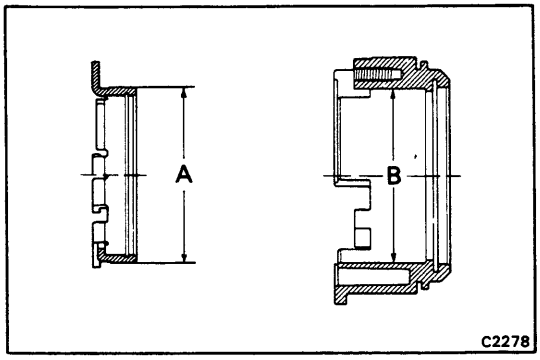


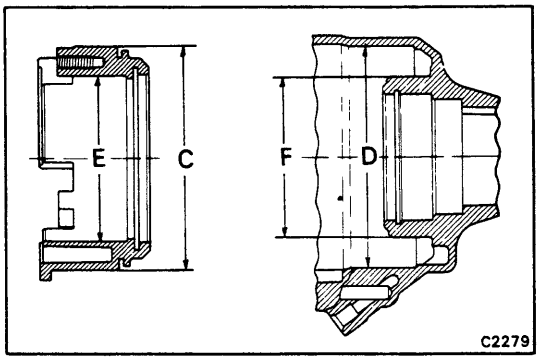
2. REMOVE CLUTCH SLEEVE

(a) Using snap ring pliers, remove the snap ring.

(b) Remove the spacer.

(c) Remove the sleeve from the clutch sleeve guide.





ASSEMBLY OF REAR SERVO PISTON ASSEMBLY

(See page AT-84)

1. MEASURE DIAMETER OF REAR SERVO PISTON ASSEMBLY

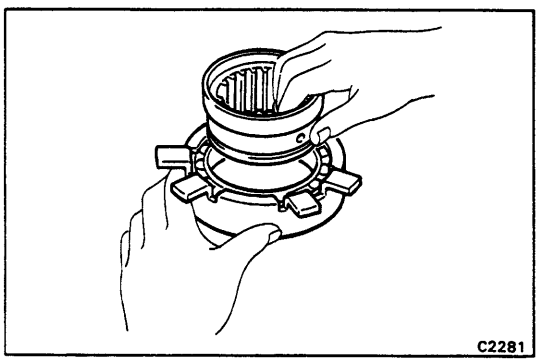
(a) Measure the outer diameter of the sliding portion of the clutch sleeve guide and inner diameter of the servo piston.

Standard A: 84.69 — 84.73 mm (3.3342 — 3.3358 in.)
B: 85.00 — 85.04 mm (3.3465 — 3.3480 in.)

(b) Measure the outer diameter of the servo piston, inner diameter of the sliding part, inner diameter of the extension housing and outer diameter of the sliding part.

Standard C: 113.79 — 113.82 mm (4.4799 — 4.4811 in.)
D: 114.00 — 114.04 mm (4.4882 — 4.4898 in.)
E: 82.30 — 82.34 mm (3.2402 — 3.2417 in.)
F: 81.89 — 81.92 mm (3.2240 — 3.2252 in.)

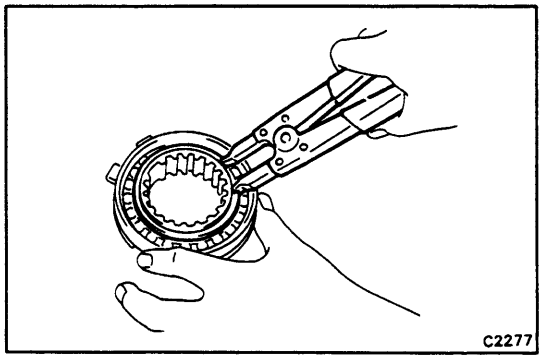
(c) Check each sliding part for scoring or wear.



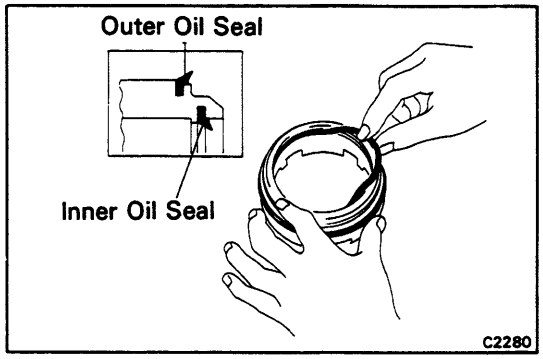
2. INSTALL CLUTCH SLEEVE TO CLUTCH SLEEVE GUIDE

(a) Install the sleeve to the clutch sleeve guide.

(b) Install the spacer.



(c) Using snap ring pliers, install the snap ring.

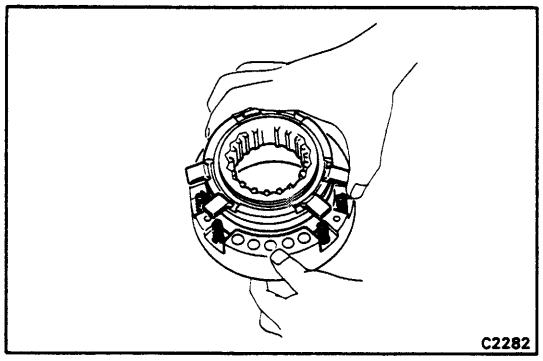


3. ASSEMBLY REAR SERVO PISTON

(a) Apply ATF (DEXRON III) to new piston oil seal inner and outer rings.

(b) Install the piston oil seal inner and outer rings to the servo piston.

NOTE: Be careful not to install new rings in the wrong direction.

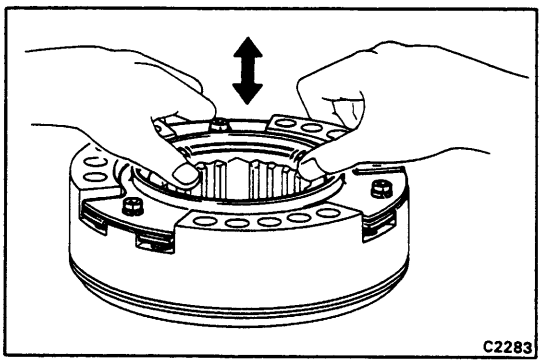


(c) Install the six compression springs to the servo piston.

(d) Apply MP grease to the clutch sleeve guide.

(e) Install the clutch sleeve guide and retainer to the servo piston.

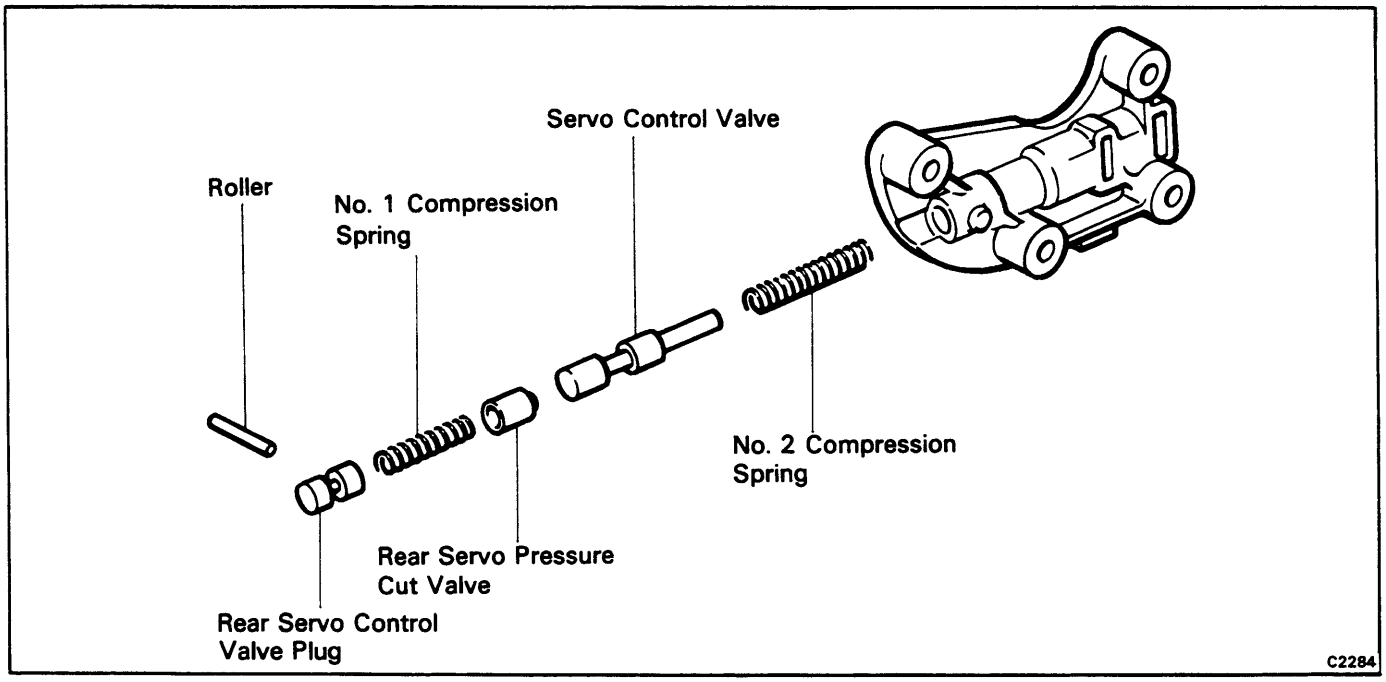
Torque: 50 kg-cm (43 in.-lb, 4.9 N·m)

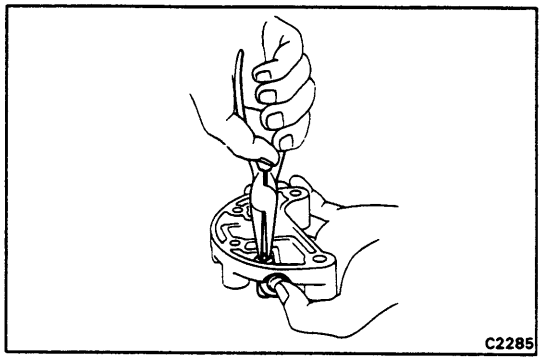


4. INSPECT REAR SERVO ASSEMBLY

Push the sleeve by hand and check that clutch sleeve guide slides smoothly in the servo piston.

Rear Valve Body



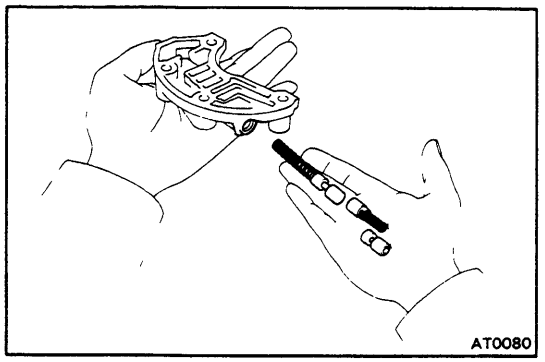


DISASSEMBLY OF REAR VALVE BODY

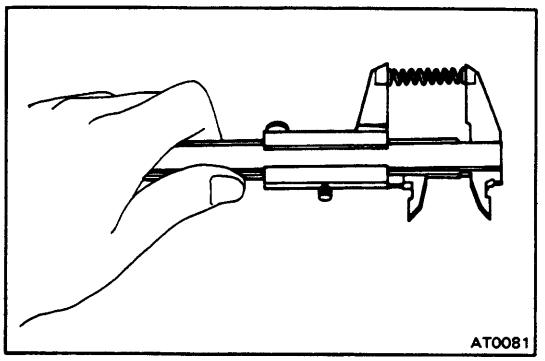
1. REMOVE PLUG VALVES AND SPRINGS

(a) Push the plug with your finger and remove the roller.

CAUTION: The spring is compressed so be careful that the valve does not fly out.



(b) Remove the rear servo control valve plug.
(c) Remove the No. 1 compression spring.
(d) Remove the rear servo pressure cut valve.
(e) Remove the servo control valve.
(f) Remove the No. 2 compression spring.



2. MEASURE TWO COMPRESSION SPRING FREE HEIGHT

(a) Measure the No. 1 compression spring free height.

Free length: 31.8 mm (1.252 in.)

(b) Measure the No. 2 compression spring free height.

Free length: 48.4 mm (1.906 in.)

ASSEMBLY OF REAR VALVE BODY

(See page AT-87)

INSTALL SPRINGS, VALVES AND PLUG

(a) Apply ATF DEXRON II to each valve.

(b) Install the No. 2 compression spring.

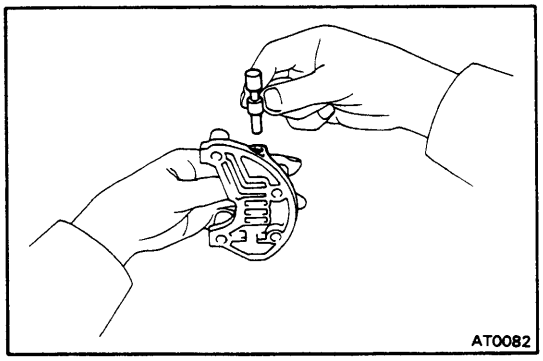
(c) Install the rear servo control valve.

(d) Install the rear servo pressure cut valve.

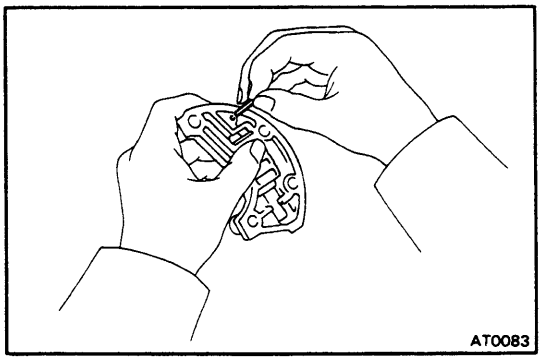
(e) Install the No. 1 compression spring.

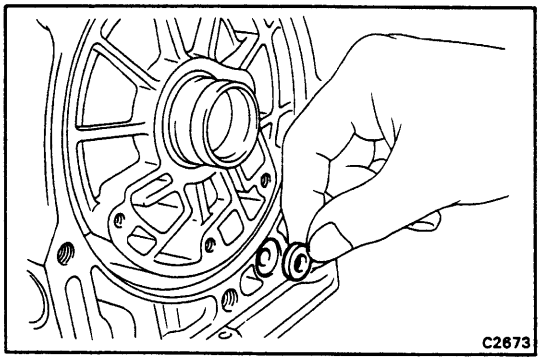
(f) Install the rear servo control valve plug.

NOTE: Be careful not to assemble the valve in the wrong direction. The valve should slide smoothly by its own weight.



(g) Push the valve by finger and install the roller.

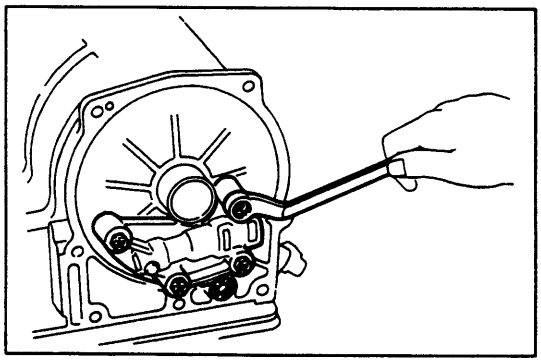




Assembly of 4WD Change-over Mechanism

(See page AT-80)

1. INSTALL APPLY GASKET

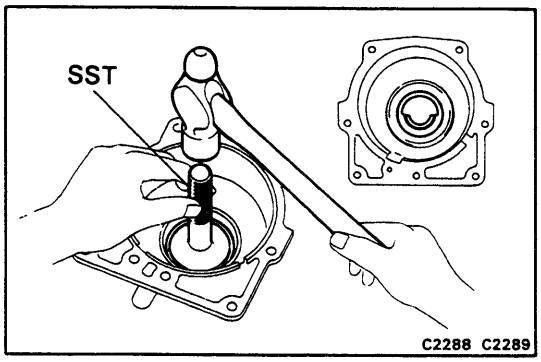


2. INSTALL REAR VALVE BODY

(a) Install the valve body with two gaskets and plate to the transmission.

(b) Torque the four bolts.

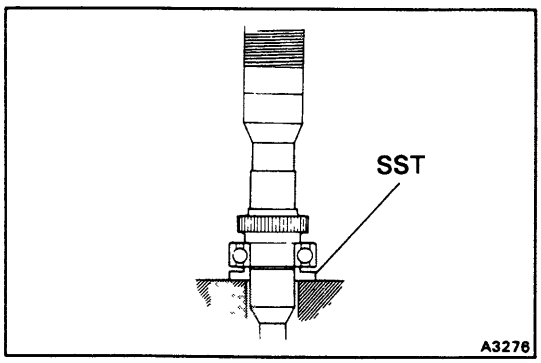
Torque: 55 kg-cm (48 in.-lb, 5.4 N·m)



3. INSTALL REAR DRIVE SHAFT COVER

Using SST and a hammer, drive the drive shaft cover into the extension housing.

SST 09608-30011



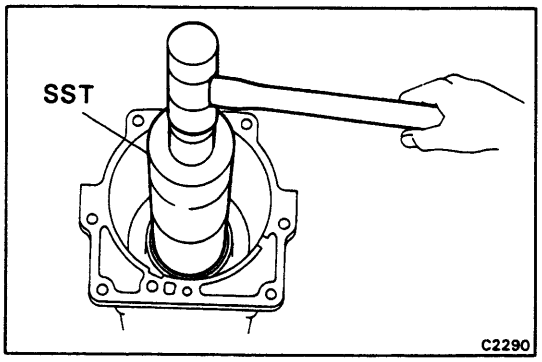
4. INSTALL OUTPUT SHAFT

(a) Using SST and a press, install the radial ball bearing to the output shaft.

SST 09506-30011

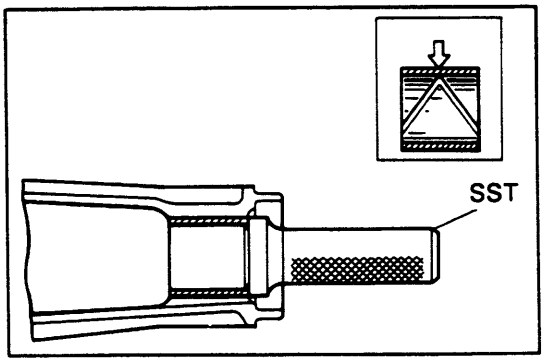
(b) Using snap ring pliers, install the snap ring to the output shaft.

(c) Install the needle roller bearing and snap ring to the output shaft.



(d) Using SST and a plastic hammer, install the output shaft to the extension housing.

SST 09316-60010

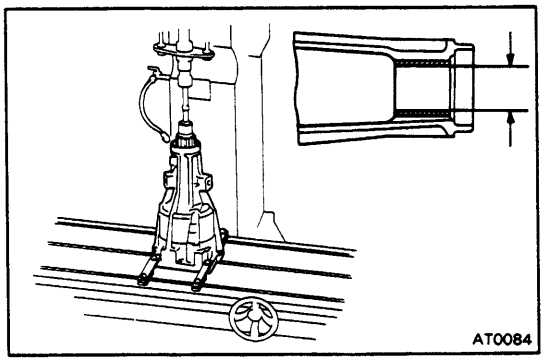


5. INSTALL EXTENSION HOUSING BUSHING

(a) Heat the extension housing to 80 – 100°C (176 – 212°F).

(b) Using SST and a hammer, install the bushing.

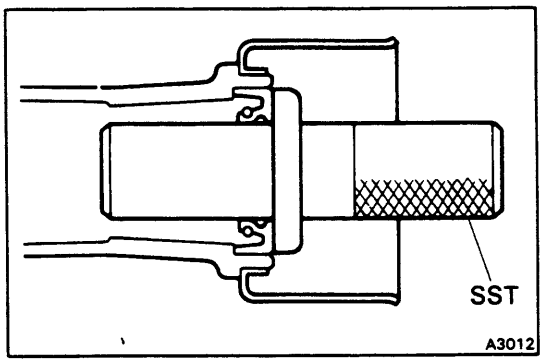
SST 09307-12010



(c) Using a honing machine, hone the inner surface of the bushing until standard inner diameter is obtained.

Standard inner diameter:
32.006 – 32.031 mm (1.2601 – 1.2611 in.)

(d) Install the deflector to the extension housing.

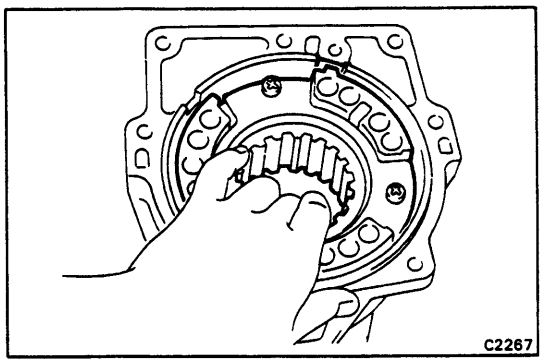


6. INSTALL EXTENSION HOUSING OIL SEAL

(a) Using SST and a hammer, drive in the oil seal. (even with the surface of the housing)

SST 09325-12010

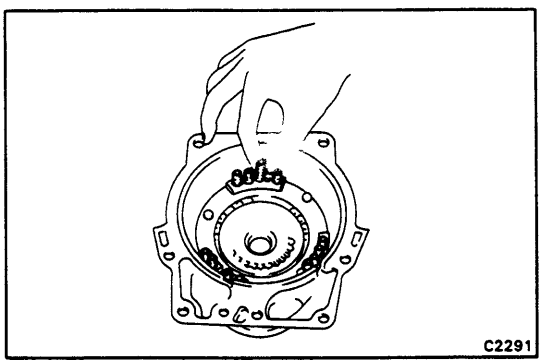
(b) Apply MP grease to the oil seal lip.



7. INSTALL REAR SERVO PISTON ASSEMBLY

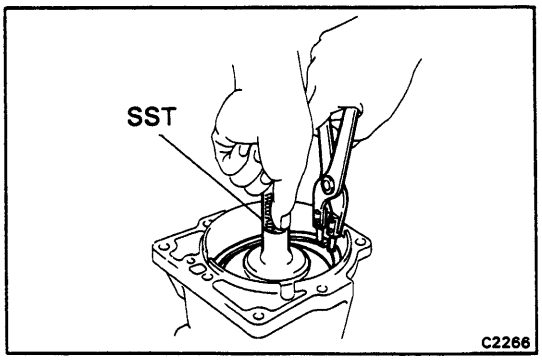
(a) Apply ATF (DEXRON II) to the extension housing and piston sliding parts.

(b) Align the protruding part of the extension housing in the groove, and assemble the piston to the extension housing. Be careful not to damage the piston oil seal.



(c) Install the twelve compression springs to the servo piston.

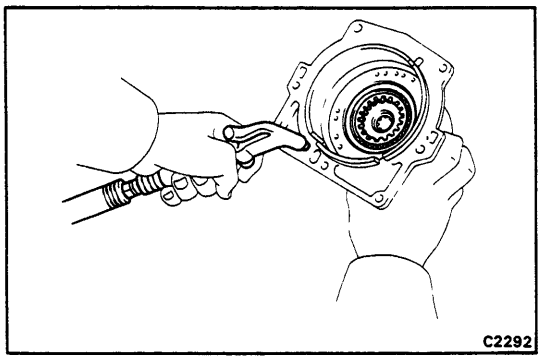
(d) Clean the oil cleaner magnet and install it to the spring seat.



(e) Install the spring seat on the rear servo piston.

(f) Using SST, push down the spring seat and install the snap ring.

SST 09223-41020

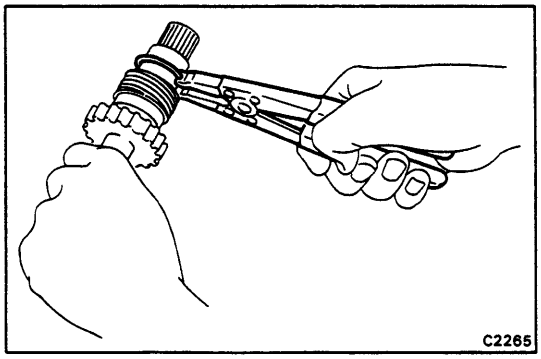


8. CHECK OPERATION OF REAR SERVO PISTON

(a) Using compressed air (approx. 2 kg/cm², 28 psi or 196 kPa) confirm that the piston is fully seated against the return spring stopper.

(b) Check the piston stroke.

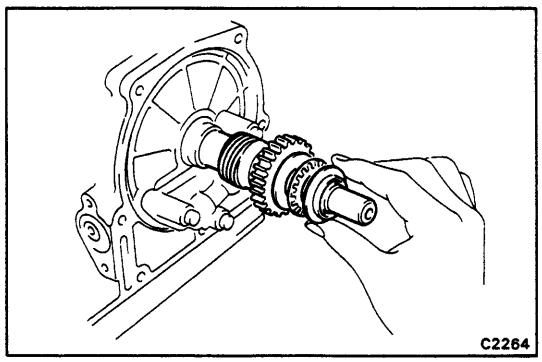
Standard piston stroke: 10 mm (0.39 in.)



9. INSTALL SPEEDOMETER DRIVE GEAR

(a) Install the locking ball and speedometer drive gear to the intermediate shaft.

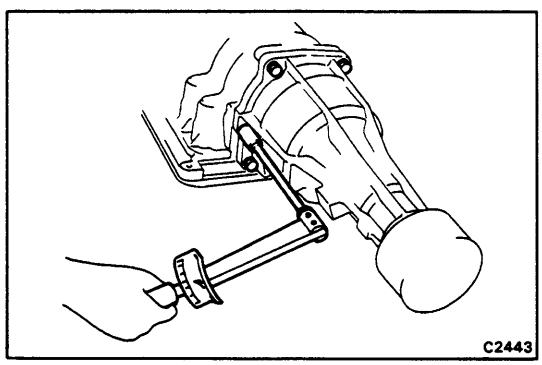
(b) Using snap ring pliers, install the snap ring.



10. INSTALL INTERMEDIATE SHAFT

(a) Install the intermediate shaft to the transmission.

(b) Install the bearing race, bearing and bearing race.



11. INSTALL EXTENSION HOUSING AND GASKET

Torque: 185 kg-cm (13 ft-lb, 18 N·m)

12. INSTALL SPEEDOMETER DRIVEN GEAR

13. INSTALL 4WD CHANGE-OVER SOLENOID

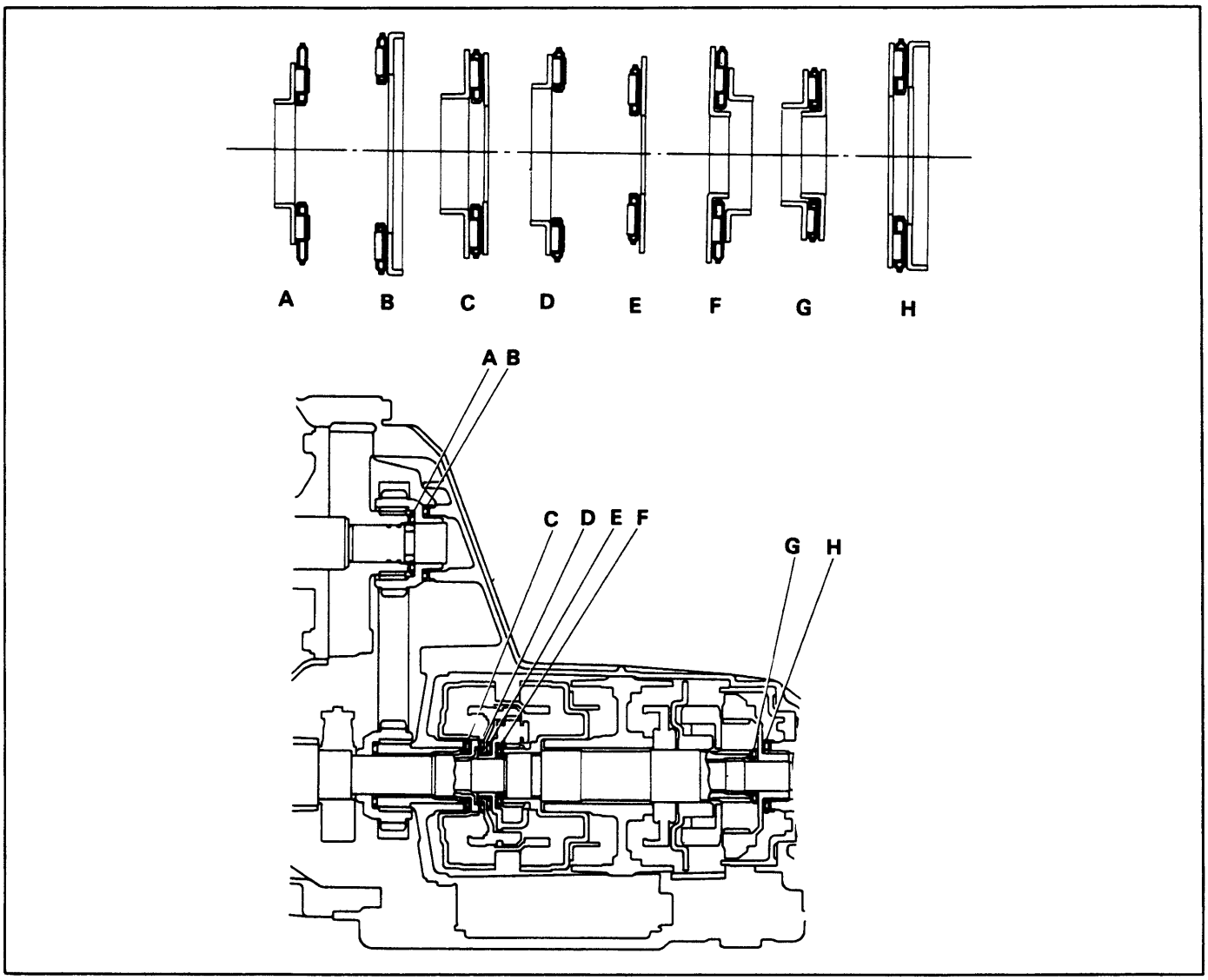
ASSEMBLY OF TRANSMISSION

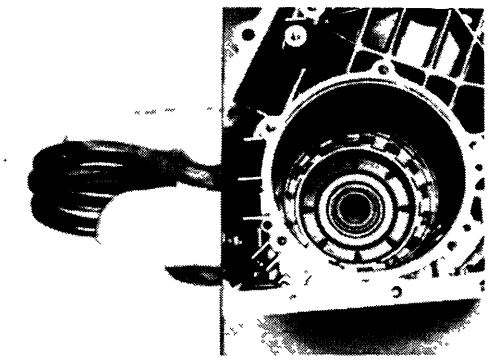
Disassembly, inspection and assembly of each component group have been indicated in the preceding chapter. This chapter deals with assembly A55 transmission.

Before assembly, make sure again that all component groups are assembled correctly. If something wrong is found in a certain component group during assembly, inspect and repair this group immediately.

GENERAL ASSEMBLY NOTE:

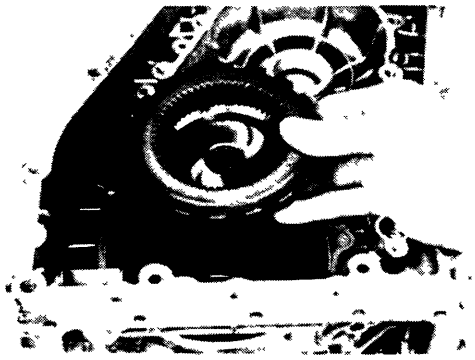
1. The automatic transmission is composed of highly precision-finished parts, necessitating careful inspection before assembly because even a small nick could cause fluid leakage or affect performance.
2. Before assembling new clutch discs, soak them in automatic transmission fluid for at least two hours.
3. Apply automatic transmission fluid on sliding or rotating surfaces of the parts before assembly.
4. Use petroleum jelly to keep the small parts in their places.
5. Do not use adhesive cements on gaskets and similar parts.
6. When assembling the transmission, be sure to use new gaskets and O-rings.
7. Dry all parts by blowing them with compressed air. Never use shop rags.
8. Be sure to install the thrust bearings and races in the correct direction and position.



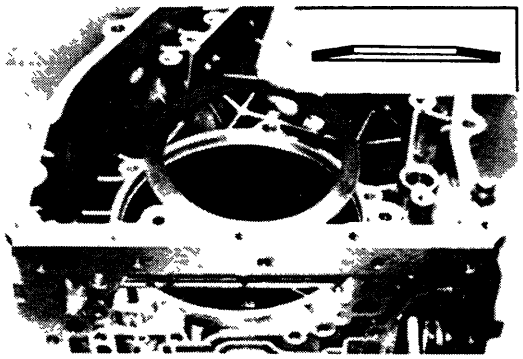


1. **INSTALL THRUST WASHER AND BEARING**

Install the thrust washer, facing the cup side downward.

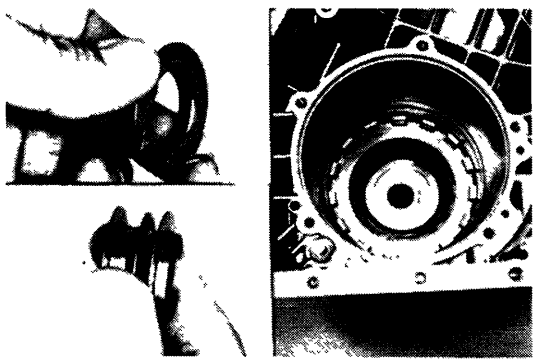


2. **INSTALL REAR PLANETARY RING GEAR**



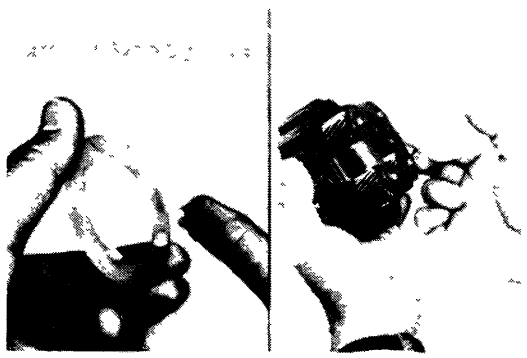
3. **INSTALL NO. 3 BRAKE CUSHION PLATE, DISC AND PLATE**

Be sure to assemble the brake cushion plate in the correct direction.



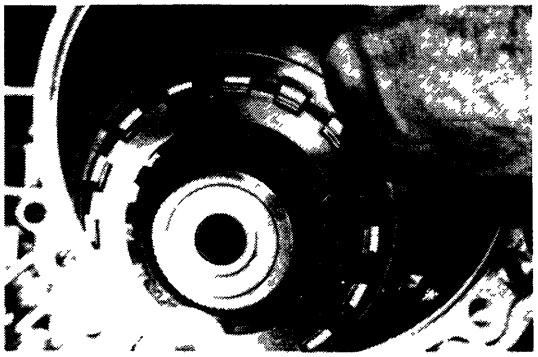
4. **INSTALL THRUST BEARING**

Coat the race with petroleum jelly and stick it onto the ring gear.

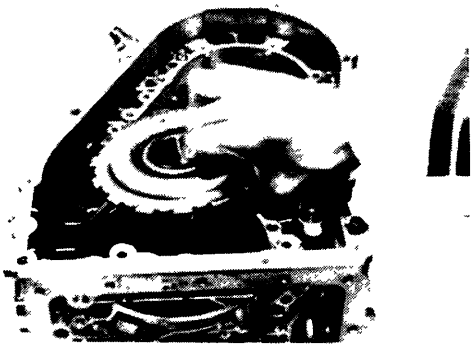


5. **INSTALL REAR PLANETARY GEAR AND THRUST WASHER**

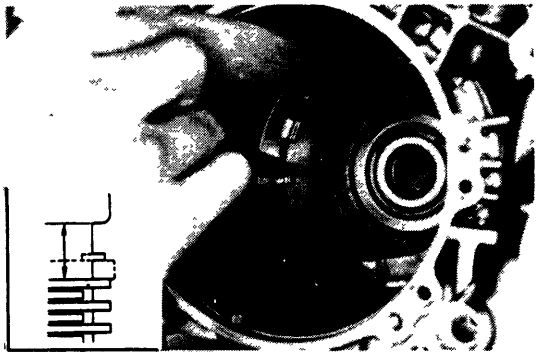
(a) After aligning the notch and tab, coat the thrust washer with petroleum jelly and stick it onto the planetary gear.



(b) Before assembling the planetary gear, align the disc flukes.



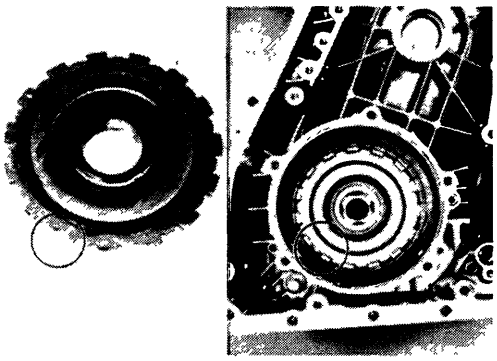
(c) Install the rear planetary gear.



6. MEASURE NO. 3 BRAKE CLEARANCE

To prevent the plate from tilting while measuring, hold it down with two hammer handles.

Standard clearance: 10.04 — 11.30 mm (0.3953 — 0.4449 in.)

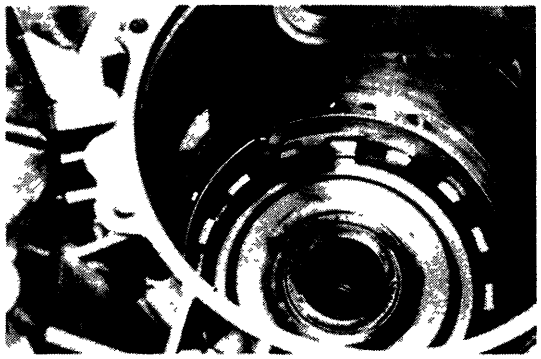


7. INSTALL REACTION PLATE

Align the portion of the reaction plate marked "A" with the "B" portion of the transmission case.

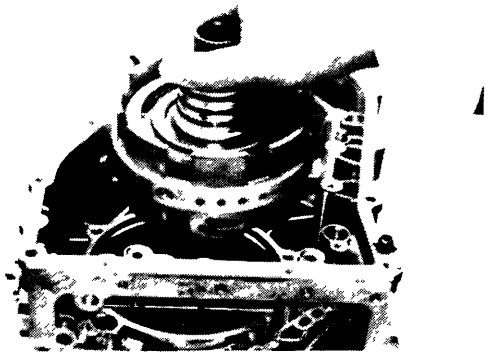
NOTE: Groove "B" is larger than the other grooves.

The reaction plate is correctly installed if the snap ring groove is fully visible.



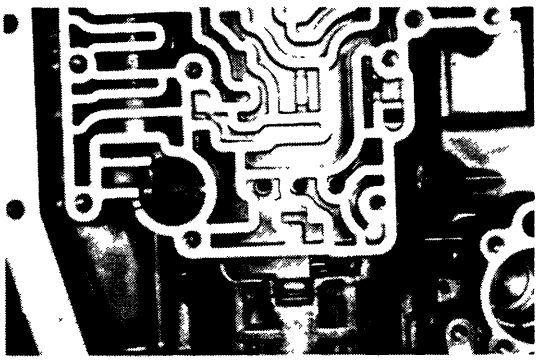
8. INSTALL SNAP RING

Use a large screwdriver to compress the snap ring. Push it into the place by hand. Work around the case. Visually check to make sure that the ring is fully seated. Make sure that the ends of the snap ring are between the lugs.



9. PUSH CENTER SUPPORT ASSEMBLY INTO CASE

Align the oil hole and bolt hole of the center support with those of the body side and insert.



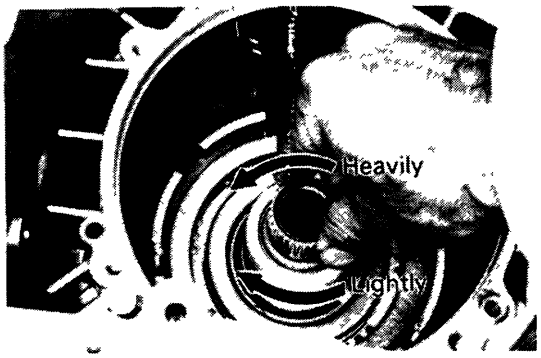
10. INSTALL TWO CENTER SUPPORT BOLTS WITH WAVE WASHERS

Align the center support with holes in the case and install the two bolts finger tight.

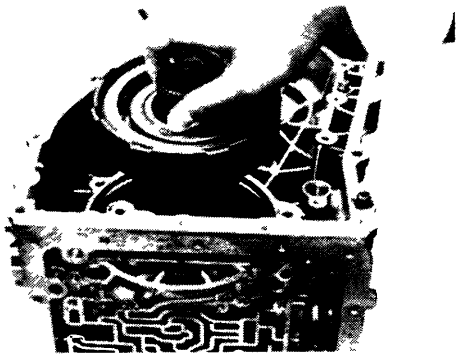
11. TIGHTEN TWO CENTER SUPPORT BOLTS

(a) Tighten the bolts alternately in 70 kg-cm (61 in.-lb, 6.9 N·m) increments.

Torque: 260 kg-cm (19 ft-lb, 25 N·m)



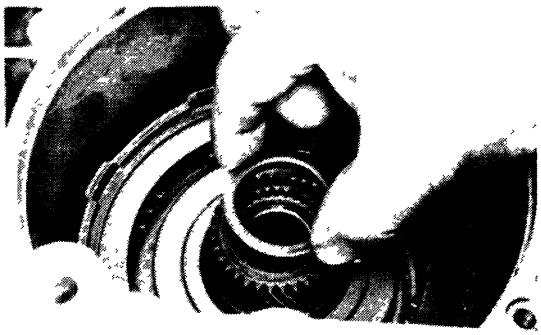
(b) Confirm that the sun gear turns lightly in clockwise direction and heavily in counterclockwise direction.



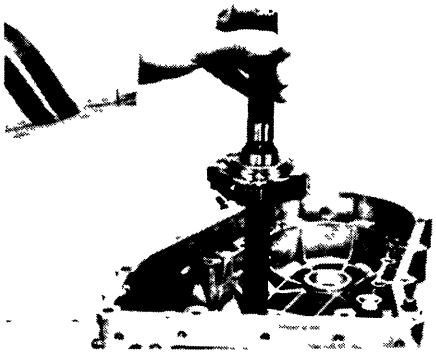
12. INSTALL REAR CLUTCH IN CASE

Rotate the clutch to mesh the hub with the center support.

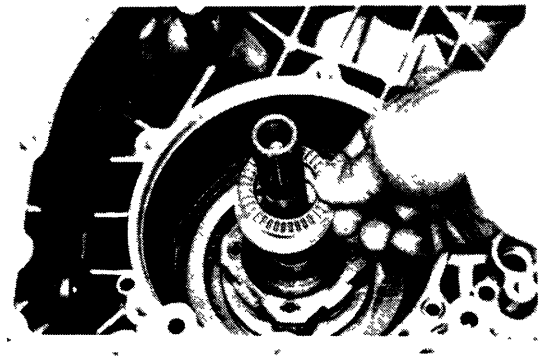
NOTE: Confirm that the B_1 brake is securely meshed with the rear clutch drum. Approx 4 mm (0.16 in.) depth from sun gear to shaft.



13. INSTALL THRUST BEARING RACE



14. INSTALL OUTPUT SHAFT AND FRONT PLANETARY GEAR

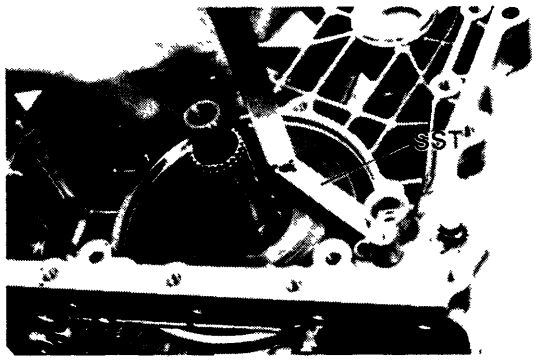


15. INSTALL THRUST BEARING AND RACE



16. INSTALL FRONT CLUTCH ASSEMBLY IN CASE

Align the flukes of the rear clutch discs and mesh them with the front clutch hub. Push the front clutch assembly into the case.

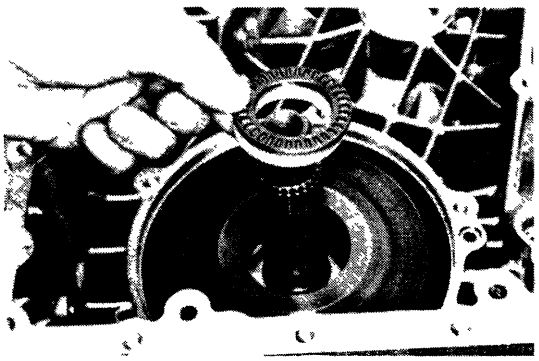


17. CHECK CORRECT INSTALLATION OF FRONT CLUTCH

Set SST on the transmission case as shown in the figure. Measure the distance between the top surface of the case and front clutch assembly. If the distance corresponds to specification, the front clutch is installed correctly.

SST 09350-20013

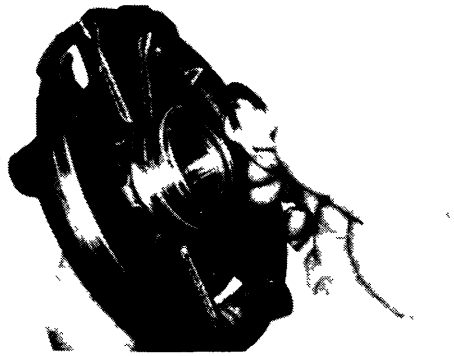
Height: 0.6 — 1.6 mm (0.024 — 0.063 in.)



18. INSTALL THRUST BEARING AND RACE

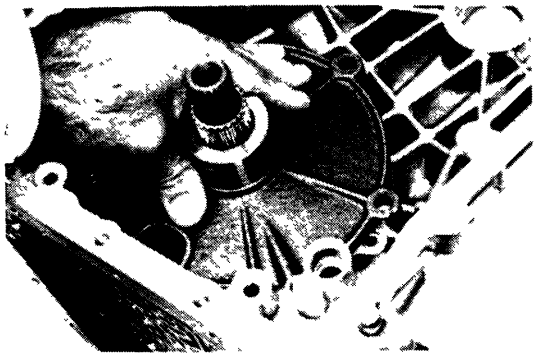


19. INSTALL O-RING ON CASE



20. INSTALL THRUST WASHER ON FRONT SUPPORT

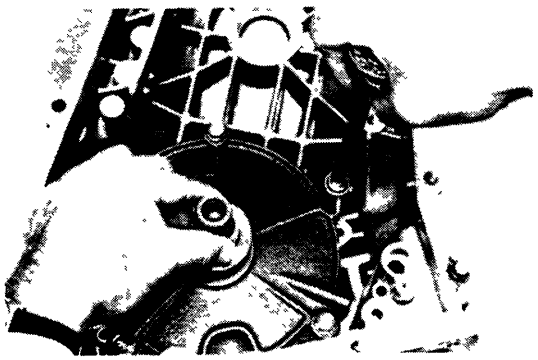
Coat the thrust washer with petroleum jelly and set it into place, facing the lip side toward the front support.



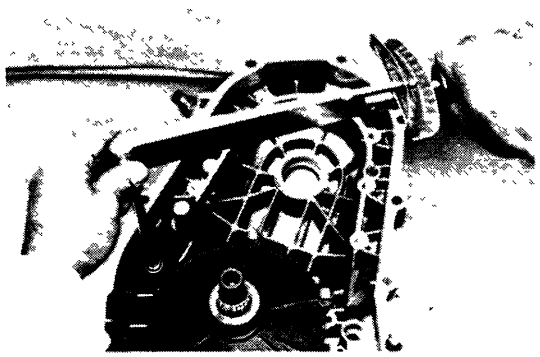
21. INSTALL FRONT SUPPORT ON CASE

(a) Install the front support to the case and confirm that there is no clearance between the surfaces of the support and case when pressing down with your hand.

NOTE: If there is a clearance, the front clutch is not completely installed.

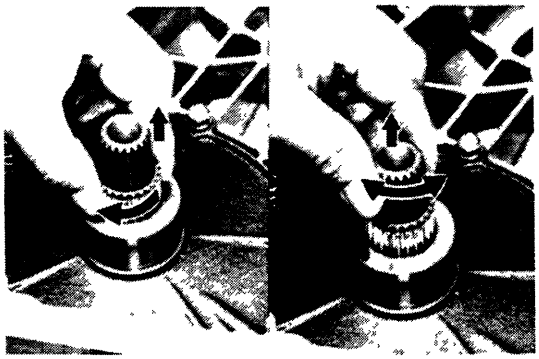


(b) Confirm that there is thrust play on the input shaft and tighten the bolts in diagonal order.



(c) Tighten the bolts a little at a time in two or three stages and in diagonal order.

Torque: 195 kg-cm (14 ft-lb, 19 N·m)



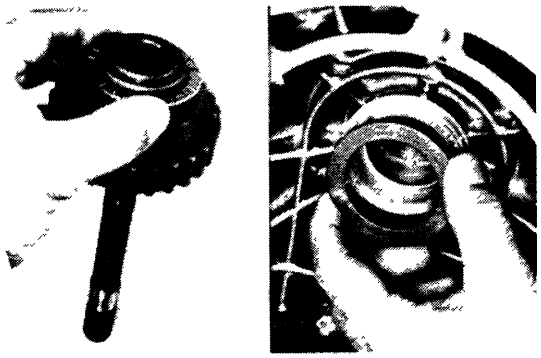
22. CHECK FRONT CLUTCH INPUT SHAFT AND OUTPUT SHAFT

(a) Make sure that the front clutch input shaft has play in axial direction and that it turns.

Thrust play: 0.24 — 0.96 mm (0.0094 — 0.0378 in.)

(b) Make sure that the output shaft has thrust play in axial direction.

Thrust play: 0.31 — 1.53 mm (0.0122 — 0.0602 in.)



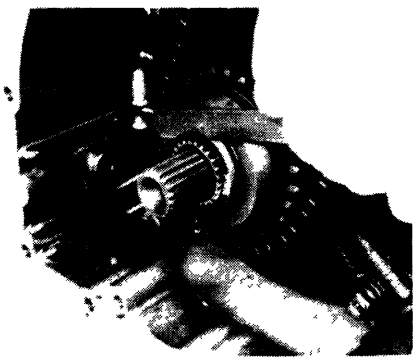
23. INSTALL BEARING ON DRIVE SPROCKET

24. INSTALL THRUST RACE ON CASE

Coat the thrust race with petroleum jelly and install the lip side toward the case.



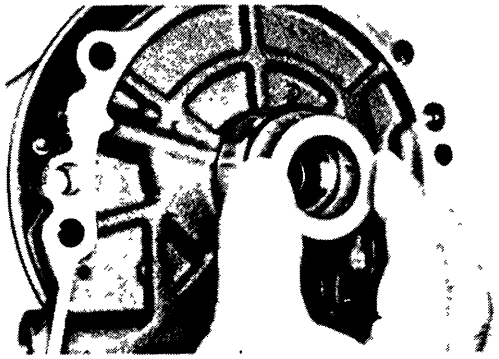
25. INSTALL INPUT SHAFT, DRIVE SPROCKET CHAIN AND DRIVEN SPROCKET



26. INSTALL SNAP RING

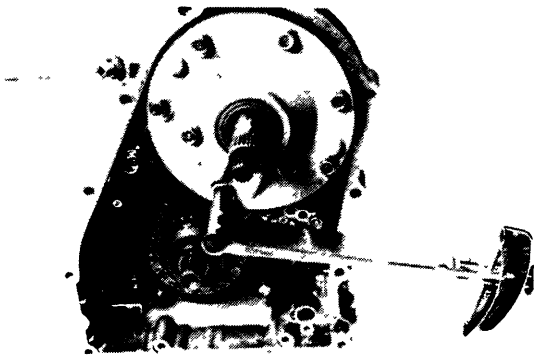
27. CHECK CLEARANCE BETWEEN SNAP RING AND DRIVEN SPROCKET

Thrust clearance:
0.11 — 0.69 mm (0.0043 — 0.0272 in.)



28. INSTALL THRUST RACE ON OIL PUMP

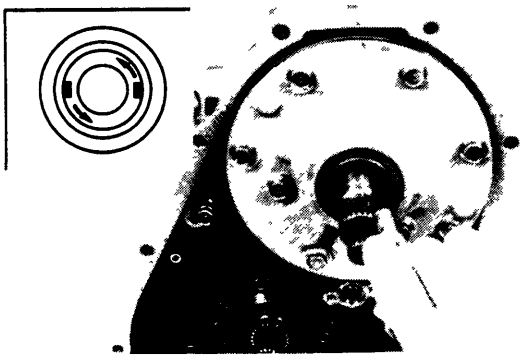
Coat the thrust race with petroleum jelly and install the lip side toward the pump body.



29. INSTALL OIL PUMP

Tighten the set bolts gradually and evenly.

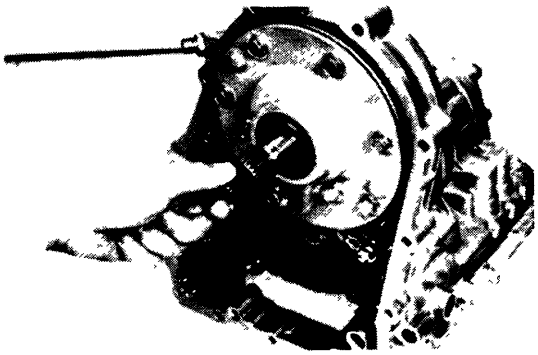
Torque: 185 kg-cm (13 ft-lb, 18 N·m)



30. CHECK OIL PUMP

Confirm that the drive gear rotates smoothly.

NOTE: Do not damage the oil seal lip.

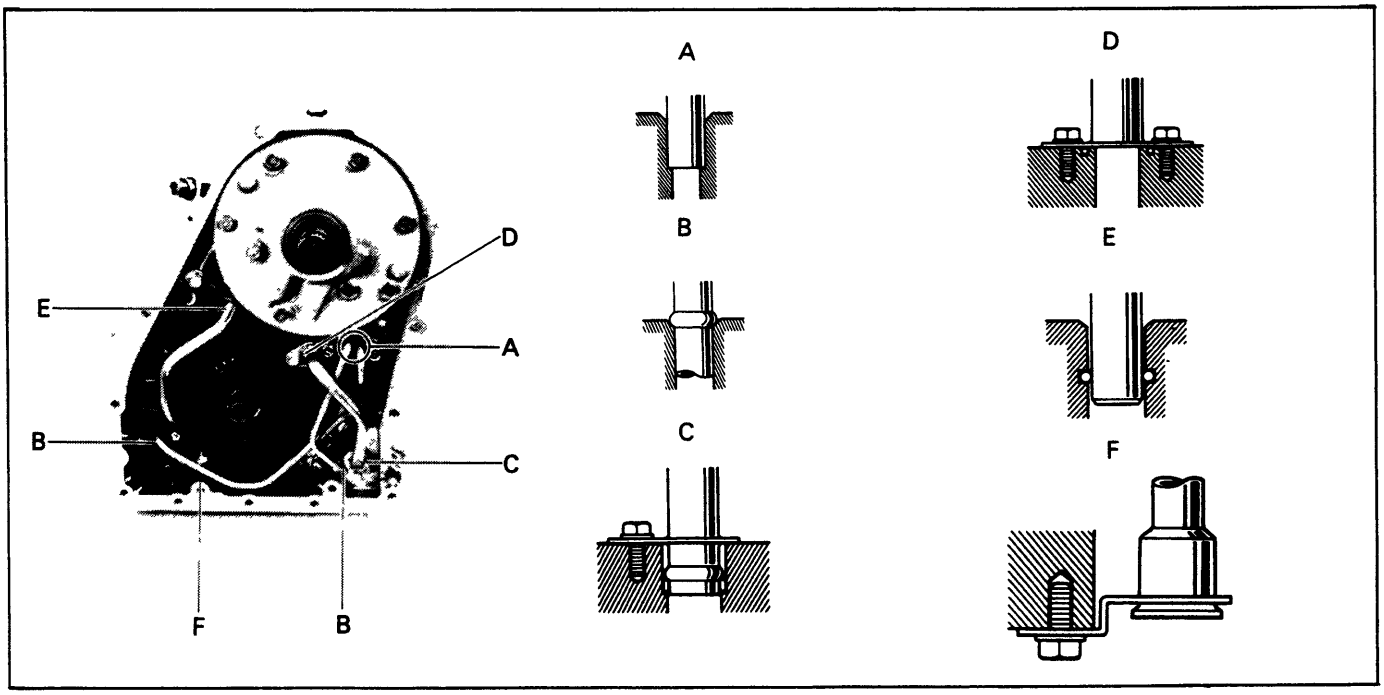


31. CHECK INPUT SHAFT

Make sure that the input shaft has play in axial direction and that it turns.

Thrust play: 0.10 — 0.70 mm (0.0039 — 0.0276 in.)

32. INSTALL TUBE AND O-RING

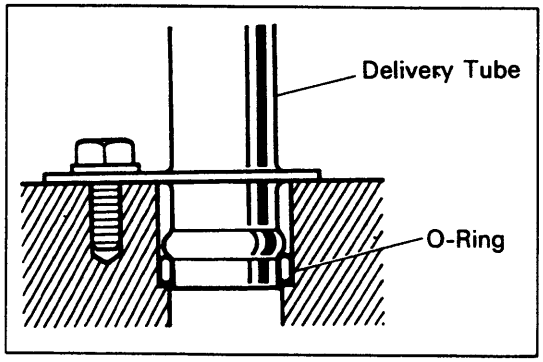




(a) Temporarily tighten the suction tube bracket.

NOTE: Always use a new O-ring.

Drive in the tube until it makes contact with either the bulge or the stopper.



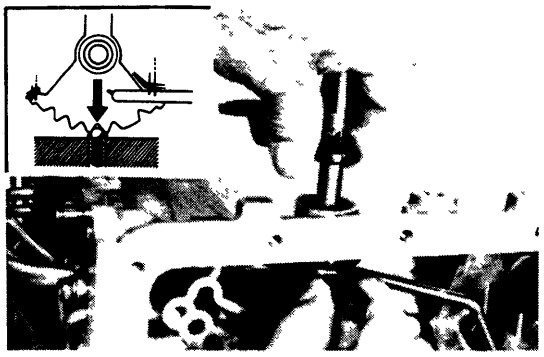
(b) After installing the O-ring on the delivery tube, install the tube into the transmission case.

33. INSTALL MANUAL VALVE LEVER SHAFT INTO CASE



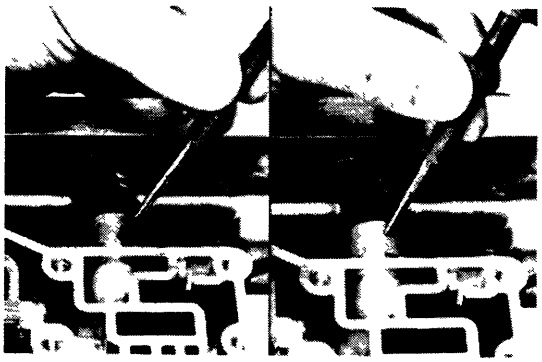
(a) Assemble a new spacer to the manual valve lever.

NOTE: Always replace the spacer and slotted spring pin with a new one. Never reuse a slotted spring pin after it has been removed.



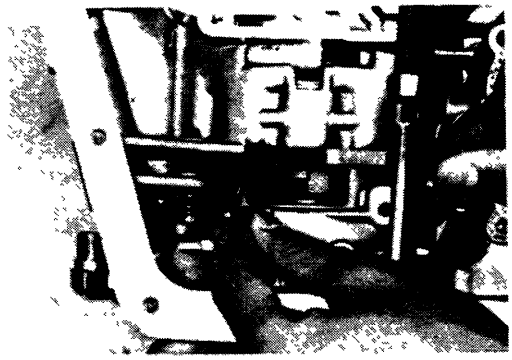
(b) Install the manual valve lever.

(c) While holding the ditent ball with the plate, install the manual valve shaft.

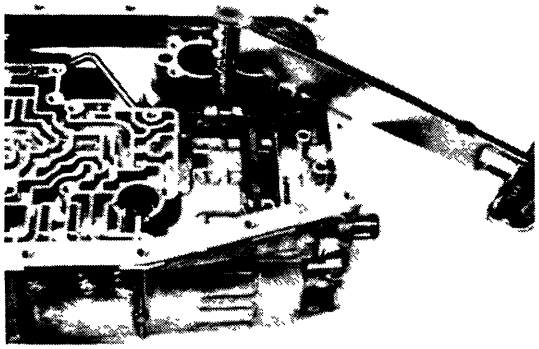


(d) Drive in the slotted spring pin.

(e) After assembly, turn the spacer 90° and stake it.



34. INSTALL PARK PAWL, PIVOT PIN AND SPRING IN CASE

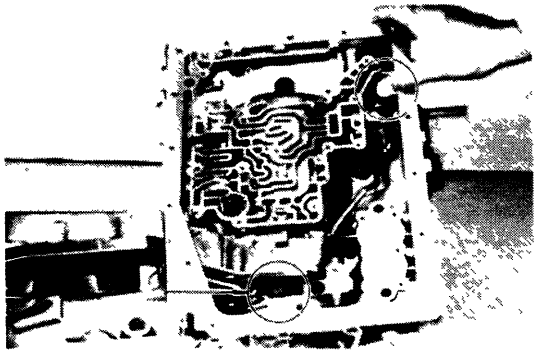


35. INSTALL PARK PAWL BRACKET ON CASE

Make sure the collar on the parking lock rod is facing toward the front of the transmission.
Tighten the two bolts. Make sure the pawl moves freely.

NOTE: It is possible for the bracket to be installed too far forward, where it will bind the pawl.

Torque: 75 kg-cm (65 in.-lb, 7.4 N·m)



36. CHECK OPERATION OF PARK LOCK PAWL

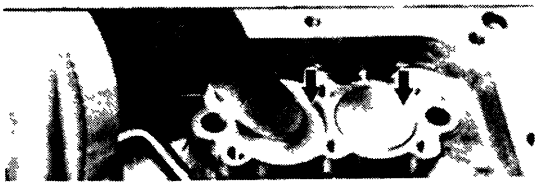
Make sure the planetary gear output shaft is locked when the manual valve lever is in the "P" range.

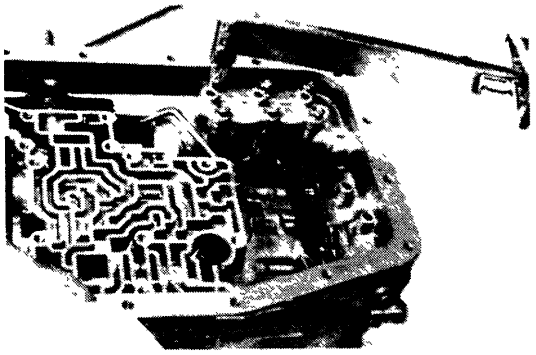


37. INSTALL ACCUMULATOR PISTON AND SPRINGS

(a) Be sure to install the accumulator spring and piston in correct direction.

(b) Fully install the pistons into the cylinder by hand.



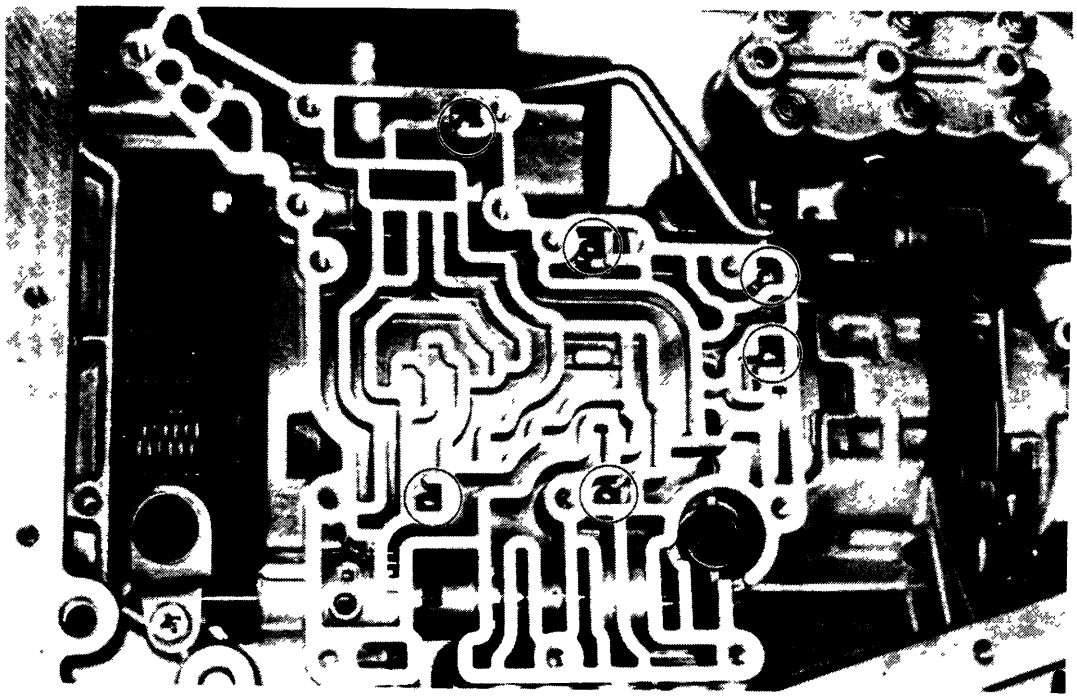


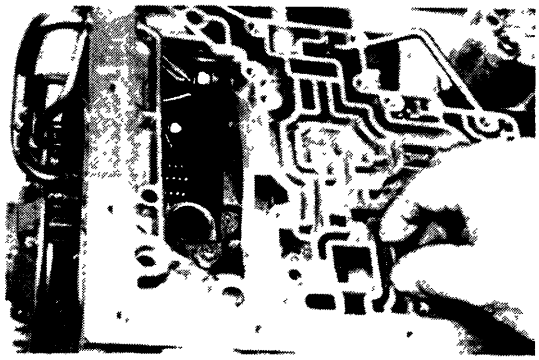
(c) Be sure to assemble the gasket in correct direction.

(d) Install the cover.

Torque: 55 kg-cm (48 in.-lb, 5.4 N·m)

38. INSTALL STEEL BALL

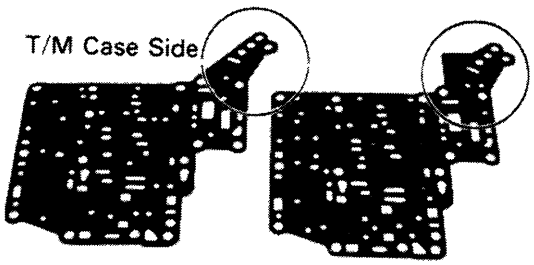




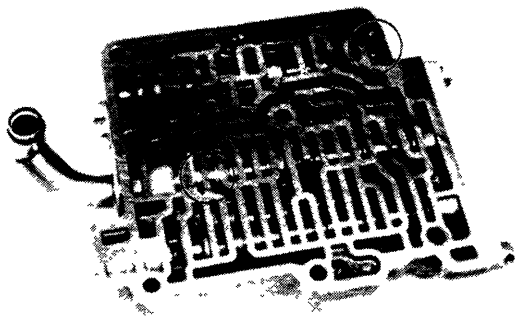
39. INSTALL VALVE BODY PLATE, GASKET VALVE BODY AND OIL STRAINER

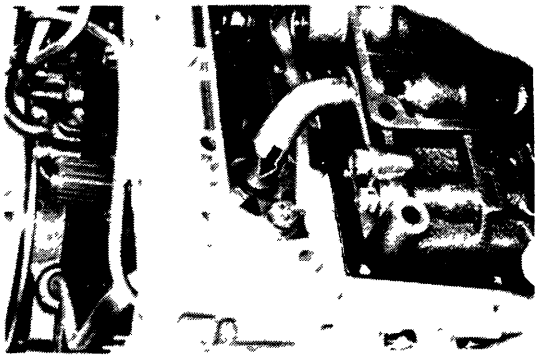
(a) Before installing the gasket, make sure the vibrating stopper is installed.

(b) Do not interchange the upper and lower gaskets.

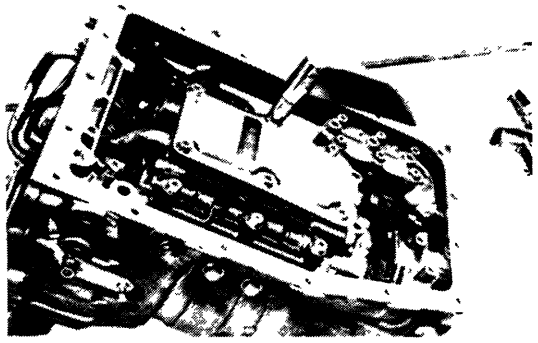


(c) Before assembling the valve body, confirm that the cut back plug lock pin has not fallen out.





(d) Connect the oil pump suction pipe and assemble the valve body to the upper case.

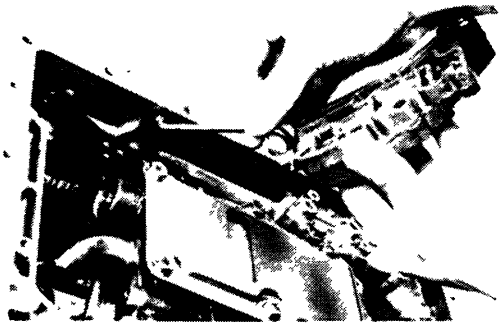


(e) Gradually tighten the bolts in diagonal order.

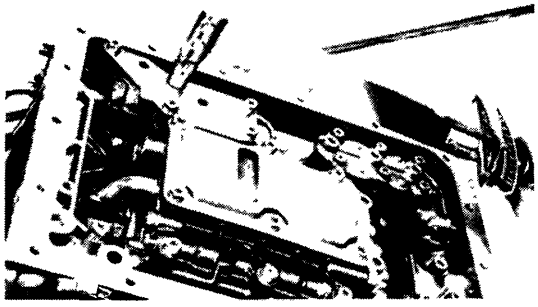
Torque: 55 kg-cm (48 in.-lb, 5.4 N·m)

NOTE: Also tighten the suction pipe bracket bolt.

40. INSTALL FRONT VALVE BODY AND ROD



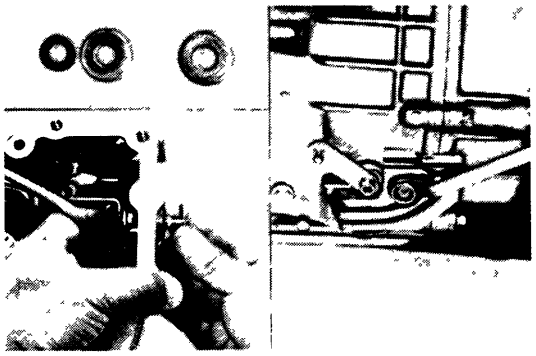
(a) Connect the manual valve connecting rod and manual valve, and then assemble the valve body.



(b) Gradually tighten the bolts in 3 or 4 stages.

Torque: 55 kg-cm (48 in.-lb, 5.4 N·m)

41. INSTALL THROTTLE LEVER



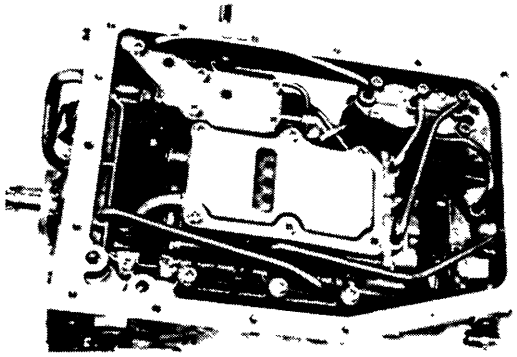
(a) Assemble one regular washer and one wave washer on the inside of the throttle lever and one regular washer on the outside.

(b) Check the thrust clearance after assembling the throttle lever.

Thrust clearance: Less than 0.50 mm (0.0197 in.)

If the clearance is more than 0.50 mm (0.0197 in.), insert a washer on the outer side.

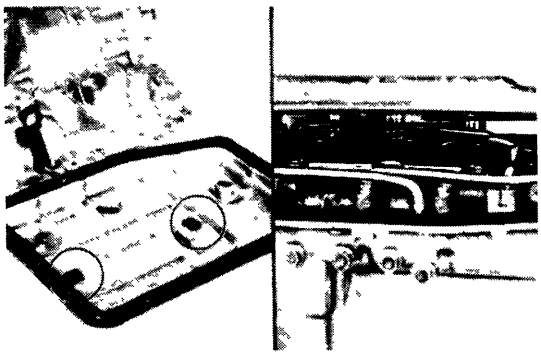
(c) Install the throttle cover.



42. INSTALL OIL TUBES

Press the tubes by hand into the positions indicated in the figure.

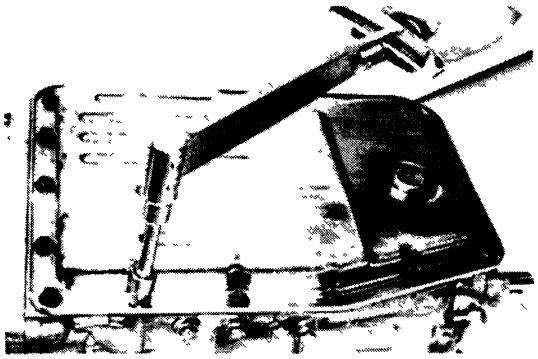
CAUTION: Be careful not to bend or damage the tubes.



43. INSTALL MAGNETS IN PAN AND INSTALL OIL PAN WITH NEW GASKET

(a) Clean the magnets and install a new gasket in the proper position.

(b) Prior to installing the oil pan, confirm that the tube will not interfere with it.



(c) Tighten the bolts.

Torque: 75 kg-cm (65 in.-lb, 7.4 N·m)

44. INSTALL DRAIN PLUG WITH NEW GASKET

Torque: 300 kg-cm (22 ft-lb, 29 N·m)



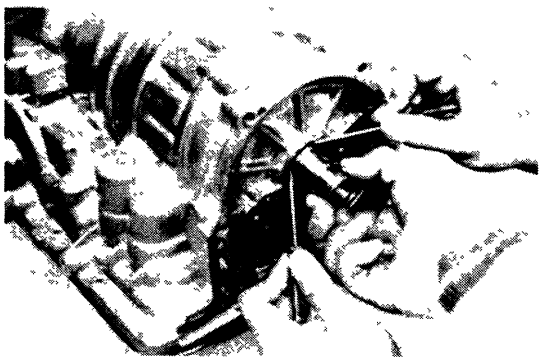
45. INSTALL TRANSAXLE GASKET AND GOVERNOR APPLY GASKET

Before assembling the transaxle, confirm that the governor apply gasket has not fallen out.

46. ASSEMBLE TRANSAXLE

Tighten the transmission mounting bolts.

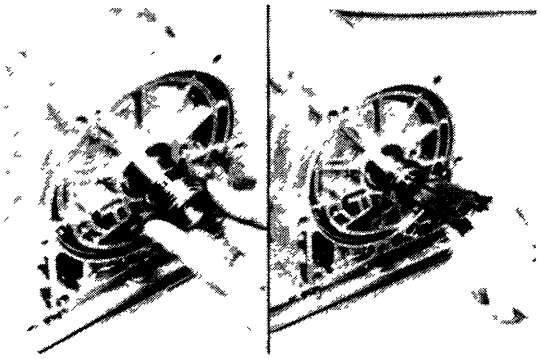
Torque: 195 kg-cm (14 ft-lb, 19 N·m)



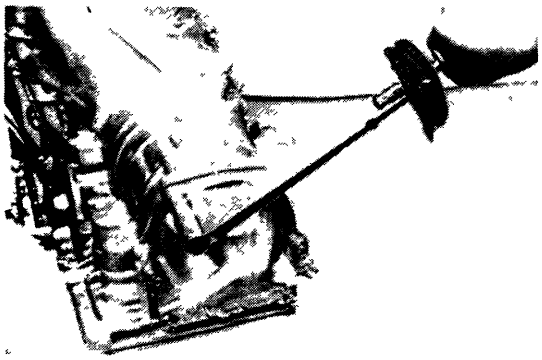
47. INSTALL OUTPUT SHAFT SLEEVE

(a) Install the oil seal ring to the output shaft sleeve.

(b) Install the output shaft sleeve to the output shaft. Push in the oil seal ring with a screwdriver.

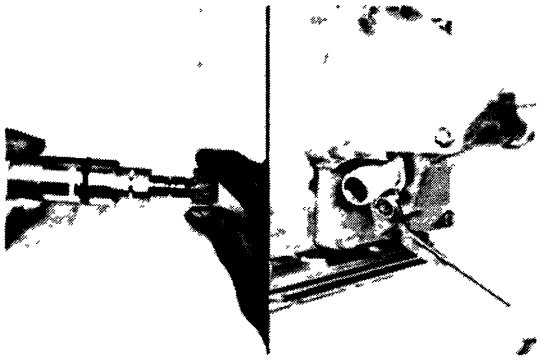


48. INSTALL SPEEDOMETER DRIVE GEAR AND SNAP RING



49. INSTALL REAR EXTENSION HOUSING WITH NEW GASKET

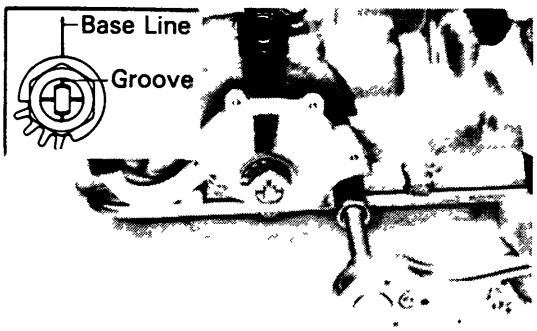
Torque: 195 kg-cm (14 ft-lb, 19 N·m)



50. INSTALL O-RINGS, BUSHING AND SPEEDOMETER DRIVEN GEAR TO SHAFT SLEEVE

51. INSTALL SPEEDOMETER DRIVEN GEAR ASSEMBLY IN EXTENSION HOUSING

Insert the shaft sleeve assembly into the housing. Install the lock plate with a bolt and lock washer.



52. INSTALL NEUTRAL START SWITCH

(a) Slide the neutral start switch onto the control shaft.

(b) Install the grommet facing the groove toward the switch body and then install the washer and nut.

(c) Move the switch so that the slit in the switch and neutral base line match. Tighten the bolt and nut.

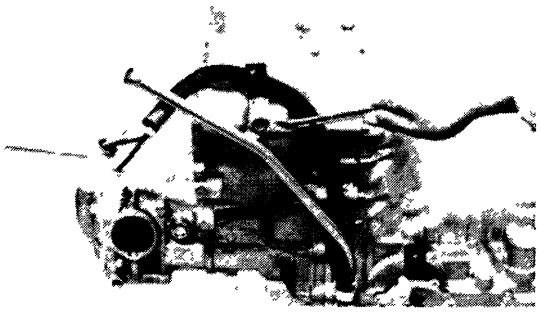
Torque: Nut 70 kg-cm (61 in.-lb, 6.9 N·m)
Bolt 130 kg-cm (10 ft-lb, 13 N·m)

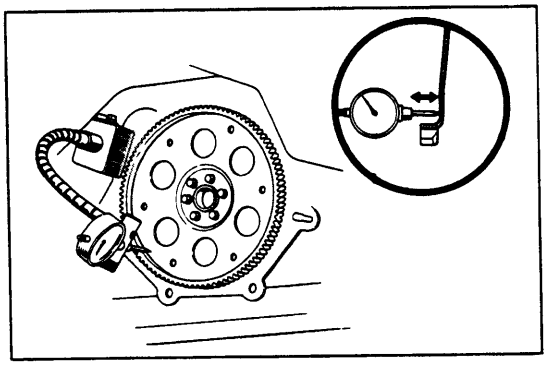
53. INSTALL SHIFT HANDLE

54. INSTALL FILLER TUBE

(a) Replace the O-ring and push the tube into place.

(b) Install the filler tube with the bolt.



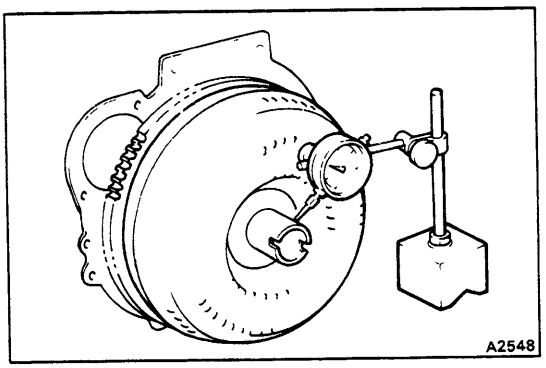


55. MEASURE DRIVE PLATE RUNOUT AND INSPECT RING GEAR

Set up a dial indicator and measure the drive plate runout.

If runout exceeds 0.20 mm (0.0079 in.) or if the ring gear is damaged, replace the drive plate. If installing a new drive plate, note the orientation of spacers and tighten the bolts.

Torque: 650 kg-cm (47 ft-lb, 64 N·m)



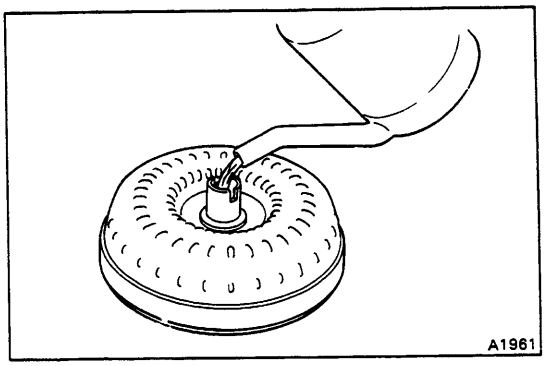
56. MEASURE TORQUE CONVERTER SLEEVE RUNOUT

(a) Temporarily mount the torque converter to the drive plate. Set up a dial indicator.

If runout exceeds 0.30 mm (0.0118 in.), try to correct by reorienting the installation of the converter. If excessive runout cannot be corrected, replace the torque converter.

NOTE: Mark the position of the converter to ensure correct installation.

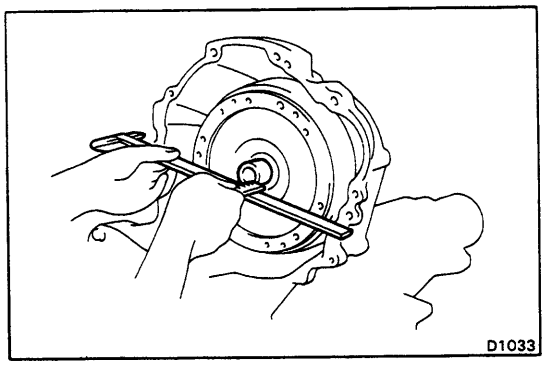
(b) Remove the torque converter.



57. INSTALL TORQUE CONVERTER IN TRANSMISSION

If the torque converter has been drained and washed, refill with fresh ATF.

ATF capacity: 1.0 liters (1.1 US qts, 0.9 Imp. qts)
Fluid type: ATF DEXRON II



58. CHECK TORQUE CONVERTER INSTALLATION

Using calipers and a straight edge, measure from the installed converter center piece surface to the front surface of the transmission housing.

Correct distance: More than 8 mm (0.31 in.)

DIFFERENTIAL

(See page MT-71)

Removal of Transaxle (FWD)

—(See page AT-24)

Removal of Transaxle (4WD)

—(See page AT-31)

Installation of Transaxle (FWD)

—(See page AT-27)

Installation of Transaxle (4WD)

—(See page AT-34)

PROPELLER SHAFT (for 4WD)

	Page
PRECAUTIONS	PR-2
TROUBLESHOOTING	PR-2
PROPELLER SHAFT	PR-2

PRECAUTIONS

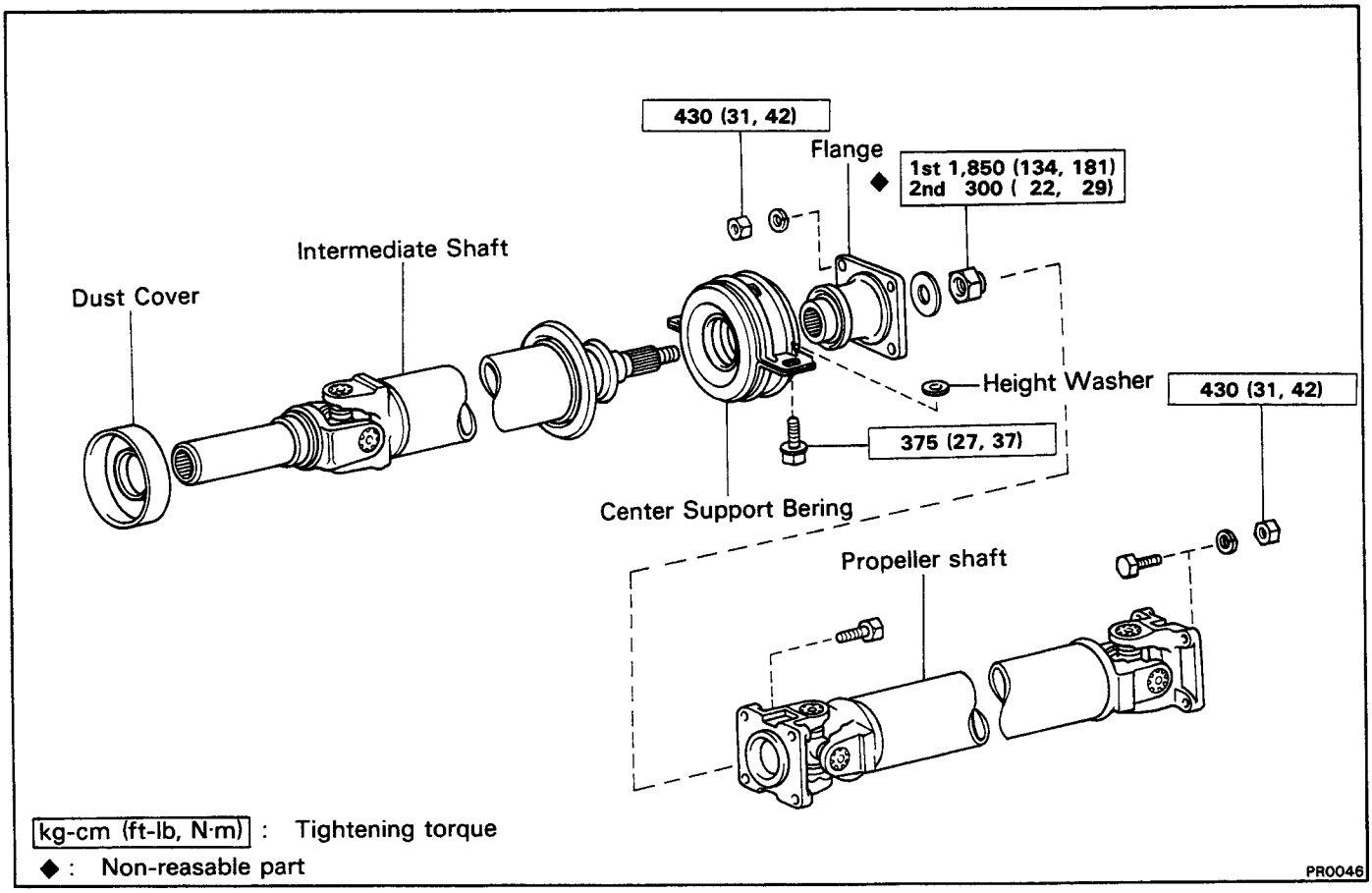
1. **As the universal joint is a non-disassembly type, the propeller shaft or intermediate shaft must be replaced as an assembly in the event of universal joint trouble.**
2. **Be careful not to grip the propeller shaft tube too tightly in the vise as this will cause deformation.**

TROUBLESHOOTING

Problem	Possible cause	Remedy	Page
Noise	Sleeve yoke spline worn	Replace intermediate shaft	PR-3
	Center bearing worn	Replace center bearing	PR-3
	Spider bearing worn or stuck	Replace intermediate shaft or propeller shaft	PR-3
Vibration	Propeller shaft runout	Replace propeller shaft	PR-3
	Propeller shaft unbalance	Balance propeller shaft	PR-3
	Transmission extension housing rear bushing worn	Replace bushing	TA-40
	Sleeve yoke spline stuck	Replace intermediate shaft	PR-3
	Center bearing height improper	Adjust bearing height	

PROPELLER SHAFT

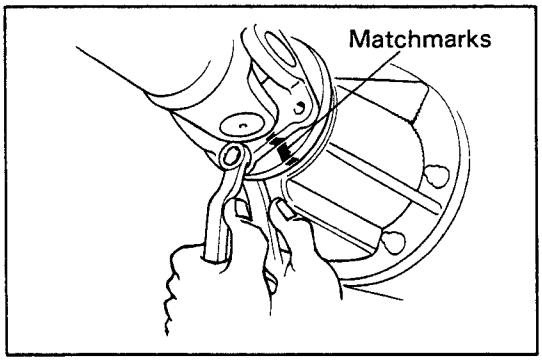
COMPONENTS



kg-cm (ft-lb, N·m) : Tightening torque

◆ : Non-reasable part

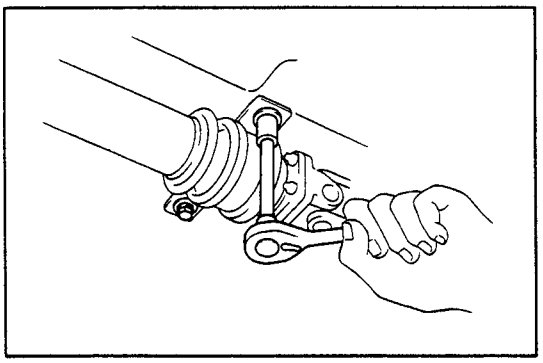
PR0046



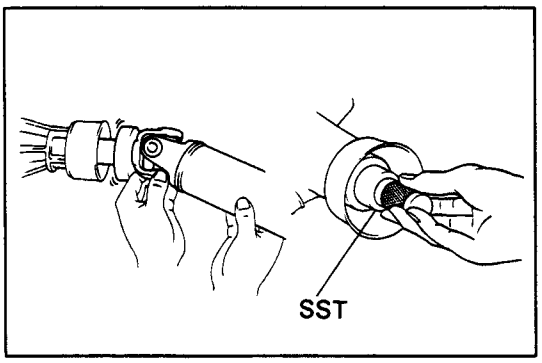
REMOVAL AND DISASSEMBLY OF PROPELLER SHAFT

(See page PR-2)

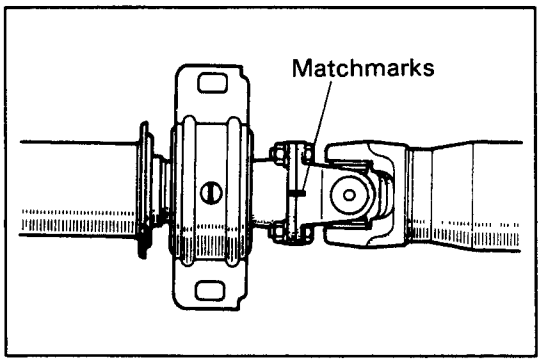
1. **DISCONNECT PROPELLER SHAFT FLANGE FROM COMPANION FLANGE ON DIFFERENTIAL**
   (a) Place matchmarks on the flanges.
   (b) Remove the four bolts and nuts.



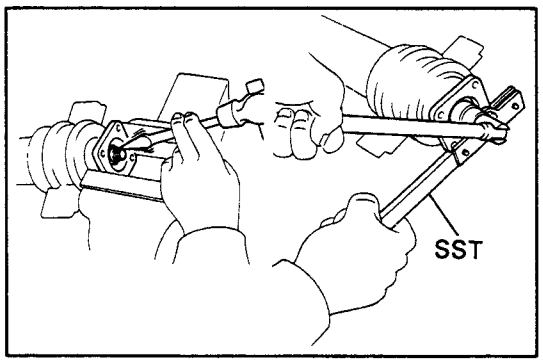
2. **REMOVE TWO BOLTS HOLDING CENTER SUPPORT BEARING TO BODY**



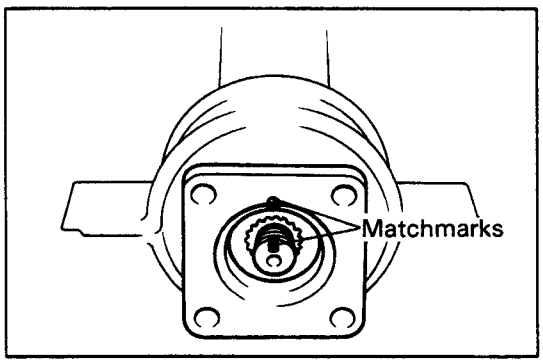
3. **REMOVE PROPELLER SHAFT WITH INTERMEDIATE SHAFT**
   (a) Pull out the yoke from the transmission.
   (b) Insert SST in the transmission to prevent oil leakage.
   SST 09325-12010



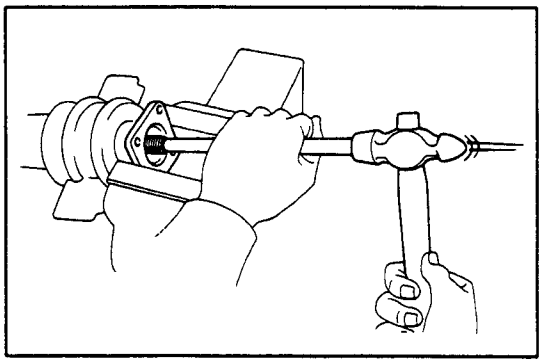
4. **SEPARATE PROPELLER SHAFT AND INTERMEDIATE SHAFT**
   (a) Place matchmarks on the flanges.
   (b) Remove the four bolts and nuts.



5. **REMOVE CENTER SUPPORT BEARING FROM INTERMEDIATE SHAFT**
   (a) Using a hammer and chisel, loosen the staked part of the nut.
   (b) Using SST to hold the flange, remove the nut.
   SST 09330-00020

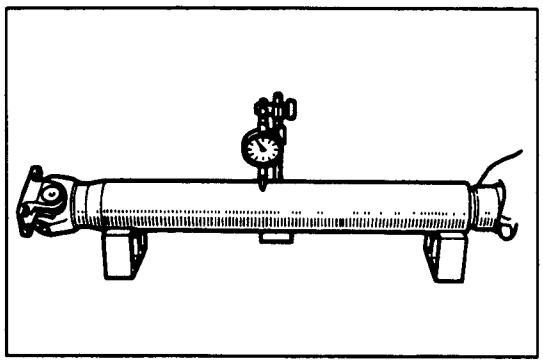


(c) Place matchmarks on the flange and shaft.



(d) Clamp the flange yoke in a vise and tap off the shaft.

(e) Remove the center support bearing.

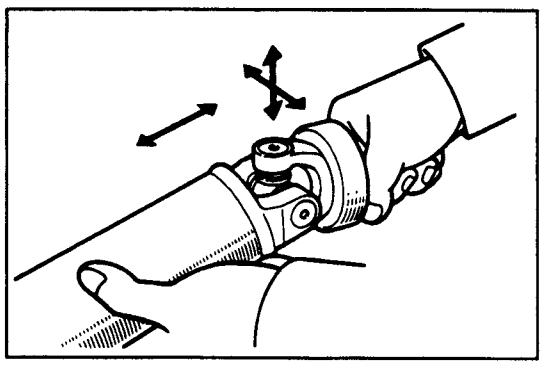


INSPECTION OF PROPELLER SHAFT COMPONENTS

1. INSPECT PROPELLER AND INTERMEDIATE SHAFTS FOR DAMAGE OR RUNOUT

Maximum runout: 0.8 mm (0.031 in.)

If shaft runout is exceeds maximum, replace the shaft.



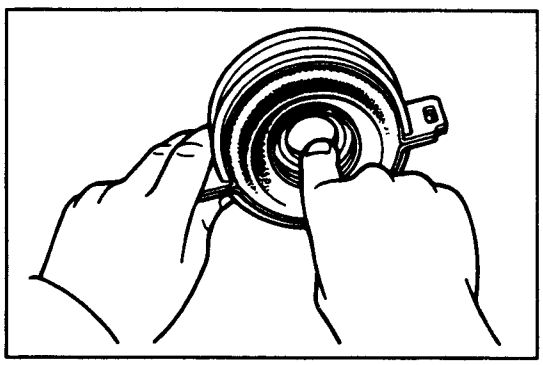
2. INSPECT SPIDER BEARINGS

(a) Inspect the spider bearings for wear or damage.

(b) Check the spider bearing axial play by turning the yoke while holding the shaft tightly.

Bearing axial play: 0 mm (0 in.)

If necessary, replace the intermediate shaft or/and propeller shaft.



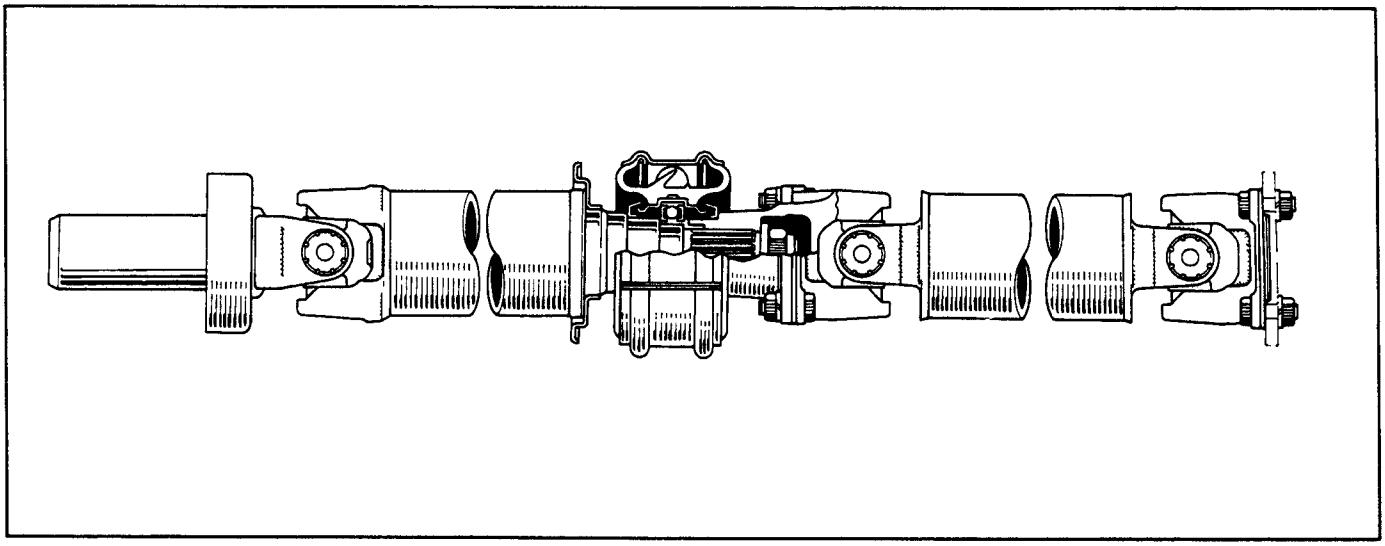
3. INSPECT CENTER SUPPORT BEARING FOR WEAR OR DAMAGE

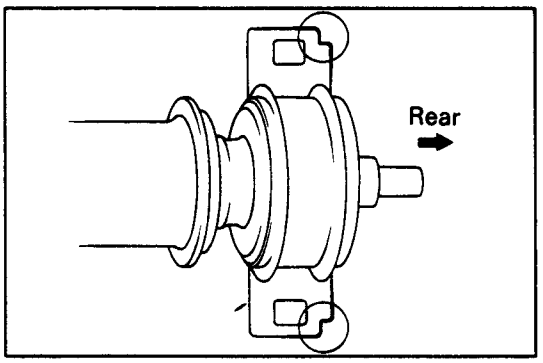
Check that the bearing turns freely.
If the bearing is damaged, worn, or does not turn freely, replace it.

ASSEMBLY AND INSTALLATION OF PROPELLER SHAFT

(See page PR-2)

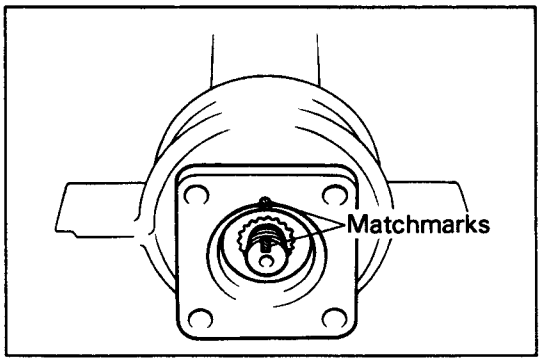
NOTE: When replacing parts, install them facing as shown in the illustration.





1. INSTALL CENTER SUPPORT BEARING ON INTERMEDIATE SHAFT

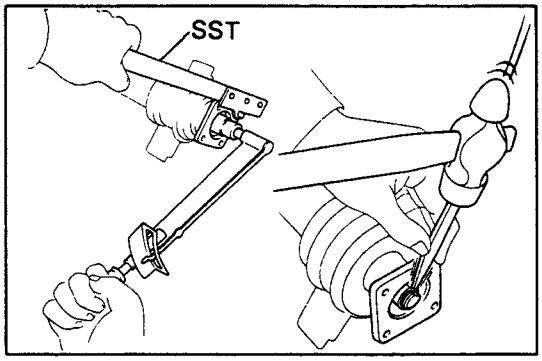
Install the center support bearing with the cutout on the rear side.



2. INSTALL FLANGE YOKE ON INTERMEDIATE SHAFT

(a) Apply MP grease to the splines of the intermediate shaft.

(b) Align the matchmarks on the yoke and shaft, and install them.



(c) Using SST to hold the flange, tighten down a new nut to press the bearing into position.

SST 09330-00020

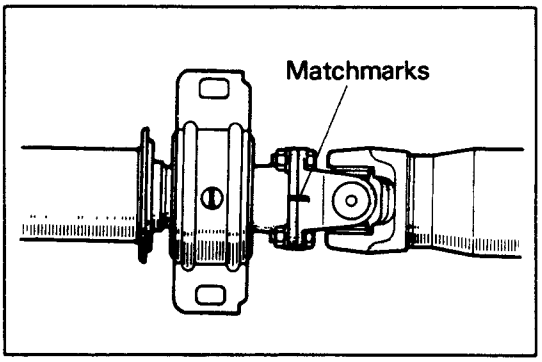
Torque: 1,850 kg-cm (134 ft-lb, 181 N·m)

(d) Loosen the nut.

(e) Torque the nut again.

Torque: 300 kg-cm (22 ft-lb, 29 N·m)

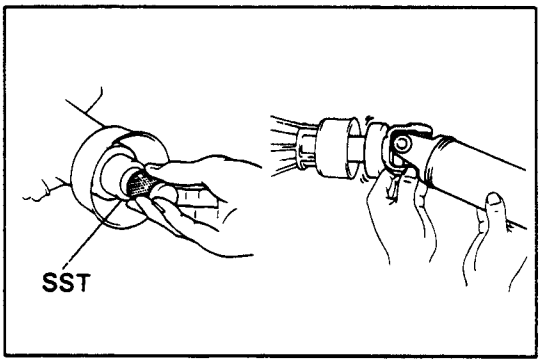
(f) Using a hammer and punch, stake the nut.



3. ASSEMBLE PROPELLER SHAFT AND INTERMEDIATE SHAFT

(a) Align the matchmarks on the flanges and connect them with the four bolts and nuts.

Torque: 430 kg-cm (31 ft-lb, 42 N·m)



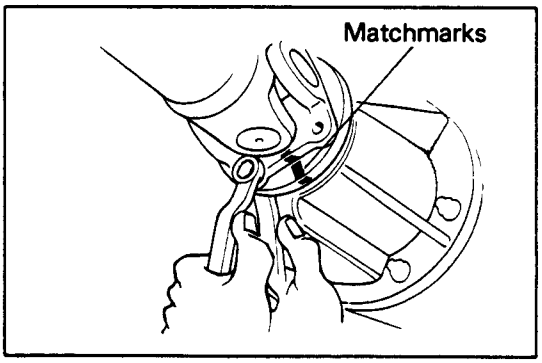
4. INSERT SLEEVE YOKE IN TRANSMISSION

(a) Apply MP grease to the outside diameter and splines of the yoke.

(b) Remove SST.

SST 09325-12010

(c) Push the yoke into the transmission.

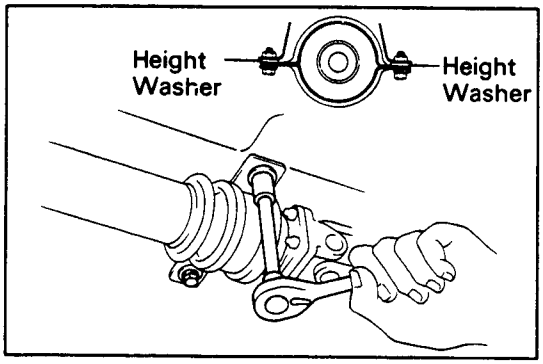


5. CONNECT PROPELLER SHAFT FLANGE TO COMPANION FLANGE ON DIFFERENTIAL

(a) Align the matchmarks on the flanges and connect the them with the four bolts and nuts.

(b) Torgue the nuts.

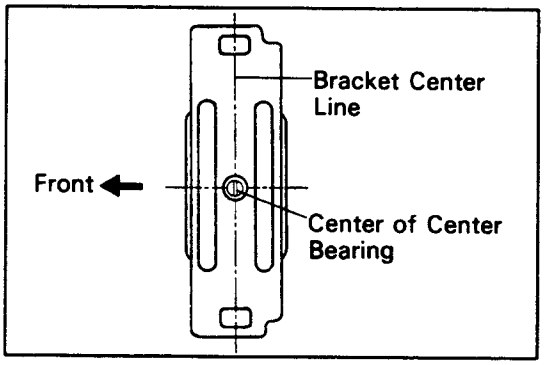
Torque: 430 kg-cm (31 ft-lb, 42 N·m)



6. CONNECT CENTER SUPPORT BEARING TO BODY

(a) Place the height washer between the body and center support bearing, and install the two mount bolts finger tight.

NOTE: Some vehicles do not have a height washer.. In this case, it is not necessary to insert one.



(b) Check that the bearing bracket is at right angles to the propeller shaft. Adjust the bracket if necessary.

(c) Check that the center line of the center bearing is set to the center line of the bracket when the vehicle is in a no-load condition.
Adjust the bracket if necessary.

(d) Torque the mount bolts.

Torque: 375 kg-cm (27 ft-lb, 37 N·m)

FRONT AXLE AND SUSPENSION

	Page
TROUBLESHOOTING	FA-2
FRONT WHEEL ALIGNMENT	FA-3
AXLE HUB	FA-7
FRONT DRIVE SHAFT	FA-13
FRONT SHOCK ABSORBER	FA-19
FRONT SUSPENSION	FA-23
Ball Joints	FA-23
Lower Arm	FA-24
Stabilizer Bar	FA-27

TROUBLESHOOTING

Problem	Possible cause	Remedy	Page
Wanders/pulls	Tires worn or improperly inflated	Replace tire or inflate tires to proper pressure	FA-3
	Alignment incorrect	Check front end alignment	FA-3
	Wheel bearing worn	Replace wheel bearing	FA-8
	Front or rear suspension parts loose or broken	Tighten or replace suspension part	
	Steering linkage loosen or worn	Tighten or replace steering linkage	
	Steering gear out of adjustment or broken	Adjust or repair steering gear	SR-9
Bottoming	Vehicle overloaded	Check loading	
	Shock absorber worn out	Replace shock absorber	FA-19
	Springs weak	Replace spring	FA-19
Sways/pitches	Tires improperly inflated	Inflate tires to proper pressure	FA-3
	Stabilizer bar bent or broken	Replace stabilizer bar	FA-27
	Shock absorber worn out	Replace shock absorber	FA-19
Front wheel shimmy	Tires worn or improperly inflated	Replace tire or inflate tires to proper pressure	FA-3
	Wheel out of balance	Balance wheel	
	Shock absorber worn out	Replace shock absorber	FA-19
	Alignment incorrect	Check front end alignment	FA-3
	Wheel bearing worn	Replace wheel bearing	FA-8
	Ball joints or bushing worn	Inspect ball joint and bushing	FA-23
	Steering linkage loosen or worn	Tighten or replace steering linkage	
	Steering gear out of adjustment or broken	Adjust or repair steering gear	SR-9
Abnormal tire wear	Tires improperly inflated	Inflate tires to proper pressure	FA-3
	Shock absorber worn out	Replace shock absorber	FA-19
	Alignment incorrect	Check toe-in	FA-3
	Suspension parts worn	Replace suspension part	

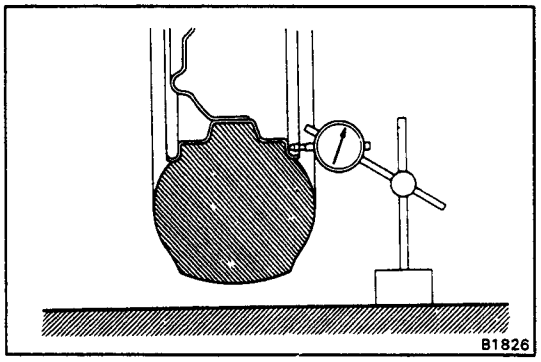
FRONT WHEEL ALIGNMENT

1. MAKE FOLLOWING CHECKS AND CORRECT ANY PROBLEMS

(a) Check the tires for wear and proper inflation.

Cold tire inflation pressure kg/cm²(psi, kPa)

Tire size		Front and Rear
FWD	145 SR 13 3A-C 4-speed M/T Others	 2.2 (32, 220) 2.0 (28, 200)
	155 SR 13	1.8 (26, 180)
	165 SR 13	1.8 (26, 180)
4WD	155 SR 13	2.0 (28, 200)
	175 SR 13	1.8 (26, 180)



(b) Check the front wheel bearings for looseness.

(c) Check the wheel runout.

Lateral runout: 1.2 mm (0.047 in.) or less

(d) Check the front suspension for looseness.

(e) Check the steering linkage for looseness.

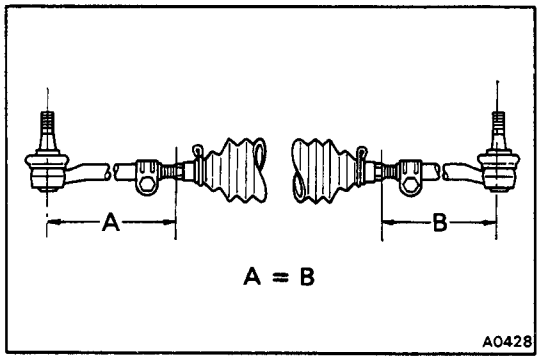
(f) Check that the front absorbers work properly by using the standard bounce test.

2. ADJUST TOE-IN

Adjust toe-in with a toe-in gauge by the following procedure.

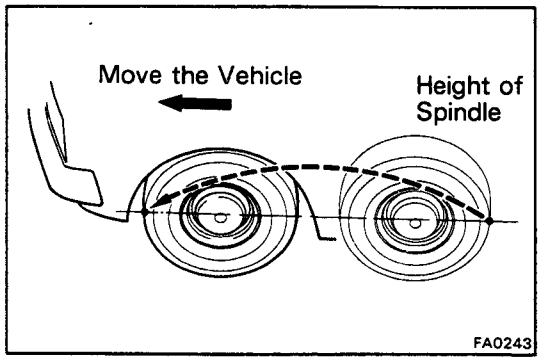
(a) Check to see that both right and left tie rods measure the same in length.

Left-right error: 1.5 mm (0.059 in.) or less



(b) Move the vehicle forward a few meters with the front wheels in the straight-ahead position on a level place.

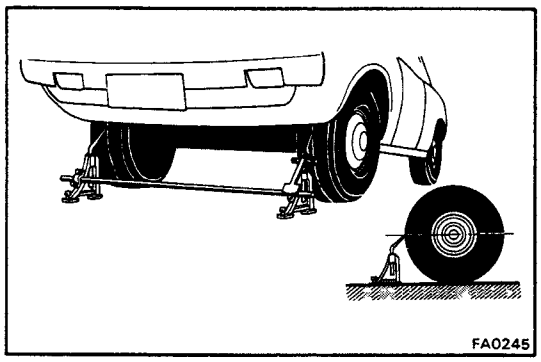
(c) Mark the center of each rear tread and measure the distance between marks of the right and left tires.

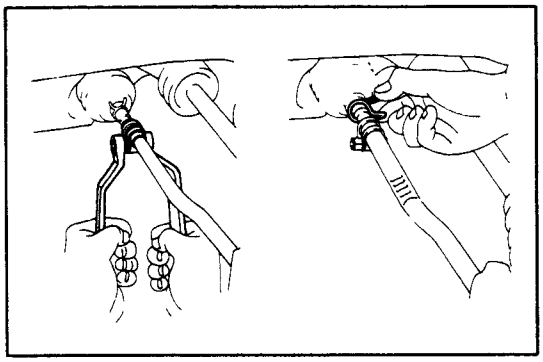


(d) Advance the vehicle till the marks on the rear of the tires come to the measuring heights of the gauge on the front.

(e) Measure the distance between the marks on the front of the tires.

Toe-in: Inspection STD −1 ± 1 mm (−0.04 ± 0.04 in.)

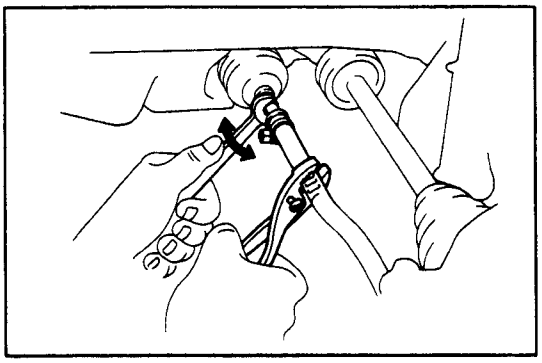




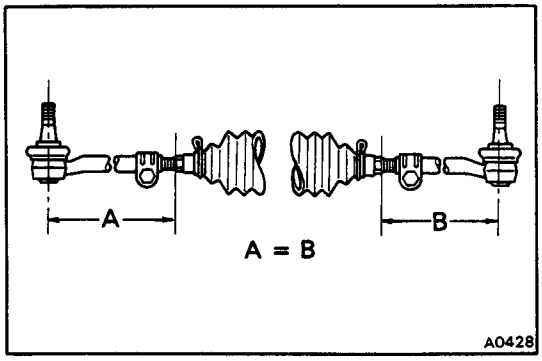
(f) If the toe-in is not within inspection STD, adjust the toe-in.

(1) Loosen the clamp.

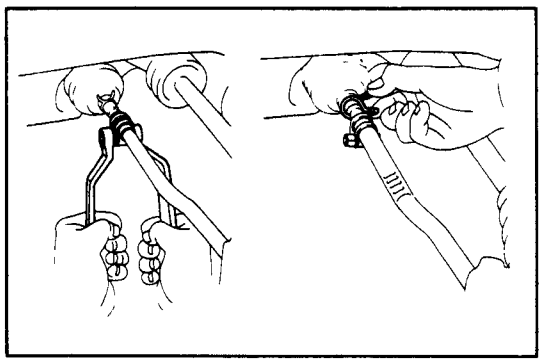
(2) Remove the boot clip.



(3) Turn the left and right rack ends an equal amount to adjust.



(4) Check that the length of the left and right tie rods are the same.

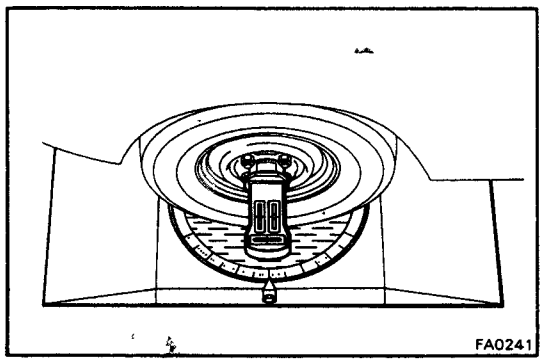


(5) Torque the tie rod end clamp.

Torque: 195 kg-cm (14 ft-lb, 19 N·m)

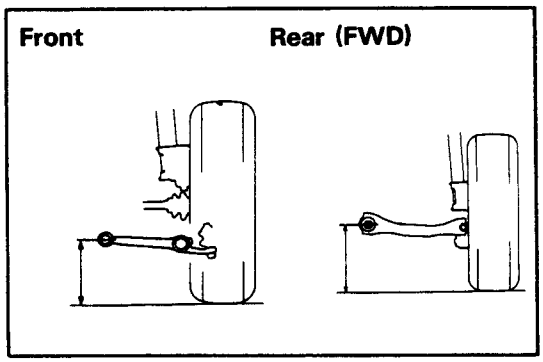
(6) Place the boot on the seal and clamp it.

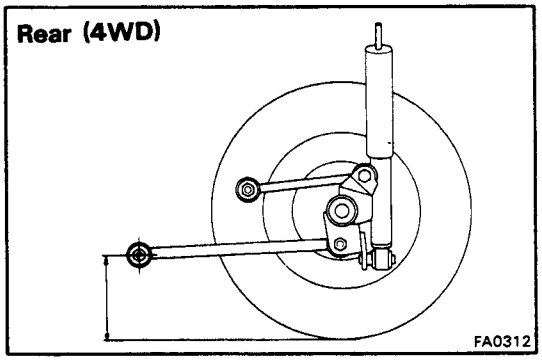
NOTE: Check that the boot is not twisted.



3. INSTALL WHEEL ALIGNMENT EQUIPMENT

Follow the specific instructions of the equipment manufacturer.



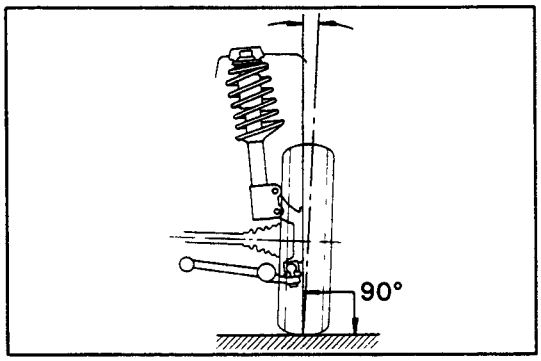


4. INSPECT VEHICLE HEIGHT

Vehicle height mm (in.)

Tire size			Front	Rear
FWD	Sedan	145 SR 13	203.0 (7.992)	287.0 (11.299)
		155 SR 13	208.0 (8.189)	292.0 (11.496)
		165/70 SR 13	204.0 (8.031)	288.0 (11.339)
	Wagon	155 SR 13	207 (8.150)	308.5 (12.146)
4WD		155 SR 13	234.4 (9.228)	273.0 (10.748)
		175/70 SR 13	235.4 (9.268)	274.0 (10.787)

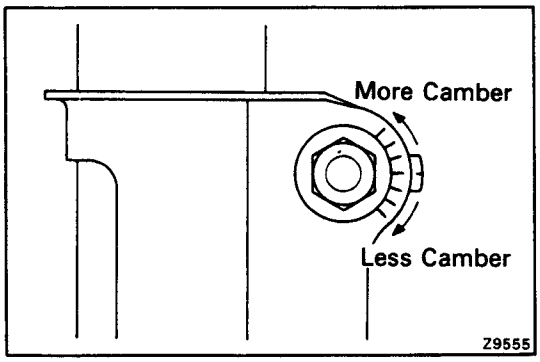
If height of the vehicle is not within specification, try to level it by shaking it down. If the height is still not correct, check for bad springs and worn or loose suspension parts.



5. ADJUST CAMBER

Camber:

Vehicle		Inspection standard	Left-right error
FWD	Sedan	10′ ± 30′	30′ or less
	Wagon	5′ ± 30′	
4WD		40′ ± 30′	



If camber is out of tolerance, adjust by turning the camber adjusting cam.

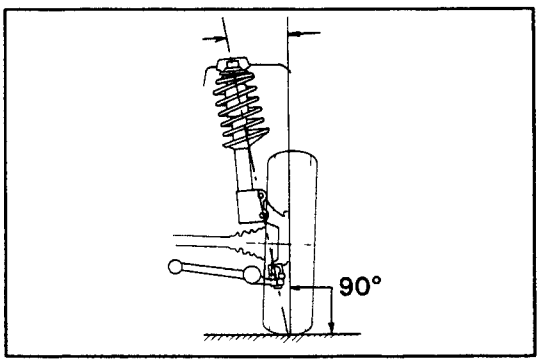
(a) Loosen the shock absorber mount nut.

(b) Turn the cam to adjust.

NOTE: Camber changes about 20′ with each graduation of the cam.

(c) Tighten to the specified torque.

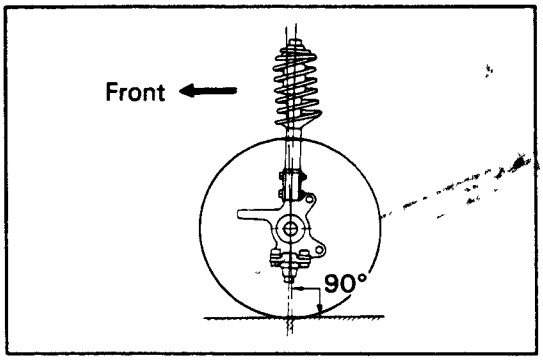
Torque: 1,450 kg-cm (105 ft-lb, 142 N·m)

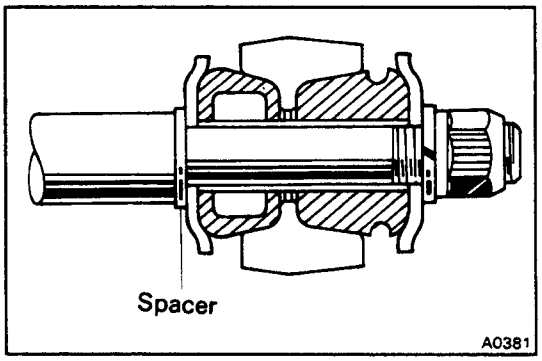


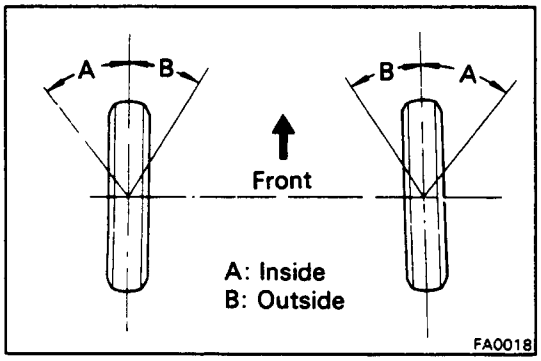
6. ADJUST STEERING AXIS INCLINATION

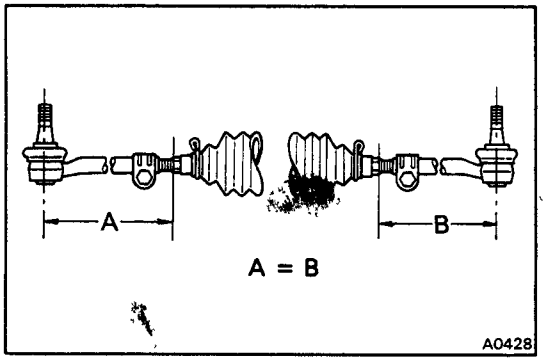
Vehicle		Inspection standard	Left-right error
FWD	Sedan	12°30′ ± 30′	30′ or less
	Wagon	12°35′ ± 30′	
4WD		11°50′ ± 30′	

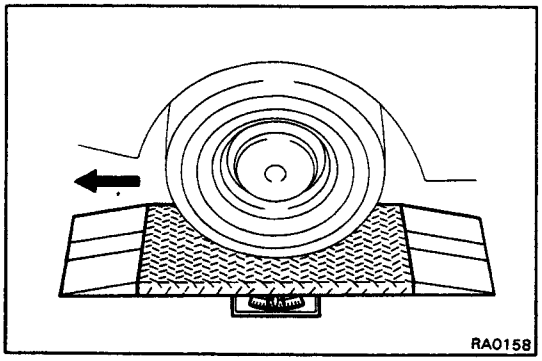
If the steering axis inclination is out of tolerance, inspect and replace any damaged or worn front suspension parts.











7. ADJUST CASTER

Caster

			w/o PS	w/ PS
FWD	Inspection Standard	Sedan	1°10′ ± 30′	2°40′ ± 30′
		Wagon	0°45′ ± 30′	2°15′ ± 30′
	Left-right error		30′ or less	
4WD	Inspection standard		2°25′ ± 30′	
	Left-right error		30′ or less	

If the caster is not within specification, adjust by increasing or decreasing the number of spacers. Do not install more than two spacers.

Torque: 1,075 kg-cm (78 ft-lb, 105 N·m)

NOTE: The caster will change 13′ with each spacer.

8. ADJUST WHEEL ANGLE

Wheel angle

				Inside wheel	Outside wheel
FWD	Sedan	w/o PS	Max.	36°20′ ± 1°	32°40′ ± 1°
			at 20°	21°30′	20°
		w/ PS	Max.	35°50′ ± 1°	32°55′ ± 1°
			at 20°	21°05′	20°
	Wagon	w/o PS	Max.	36°13′ ± 1°	32°58′ ± 1°
			at 20°	21°25′	20°
		w/ PS	Max.	35°47′± 1°	32°50′ ± 1°
			at 20°	21°05′	20°
4WD		w/o PS	Max.	36°30′ ± 1°	33°15′ ± 1°
			at 20°	21°15′	20°
		w/ PS	Max.	36°20′ ± 1°	33°20′ ± 1°
			at 20°	21°05′	20°

If the steering angles differ from the standard specification, check to see that the length of the left and right tie rods are the same.

NOTE: If the tie rod lengths are not equal, the steering angle cannot be adjusted properly.

If the rie rod lengths were changed to adjust the steering anble, reinspect the toe-in.

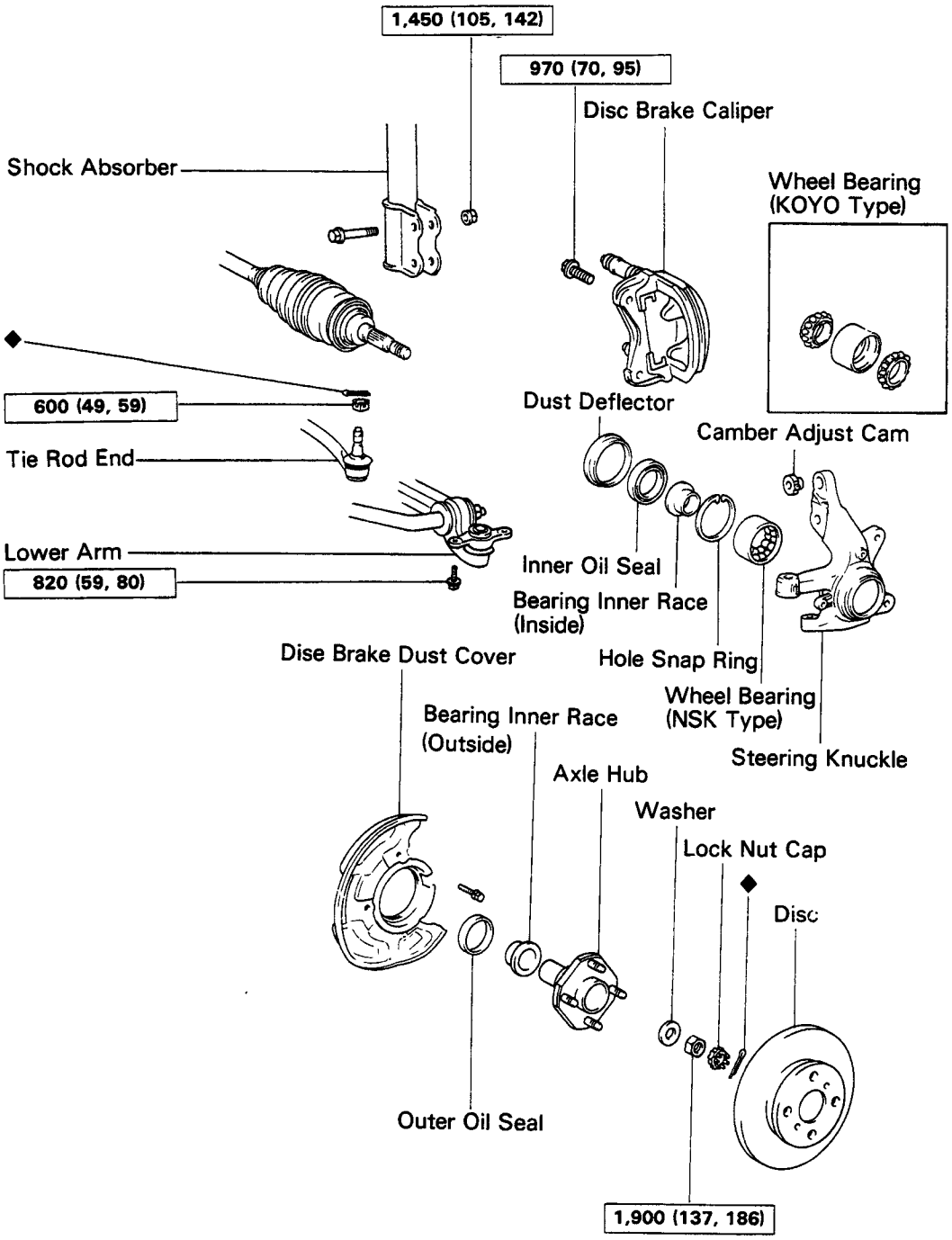
9. INSPECT SIDE SLIP WITH SIDE SLIP TESTER

Side slip: 3.0 mm/m (0.118 in./3.3 ft) or less

If the side slip is not within specification, the toe-in or front wheel alignment may not be correct.

AXLE HUB

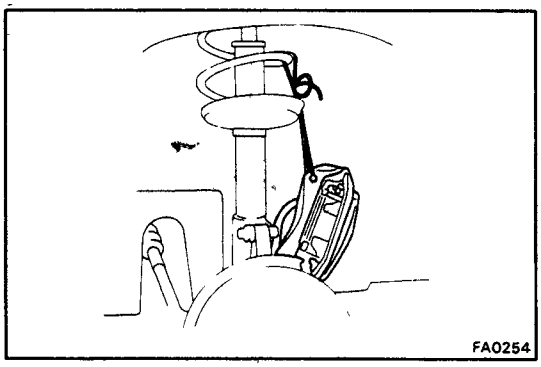
COMPONENTS



kg-cm (ft-lb, N·m) : Tightening torque

◇ : Non-reusable part

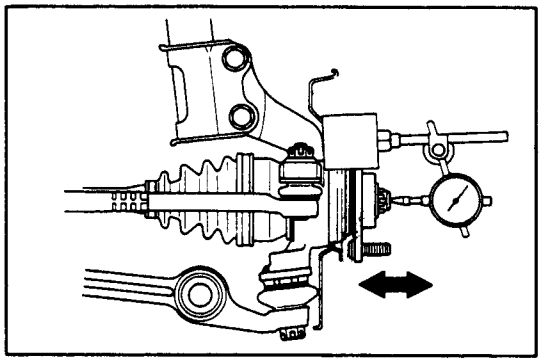
FA0400


FA0254

REMOVAL OF FRONT AXLE HUB

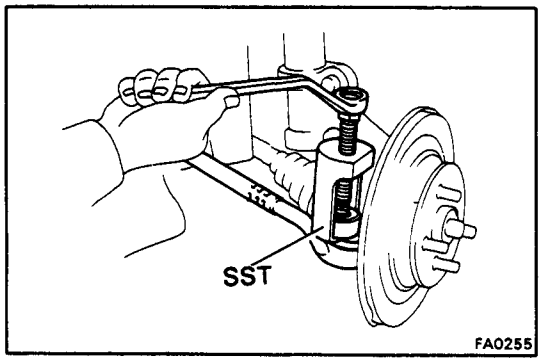
1. **REMOVE COTTER PIN, BEARING LOCK NUT CAP AND LOCK NUT**
   (a) Remove the cotter pin and lock nut cap.
   (b) Before removing the brake caliper, loosen the lock nut while depressing the brake pedal.

2. **REMOVE BRAKE CALIPER**
   Remove the brake caliper from the steering knuckle and suspend it with wire.



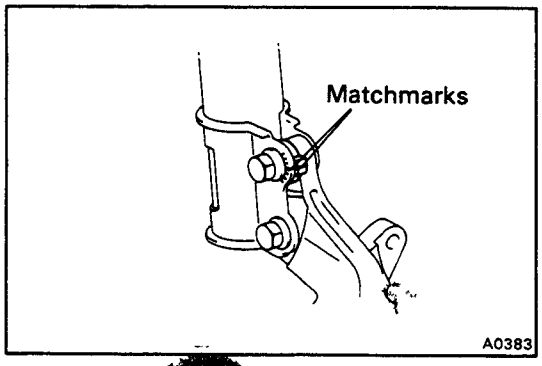
3. **REMOVE DISC**

4. **CHECK BEARING PLAY IN AXIAL DIRECTION**
   Maximum: 0.05 mm (0.0020 in.)



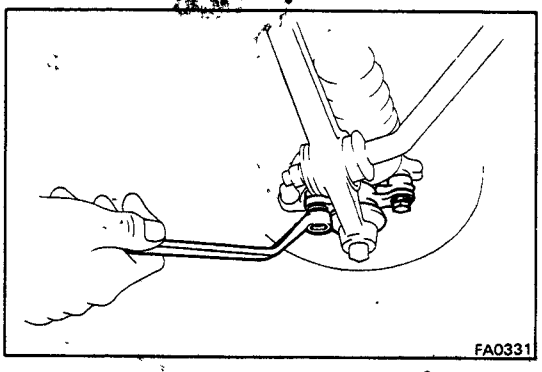
FA0255

5. **DISCONNECT TIE ROD END FROM STEERING KNUCKLE**
   (a) Remove the cotter pin and nut.
   (b) Using SST, disconnect the tie rod end.
   SST 09610-20012

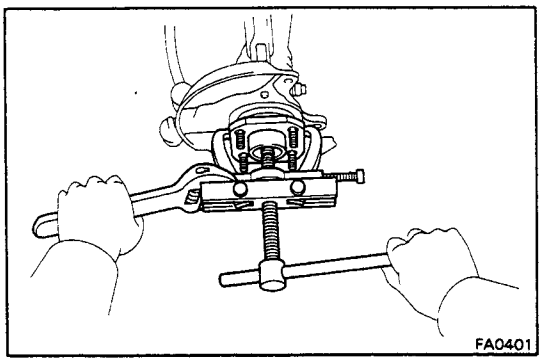


A0383

6. **DISCONNECT STEERING KNUCKLE FROM SHOCK ABSORBER**
   (a) Place matchmarks on the shock absorber lower bracket and camber adjust cam.
   (b) Remove the two bolts and nuts, and disconnect the steering knuckle.


FA0331

7. **DISCONNECT LOWER ARM FROM STEERING KNUCKLE**
   Remove the two bolts holding the ball joint to the steering knuckle.



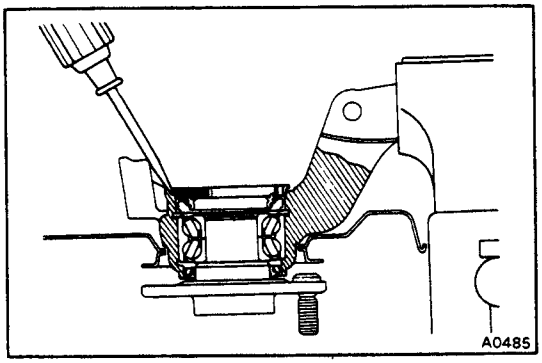
8. **REMOVE AXLE HUB FROM DRIVE SHAFT**

Using SST, remove the axle hub.

SST 09950-20015

CAUTION: Cover the drive shaft to protect it from damage.

Cover the drive shaft boot with cloth to protect it from damage.

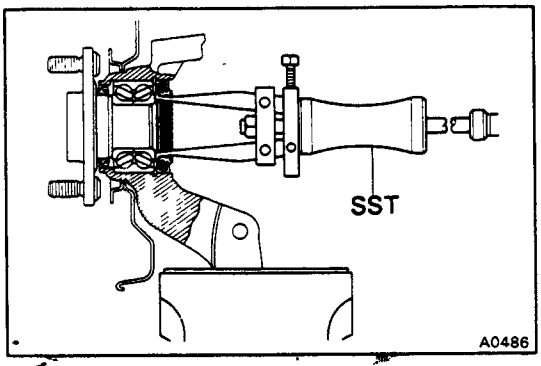


REPLACEMENT OF FRONT AXLE HUB AND WHEEL BEARING

(See page FA-7)

1. **REMOVE DUST DEFLECTOR**

Using a screwdriver, remove the dust deflector.



2. **REMOVE INNER OIL SEAL FROM STEERING KNUCKLE**

Using SST, pull out the oil seal.

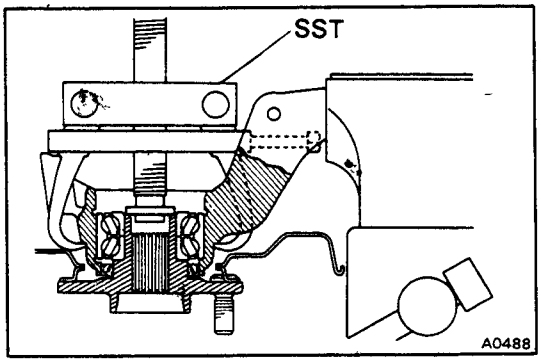
SST 09308-00010

3. **REMOVE HOLE SNAP RING**

Using snap ring pliers, remove the hole snap ring.

4. **REMOVE THREE BOLTS**

Remove the three bolts holding the disc brake dust cover to the steering knuckle.



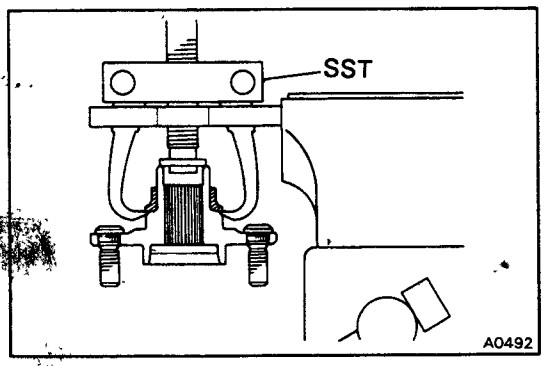
5. **REMOVE AXLE HUB FROM STEERING KNUCKLE**

Using SST, push off the axle hub.

SST 09950-20015

6. **REMOVE DISC BRAKE DUST COVER**

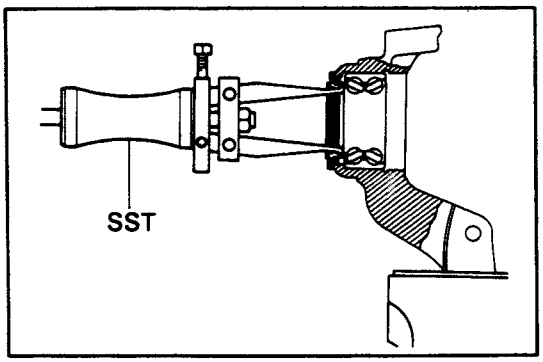
7. **REMOVE BEARING INNER RACE (INSIDE)**



8. **REMOVE BEARING INNER RACE (OUTSIDE)**

Using SST, pull off the bearing inner race.

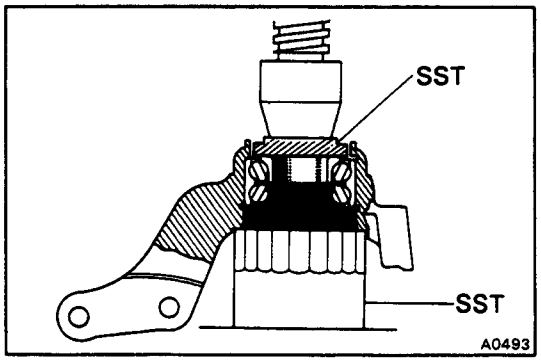
SST 09950-20015



9. REMOVE OUTER OIL SEAL

Using SST, pull out oil seal.

SST 09308-00010

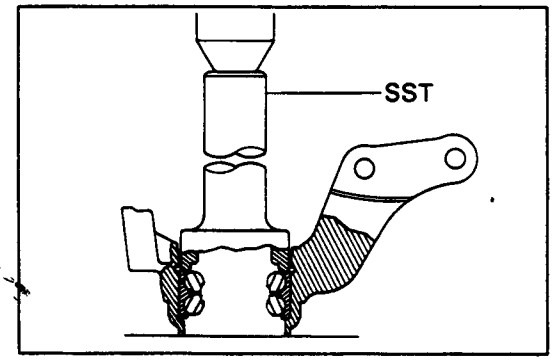


10. REPLACE WHEEL BEARING

(a) First place the inner race (outside) of the bearing in the bearing.

(b) Using SST, press out the bearing.

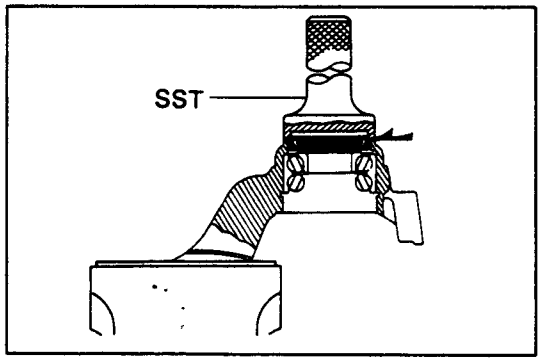
SST 09228-22020 and 09950-20015



(c) Using SST, press in a new bearing.

SST 09309-35010

NOTE: There are two types of bearings; KOYO and NSK.



11. INSTALL OUTER OIL SEAL

(a) Install the bearing inner race (outside) before installing a new oil seal.

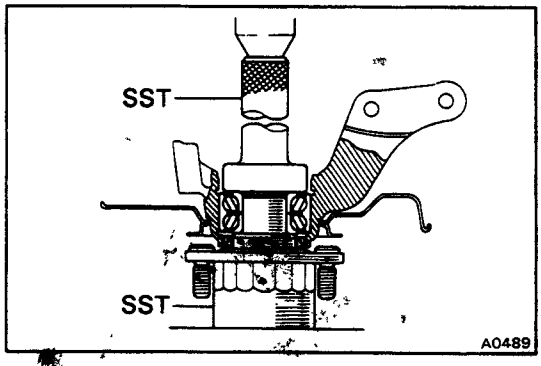
(b) Using SST, drive the oil seal into the steering knuckle.

SST 09515-35010

(c) Apply MP grease to the oil seal lip.

12. INSTALL DISC BRAKE DUST COVER ONTO STEERING KNUCKLE WITH THREE BOLTS

Apply liquid sealer to the dust cover and steering knuckle connection before assembly.



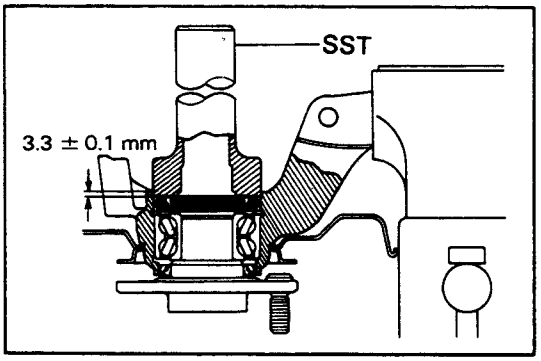
13. INSTALL AXLE HUB

(a) Install new inner races into the inner bearing.

(b) Using SST, press in the inner race until it is tightly against the shoulder of the hub.

SST 09228-22020 and 09310-35010

NOTE: Do not interchange the inner and outer races when installing.



14. INSTALL HOLE SNAP RING

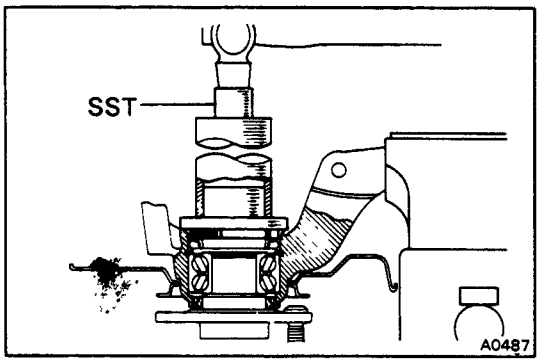
Using snap ring pliers, install the hole snap ring into the steering knuckle.

15. INSTALL INNER OIL SEAL

Using SST, drive in a new oil seal.

SST 09309-35010

NOTE: Tap in the oil seal 3.3 ± 0.1 mm (0.130 ± 0.004 in.) from the end surface.



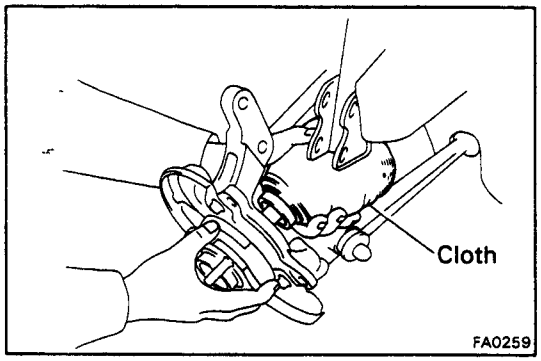
16. INSTALL DUST DEFLECTOR

Using SST, drive a new dust deflector into the steering knuckle.

SST 09316-60010

INSTALLATION OF FRONT AXLE HUB

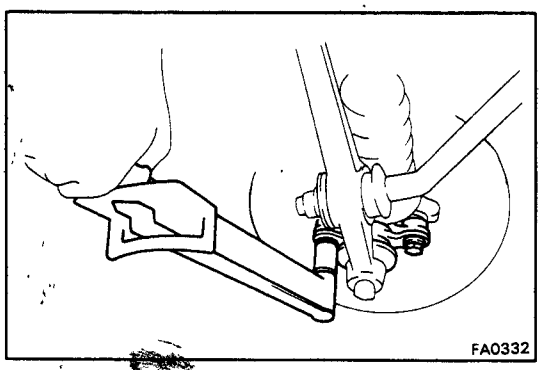
(See page FA-7)



1. INSTALL AXLE HUB TO DRIVE SHAFT

Install the axle hub with the washer and lock nut. Do not torque the nut yet.

CAUTION: Be careful not to damage the drive shaft boot and oil seal lip.

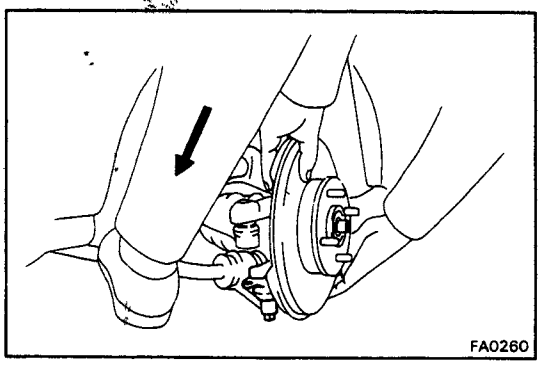


2. INSTALL AXLE HUB TO LOWER ARM

Torque the holding two bolts the steering knuckle to the lower arm.

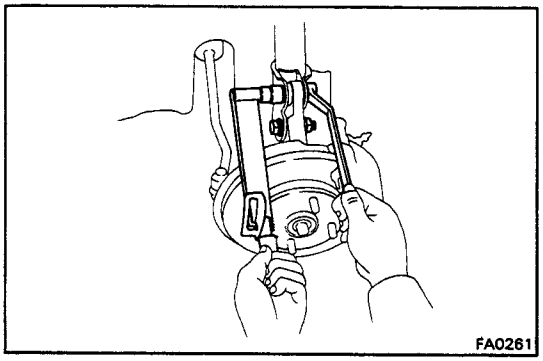
Torque: 820 kg-cm (59 ft-lb, 80 N·m)

3. INSTALL DISC TO AXLE HUB



4. INSTALL STEERING KNUCKLE TO SHOCK ABSORBER

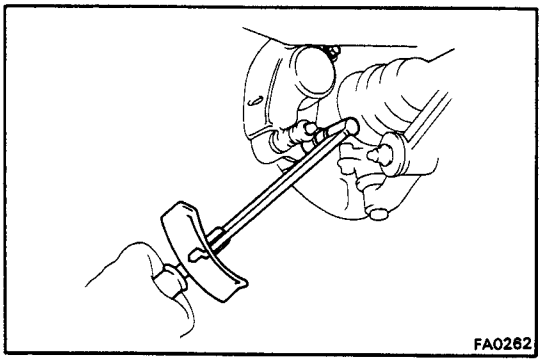
(a) Lower the stabilizer bar and assemble the steering knuckle to the shock absorber lower bracket.



(b) Insert the bolts from the front side and align the matchmarks of the camber adjust cam.

(c) Torque the bolts.

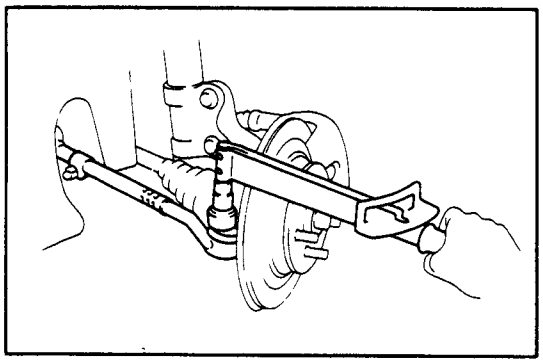
Torque: 1,450 kg-cm (105 ft-lb, 142 N·m)



5. INSTALL BRAKE CALIPER TO STEERING KNUCKLE

Torque the bolts.

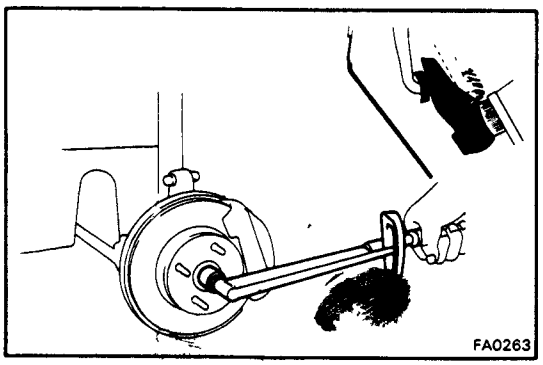
Torque: 970 kg-cm (70 ft-lb, 95 N·m)



6. CONNECT TIE ROD END TO STEERING KNUCKLE

Torque the nut and secure it with a new cotter pin.

Torque: 600 kg-cm (43 ft-lb, 59 N·m)



7. TORQUE BEARING LOCK NUT AND INSTALL LOCK NUT CAP AND COTTER PIN

(a) Torque the lock nut while depressing the brake pedal.

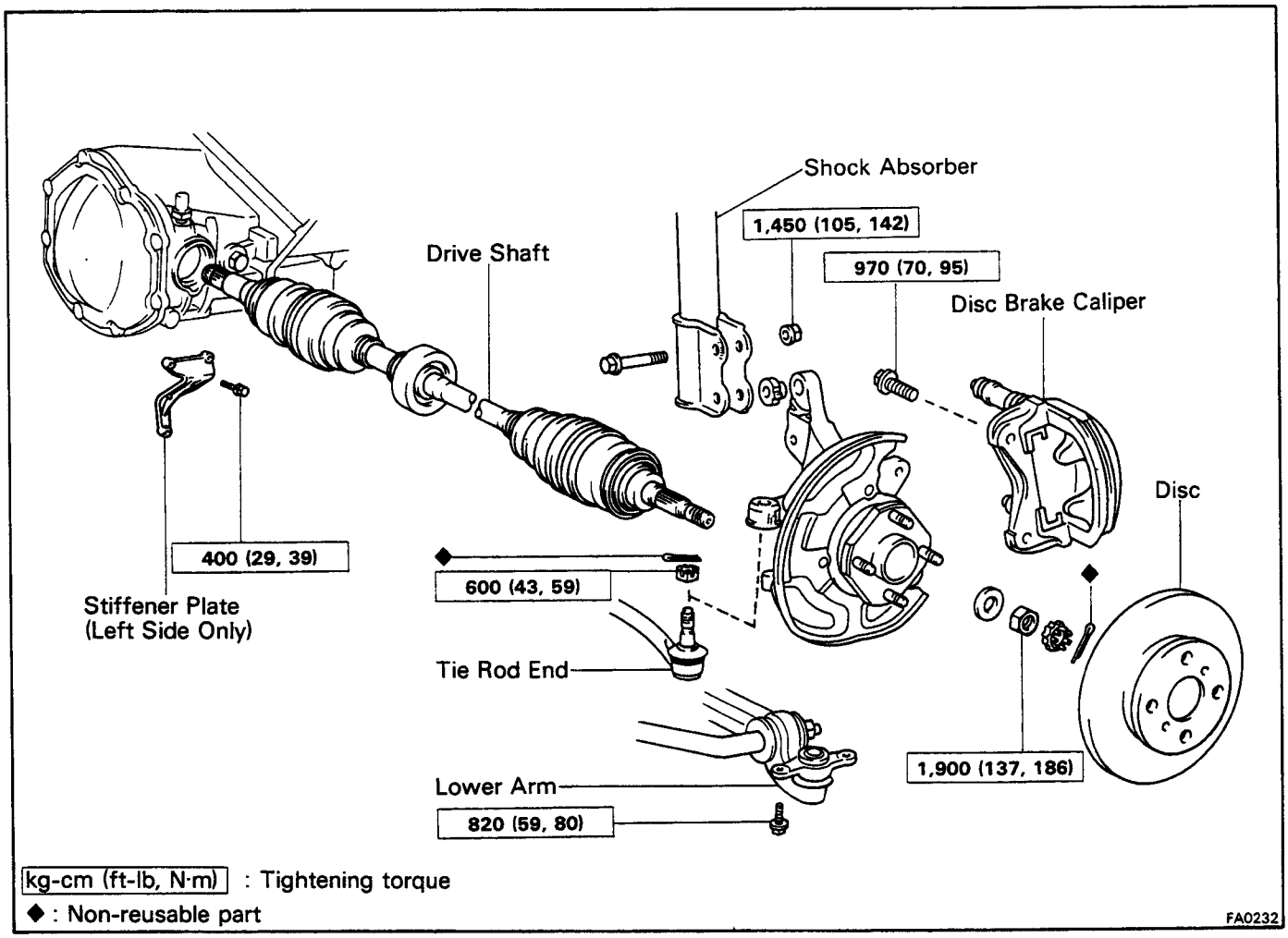
Torque: 1,900 kg-cm (137 ft-lb, 186 N·m)

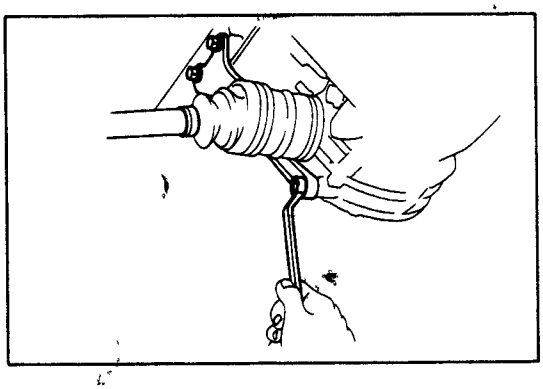
(b) Install the lock nut cap and, using pliers, install a new cotter pin.

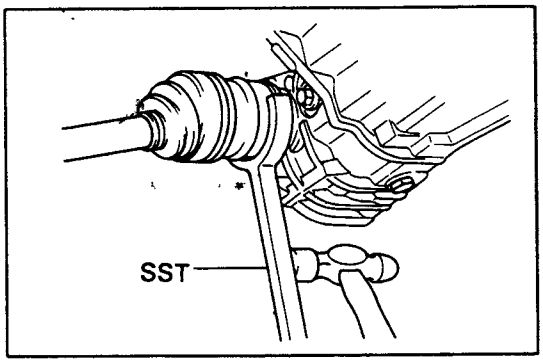
8. CHECK FRONT WHEEL ALIGNMENT (See page FA-3)

FRONT DRIVE SHAFT

REMOVAL OF FRONT DRIVE SHAFT







1. **REMOVE STEERING KNUCKE AND AXLE HUB WITHOUT DISCONNECTING LOWER ARM**

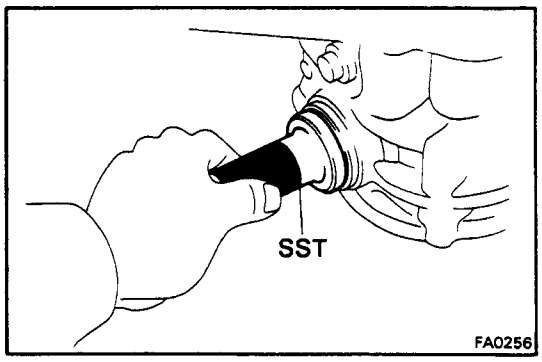
   (See step 1 to 6 and 8 on page FA-8)

2. **REMOVE FRONT DRIVE SHAFT**

   (a) Remove the stiffener plate from the transaxle assembly and engine (left side only).

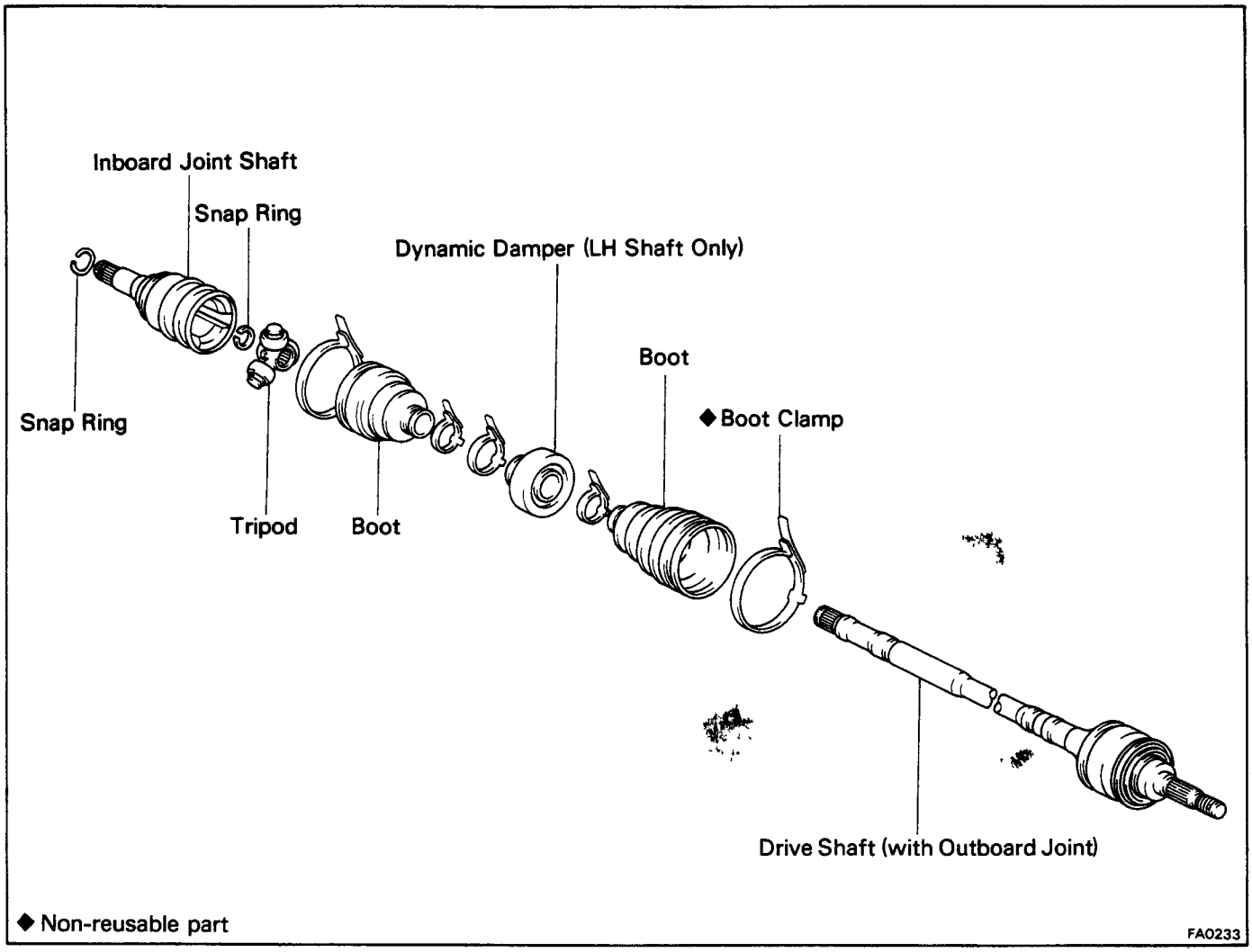
   (b) Using SST and a hammer, tap out the front drive shaft.

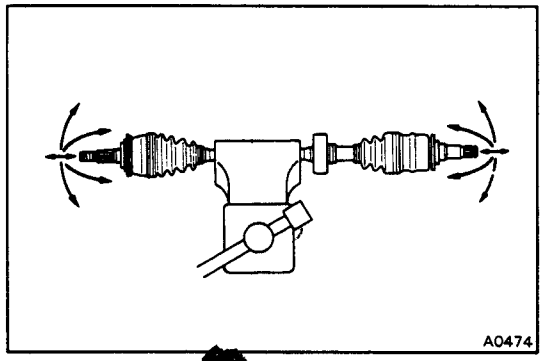
   SST 09648-16010



(c) After pulling out the shaft, leave the SST inserted.
SST 09563-16010

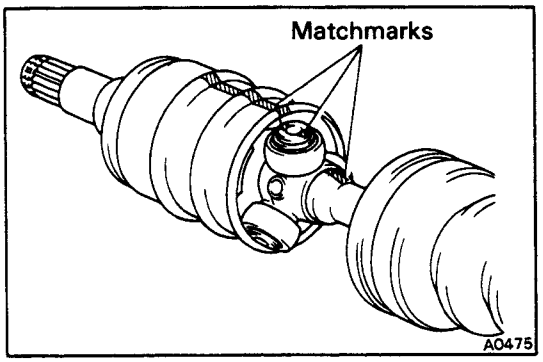
COMPONENTS





DISASSEMBLY OF FRONT DRIVE SHAFT

1. **REMOVE SNAP RING FROM INBOARD JOINT**
2. **CHECK DRIVE SHAFT**
   (a) Check to see that there is no play in the outboard joint.
   (b) Check to see that inboard joint slides smoothly in the thrust direction.
   (c) Check to see that there is no remarkable play in the radial direction of the inboard joint.
   (d) Check for damage to the boot.
3. **DISASSEMBLE BOOT CLAMPS**

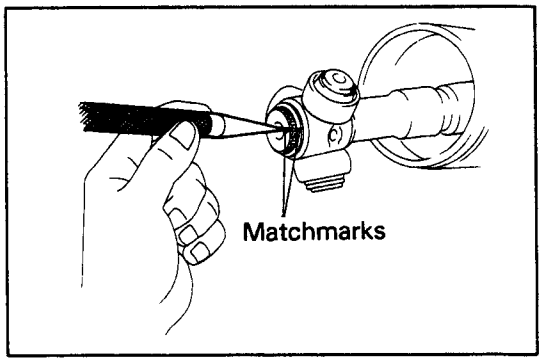


4. DISASSEMBLE INBOARD JOINT SHAFT

(a) Place matchmarks on the inboard joint shaft and drive shaft.

CAUTION: Do not use a punch.

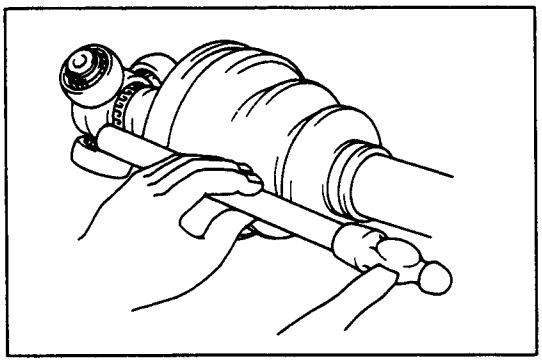
(b) Remove the inboard joint from the drive shaft.



5. DISASSEMBLE TRIPOD JOINT

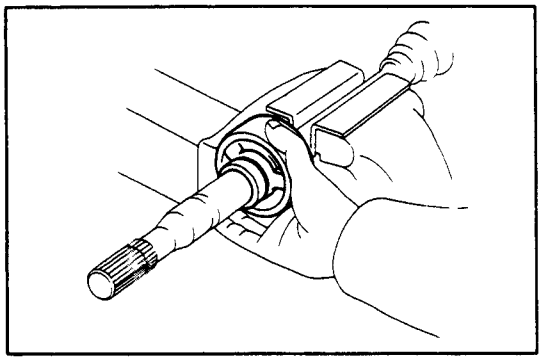
(a) Using snap ring pliers, remove the snap ring.

(b) Using a punch and hammer place matchmarks on the shaft and tripod.



(c) Uniformily tap to remove the tripod joint from the drive shaft.

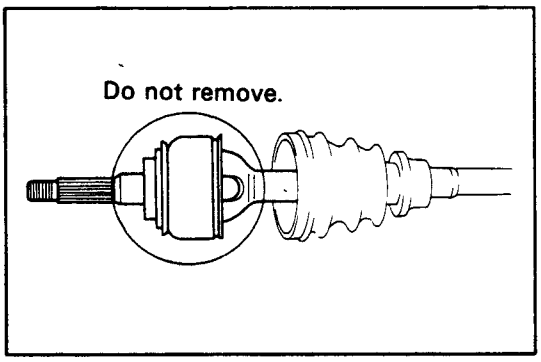
CAUTION: Do not tap on the roller.



6. REMOVE FOLLOWING PARTS:

(a) Remove the boot from the drive shaft.

(b) Remove the clamp and dynamic damper (LH shaft only.)

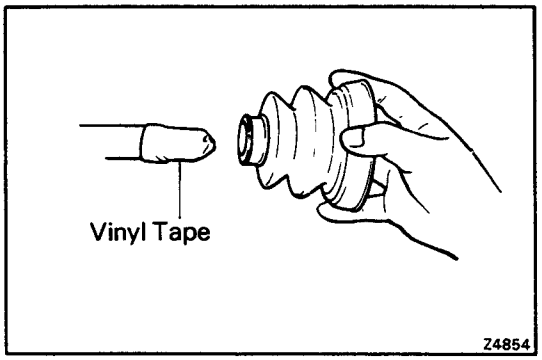


(c) Remove the two boot clamps from the boot of the outboard joint.

(d) Remove the boot from the outboard joint.

CAUTION: Do not remove the outboard joint.

(e) Check the inside and outside of the boot for damage.

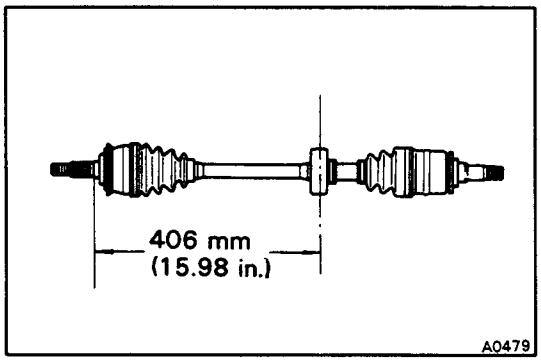


ASSEMBLY OF FRONT DRIVE SHAFT

(See page FA-14)

1. **PROVISIONALLY INSTALL BOOT AND BOOT CLAMP TO OUTBOARD JOINT**

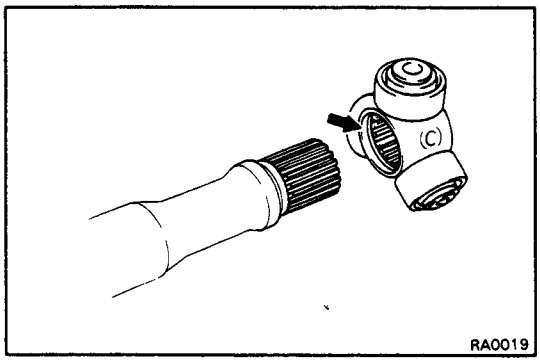
   NOTE: Before installing the boot, wrap vinyl tape around the spline of the shaft to prevent damaging the boot.



2. **INSTALL DYNAMIC DAMPER AND CLAMP (LH SHAFT only)**

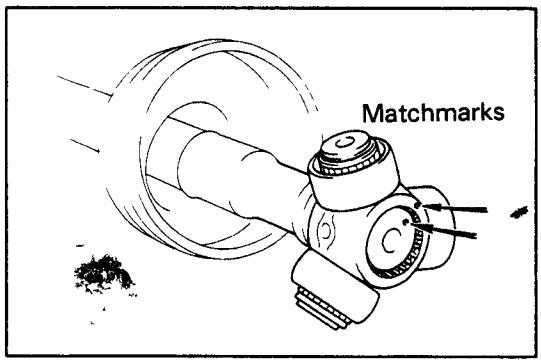
3. **PROVISIONALLY INSTALL BOOT AND CLAMP (For INBOARD JOINT) TO DRIVE SHAFT**

4. **ASSEMBLE BOOT CLAMPS ONTO DRIVE SHAFT**

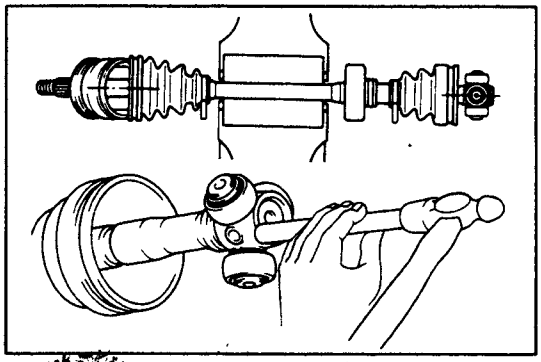


5. **ASSEMBLE TRIPOD JOINT**

   (a) Place the beveled side of the tripod axial spline toward the outboard joint.

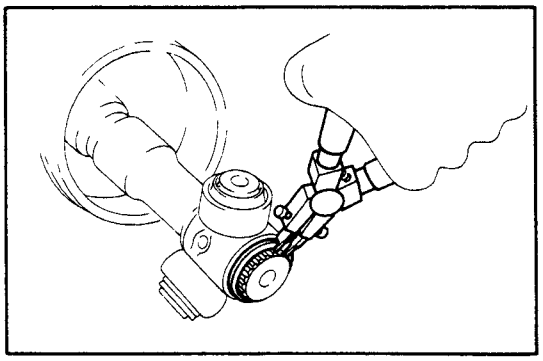


   (b) Align the matchmarks placed before disassembly.



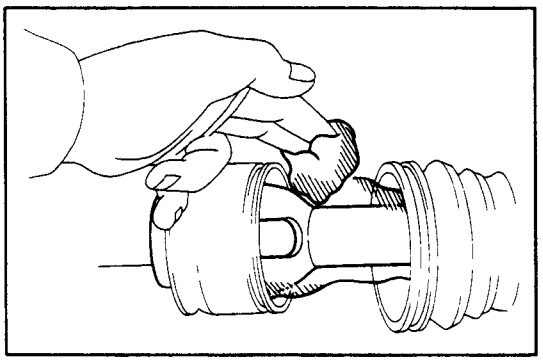
   (c) When replacing the inboard joint, first align the center of the inboard joint and outboard joint.

   (d) Using a brass bar and hammer, tap the tripod onto the drive shaft.



6. INSTALL NEW SNAP RING

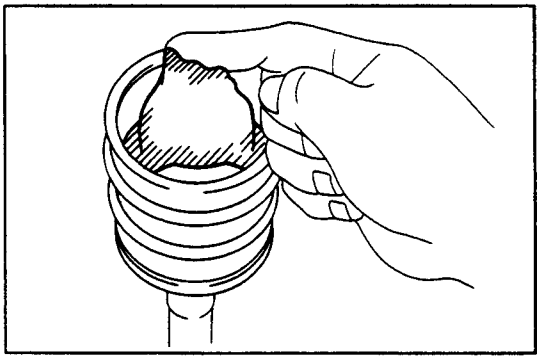
Using snap ring pliers, install a new snap ring.



7. ASSEMBLE BOOT TO OUTBOARD JOINT SHAFT

Before assembling the boot, pack in 240 g (0.5 lb) of grease.

NOTE: Use the grease supplied in the boot kit.

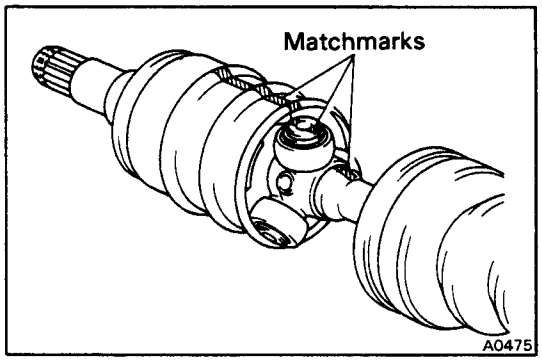


8. ASSEMBLE INBOARD JOINT TO DRIVE SHAFT

(a) Pack in 140 g (0.3 lb, 1.4 N) of grease.

Amount: Joint side 90 g (0.2 lb)
Boot side 50 g (0.1 lb)

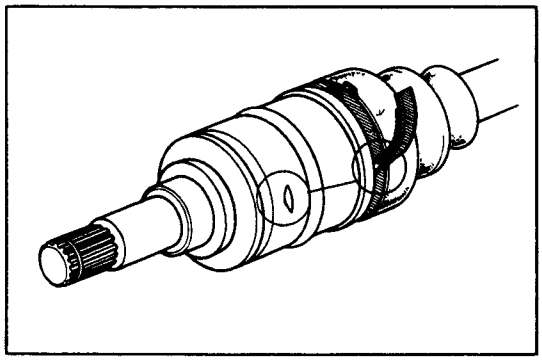
NOTE: Use the grease supplied in the boot kit.



(b) Align the matchmarks placed before disassembly.

(c) Install the inboard joint shaft to the drive shaft.

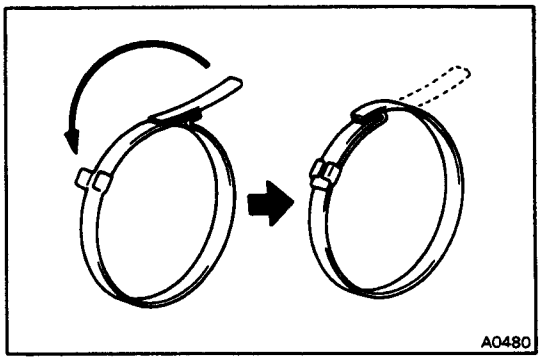
(d) Install the boot to the inboard joint shaft.



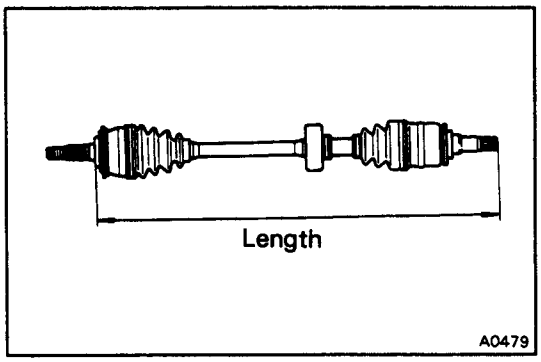
9. ASSEMBLE BOOTS CLAMP TO BOTH BOOTS

(a) Be sure the boot is on the shaft groove.

(b) Install a new clamp on the inboard joint side around the hollow portion of the cover.



(c) Bend the clamp and lock it as is shown in the figure.



(d) Check that the boot is not stretched or contracted when the drive shaft is at specified length.

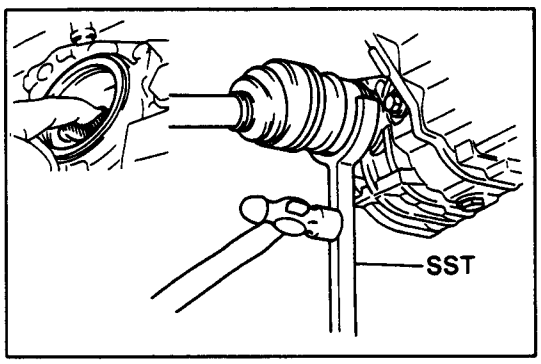
Drive shaft length:

Right side	**Approx. 620 mm (24.41 in.)**
Left side	**Approx. 722 mm (28,43 in.)**

10. INSTALL NEW SNAP RING TO INBOARD JOINT SHAFT

INSTALLATION OF FRONT DRIVE SHAFT

(See page FA-13)



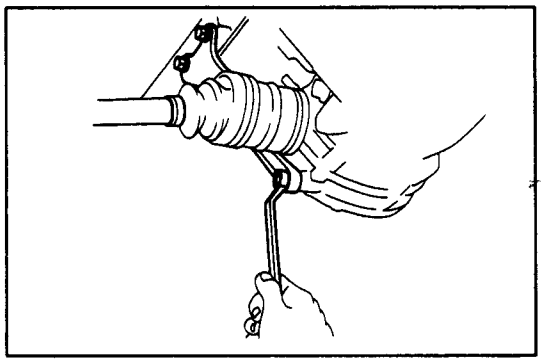
1. INSTALL DRIVE SHAFT TO TRANSAXLE ASSEMBLY

(a) Apply MP grease to the oil seal lip.

(b) Install the drive shaft by tapping on the SST.

SST 09648-16010

NOTE: Whether or not the drive shaft is contacting the pinion shaft can be know by its sound or feel when tapping it in.



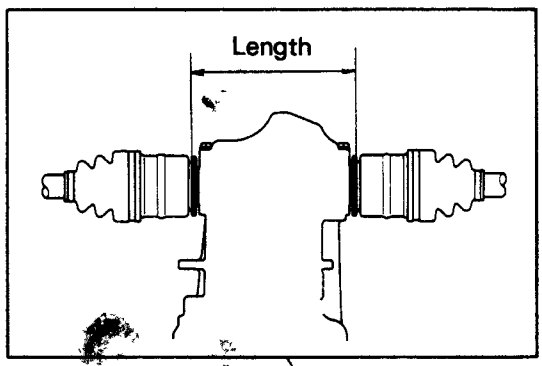
2. INSTALL STIFFENER PLATE

Install the three bolts holding the stiffener plate to the engine and transaxle. Torque the bolts.

Torque: 400 kg-cm (29 ft-lb, 39 N·m)

3. INSTALL STEERING KNUCKE AND AXLE HUB

(See step 2 to 7 on page FA-11 and 12)



4. CHECK FOLLOWING PARTS:

(a) Check the boots for damage.

NOTE: Check the entire circumference of the boots.

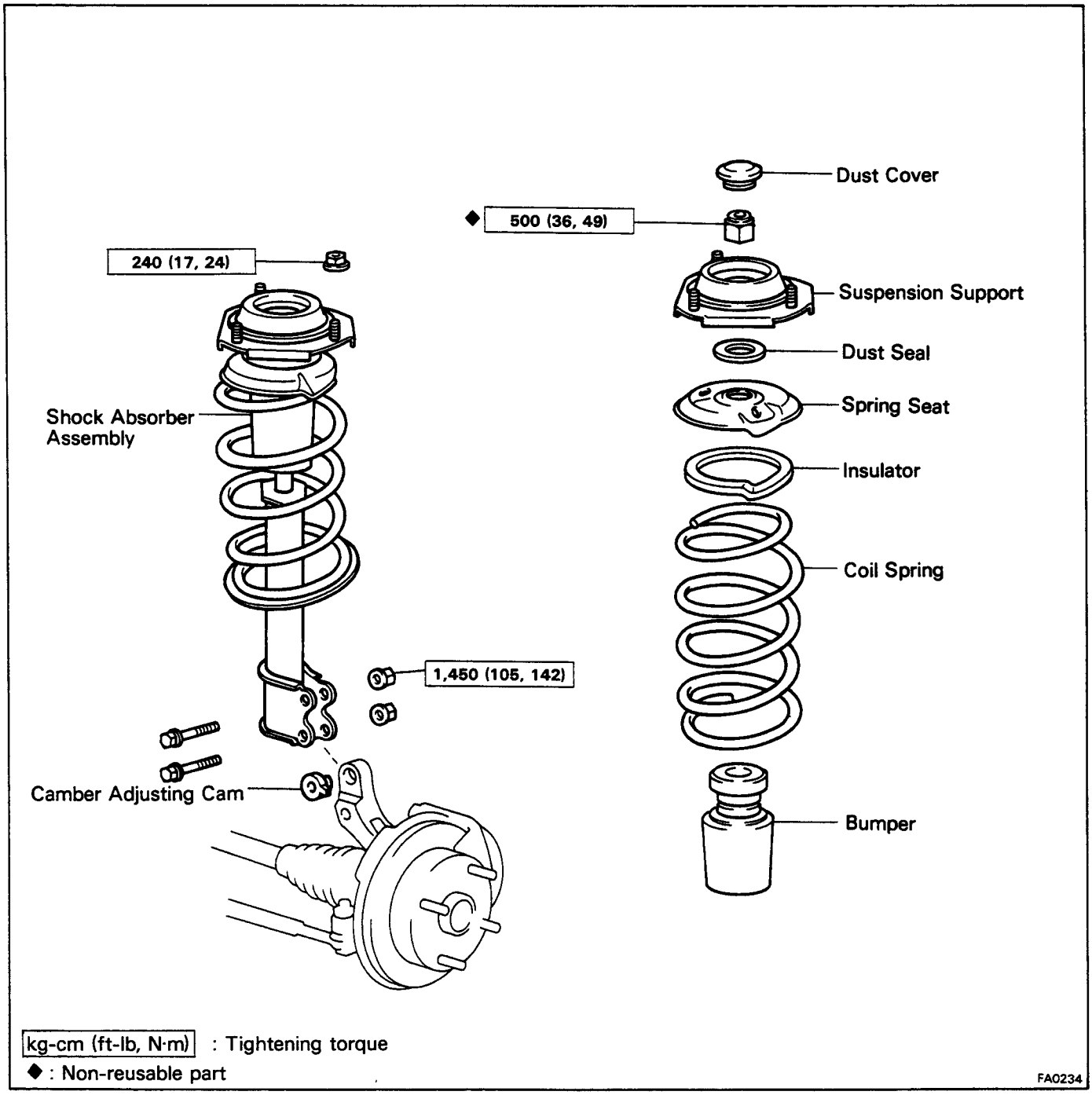
(b) Check the length between the left and right shaft after installing the drive shaft.

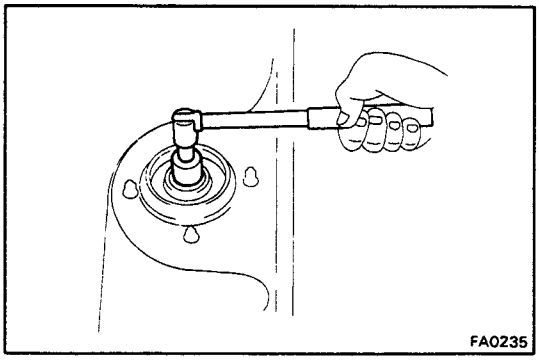
Length: Approx. 193 mm (7.60 in.)

5. CHECK FRONT WHEEL ALIGNMENT (See page FA-3)

FRONT SHOCK ABSORBER

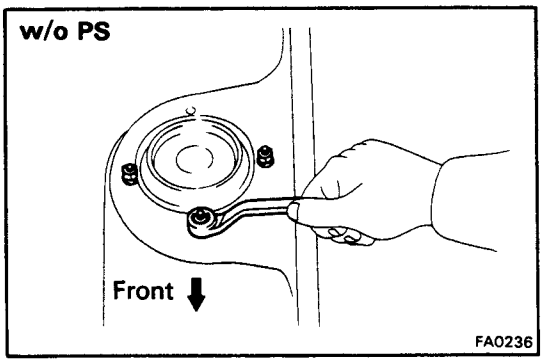
COMPONENTS

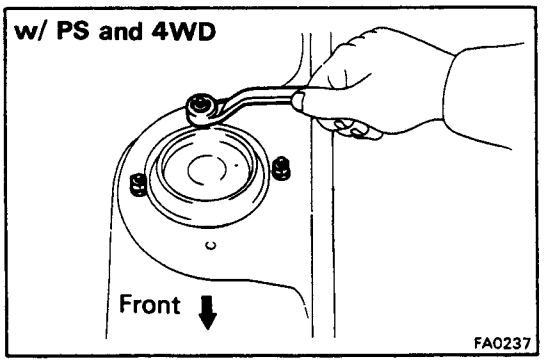




REMOVAL DISASSEMBLY OF FRONT SHOCK ABSORBER ASSEMBLY

1. **DISCONNECT STEERING KNUCKLE FROM SHOCK ABSORBER (See step 6 on page FA-8)**
2. **REMOVE SHOCK ABSORBER ASSEMBLY FROM BODY**
   (a) Remove the dust cover from the suspension support.
   (b) Loosen the nut. Do not remove the nut yet.

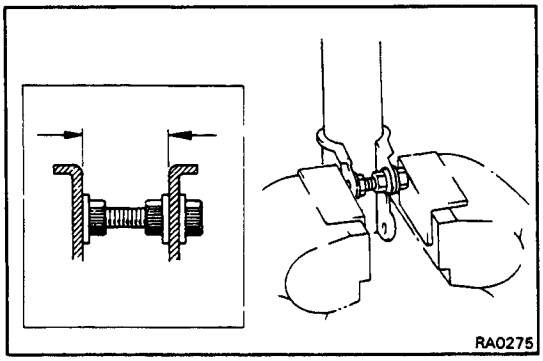




(c) Remove the three nuts holding the shock absorber to the body.

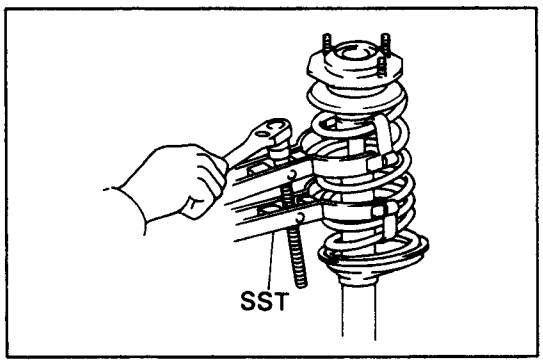
(d) Remove the shock absorber assembly.

CAUTION: Cover the drive shaft boot with cloth to avoid damage.



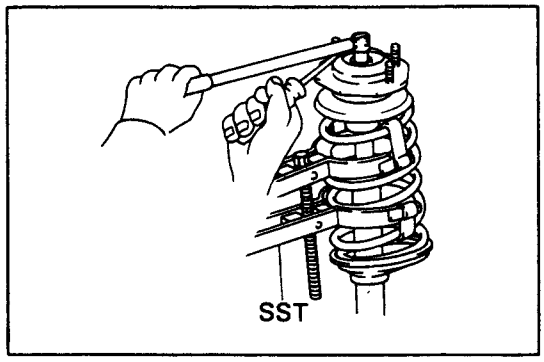
3. CLAMP SHOCK ABSORBER IN VISE

Install a bolt and nuts to the bracket at the lower portion of the shock absorber shell and secure it in a vise.



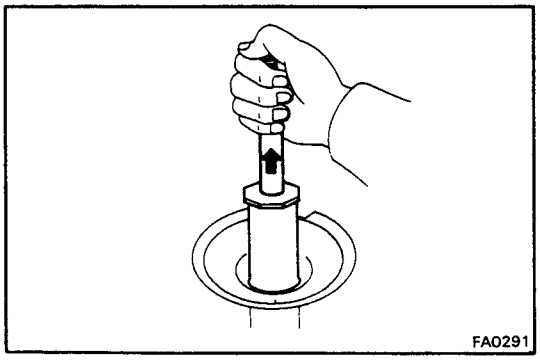
4. REMOVE COIL SPRING

(a) Using SST, compress the coil spring.
SST 09727-22032



(b) Hold the suspension with a screwdriver or such so that it will not turn, and then remove the support nut.

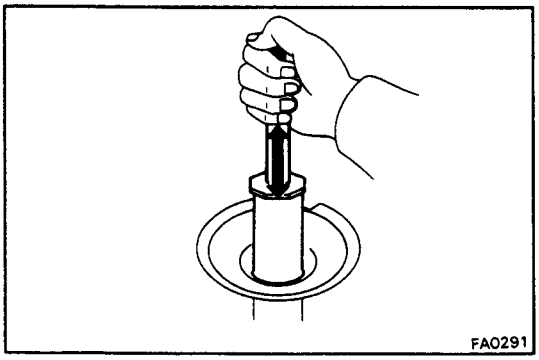
(c) Remove the suspension support, spring seat, spring and dust cover.



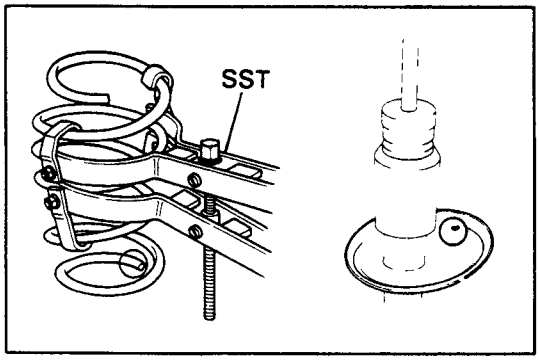
INSPECTION OF FRONT SHOCK ABSORBER

INSPECT OPERATION OF SHOCK

(a) Pull out the shock absorber piston rod at a constant speed and check to see that the pull feeling throughout the stroke is the same.



(b) Check to see that there is no change in the pull when the piston rod is rapidly moved up and down with a stroke of 5 – 10 mm (0.20 – 0.39 in.).



ASSEMBLY AND INSTALLATION OF FRONT SHOCK ABSORBER ASSEMBLY

(See page FA-19)

1. INSTALL BUMPER, COIL SPRING INSULATOR, SPRING SEAT AND DUST SEAL

(a) Mount the shock absorber in a vise.

(b) Install the bumber to the piston rod.

(c) Using SST, compress the coil spring.

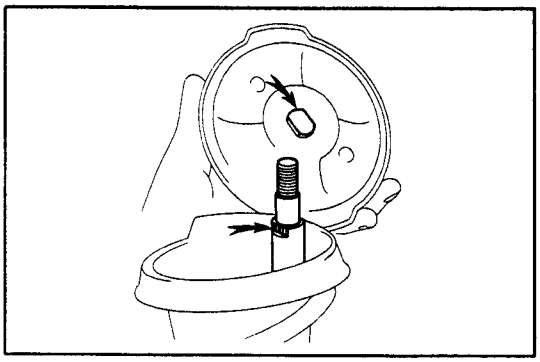
SST 09727-22032

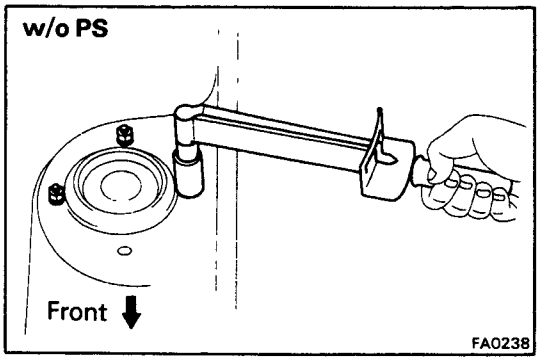
(d) Align the coil spring end with the lower seat hollow and install.

(e) Align the spring seat with the piston rod and install.

(f) Install the dust seal on the spring seat.

(g) Install the suspension support with a new nut. Do not torque the nut yet.

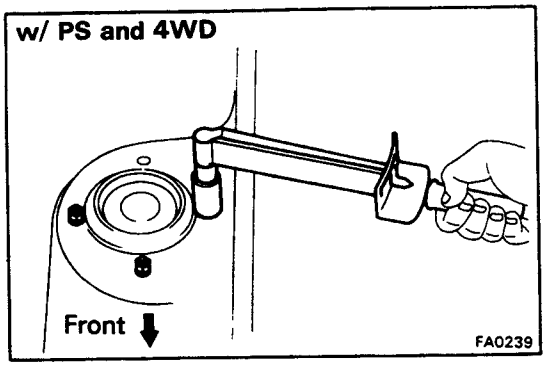


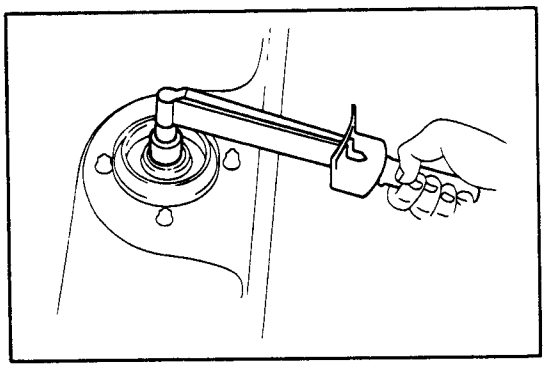


2. INSTALL SHOCK ABSORBER TO BODY

Connect three bolts holding the shock absorber to the body. Torque the nuts.

Torque: 240 kg-cm (17 ft-lb, 24 N·m)





3. **INSTALL STEERING KNUCKLE TO SHOCK ABSORBER (See step 4 on page FA-11)**

4. **TORQUE SUSPENSION SUPPORT NUT**

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

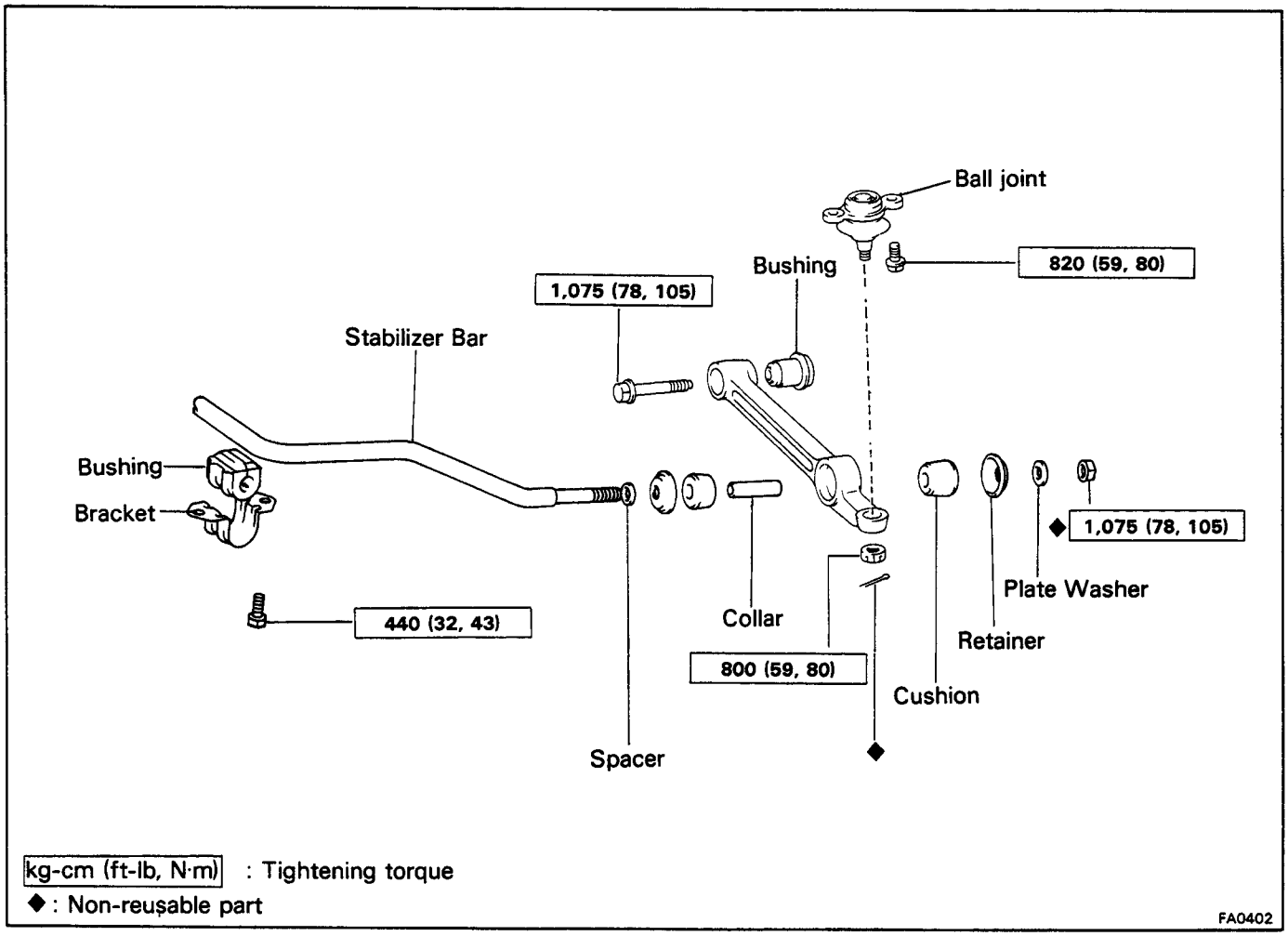
5. **INSTALL DUST COVER**

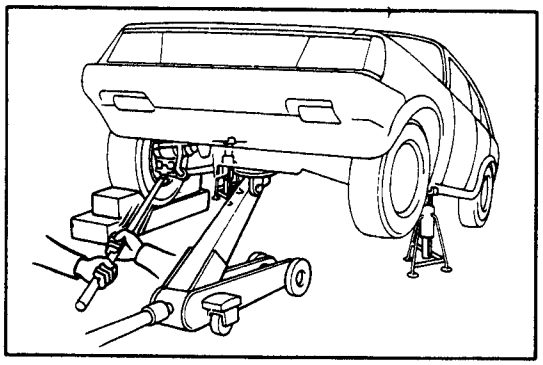
   Pack the bearing in the suspension support with MP grease. Install the dust cover.

6. **CHECK CAMBER (See page FA-5)**

FRONT SUSPENSION

COMPONENTS





Ball Joints

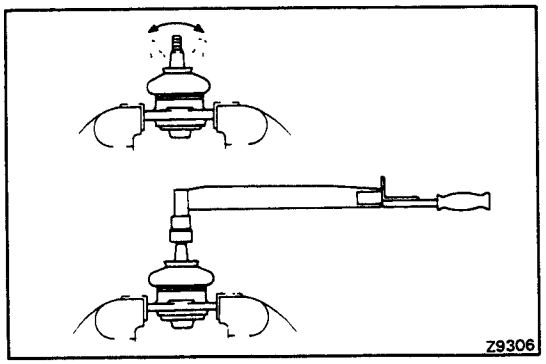
INSPECTION OF BALL JOINTS

1. **INSPECT BALL JOINTS FOR EXCESSIVE LOOSENESS**
   (a) Jack up the front of the vehicle and place a wooden block with a height of 180 – 200 mm (7.09 – 7.87 in.) under one front tire.
   (b) Lower the jack until there is about half a load on the front coil springs. Place stands under the vehicle for safety.
   (c) Make sure the front wheels are in a straightforward position and block them with chocks.
   (d) Move the lower arm up and down and check that the ball joint has no excessive play.

   Maximum ball joint vertical play: 0 mm (0 in.)

2. **INSPECT BALL JOINT DUST COVERS FOR DAMAGE OR DETERIORATION**

   If a problem is found, replace the ball joint assembly.



3. **INSPECT BALL JOINT FOR ROTATION CONDITION**
   (a) Remove the ball joint. (See page FA-29)
   (b) As shown in the figure, flip the ball joint stud back and forth 5 times before installing the nut.
   (c) Using a torque gauge, turn the nut continuously one turn each 2-4 seconds and take the torque reading on the 5th turn.

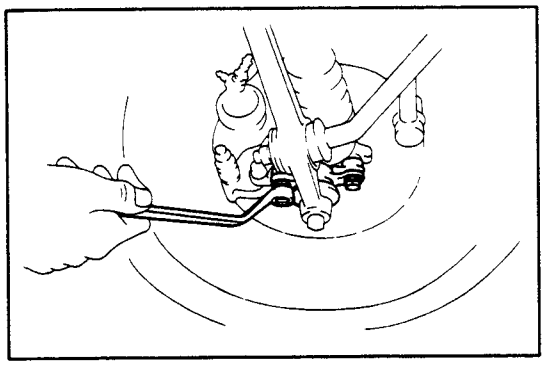
Torque (turning):
8 – 25 kg-cm (7 – 21 in.-lb, 0.8 – 2.4 N·m)

If the torque is not within specification, replace the ball joint.

Lower Arm

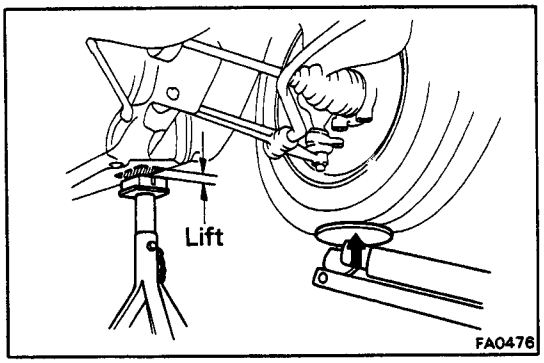
(See page FA-23)

REMOVAL OF LOWER ARM



1. **DISCONNECT LOWER ARM TO STEERING KNUCKLE**

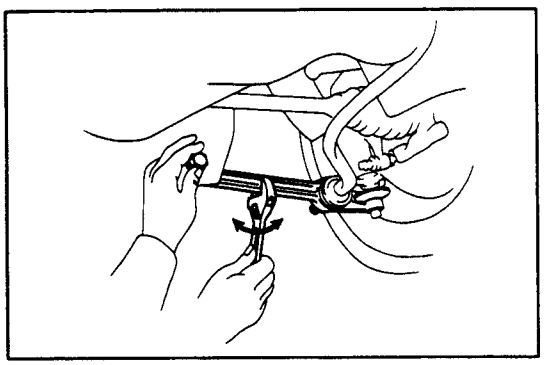
Remove the two bolts holding the ball joint to the steering knuckle.



2. **DISCONNECT STABILIZER BAR END TO LOWER ARM**

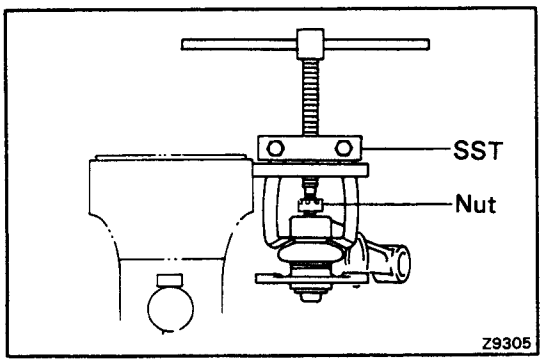
Remove the stabilizer bar nut, retainer and cushion.

3. **REMOVE LOWER ARM**
   (a) Jack up the opposite wheel until the vehicle body lifts off the stands.



(b) Loosen the lower arm bolt, pry the lower arm and pull out the bolt.
(c) Disconnect the lower arm from the stabilizer bar.

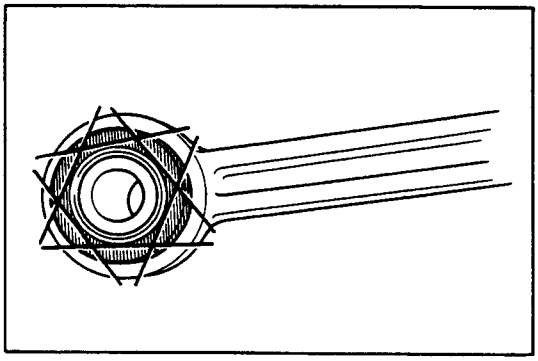
CAUTION: Be careful not to lose the caster adjust spacer.



(d) Using SST, disconnect the ball joint from the lower arm.

SST 09950-20015

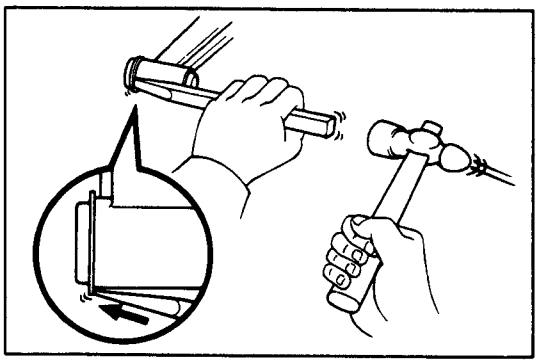
NOTE: Temporarily install the nut to prevent the ball joint from falling out.



REPLACEMENT OF LOWER ARM BUSHING

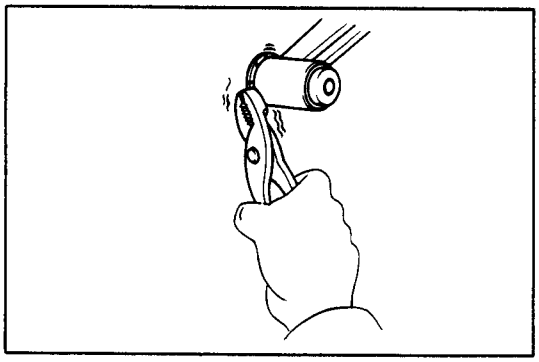
1. REMOVE LOWER ARM BUSHING

(a) Cut off the flange tip of the bushing as is shown in the figure.

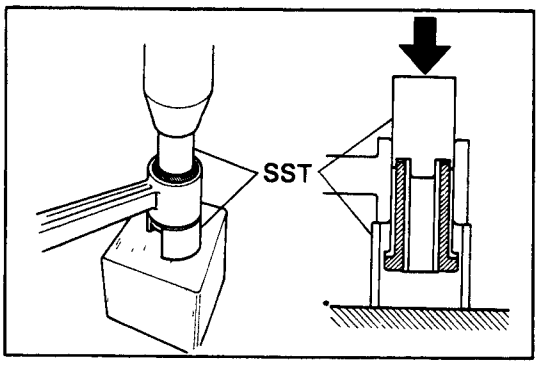


(b) Bend the remaining portions inward with a cold chisel.

CAUTION: Be careful not to damage the flange.

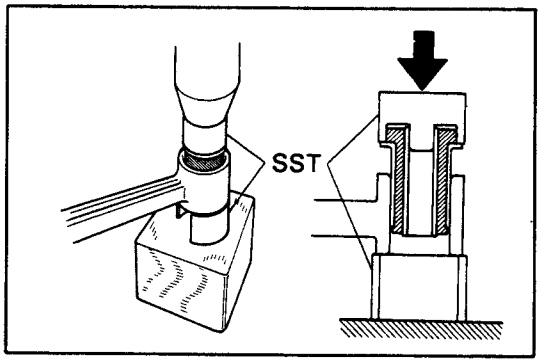


(c) Bend in the flange tips and pull off the flange with a pair of pliers.



(d) Using SST and a press, press out the bushing.

SST 09726-32010

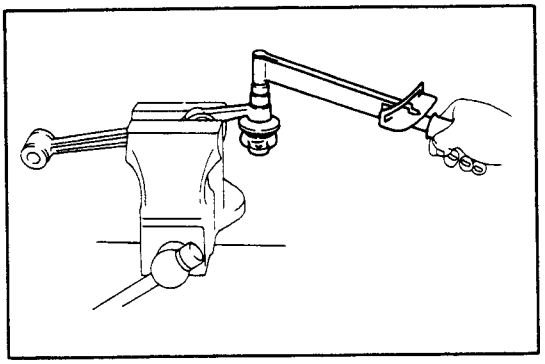


2. INSTALL LOWER ARM BUSHING

Using SST and a press, press the bushing into the arm.

SST 09726-32010

CAUTION: Do not allow grease or oil to get on the bushing.

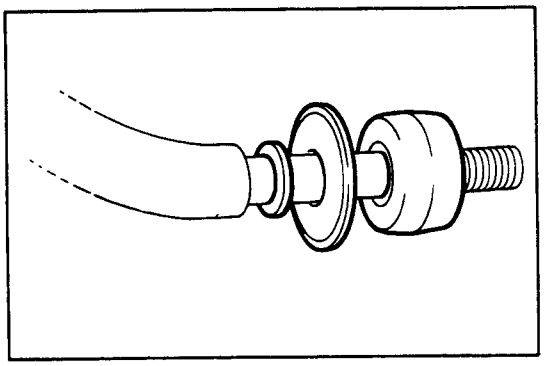


INSTALLATION OF LOWER ARM

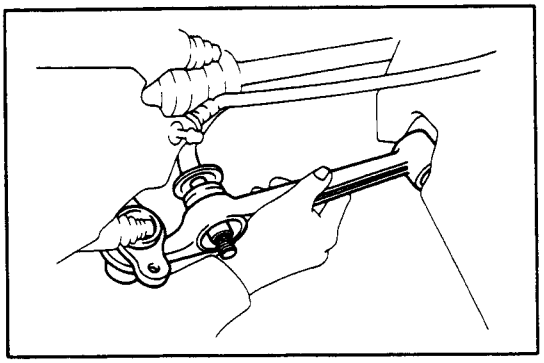
1. CONNECT LOWER ARM TO BALL JOINT

Install the lower arm to the ball joint with a nut. Torque the nut and install a new cotter pin.

Torque: 800 kg-cm (58 ft-lb, 78 N·m)

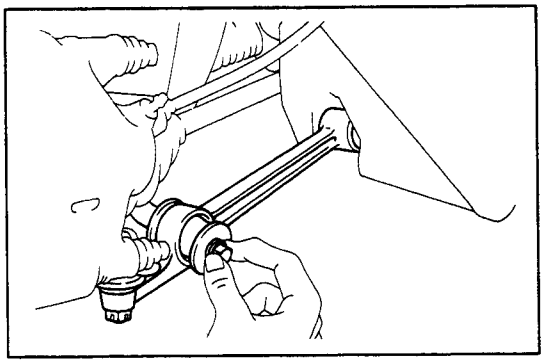


2. INSTALL SPACER, RETAINER, CUSHION AND COLLAR



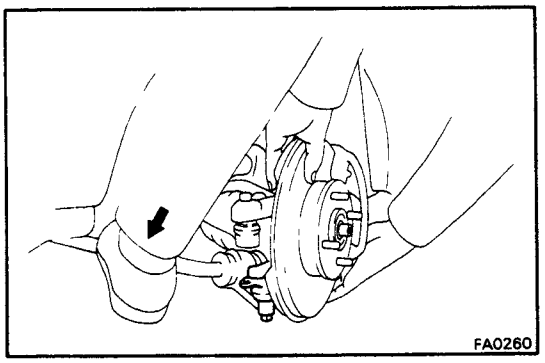
3. CONNECT LOWER ARM TO BODY

(a) Pass the lower arm through the stabilizer bar.



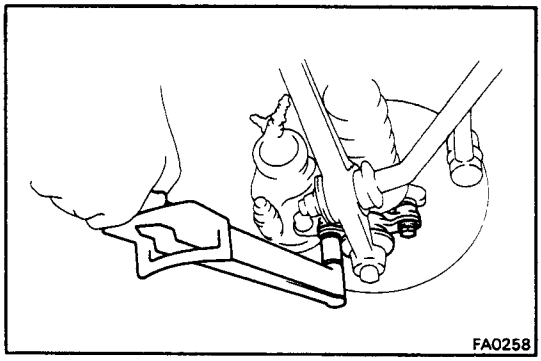
(b) Connect the lower arm with the bolt. Do not torque the bolt yet.

(c) Install the stabilizer bar with the cushion, washer and a new nut. Do not torque the nut yet.



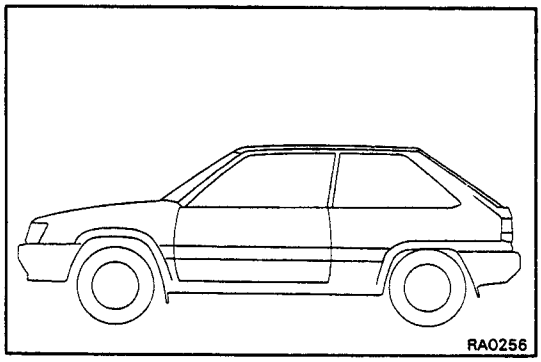
4. CONNECT LOWER ARM TO STEERING KNUCKLE

(a) Lower the stabilizer bar and connect the ball joint to steering knuckle with the two nuts.



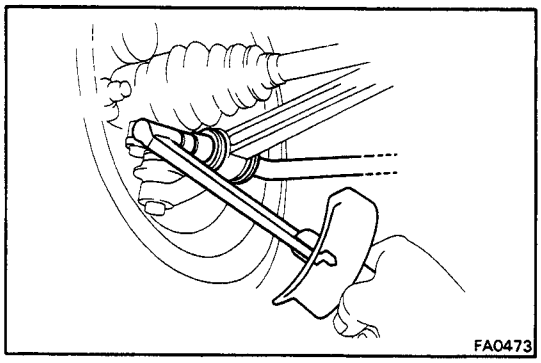
(b) Torque the nuts.

Torque: 820 kg-cm (59 ft-lb, 80 N·m)



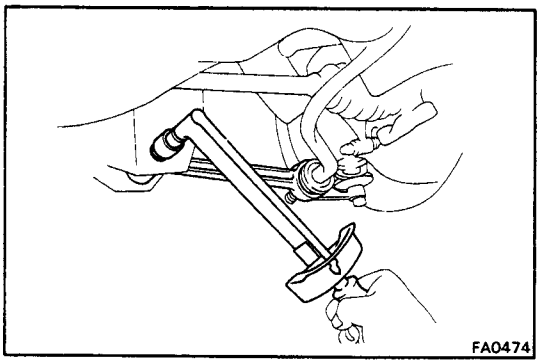
5. INSTALL TIRE AND LOWER VEHICLE

Bounce the vehicle to stabilize the suspension.



6. TORQUE NUT HOLDING STABILIZER BAR TO LOWER ARM

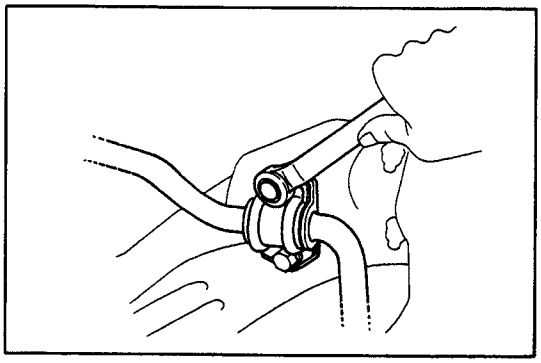
Torque: 1,075 kg-cm (78 ft-lb, 105 N·m)



7. TORQUE BOLT HOLDING LOWER ARM TO BODY

Torque: 1,150 kg-cm (83 ft-lb, 113 N·m)

8. CHECK FRONT WHEEL ALIGNMENT (See page FA-3)



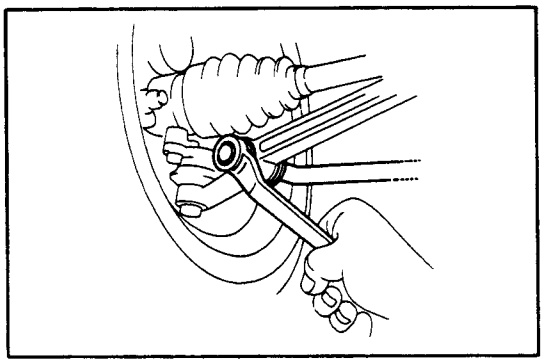
Stabilizer Bar

(See page FA-23)

REMOVAL OF STABILIZER BAR

1. REMOVE ENGINE UNDER COVER

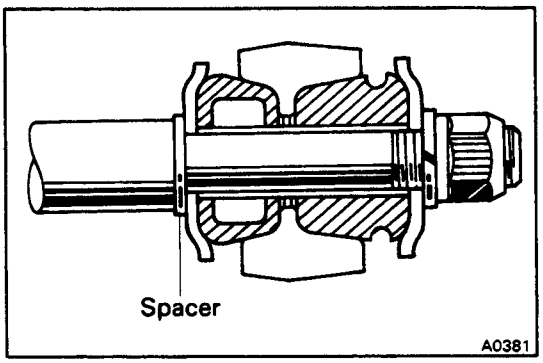
2. REMOVE BOTH STABILIZER BAR BRACKETS FROM CROSSMEMBER



3. **DISCONNECT BOTH STABILIZER BAR ENDS TO LOWER ARM**

4. **REMOVE STABILIZER BAR**

CAUTION: Be careful not to lose the spacer.

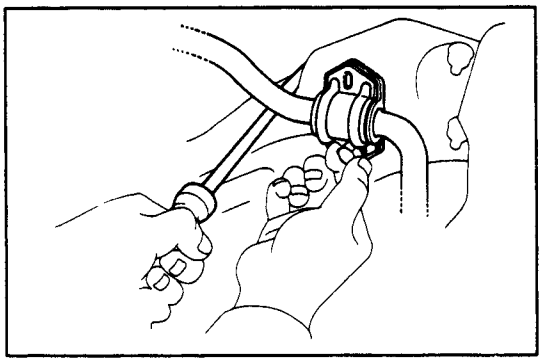


INSTALLATION OF STABILIZER BAR

1. **INSTALL STABILIZER BAR END TO LOWER ARM**

(a) Install the spacer, retainer, rubber and collar as shown in the figure.

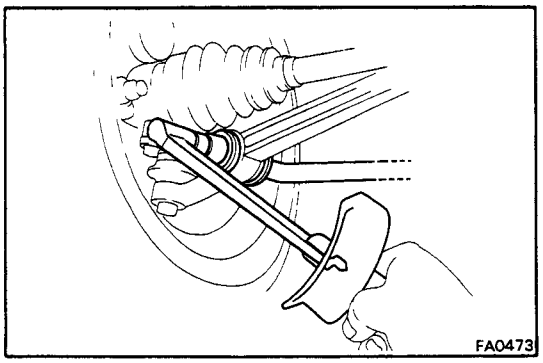
(b) Finger tighten a new stabilizer bar nut.



2. **INSTALL BRACKET TOGETHER WITH STABILIZER BAR**

Pry the bar forward and install the brackets.
Torque the bolts.

Torque: 440 kg-cm (32 ft-lb, 43 N·m)



3. **TORQUE NUT HOLDING STABILIZER BAR TO LOWER ARM**

Torque: 1,075 kg-cm (78 ft-lb, 105 N·m)

NOTE: Bounce the vehicle to stabilize the suspension before torquing the stabilizer bar nut.

4. **INSTALL ENGINE UNDER COVER**

5. **CHECK FRONT WHEEL ALIGNMENT (See page FA-3)**

REAR AXLE AND SUSPENSION

	Page
(FWD)	
TROUBLESHOOTING	RA-2
REAR WHEEL ALIGNMENT	RA-3
REAR AXLE HUB AND CARRIER	RA-5
Sedan	RA-5
Wagon	RA-12
REAR SUSPENSION	RA-16
Rear Shock Absorber	RA-17
Suspension Arm	RA-20
Strut Rod	RA-23
(4WD)	
TROUBLESHOOTING	RA-24
REAR AXLE SHAFT	RA-25
DIFFERENTIAL	RA-28
FOUR LINK TYPE REAR SUSPENSION	RA-42
Coil Spring and Rear Shock Absorber	RA-43
Lateral Control Rod	RA-46
Upper and Lower Control Arm	RA-48
Rear Stabilizer Bar	RA-51

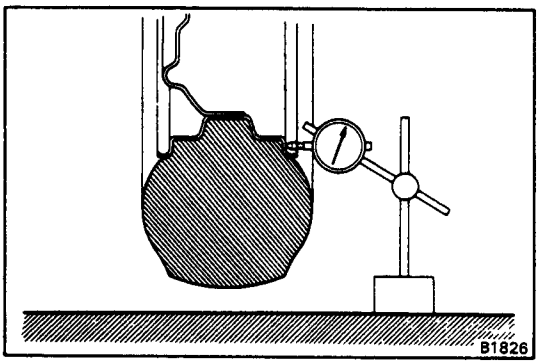
TROUBLESHOOTING (FWD)

Problem	Possible cause	Remedy	Page
Wanders/pulls	Tires worn or improperly inflated	Replace tire or inflate tires to proper pressure	RA-3
	Alignment incorrect	Check alignment	RA-3
	Wheel bearing adjusted too tight (Sedan)	Adjust wheel bearing	RA-5
	Wheel bearing worn (Wagon)	Replace wheel bearing	RA-12
	Rear suspension parts loose or broken	Tighten or replace suspension parts	RA-5, 17
Bottoming	Vehicle overloaded	Check loading	
	Shock absorber worn out	Replace shock absorber	RA-17
	Spring weak	Replace spring	RA-17
Sways/pitches	Tires improperly inflated	Inflate tires to proper pressure	RA-3
	Shock absorber worn out	Replace shock absorber	RA-17
Abnormal tire wear	Tires improperly inflated	Inflate tires to proper pressure	RA-3
	Shock absorber worn out	Replace shock absorber	RA-17
	Alignment incorrect	Check toe-in	RA-4
	Suspension parts worn	Replace suspension parts	RA-5, 17

REAR WHEEL ALIGNMENT (FWD)

1. **MAKE FOLLOWING CHECKS AND CORRECT ANY PROBLEM**

   (a) Check the tires for wear and proper inflation. (See page FA-3)



   (b) Check the rear wheel bearings for looseness.

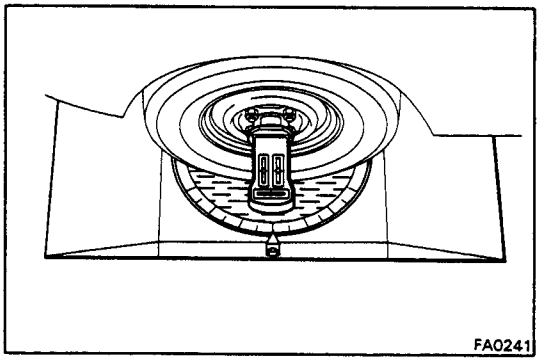
   (c) Check the wheel runout.

   Lateral runout: 1.2 mm (0.047 in.) or less

   (d) Check the rear suspension for looseness.

   (e) Use the standard bounce test to check if the rear absorbers work properly.

2. **INSPECT VEHICLE HEIGHT (See page FA-5)**



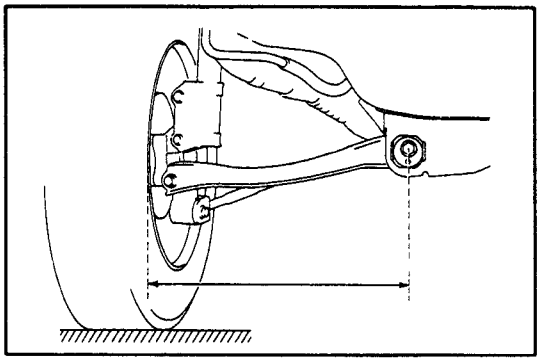
3. **INSTALL WHEEL ALIGNMENT EQUIPMENT**

   Follow the specific instructions of the equipment manufacturer.

4. **INSPECT CAMBER**

   Inspection standard: −5′ ± 30′ (Sedan)
   −10′ ± 30′ (Wagon)
   Left-right error: 30′

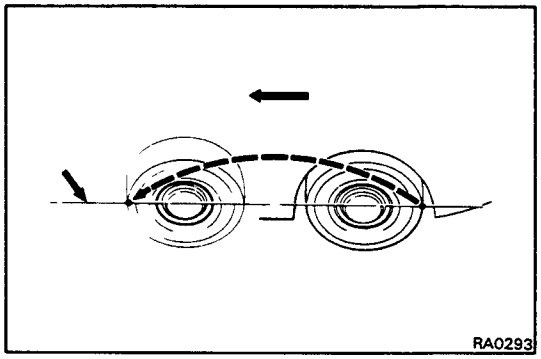
   If not within specification, inspect and replace any damaged or worn rear suspension parts.



5. **ADJUST TOE-IN**

   (a) Measure the distance between each wheel disc and cam bolt center of the suspension arm and check that both are the same.

   Left-right error: 3 mm (0.12 in.) or less

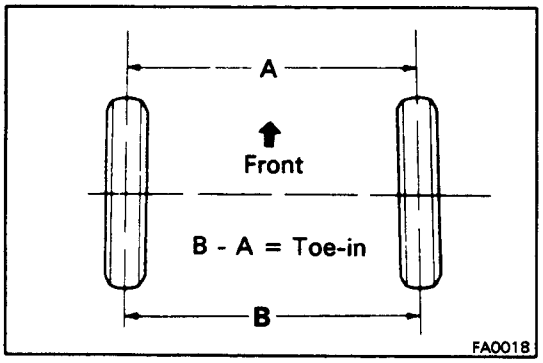


   (b) Move the vehicle forward a few meters with the rear wheels in the straight-ahead position on a level place.

   (c) Mark the center of each rear tread and measure the distance between the marks of the right and left tires.

   (d) Advance the vehicle until the marks on the rear of the tires come to the front.

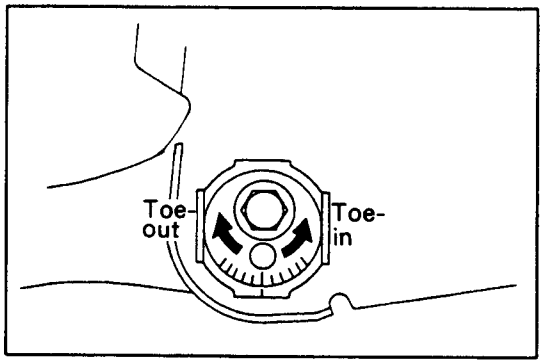
   NOTE: The toe-in should be measured at the same point on the tire and at the same level.



(e) Measure the distance between the marks on the front of the tires.

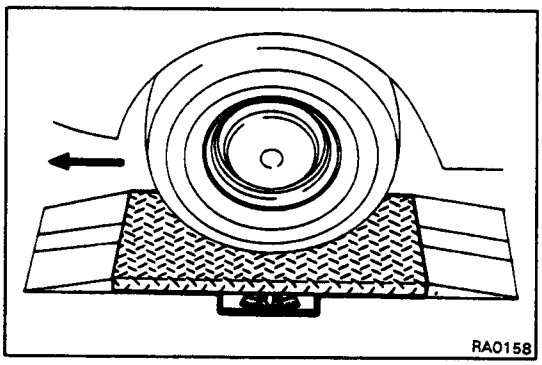
Toe-in:

Inspection STD 0 ± 1 mm (0 ± 0.04 in.)



(f) If not within specification, turn the left and right toe-in adjusting cams an equal amount to adjust.

NOTE: The toe-in will change about 2 mm (0.08 in.) with each graduation of the cam (one side).



6. CHECK SIDE SLIP WITH SIDE SLIP TESTER

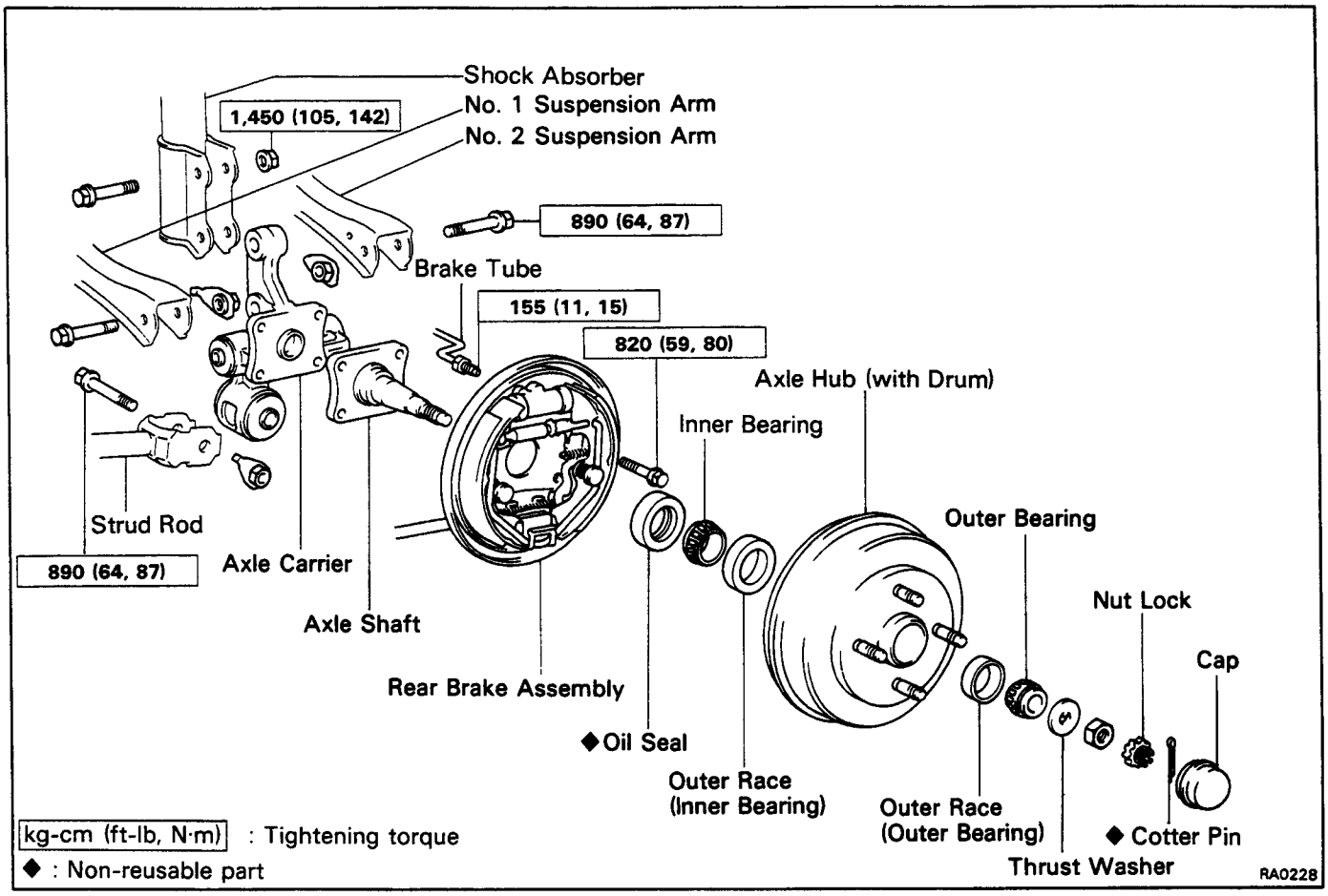
Side slip: 3.0 mm/m (0.118 in./3.3 ft) or less

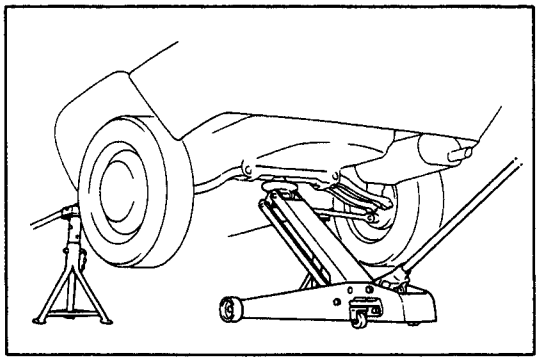
If the side slip is not within specification, the toe-in may not be correct.

REAR AXLE HUB AND CARRIER (FWD)

Sedan

COMPONENTS

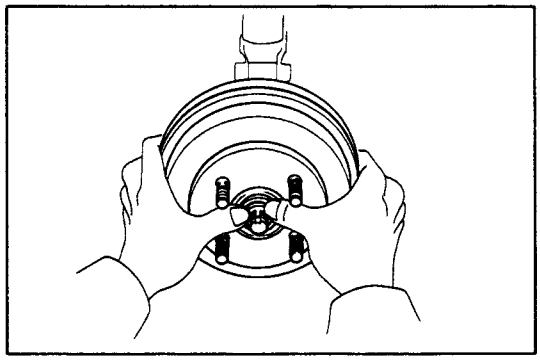




REMOVAL OF REAR AXLE HUB AND CARRIER

1. JACK UP VEHICLE

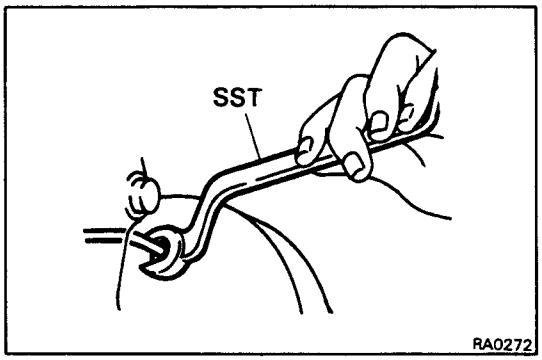
Jack up the vehicle and support the body with stands.



2. REMOVE AXLE HUB

(a) Remove the cap, cotter pin, nut lock and nut.

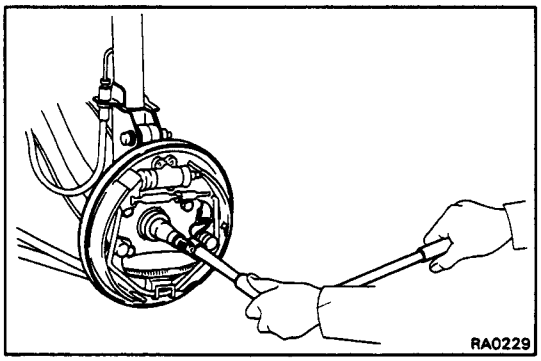
(b) Remove the axle hub together with the outer bearing and thrust washer.



3. DISCONNECT BRAKE TUBE FROM WHEEL CYLINDER

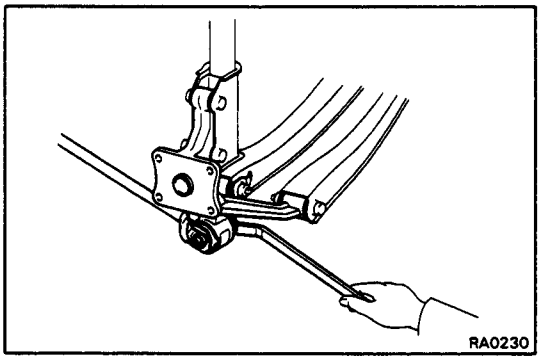
Using SST, disconnect the brake tube.

SST 09751-36011



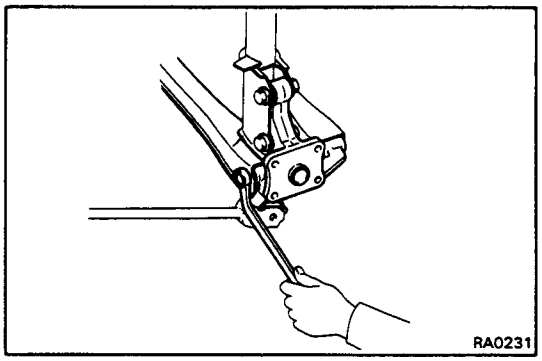
4. REMOVE AXLE SHAFT

Remove the bolts holding the axle shaft to the carrier, and remove the axle shaft and rear brake assembly.

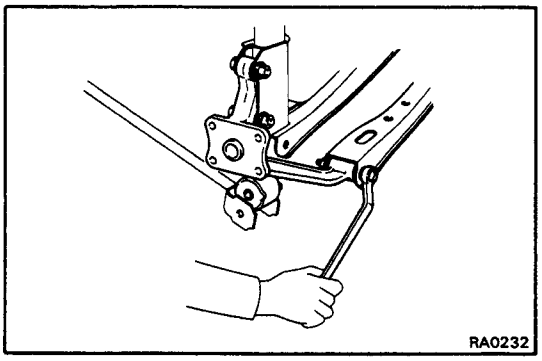


5. REMOVE AXLE CARRIER

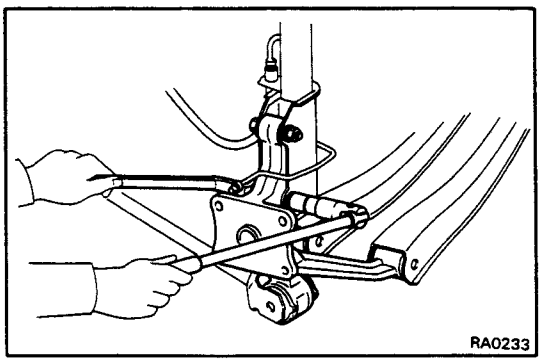
(a) Remove the bolt and nut holding the axle carrier to the strut rod.



(b) Remove the bolt and nut holding the axle carrier to the No.1 suspension arm.



(c) Remove the bolt and nut holding the axle carrier to the No.2 suspension arm.



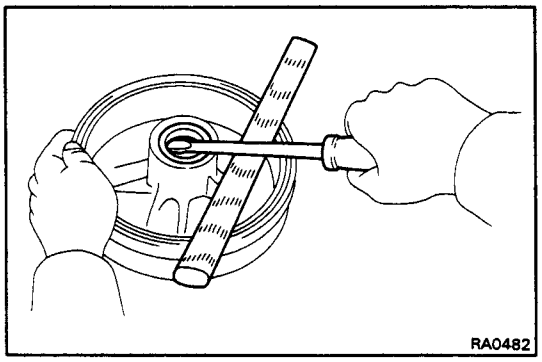
(d) Remove the bolts and nuts holding the axle carrier to the shock absorber, and remove the axle carrier.

REPLACEMENT OF WHEEL BEARINGS

1. REMOVE INNER BEARING AND OIL SEAL

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

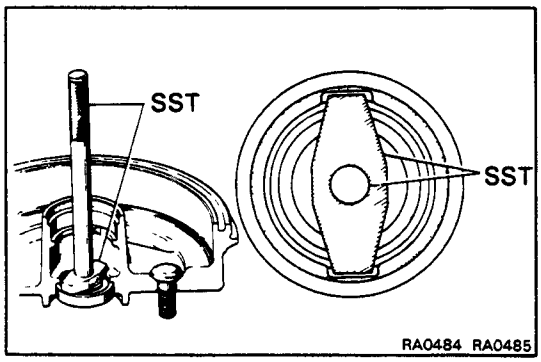
(b) Remove the inner bearing from the disc.



2. REMOVE BEARING OUTER RACES

Using SST, press out the bearing races.

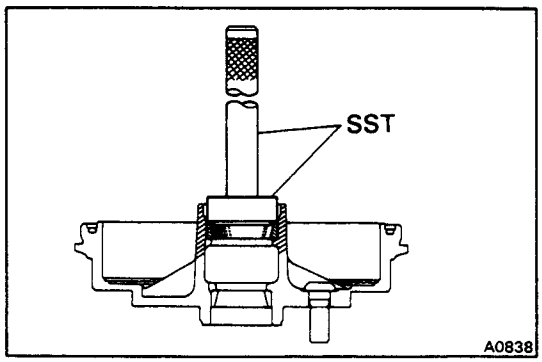
SST 09608-16010 and 09608-20011



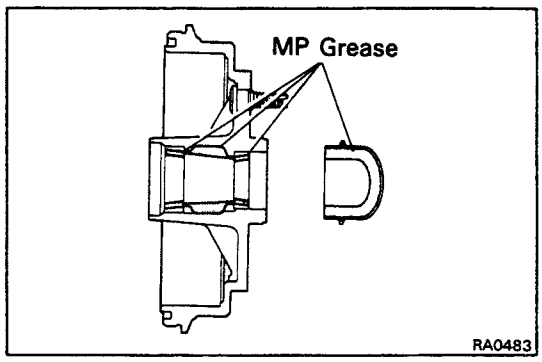
3. INSTALL BEARING OUTER RACES

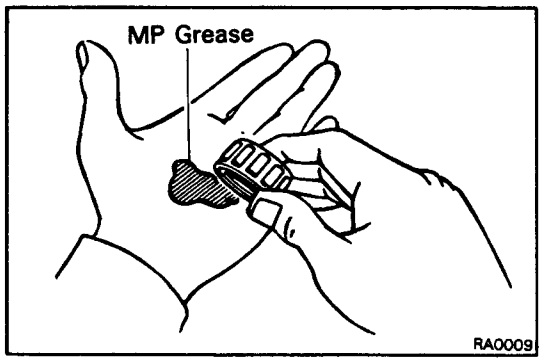
Using SST, carefully press in new bearing races.

SST 09608-16010 and 09608-20011



4. FILL INSIDE OF AXLE HUB AND CAP WITH MP GREASE



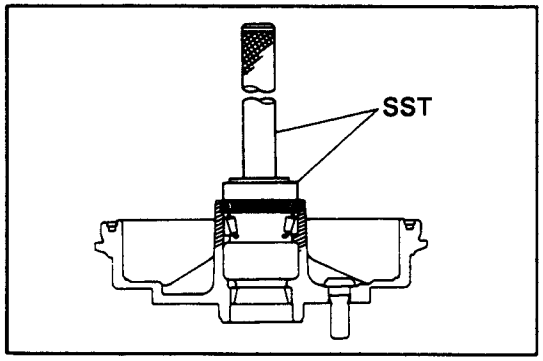


5. PACK BEARINGS WITH MP GREASE

(a) Place MP grease in the palm of your hand.

(b) Pack grease into the bearing, continuing until the grease oozes out from the other side.

(c) Do the same around the bearing circumference.



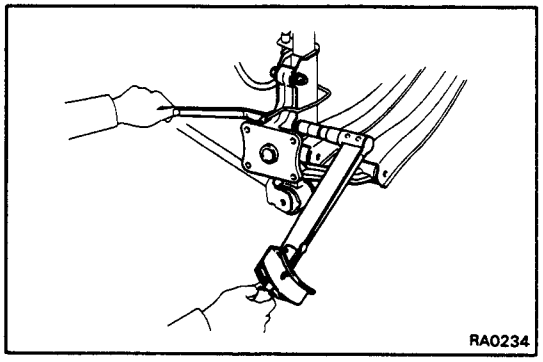
6. INSTALL INNER BEARING AND NEW OIL SEAL

(a) Place the inner bearing into the axle hub.

(b) Using SST, drive a new oil seal in the axle hub.

SST 09608-20011

(c) Apply MP grease to the oil seal.



INSTALLATION OF REAR AXLE HUB AND CARRIER

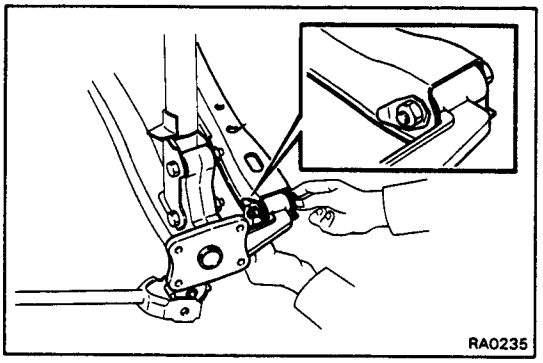
(See page RA-5)

1. INSTALL AXLE CARRIER

(a) Place the axle carrier in position.

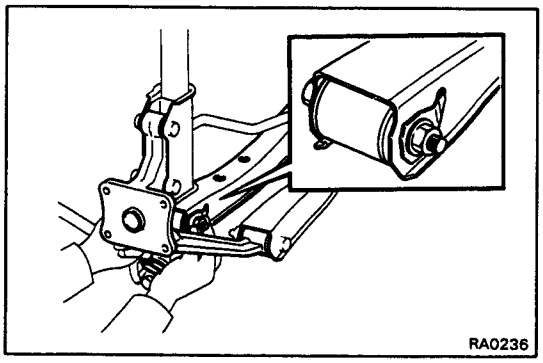
(b) Install the two bolts and nuts holding the axle carrier to the shock absorber. Torque the nuts.

Torque: 1,450 kg-cm (105 ft-lb, 142 N·m)



(c) Provisionally install the bolt and nut holding the axle carrier to the No.2 suspension arm.

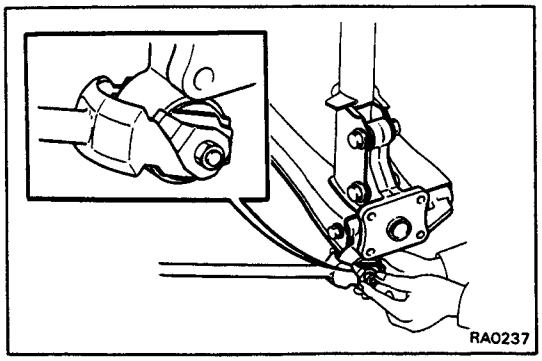
NOTE: Be sure the lip of the nut is resting on the flange of the suspension arm-not over it.



(d) Provisionally install the bolt and nut holding the axle carrier to the No.1 suspension arm.

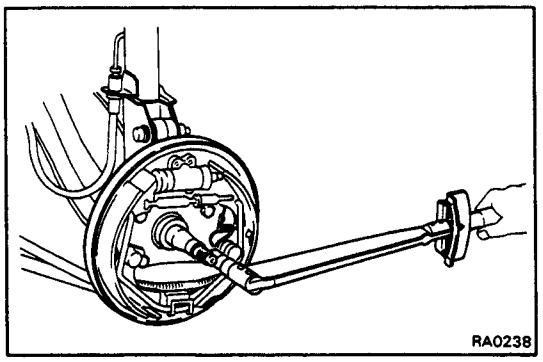
NOTE: When installing, insert the lip of the nut into the hole on the suspension arm.





(e) Provisionally install the bolt and nut holding the axle carrier to the strut rod.

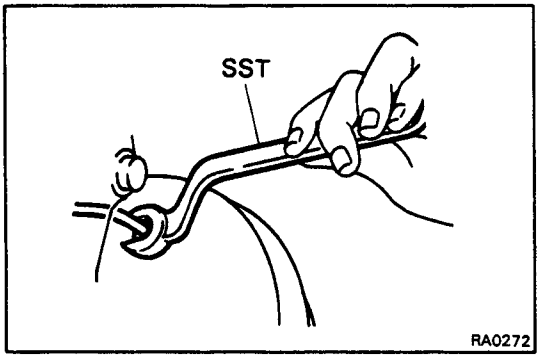
NOTE: When installing, insert the lip of the nut into the groove on the bracket.



2. INSTALL AXLE SHAFT

Install the axle shaft and rear brake assembly with four bolts. Torque the bolts.

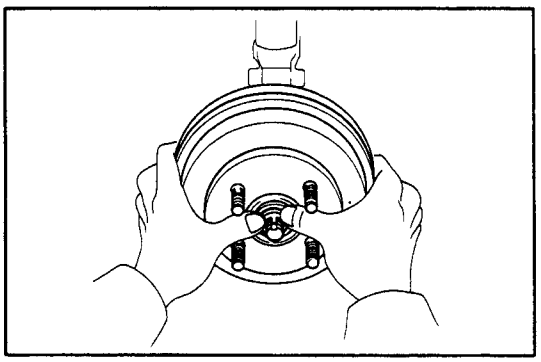
Torque: 820 kg-cm (59 ft-lb, 80 N·m)



3. CONNECT BRAKE TUBE TO WHEEL CYLINDER

SST 09751-36011

Torque: 155 kg-cm (11 ft-lb, 15 N·m)

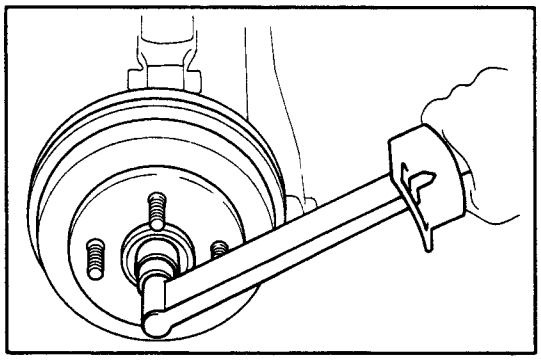


4. INSTALL AXLE HUB ON SPINDLE

(a) Place the axle hub and outer bearing on the axle shaft.

(b) Fill in MP grease between the outer bearing and thrust washer.

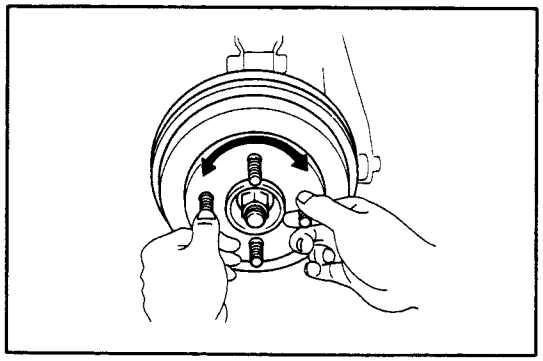
(c) Install the thrust washer.



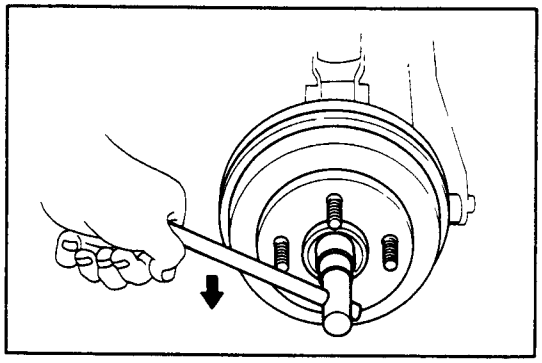
5. ADJUST PRELOAD

(a) Install and torque the nut.

Torque: 300 kg-cm (22 ft-lb, 29 N·m)

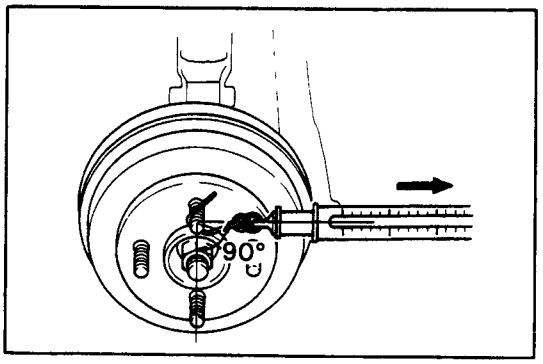


(b) Snug down the bearing by turning the hub several times.



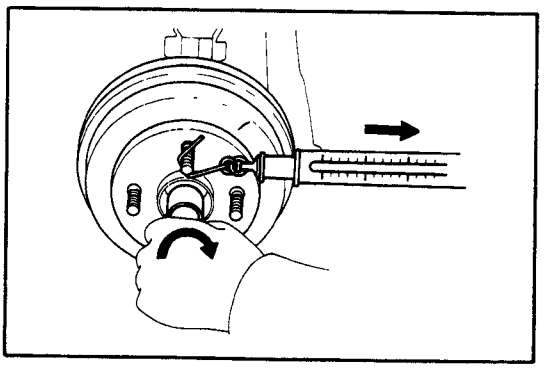
(c) Loosen the nut until it can be turned by hand.

NOTE: Make sure that there is absolutely no brake drag.



(d) Measure and make a note of the rotation frictional force of the oil seal.

Oil seal frictional force: Approx. 400g (0.9 lb, 3.9 N)



(e) Tighten the nut until the preload is within specification.

Bearing preload (while turning):

In addition to oil seal frictional force

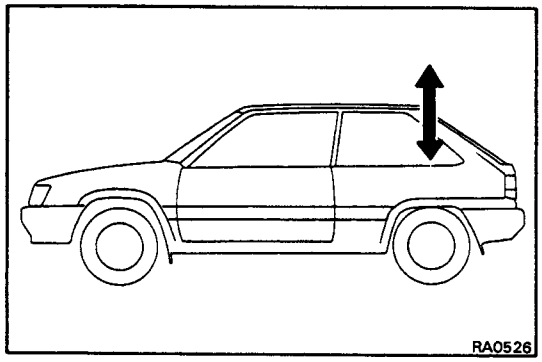
400 – 1,000 g (0.9 – 2.2 lb, 3.9 – 9.8 N)

(f) Insure that the drum rotates smoothly.

6. INSTALL NUT LOCK, COTTER PIN AND CAP

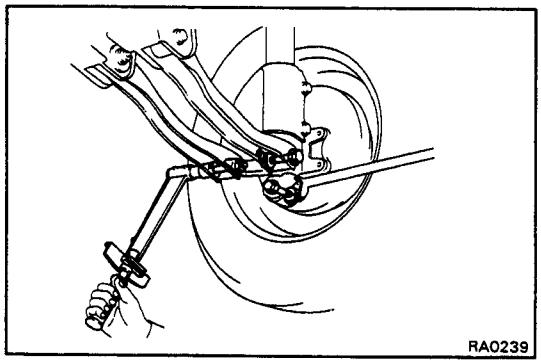
NOTE: If the cotter pin hole does not line up, correct by tightening the nut the smallest amount possible.

7. FILL BRAKE RESERVOIR WITH BRAKE FLUID AND BLEED BRAKE SYSTEM (See page BR-7)



8. TORQUE AXLE CARRIER MOUNT BOLTS

(a) Remove the stands and bounce the vehicle to stabilize the suspension.



(b) Torque the mount bolts with the vehicle weight on the suspension.

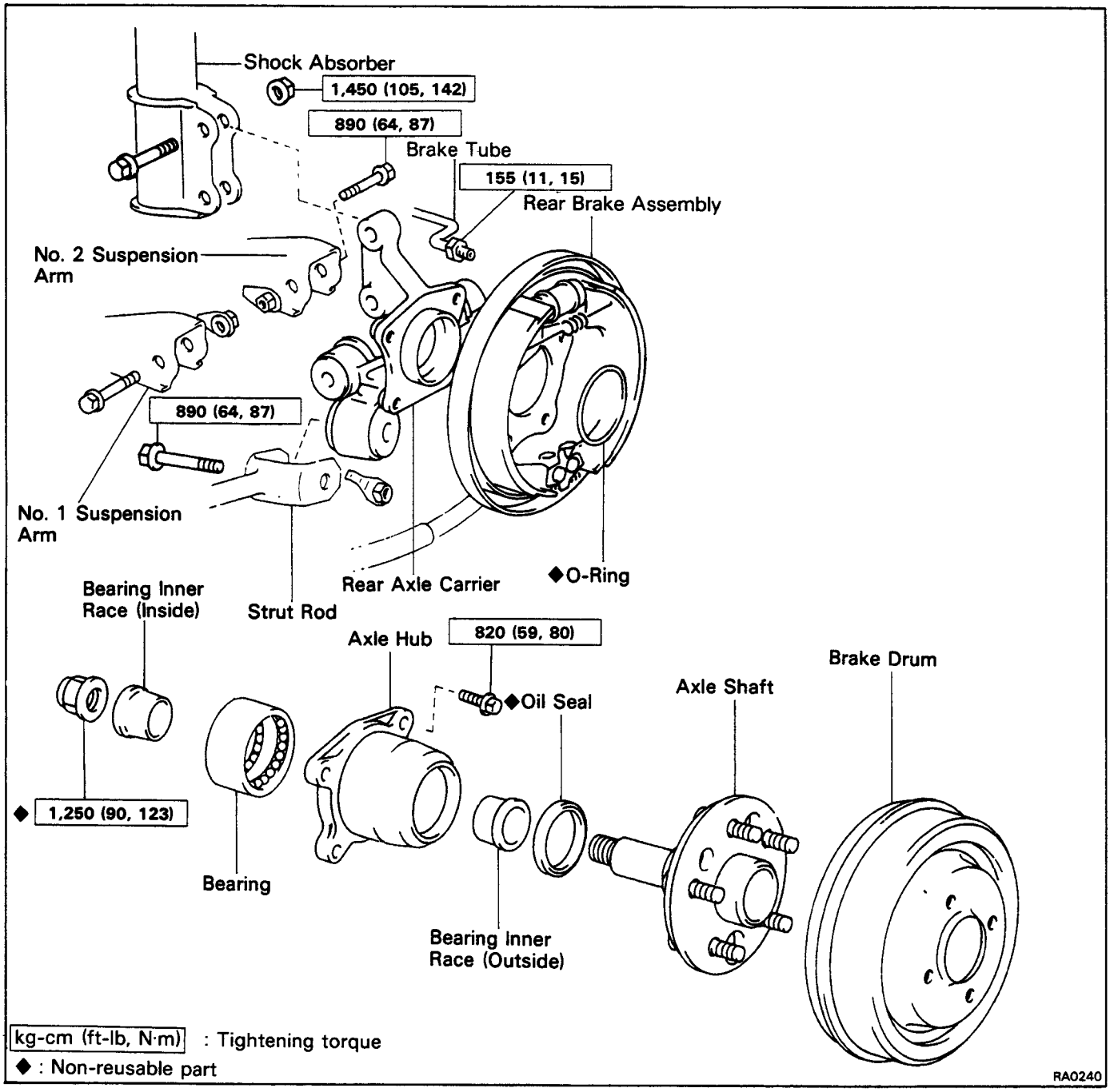
Torque: 890 kg-cm (64 ft-lb, 87 N·m)

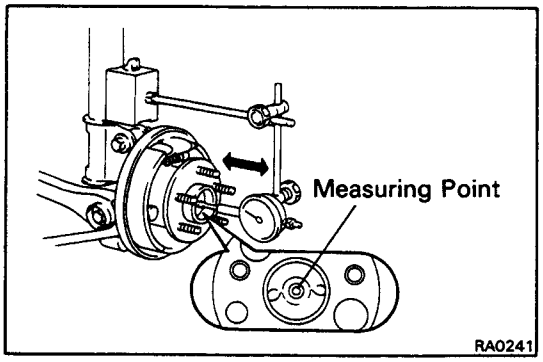
9. CHECK REAR WHEEL ALIGNMENT

(See page RA-3)

Wagon

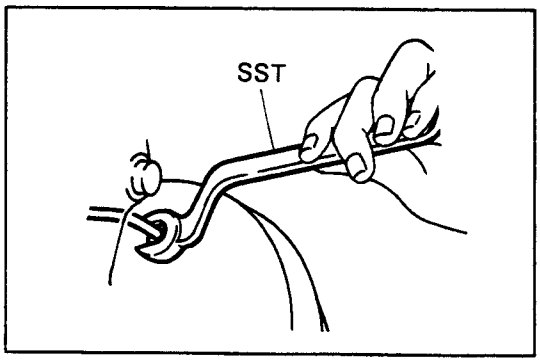
COMPONENTS





REMOVAL OF REAR AXLE HUB AND CARRIER

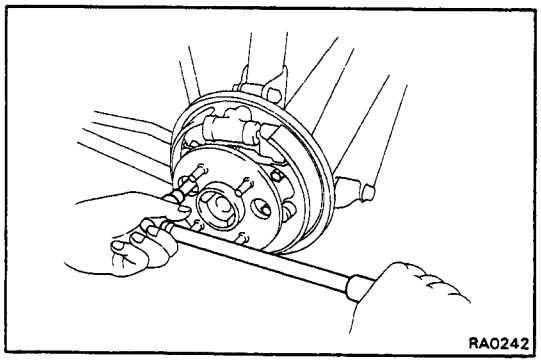
1. **REMOVE BRAKE DRUM**
2. **CHECK BEARING PLAY IN AXIAL DIRECTION**
   Limit: 0.05 mm (0.0020 in.)



3. DISCONNECT BRAKE TUBE FROM WHEEL CYLINDER

Using SST, disconnect the brake tube.

SST 09751-36011



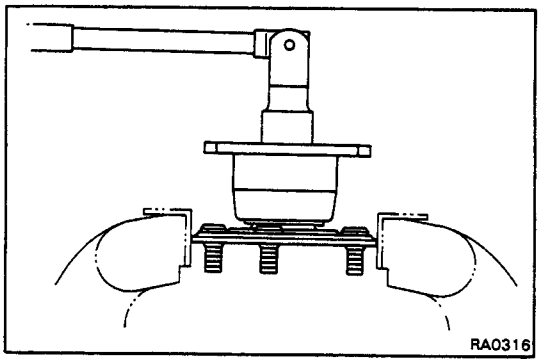
4. REMOVE REAR AXLE HUB

(a) Remove the four bolts holding the axle hub to the axle carrier, and remove the axle hub and brake assembly.

(b) Remove the O-ring.

5. REMOVE REAR AXLE CARRIER

(See pages RA-6 and 7)



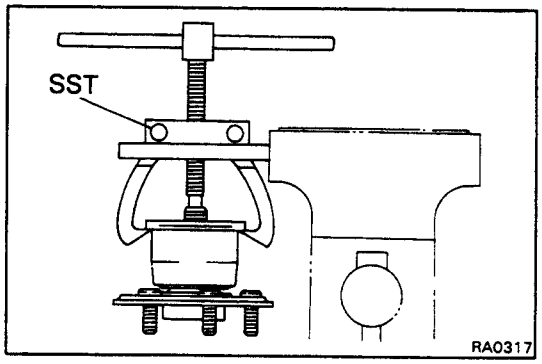
REPLACEMENT OF REAR AXLE HUB AND WHEEL BEARING

(See page RA-12)

1. REMOVE NUT

(a) Using a chisel and hammer, unstake the nut.

(b) Remove the nut.

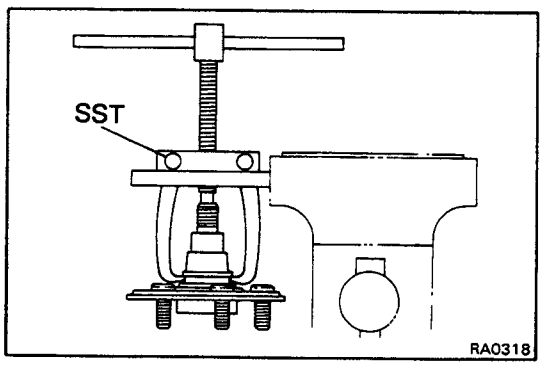


2. REMOVE AXLE SHAFT FROM AXLE HUB

Using SST, push the axle shaft off the axle hub.

SST 09950-20015

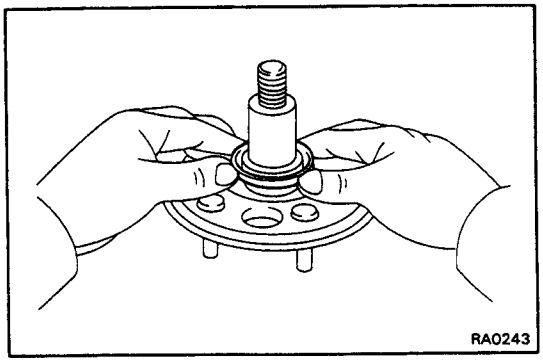
3. REMOVE BEARING INNER RACE (INSIDE)



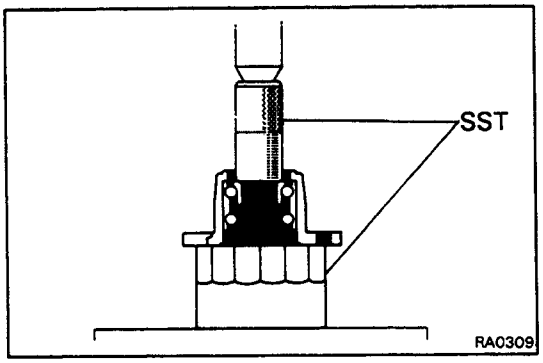
4. REMOVE BEARING INNER RACE (OUTSIDE)

Using SST, pull off the bearing inner race (outside) from the axle shaft.

SST 09950-20015



5. REMOVE OIL SEAL

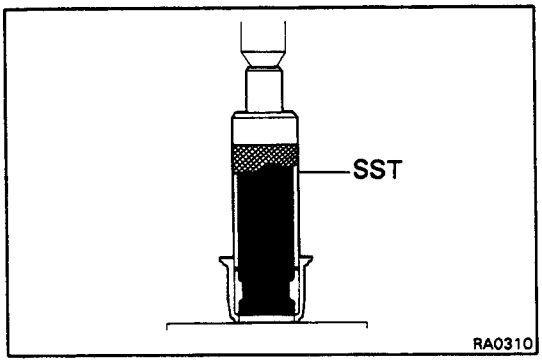


6. REMOVE BEARING

(a) First, install the inner race (inner side) of the removed bearing.

(b) Using SST, press out the bearing.

SST 09228-22020 and 09636-20010



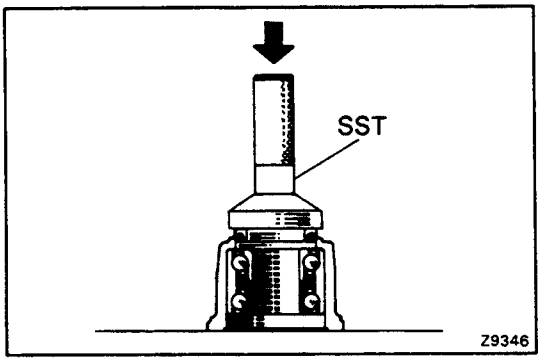
7. INSTALL BEARING

NOTE: Always replace the bearing as an assembly.

(a) Apply MP grease around the bearing outer race.

(b) Using SST, press a new bearing into the bearing case.

SST 09316-60010

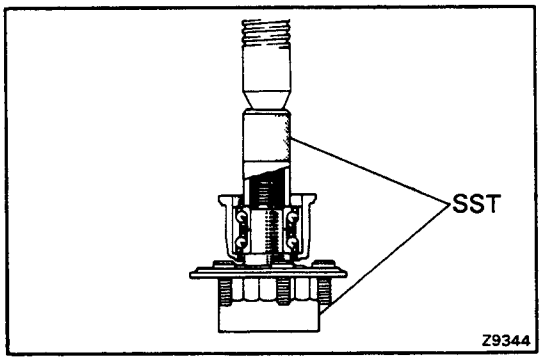


8. INSTALL OIL SEAL

(a) Using SST, drive an oil seal into the axle hub.

SST 09310-35010

(b) Apply MP grease between the oil seal lip.

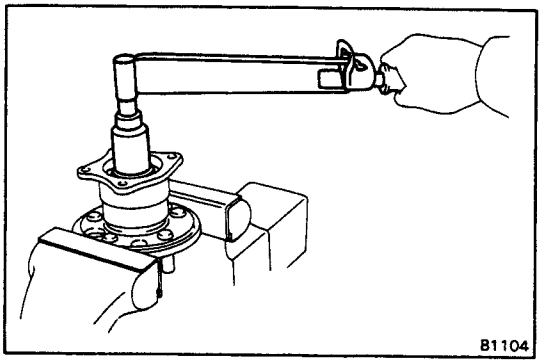


9. INSTALL AXLE SHAFT

(a) Install the bearing both side inner race.

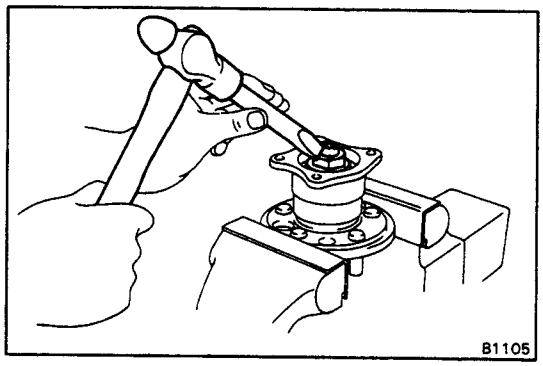
(b) Using SST, press the inner race into the axle shaft.

SST 09228-22020 and 09636-20010

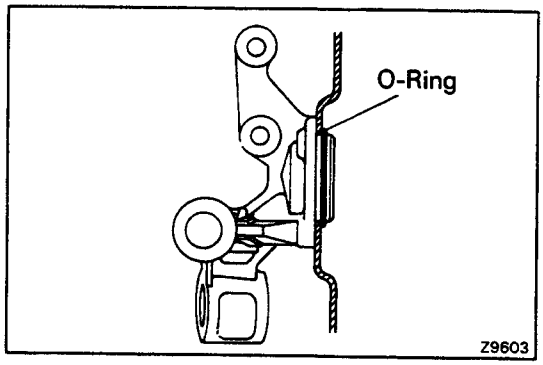


(c) Install and torque a new nut.

Torque: 1,250 kg-cm (90 ft-lb, 123 N·m)



(d) Stake the nut.

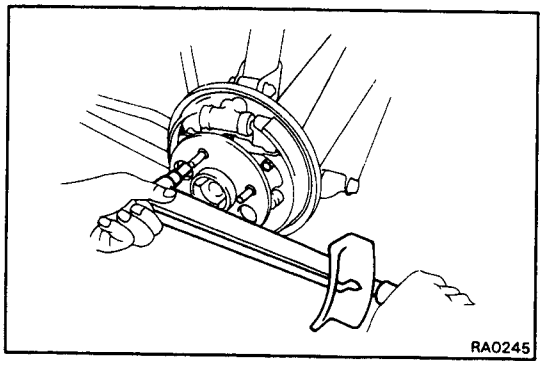


INSTALLATION OF REAR AXLE HUB AND CARRIER

(See page RA-12)

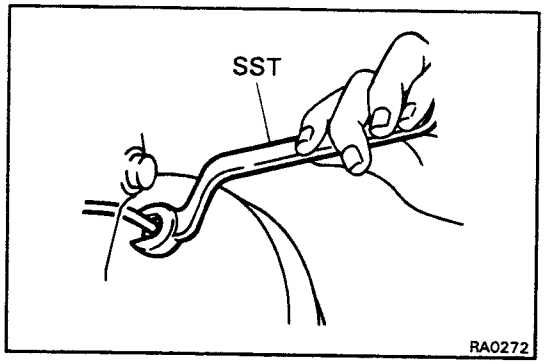
1. **INSTALL REAR AXLE CARRIER**
   (See pages RA-8 and 9)

2. **INSTALL REAR AXLE HUB**
   (a) Install a new O-ring to the axle carrier.



(b) Install the axle hub and rear brake assembly with the four bolts. Torque the bolts.

Torque: 820 kg-cm (59 ft-lb, 80 N·m)



3. **CONNECT BRAKE TUBE TO WHEEL CYLINDER**
   SST 09751-36011
   Torque: 155 kg-cm (11 ft-lb, 15 N·m)

4. **INSTALL BRAKE DRUM**

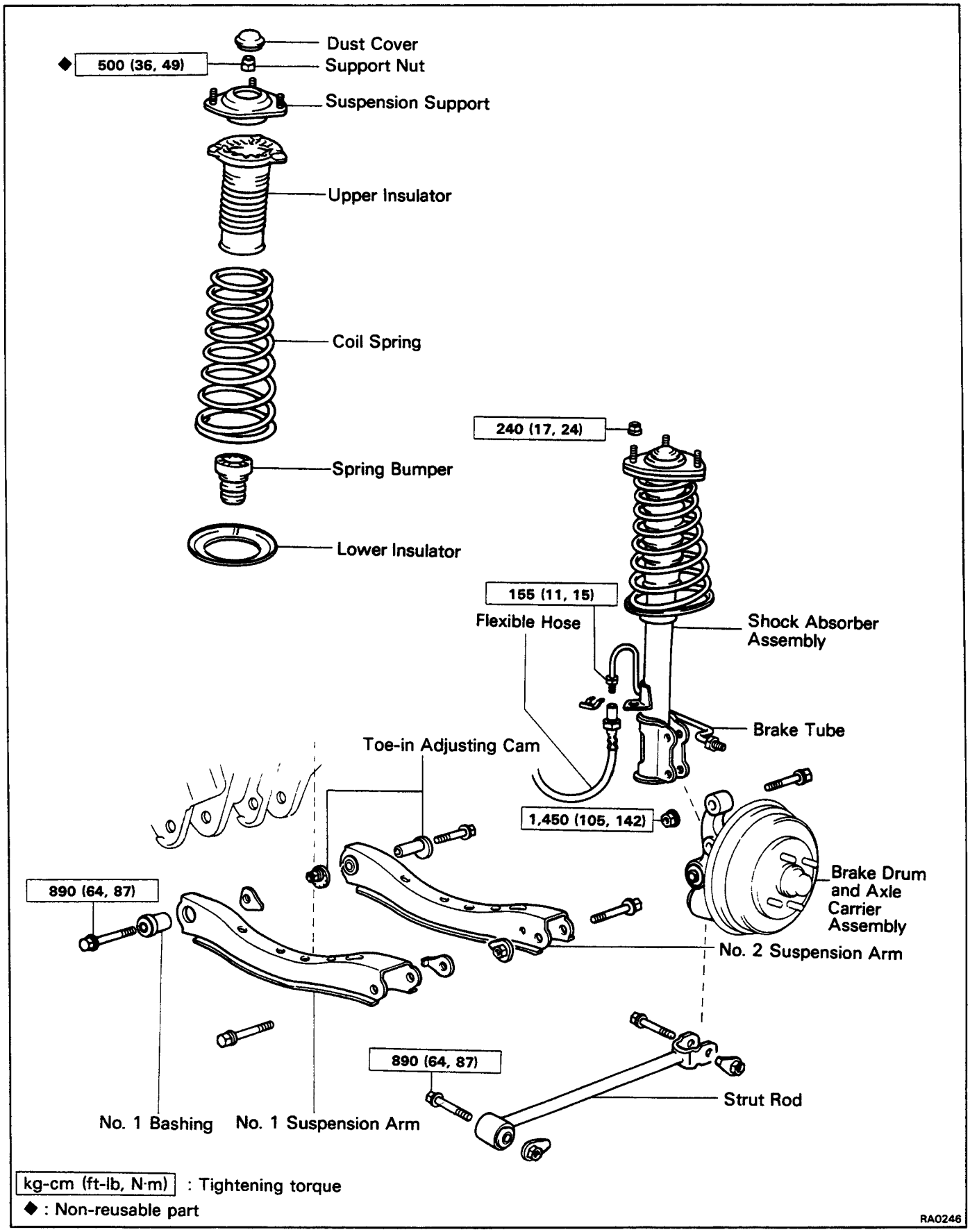
5. **FILL BRAKE RESERVOIR WITH BRAKE FLUID AND BLEED BRAKE SYSTEM (See page BR-7)**

6. **TORQUE AXLE CARRIER MOUNT BOLTS**
   (See page RA-11)

7. **CHECK REAR WHEEL ALIGNMENT (See page RA-3)**

REAR SUSPENSION (FWD)

COMPONENTS



kg-cm (ft-lb, N·m) : Tightening torque

◆ : Non-reusable part

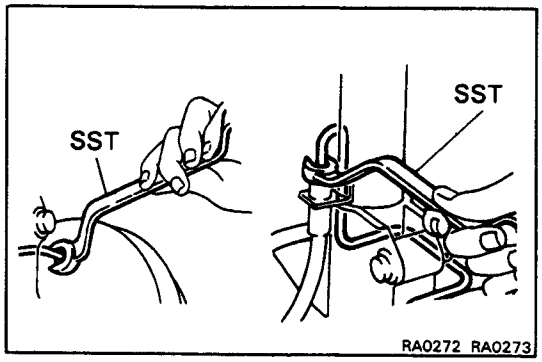
RA0246

Rear Shock Absorber

(See page RA-16)

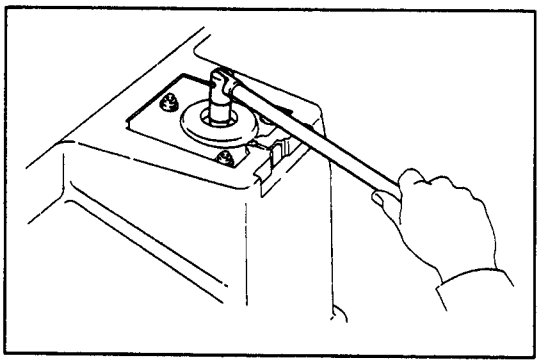
REMOVAL OF REAR SHOCK ABSORBER

1. **REMOVE SHOCK ABSORBER COVER AND PACKAGE TRAY BRACKET**

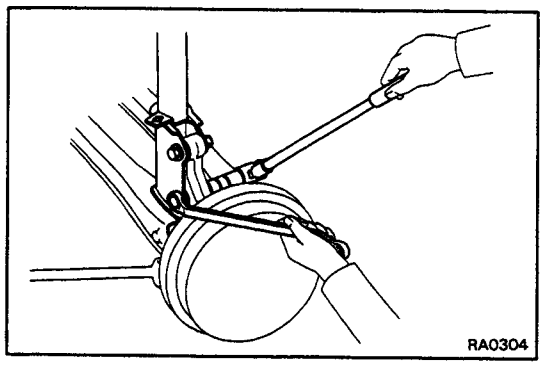


2. **REMOVE BRAKE TUBE**
   (a) Using SST, disconnect the brake tube from the wheel cylinder.
   SST 09751-36011
   (b) Using SST, remove the brake tube from the flexible hose.
   SST 09751-36011

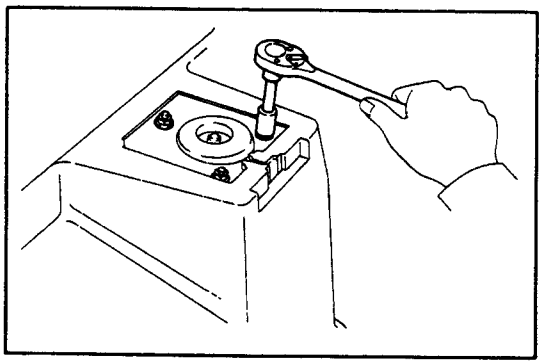
3. **DISCONNECT FLEXIBLE HOSE FROM SHOCK ABSORBER**



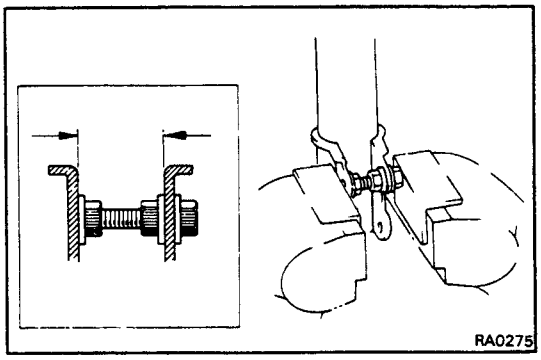
4. **LOOSEN NUT HOLDING SUSPENSION SUPPORT TO SHOCK ABSORBER**
   (a) Remove the dust cover from the suspension support.
   (b) Loosen the nut. Do not remove the nut yet.



5. **DISCONNECT SHOCK ABSORBER FROM AXLE CARRIER**
   Remove the bolts and nuts holding the shock absorber to the axle carrier and disconnect the absorber.

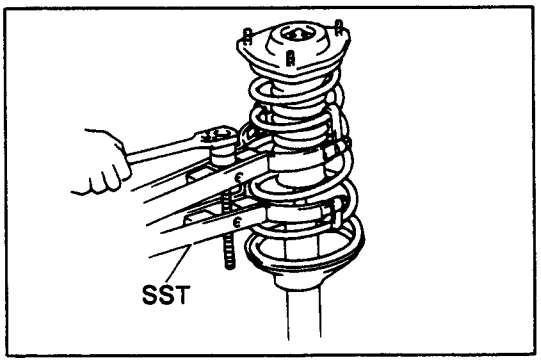


6. **REMOVE SHOCK ABSORBER FROM BODY**
   Remove the nuts holding the shock absorber to the body and remove the shock absorber.



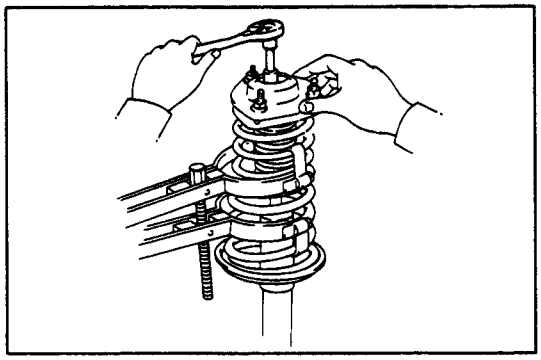
7. REMOVE COIL SPRING

(a) Install a bolt and nut to the bracket at the lower end of the shock absorber and secure it in a vise.



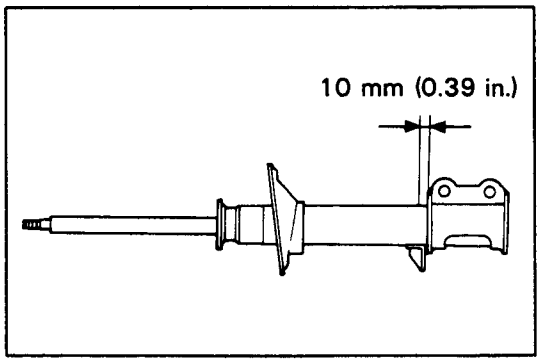
(b) Using SST, compress the coil spring.

SST 09727-22032



(c) Remove the nut.

(d) Remove the suspension support, upper insulator coil spring, lower insulator and bumper.



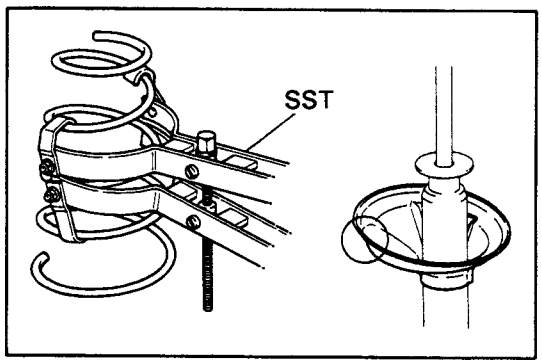
8. HANDLING OF SHOCK ABSORBER

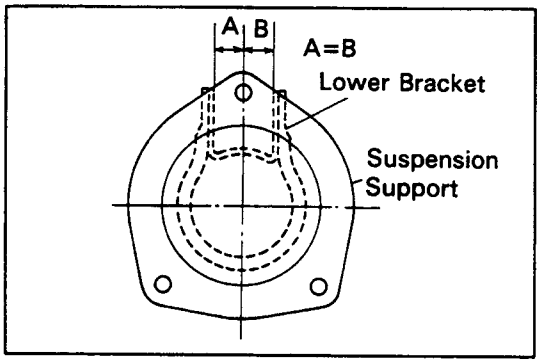
(a) Do not disassemble the shock absorber because the cylinder is filled with gas.

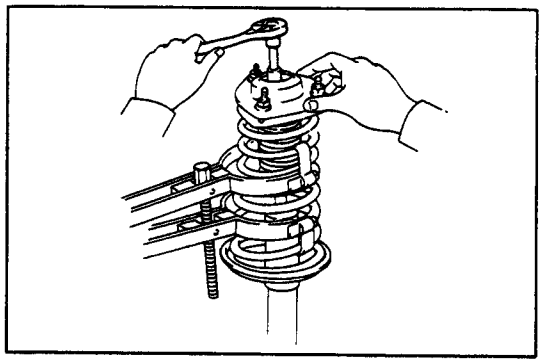
(b) If you replace a shock absorber, drill a 2.0 – 3.0 mm (0.079 – 0.118 in.) hole in the bottom of the replaced shock absorber's cylinder to completely release the high pressure gas. (The gas is colorless, odorless and not poisonous. However, when drilling, chips may fly out so work carefully.)

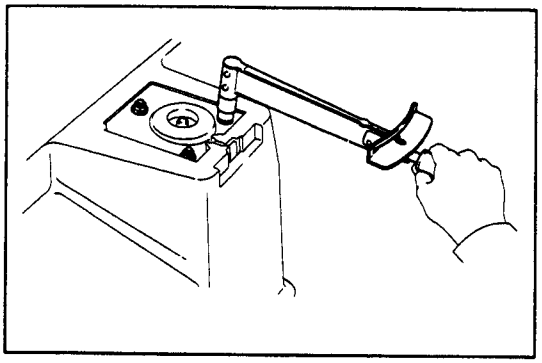
(c) Handle the shock absorber carefully. Never score or scratch the exposed part of the piston rod, and never allow paint or oil to get on it.

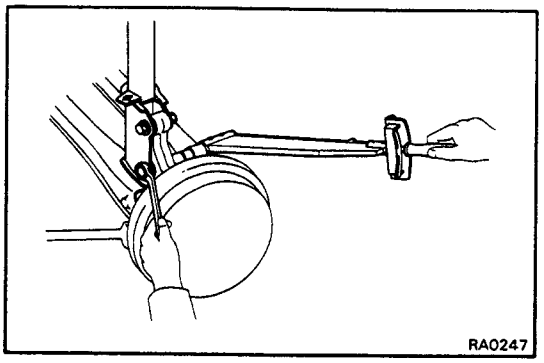
(d) Do not turn the piston rod and cylinder with the shock absorber extended completely.











INSTALLATION OF REAR SHOCK ABSORBER

1. INSTALL SPRING BUMPER, COIL SPRING, INSULATOR AND SUSPENSION SUPPORT

(a) Mount the shock absorber in a vise.

(b) Install the lower insulator to the lower seat of the shock absorber.

(c) Using SST, compress the coil spring.

SST 09727-22032

(d) Align the coil spring end with the lower insulator hollow and install the coil spring.

(e) Install the spring bumper and insulator.

(f) Align the suspension support lower seat hollow and lower insulater hollow.

(g) Align the suspension support with the piston rod and install.

(h) Align the suspension support with the shock absorber lower bracket as shown.

(i) Provisionally install a new nut.

2. CONNECT SHOCK ABSORBER TO BODY

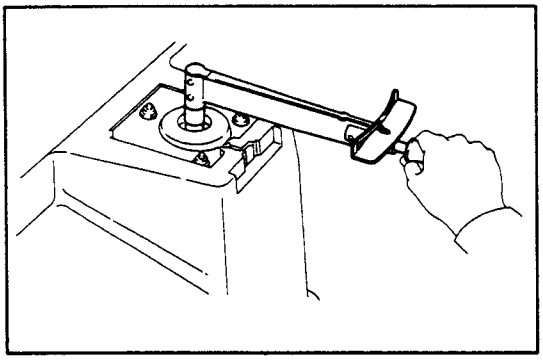
Connect the shock absorber with three nuts. Torque the nuts.

Torque: 240 kg-cm (17 ft-lb, 24 N·m)

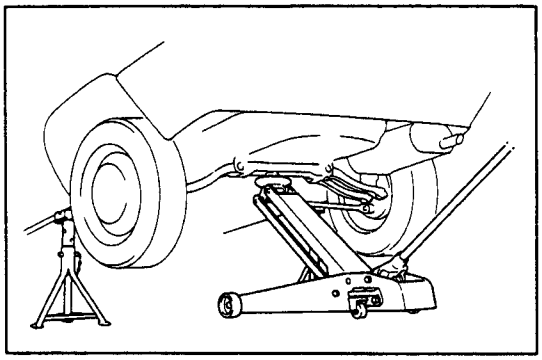
3. INSTALL SHOCK ABSORBER TO AXLE CARRIER

Install the shock absorber with two bolts and two nuts. Torque the nuts.

Torque: 1,450 kg-cm (105 ft-lb, 142 N·m)



4. **TORQUE NUT HOLDING SUSPENSION SUPPORT TO SHOCK ABSORBER**
   (a) Torque the nut.
   Torque: 500 kg-cm (36 ft-lb, 49 N·m)
   (b) Install the dust cover on the suspension support.
5. **INSTALL FLEXIBLE HOSE TO SHOCK ABSORBER BRACKET**
6. **INSTALL BRAKE TUBE**
   Torque: 155 kg-cm (11 ft-lb, 15 N·m)
7. **FILL BRAKE RESERVOIR WITH BRAKE FLUID AND BLEED BRAKE SYSTEM (See page BR-7)**
8. **CHECK REAR WHEEL ALIGNMENT (See page RA-3)**
9. **INSTALL PACKAGE TRAY BRACKET AND SHOCK ABSORBER**

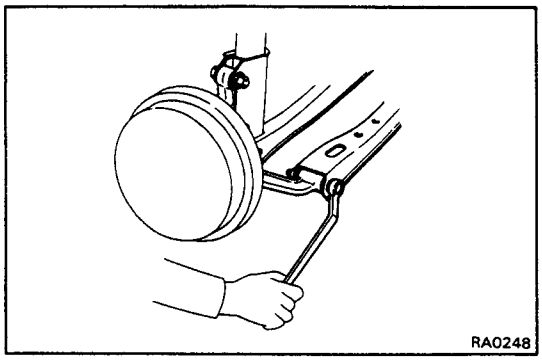


Suspension Arm

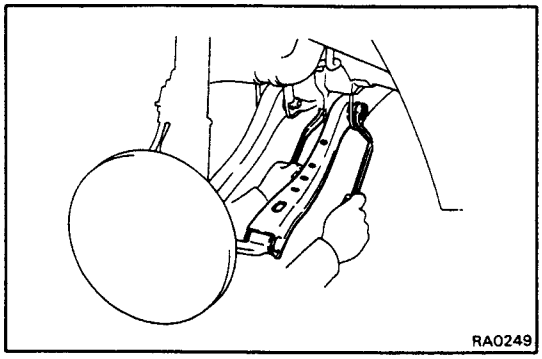
(See page RA-16)

REMOVAL OF SUSPENSION ARM

1. **JACK UP VEHICLE**
   Jack up the vehicle and support the body with stands.

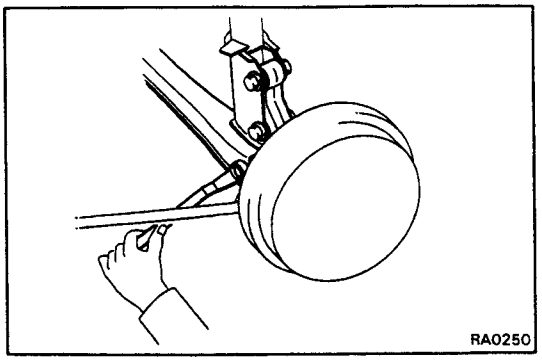


2. **REMOVE NO.2 SUSPENSION ARM**
   (a) Remove the bolt and nut holding the suspension arm to the axle carrier.



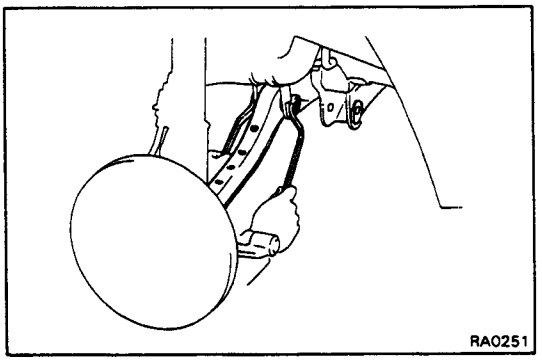
   (b) Remove the cam and bolt holding the suspension arm to the body and remove the suspension arm.

NOTE: (1) Remember where the cam plate mark is when removing the suspension arm.
(2) When removing, loosen the bolt. Do not turn the cam.



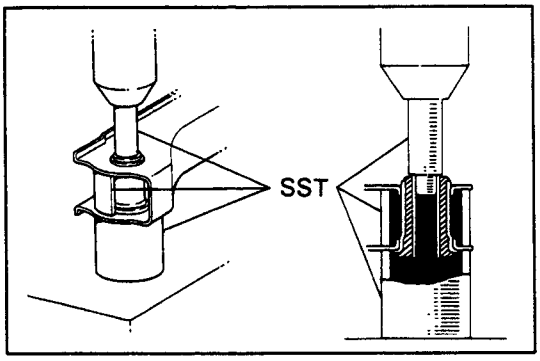
3. REMOVE NO.1 SUSPENSION ARM

(a) Remove the bolt and nut holding the suspension arm to the axle carrier.



(b) Remove the bolt and nut holding the suspension arm to the body and remove the suspension arm.

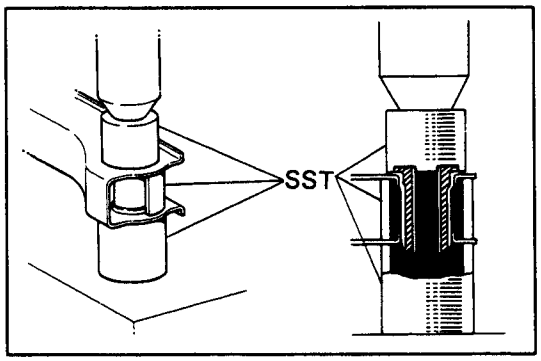
REPLACEMENT OF NO.1 BUSHING



1. REMOVE BUSHING

Using SST, press out the bushing.

SST 09726-32010



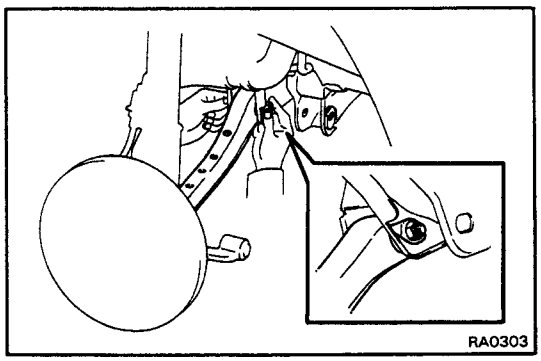
2. INSTALL BUSHING

Using SST, press in a new bushing.

SST 09726-32010

CAUTION: Do not use a lubricant when pressing in the bushing.

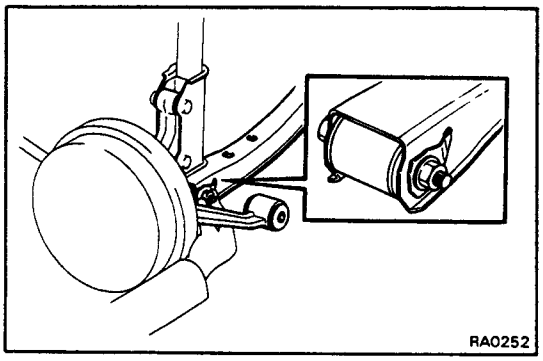
INSTALLATION OF SUSPENSION ARM



1. INSTALL NO.1 SUSPENSION ARM

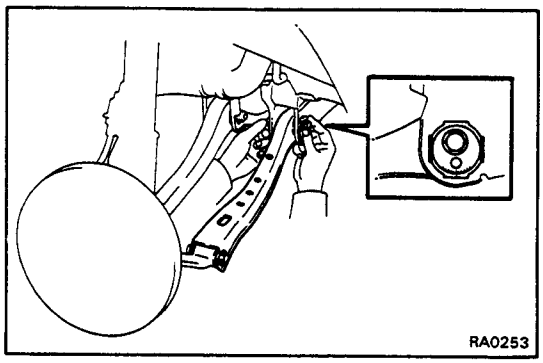
(a) Connect the suspension arm to the body with the bolt and nut. Do not torque the bolt yet.

NOTE: Be sure the lip of the nut is resting on the flange of the bracket, not over it.



(b) Connect the suspension arm to the axle carrier with the bolt and nut. Do not torque the bolt yet.

NOTE: When connecting the suspension arm, insert the lip of the nut into the hole on the suspension.

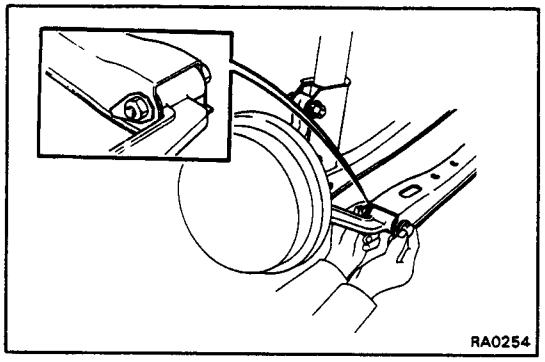


2. INSTALL NO.2 SUSPENSION ARM

(a) Place the suspension arm in position.

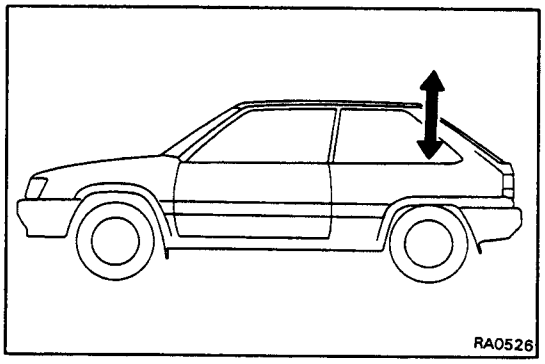
(b) Install the cam and bolt holding the suspension arm to the body. Do not torque the bolt yet.

(c) Align the cam plate mark at the same position it was before removal.



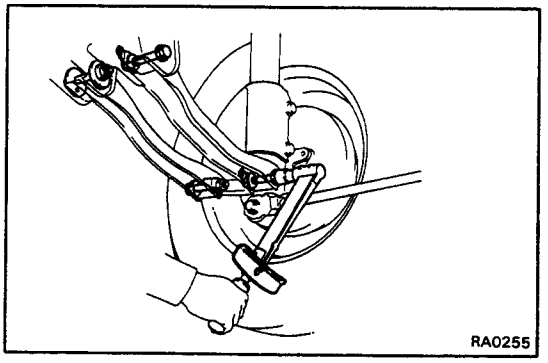
(d) Install the bolt and nut holding the suspension arm to the axle carrier. Do not torque the bolt yet.

NOTE: Be sure the lip of the nut is resting on the flange of the suspension arm, not over it.



3. TORQUE SUSPENSION ARM SETTING BOLTS

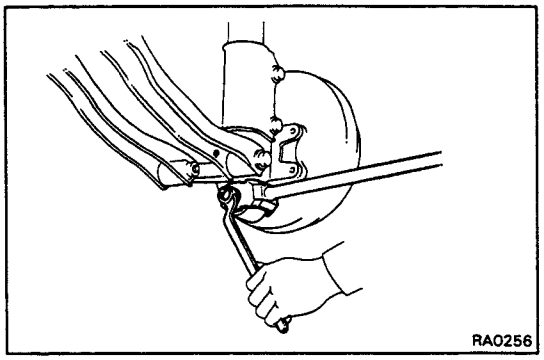
(a) Remove the stands and bounce the vehicle to stabilize the suspension.



(b) Torque the setting bolts with the vehicle weight on the suspension.

Torque: 890 kg-cm (64 ft-lb, 87 N·m)

4. CHECK REAR WHEEL ALIGNMENT (See page RA-3)



Strut Rod

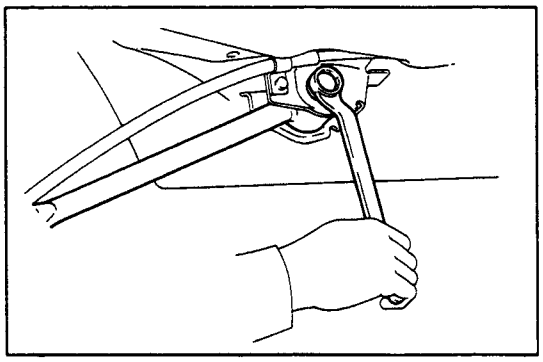
(See page RA-16)

REMOVAL OF STRUT ROD

1. **JACK UP VEHICLE (See page RA-20)**

2. **REMOVE STRUT ROD**

   (a) Remove the bolt and nut holding the strut rod to the axle carrier.



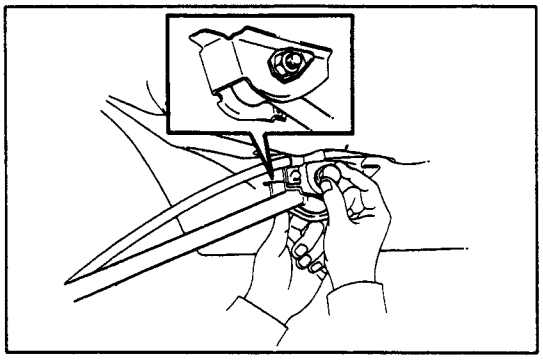
   (b) Remove the bolt and nut holding the strut rod to the body and remove the strut rod.

INSTALLATION OF STRUT ROD

1. **INSTALL STRUT ROD**

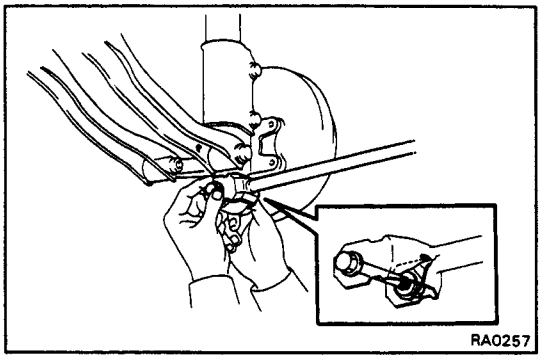
   (a) Connect the strut rod to the body with the bolt and nut. Do not torque the bolt yet.

   NOTE: Be sure the lip of the nut is resting on the flange of the bracket.



   (b) Connect the strut rod to the axle carrier with the bolt and nut. Do not torque the bolt yet.

   NOTE: When connecting the strut rod, align the lip of the nut with the groove on the bracket.



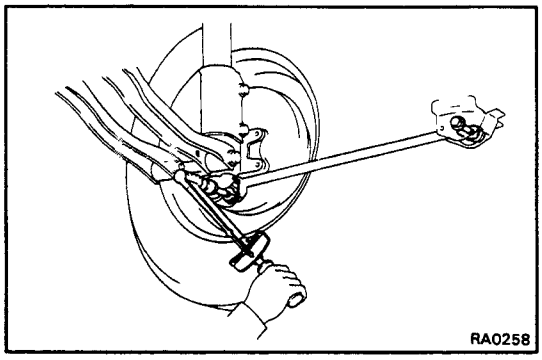
2. **TORQUE STRUT ROD SETTING BOLTS**

   (a) Remove the stands and bounce the vehicle to stabilize the suspension.

   (b) Torque the setting bolts with the vehicle weight on the suspension.

   Torque: 890 kg-cm (64 ft-lb, 87 N·m)

3. **CHECK REAR WHEEL ALIGNMENT (See page RA-3)**

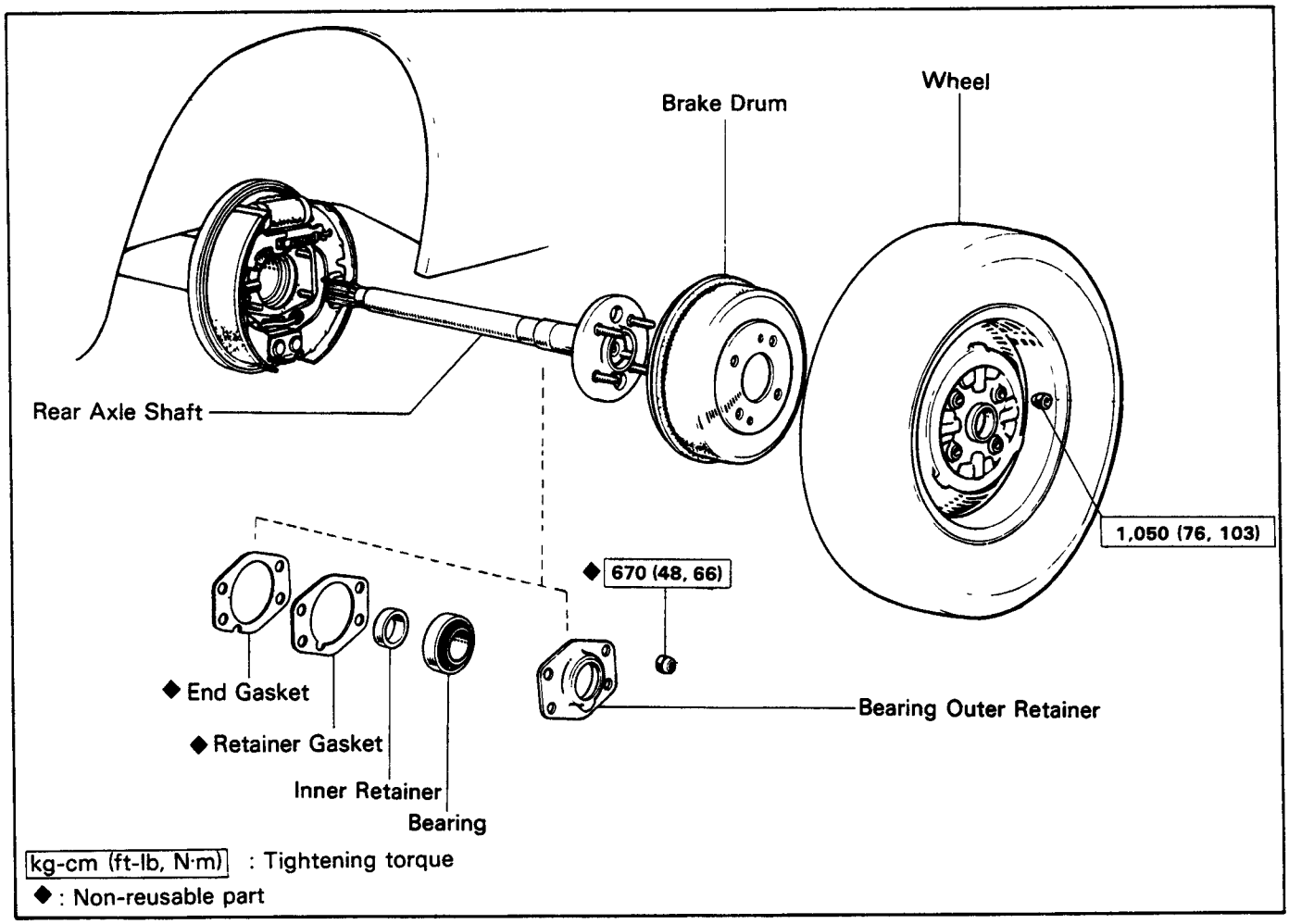


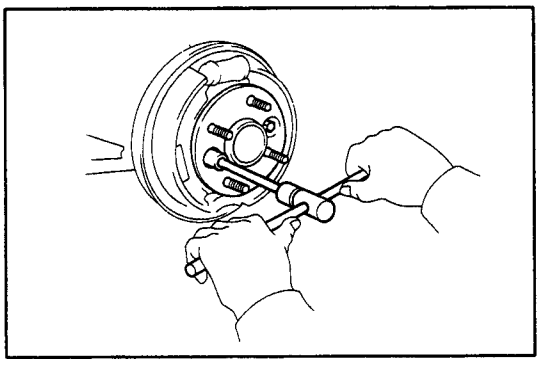
TROUBLESHOOTING (4WD)

Problem	Possible cause	Remedy	Page
Oil leak at rear axle	Oil seals worn or damaged	Replace oil seal	RA-25
	Bearing retainer loose	Replace retainer	RA-25
	Rear axle housing cracked	Repair as necessary	
Oil leak at pinion shaft	Oil level too high or wrong grade	Drain and replace oil	
	Oil seal worn or damaged	Replace oil seal	RA-28
	Companion flange loose or damaged	Tighten or replace flange	RA-28
Noise in rear axle	Oil level low or wrong grade	Drain and replace oil	
	Excessive backlash between drive pinion and ring or side gear	Check backlash	RA-28
	Ring, drive pinion or side gears worn or chipped	Check gears	RA-28
	Drive pinion bearing worn	Replace bearing	RA-28
	Axle shaft bearing worn	Replace bearing	RA-25
	Side bearing loose or worn	Tighten or replace bearings	RA-36
Bottoming	Vehicle overloaded	Check loading	
	Shock absorber worn out	Replace shock absorber	RA-43
	Springs weak	Replace spring	RA-43

REAR AXLE SHAFT (4WD)

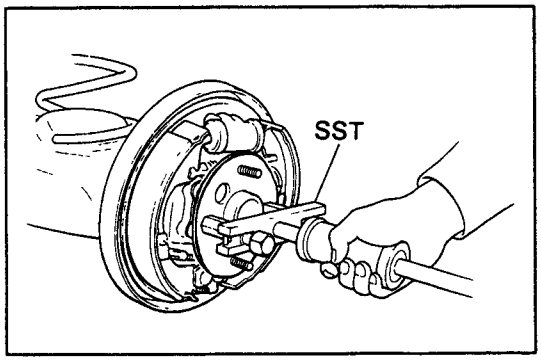
COMPONENTS





REMOVAL OF REAR AXLE SHAFT

1. **REMOVE WHEEL AND BRAKE DRUM**
2. **REMOVE FOUR BACKING PLATE MOUNTING NUTS**

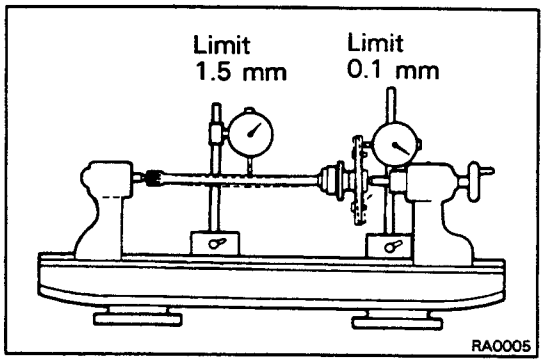


3. **REMOVE REAR AXLE**

   Using SST, pull out the rear axle.

   SST 09520-00031

   CAUTION: When pulling out the rear axle, be careful not to damage the oil seal.

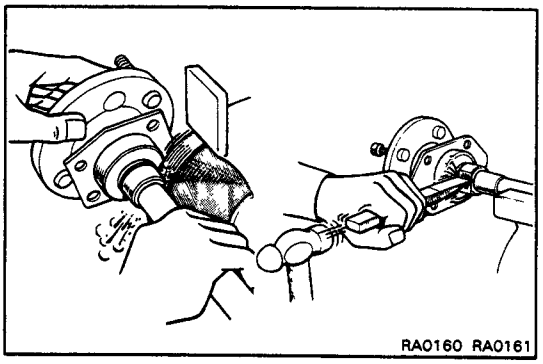


INSPECTION AND REPAIR OF REAR AXLE SHAFT COMPONENTS

1. INSPECT REAR AXLE SHAFT AND FLANGE FOR WEAR, DAMAGE OR RUNOUT

Maximum shaft runout: 1.5 mm (0.059 in.)
Maximum flange runout: 0.1 mm (0.004 in.)

If the rear axle shaft or flange is damaged or worn, or if their runout is greater than maximum, replace the rear axle shaft.



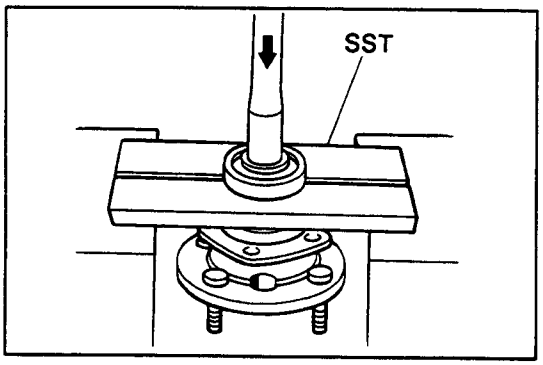
2. INSPECT REAR AXLE BEARING FOR WEAR OR DAMAGE

If the bearing is damaged or worn, replace it.

3. REMOVE BEARING INNER RETAINER

(a) Using a grinder, grind down the inner retainer.

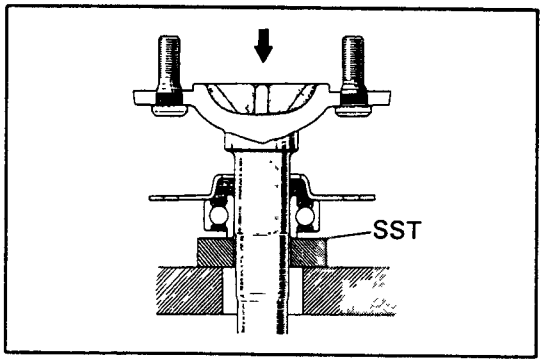
(b) Using a chisel and hammer, cut off the retainer and remove it from the shaft.



4. REMOVE BEARING FROM SHAFT

Using SST, press the bearing off the shaft.

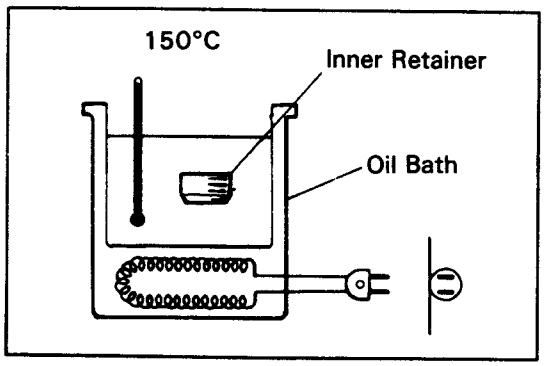
SST 09527-20011



5. INSTALL BEARING OUTER RETAINER AND NEW BEARING ON SHAFT

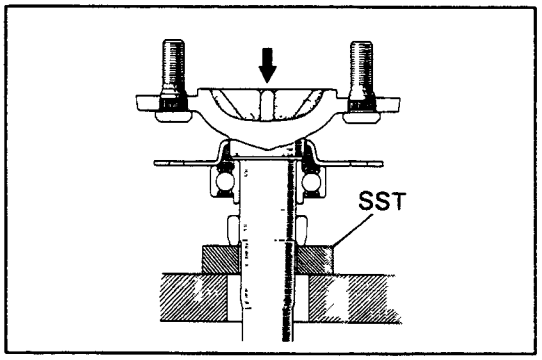
Using SST, press on the bearing outer retainer and new bearing.

SST 09515-20010



6. INSTALL BEARING INNER RETAINER ON SHAFT

(a) Gradually heat the bearing inner retainer to about 150°C (302°F) in an oil bath.

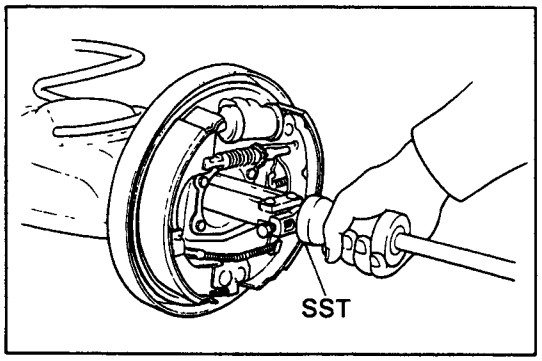


(b) While the inner retainer is still hot, press the retainer on the shaft with SST.

SST 09515-20010

NOTE: Be sure that there is no oil or grease on the rear axle shaft or retainer.

Face the non-beveled side of the inner retainer toward the bearing.



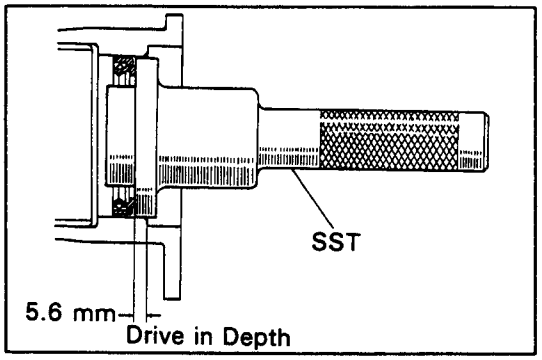
7. INSPECT OIL SEAL FOR WEAR OR DAMAGE

If the seal is damaged or worn, replace it.

8. REMOVE OIL SEAL FROM AXLE HOUSING

Using SST, remove the oil seal.

SST 09308-00010



9. INSTALL NEW OIL SEAL IN AXLE HOUSING

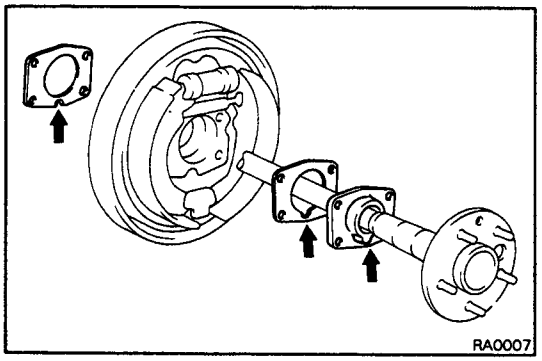
(a) Apply MP grease to the oil seal.

(b) Using SST, drive in the oil seal to a depth of 5.6 mm (0.220 in.).

SST 09517-12010

INSTALLATION OF REAR AXLE SHAFT

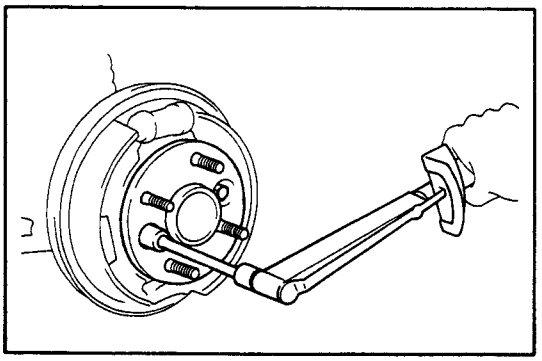
(See page RA-25)



1. APPLY LIQUID SEALEAR TO BOTH SIDES OF END AND RETAINER GASKETS

2. PLACE NEW END AND RETAINER GASKETS IN POSITION

Face the notch of the gasket downward.



3. INSTALL REAR AXLE SHAFT IN HOUSING

(a) Face the notch of the retainer downward.

(b) Install the rear axle shaft with four new self-locking nuts.

Torque: 670 kg-cm (48 ft-lb, 66 N·m)

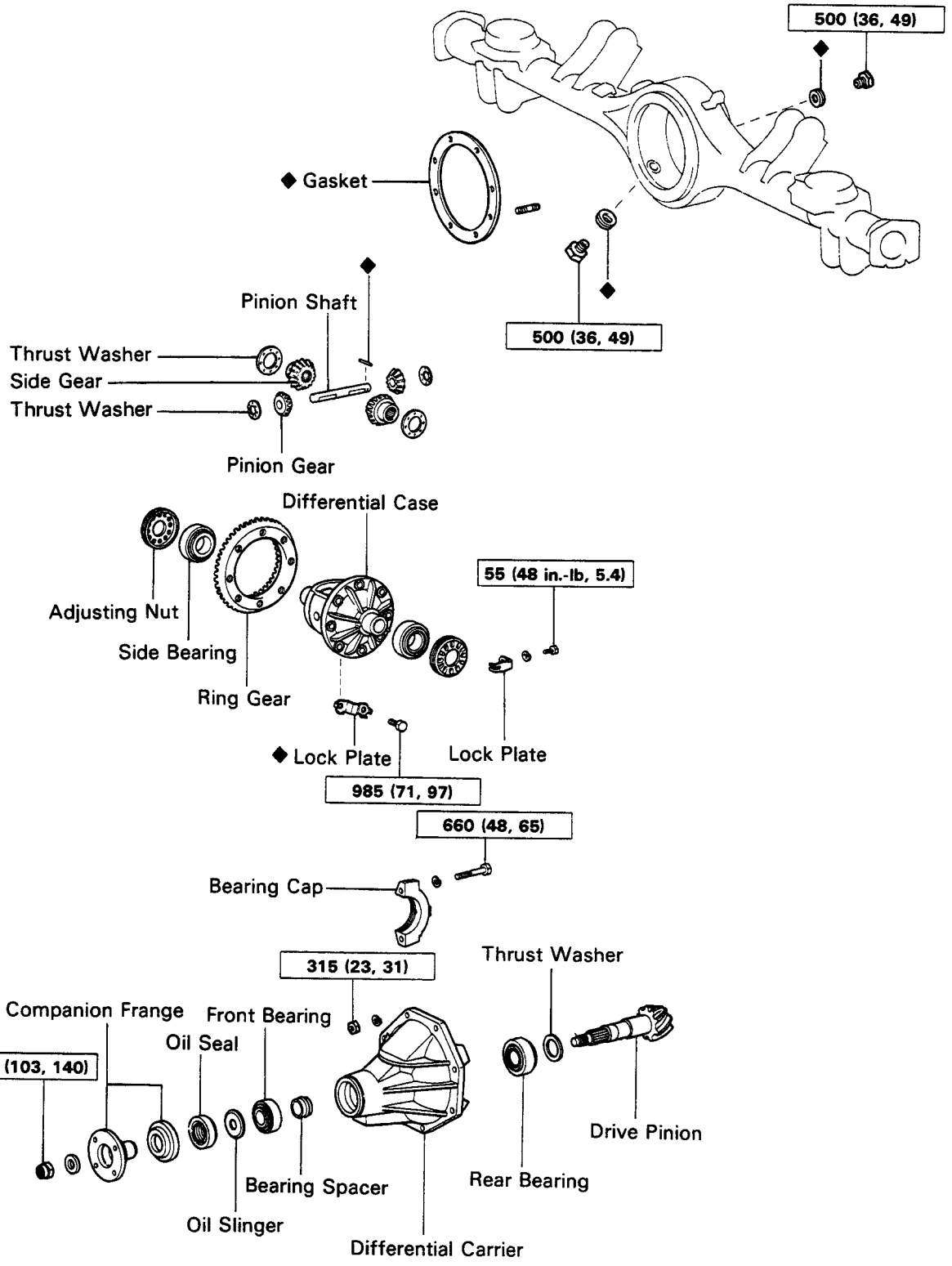
NOTE:

- Be careful not to damage the oil seal.
- When inserting the axle shaft, be careful not to hit or dent the oil deflector inside the axle housing.

4. INSTALL BRAKE DRUM AND WHEEL

DIFFERENTIAL (4WD)

COMPONENTS



kg-cm (ft-lb, N·m) : Tightening torque

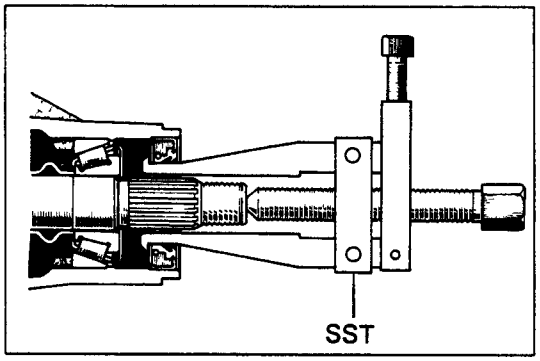
◆ : Non-reusable part

RA0527

ON-VEHICLE REPLACEMENT OF OIL SEAL

1. **DISCONNECT PROPELLER SHAFT FROM DIFFERENTIAL (See page PR-3)**

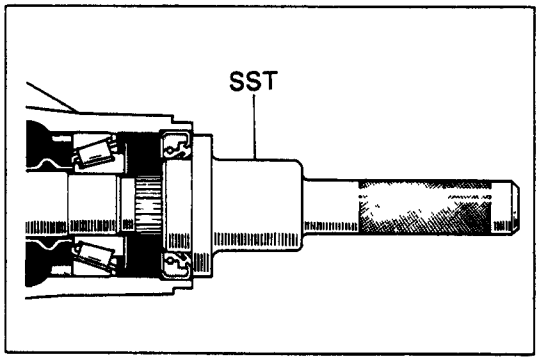
2. **REMOVE COMPANION FLANGE (See step 7 on page RA-31)**



3. **REMOVE OIL SEAL AND OIL SLINGER**
   (a) Using SST, remove the oil seal from the housing.
   SST 09308-10010
   (b) Remove the oil slinger.

4. **REMOVE FRONT BEARING AND BEARING SPACER (See step 9 on page RA-31)**

5. **INSTALL NEW BEARING SPACER AND FRONT BEARING (See step 9 on page RA-39)**



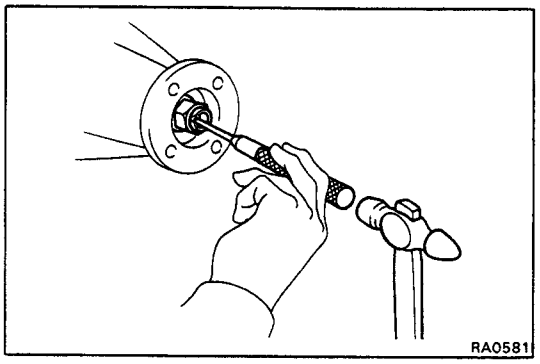
6. **INSTALL OIL SLINGER AND NEW OIL SEAL**
   (a) Install the oil singer facing as shown.
   (b) Using SST, drive in a new oil seal as shown.
   SST 09554-30011
   Oil seal drive in depth: 1.0 mm (0.039 in.)
   (c) Apply MP grease to the oil seal lip.

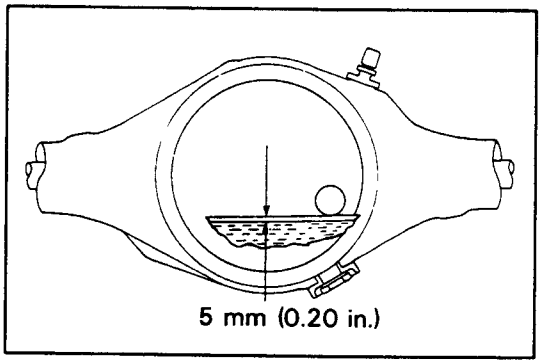
7. **INSTALL COMPANION FLANGE (See step 11 on page RA-39)**

8. **ADJUST DRIVE PINION (See step 12 on page RA-40)**

9. **STAKE DRIVE PINION NUT**

10. **CONNECT PROPELLER SHAFT FLANGE TO COMPANION FLANGE (See page PR-6)**





11. **CHECK DIFFERENTIAL OIL LEVEL**
    Fill with hypoid gear oil if necessary.

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)**	

Torque the filler plug.
Torque: 500 kg-cm (36 ft-lb, 49 N·m)

REMOVAL OF DIFFERENTIAL

(See page RA-28)

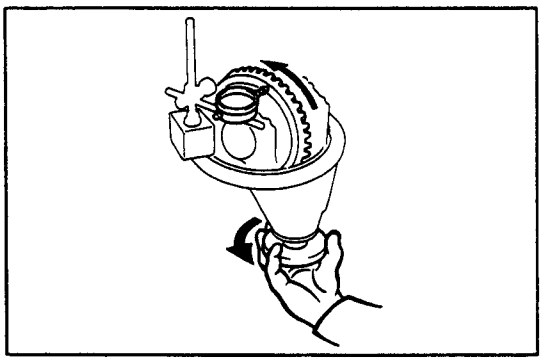
1. **DRAIN DIFFERENTIAL OIL**
2. **REMOVE REAR AXLE SHAFT (See page RA-25)**
3. **DISCONNECT PROPELLER SHAFT FROM DIFFERENTIAL (See page RA-28)**
4. **REMOVE DIFFERENTIAL CARRIER ASSEMBLY**

DISASSEMBLY OF DIFFERENTIAL

(See page RA-28)

NOTE: If the differential is noisy, perform the following pre-inspection before disassembly to determine the cause.

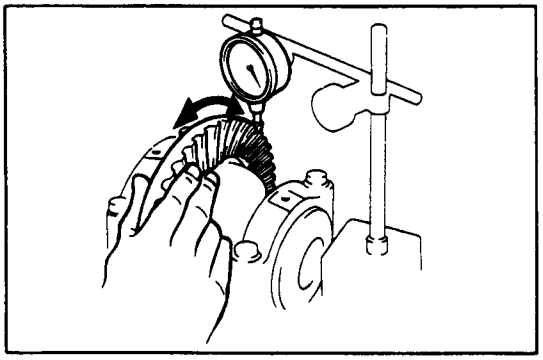
If the differential has severe problems, disassemble and repair as necessary.



1. **CHECK RING GEAR RUNOUT**

   Maximum runout: 0.07 mm (0.0028 in.)

   If the runout is exceeds maximum, replace the ring gear.



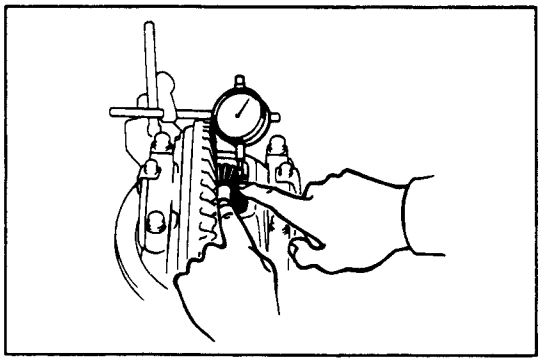
2. **CHECK RING GEAR BACKLASH**

   Backlash: 0.10 – 0.15 mm (0.0039 – 0.0059 in.)

   If the backlash is not within specification, adjust the side bearing preload or repair as necessary. (See step 5 on page RA-36)

3. **INSPECT TOOTH CONTACT BETWEEN RING GEAR AND DRIVE PINION (See step 6 on page RA-38)**

   Note the tooth contacting position.

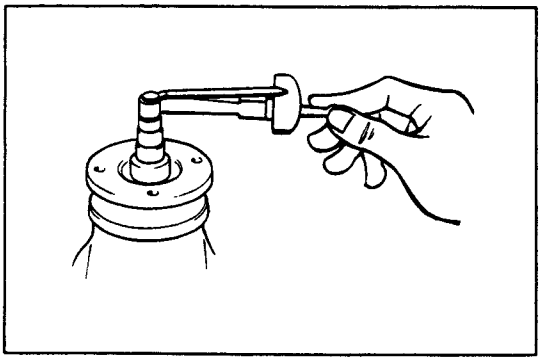


4. **CHECK SIDE GEAR BACKLASH**

   Measure the side gear backlash while holding one pinion gear toward the case.

   Standard backlash:
   0.02 – 0.15 mm (0.0008 – 0.0059 in.)

   If the backlash is not within specification, install the correct thrust washers.



5. **CHECK DRIVE PINION PRELOAD**

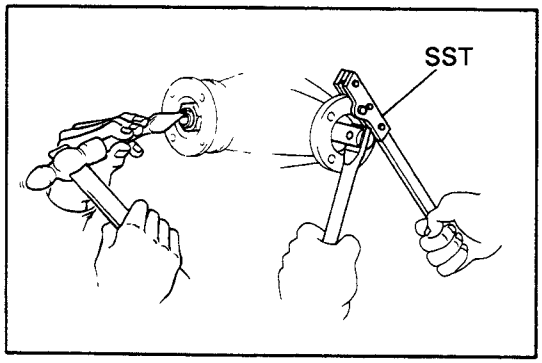
   Using a torque wrench, measure the preload of the backlash between the drive pinion and ring gear.

   Preload: 4 – 7 kg-cm
   (3.5 – 6.1 in.-lb, 0.4 – 0.7 N·m)

6. **CHECK TOTAL PRELOAD**

   Using a torque wrench, measure the total preload.

   Total preload:
   In addition to drive pinion preload
   2 – 4 kg-cm (1.7 – 3.5 in.-lb, 0.2 – 0.4 N·m)

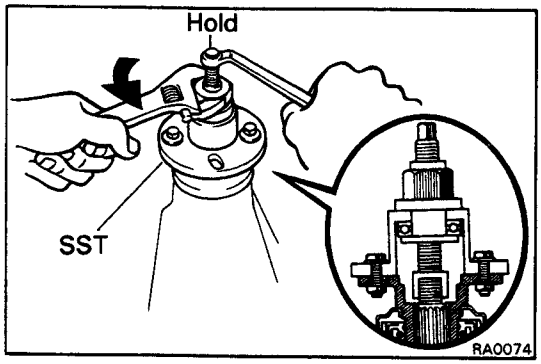


7. REMOVE COMPANION FLANGE

(a) Using a chisel and hammer, loosen the staked part of the nut.

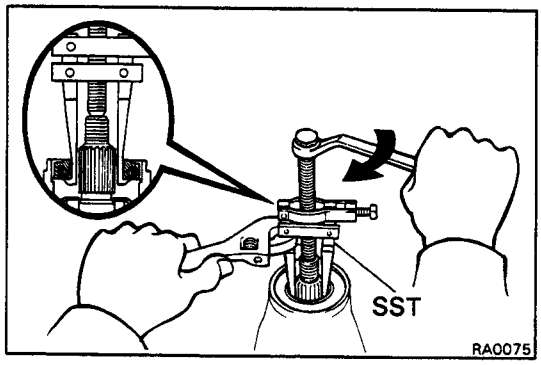
(b) Using SST to hold the flange, remove the nut and washer.

SST 09330-00020



(c) Using SST, remove the companion flange.

SST 09557-22022

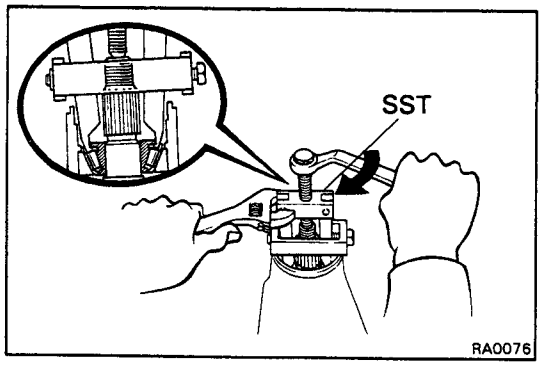


8. REMOVE OIL SEAL AND OIL SLINGER

(a) Using SST, remove the oil seal from the housing.

SST 09308-10010

(b) Remove the oil slinger.



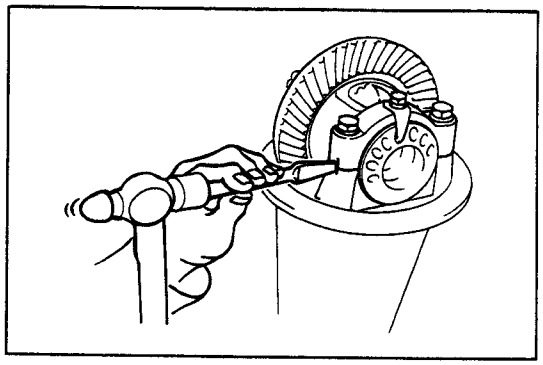
9. REMOVE FRONT BEARING AND BEARING SPACER

(a) Using SST, remove the front bearing from the drive pinion.

SST 09556-12010

(b) Remove the bearing spacer.

If the front bearing is damaged or worn, replace the bearing.



10. REMOVE DIFFERENTIAL CASE FROM CARRIER

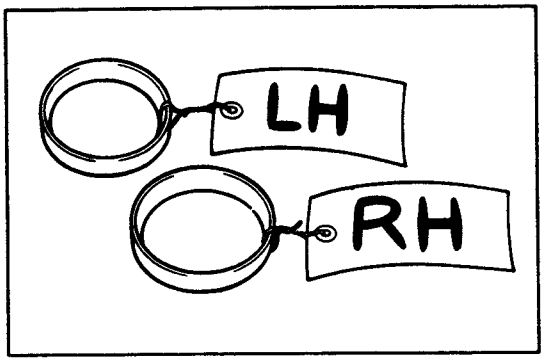
(a) Put matchmarks on the bearing cap and differential carrier.

(b) Remove the two adjusting nut locks.

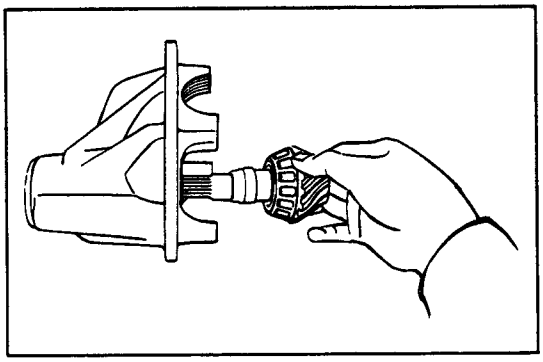
(c) Remove the two bearing caps and two adjusting nuts.

(d) Remove the two bearing outer races.

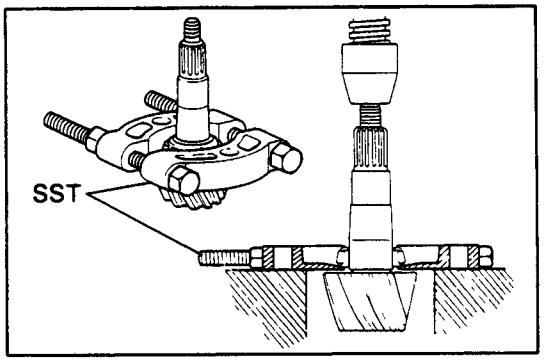
(e) Remove the differential case.



NOTE: Tag the disassembled parts to show the location for reassembly.



11. REMOVE DRIVE PINION FROM DIFFERENTIAL CARRIER



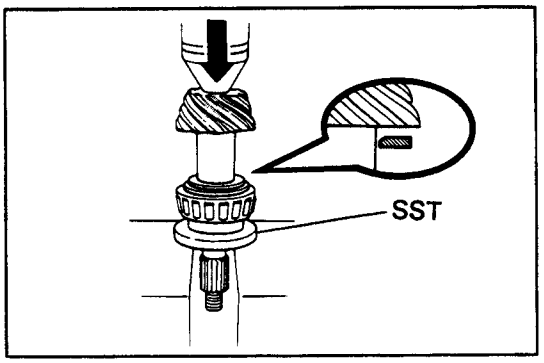
INSPECTION AND REPLACEMENT OF DIFFERENTIAL

(See page RA-28)

1. REPLACE DRIVE PINION REAR BEARING RACE

(a) Using SST and a press, pull out the rear bearing from the drive pinion.

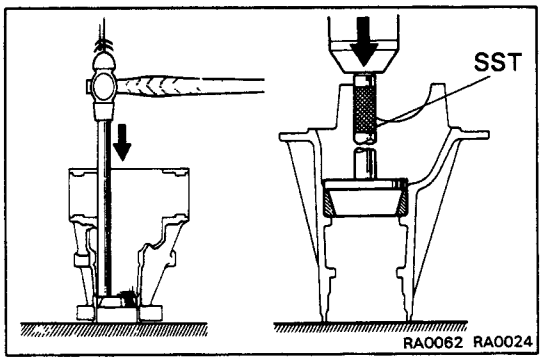
SST 09950-00020



(b) Install the resued thrust washer on the drive pinion with the chamfered end facing the pinion gear.

(c) Using SST and a press, press a new rear bearing on the drive pinion.

SST 09608-12010

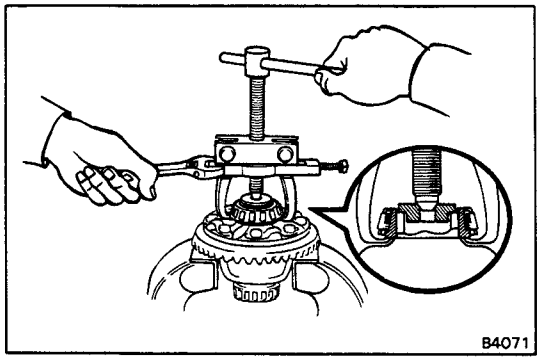


2. REPLACE DRIVE PINION FRONT AND REAR BEARING OUTER RACES

(a) Using a brass bar and hammer, tap out the outer race.

(b) Using SST and a press, drive in a new outer race.

SST 09608-12010

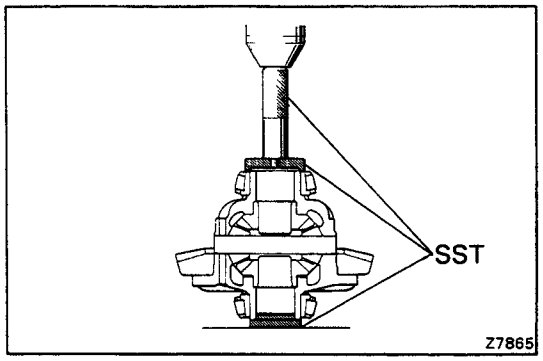


3. IF NECESSARY, REPLACE SIDE BEARINGS

(a) Using SST, remove the side bearing from the differential case.

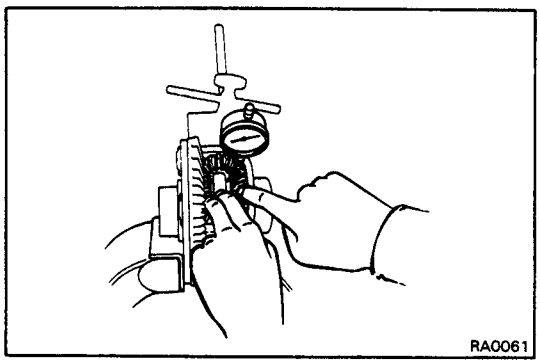
SST 09502-10012

NOTE: On the differential case there are indentations into which the SST fits.



(b) Using SST and a press, press in a new bearing.

SST 09608-20011



4. INSPECT SIDE GEAR BACKLASH

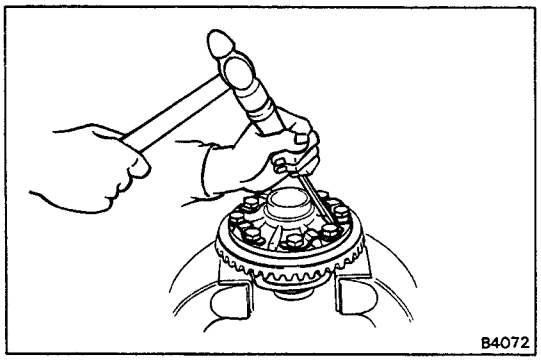
Measure the side gear backlash while holding the other side gear toward the case.

Standard backlash: 0.02 – 0.15 mm (0.0008 – 0.0059 in.)

5. IF NECESSARY, REPLACE RING GEAR, SIDE GEARS AND PINION GEARS

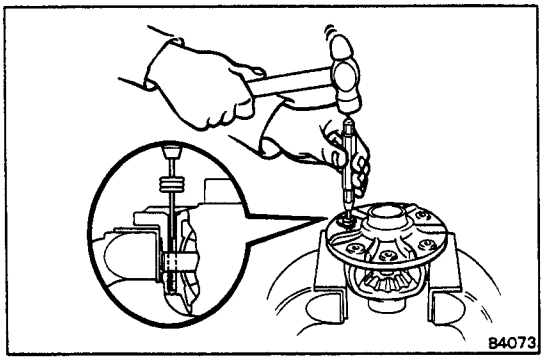
NOTE:

- If the ring gear is to be used again, place matchmarks before separating it.
- If the ring gear or drive pinion are damaged, replace them as a set.



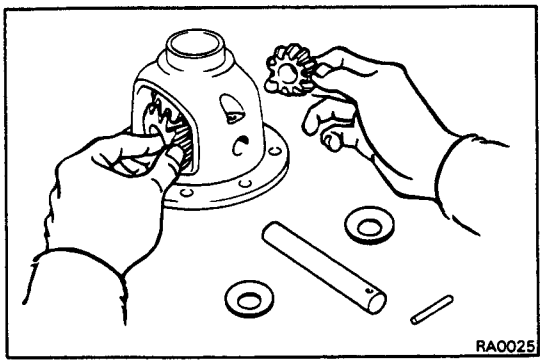
(a) Lift the lock plates and remove the mount bolts.

(b) Using a plastic-faced hammer, tap on the ring gear to separate it from the differential case.



(c) Using a pin punch and hammer, drive out the straight pin foward the ring gear installation surface.

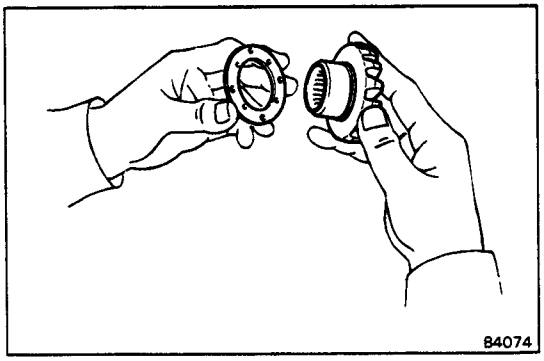
(d) Remove the pinion shaft, pinion gerars, side gears and thrust washers.



(e) Install the side gears, thrust washers, pinion gears and shaft.

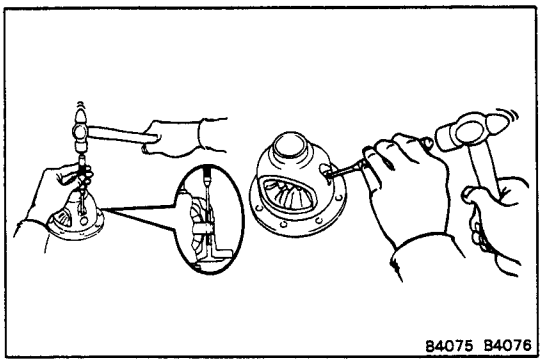
(f) Check the side gear backlash. (See page RA-33)

Standard backlash: 0.02 – 0.15 mm (0.0008 – 0.0059 in.)



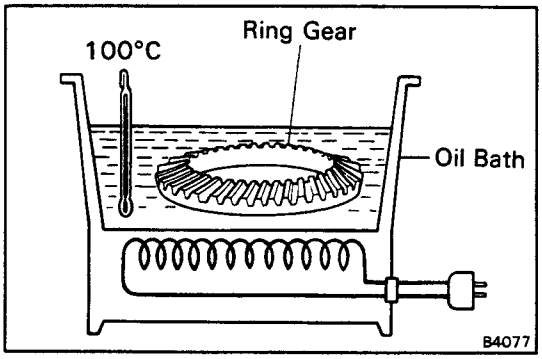
(g) If the backlash is not within specification, use thrust washer of a different thickness.

Thrust washer thickness mm (in.)	
1.50 (0.0591)	1.65 (0.0650)
1.55 (0.0610)	1.70 (0.0669)
1.60 (0.0630)	1.75 (0.0689)



(h) Using a pin punch and hammer, tap a new straight pin through the case and hole in the pinion shaft.

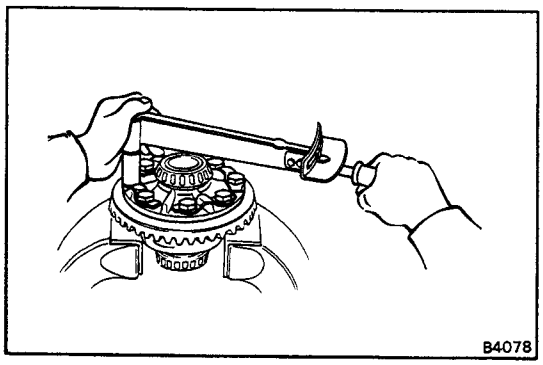
(i) Stake the pin and differential case.



(j) Clean the contact surface of the differential case.

(k) Gradually heat the ring gear to about 100°C (212°F) in an oil bath.

CAUTION: Do not heat the ring gear above 110°C (230°F).



(l) Clean the contact surface of the ring gear with cleaning solvent.

(m) Then quickly install the ring gear on the differential case.

(n) Coat the ring gear mount bolts with gear oil.

(o) Install new lock plates and the mount bolts. Tighten the mount bolts uniformly and a little at a time. Torque the bolts.

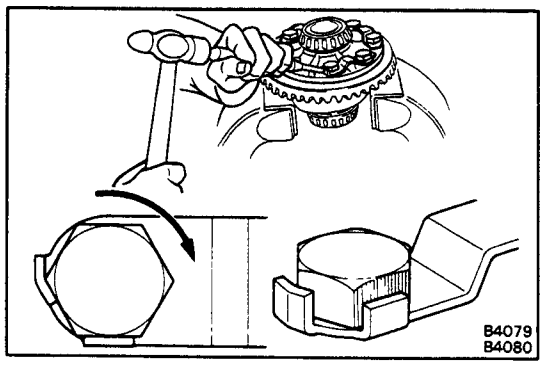
Torque: 985 kg-cm (71 ft-lb, 97 N·m)

(p) Check the ring gear runout.

Maximum runout: 0.07 mm (0.028 in.)

(q) Stake the lock plate.

NOTE: Stake one claw flush with the flat surface of the nut. For the claw contacting the protruding portion of the nut, stake (bend) only the half on the tightening side.



ASSEMBLY OF DIFFERENTIAL

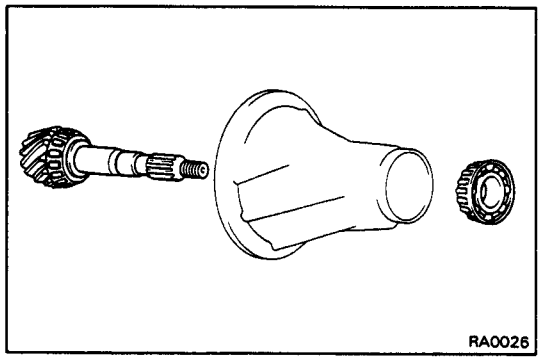
(See page RA-28)

1. TEMPORARILY ADJUST DRIVE PINION PRELOAD

(a) Install the following parts:

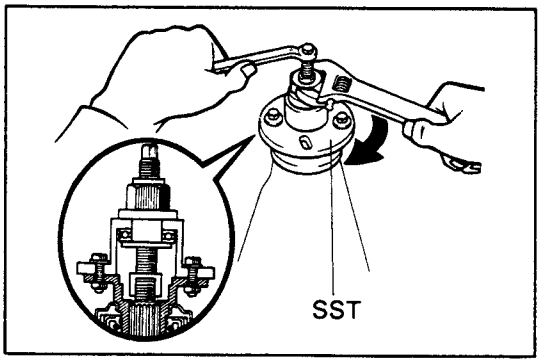
- Drive pinion
- Front bearing

NOTE: Assemble the spacer, oil slinger and oil seal after adjusting the gear contact pattern.



(b) Using SST, install the companion flange.

SST 09557-22022

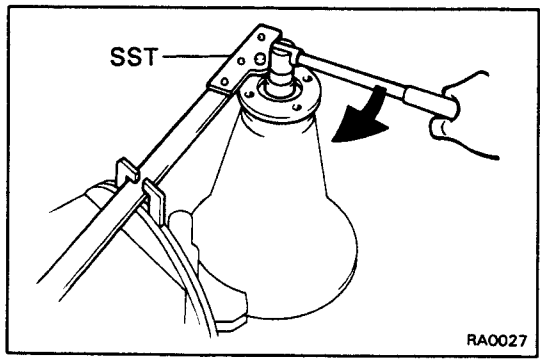


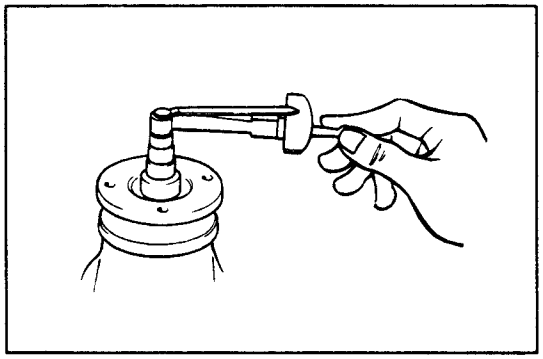
(c) Adjust the drive pinion preload by tightening the companion flange nut.

Using SST to hold the flange, tighten the nut.

SST 09330-00020

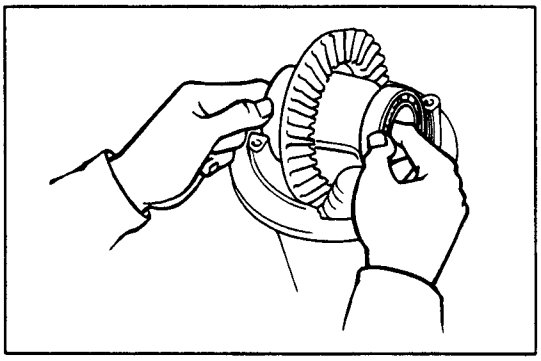
CAUTION: As there is no spacer, tighten a little at a time, being careful not to overtighten.





(d) Using a torque wrench, measure the preload.

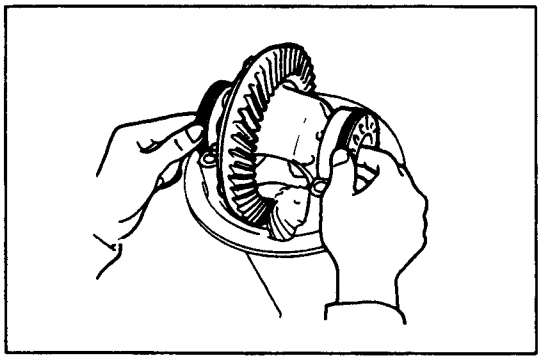
Preload: New bearing 6.5 – 12.5 kg-cm (5.6 – 10.9 in.-lb) (0.6 – 1.2 N·m)
Reused bearing 4 – 7 kg-cm (3.5 – 6.1 in.-lb) (0.4 – 0.7 N·m)



2. INSTALL DIFFERENTIAL CASE IN CARRIER

(a) Place the bearing outer races on their respective bearings. Make sure the left and right outer races are not interchanged.

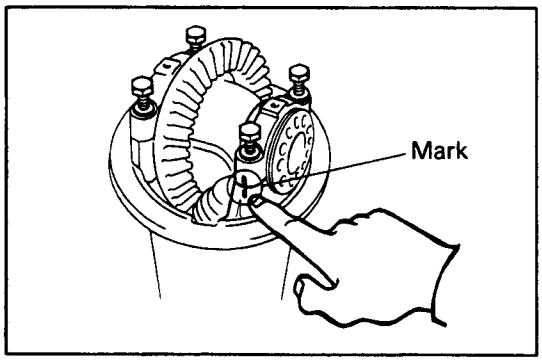
(b) Install the case in the carrier.



3. INSTALL ADJUSTING NUTS

Install the adjusting nuts on their respective carrier, making sure they are threaded properly.

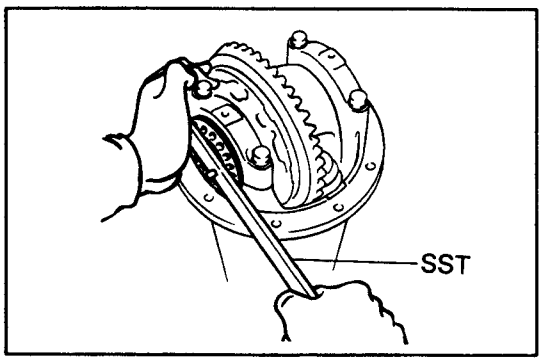
NOTE: Make sure that there is backlash between the ring gear and drive pinion.



4. INSTALL BEARING CAPS

Align the matchmarks on the cap and carrier. Screw in the two bearing cap bolts two or three turns and press down the bearing cap by hand.

NOTE: If the bearing cap does not fit tightly on the carrier, the adjusting nut threads are not threaded properly. Reinstall adjusting nuts if necessary.

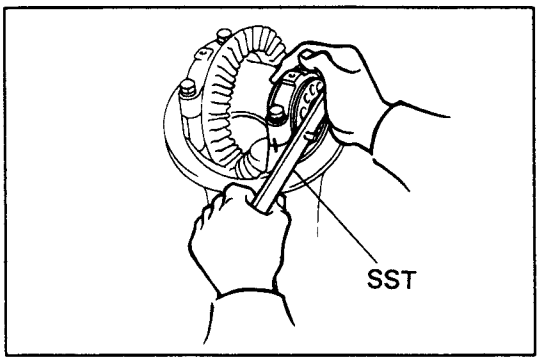


5. ADJUST SIDE BEARING PRELOAD

(a) Tighten the bearing cap bolts until the spring washers are slightly compressed.

(b) Using SST, tighten the adjusting nut on the ring gear side until the ring gear has a backlash of about 0.2 mm (0.008 in.).

SST 09504-00011

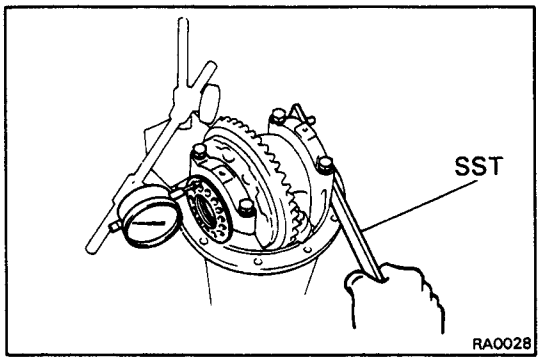


(c) Using SST, firmly tighten the adjusting nut on the drive pinion side.

SST 09504-00011

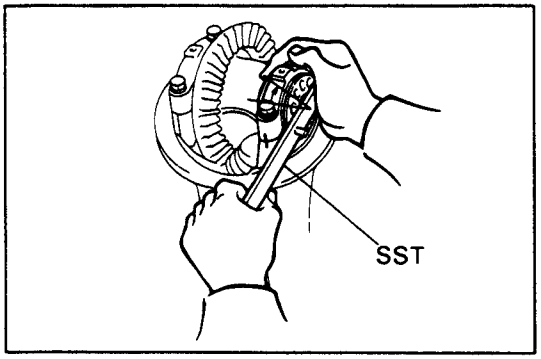
(d) Check the ring gear backlash.

If tightening the adjusting nut creates ring gear backlash, loosen the nut so that backlash is eliminated.

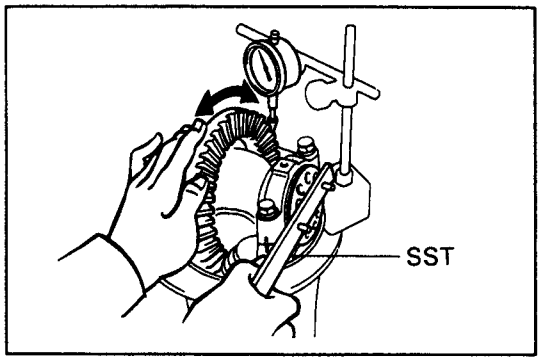


(e) Place a dial indicator on the top of the bearing cap on the ring gear side.

(f) Adjust the side bearing for zero preload by tightening the other adjusting nut until the pointer on the indicator begins to move.



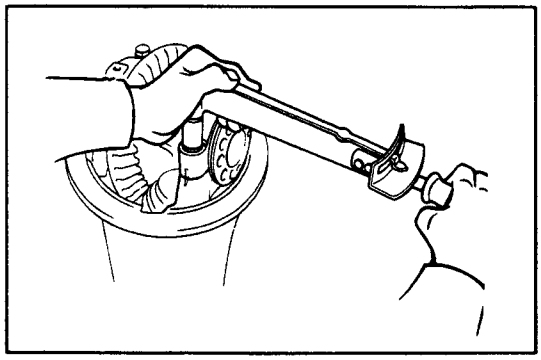
(g) Tighten the adjusting nut 1 – 1½ notches from the zero preload position.



(h) Using a dial indicator, adjust the ring gear backlash until it is within specification.

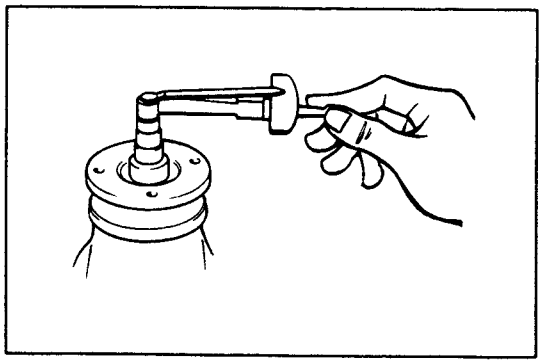
Backlash: 0.10 – 0.15 mm (0.0039 – 0.0059 in.)

NOTE: The backlash is adjusted by turning the left and right adjusting nuts equal amounts. For example, loosen the nut on the left side one notch and tighten the nut on the right side one notch.



(i) Torque the bearing cap bolts.

Torque: 600 kg-cm (43 ft-lb, 59 N·m)

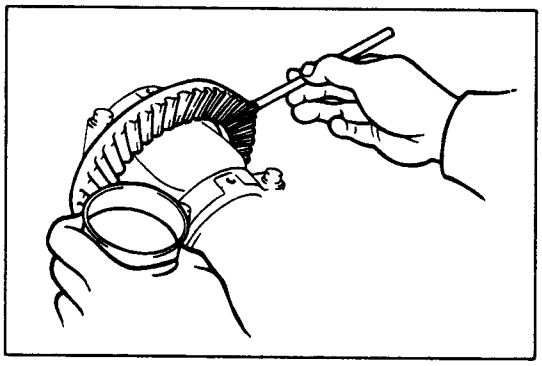


(j) Recheck the ring gear backlash.

(k) Using a torque meter, measure the total preload.

Total preload:
In addition to drive pinion preload
2 – 4 kg-cm (1.7 – 3.5 in.-lb, 0.2 – 0.4 N·m)

Backlash: 0.10 – 0.15 mm (0.0039 – 0.0059 in.)

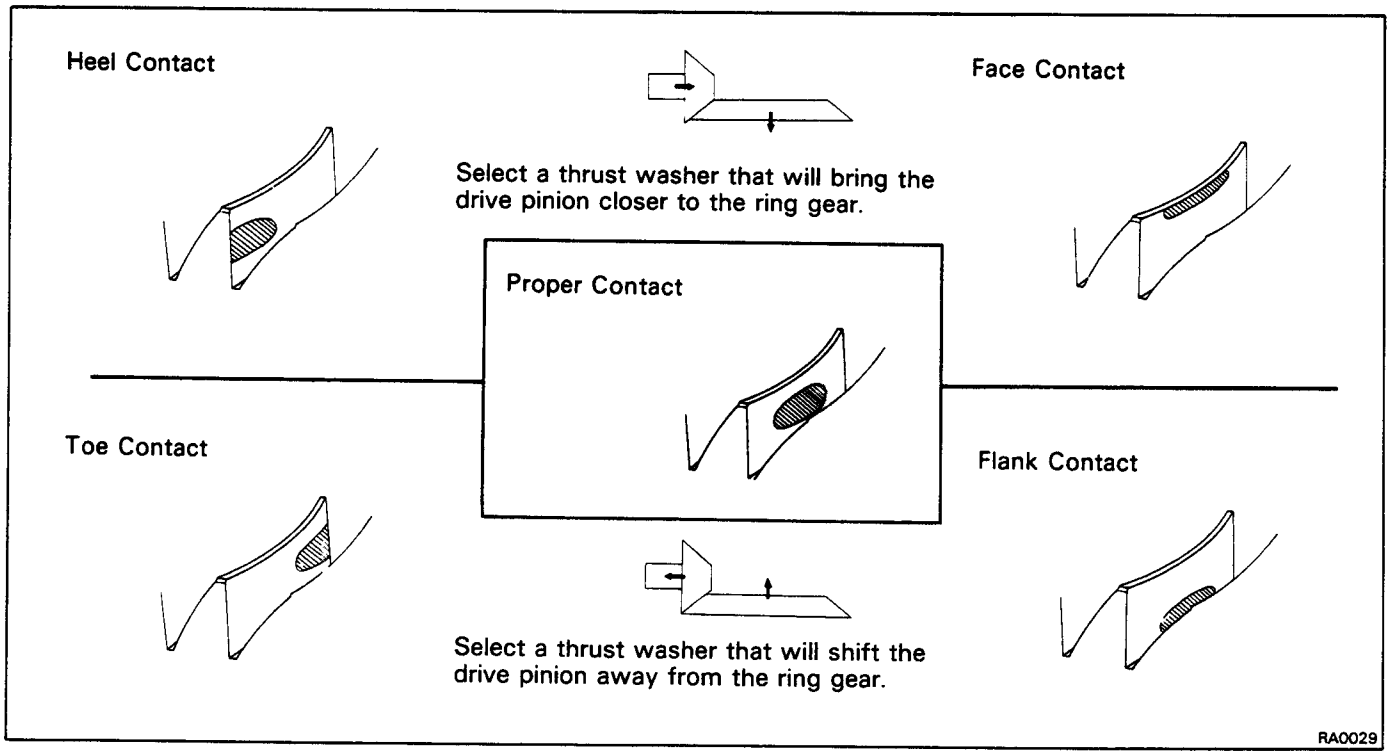


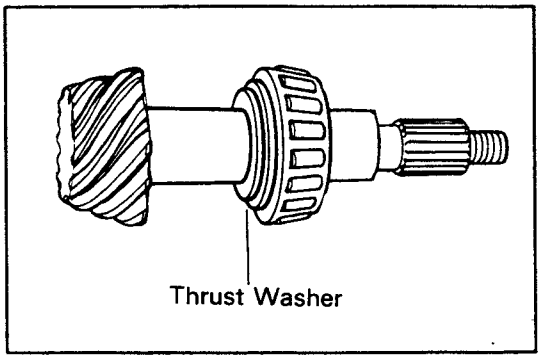
6. INSPECT TOOTH CONTACT BETWEEN RING GEAR AND DRIVE PINION

(a) Coat red lead on 3 or 4 teeth at three different positions of the ring gear.

(b) Hold the companion flange firmly and rotate the ring gear in both directions.

(c) Inspect the tooth pattern.



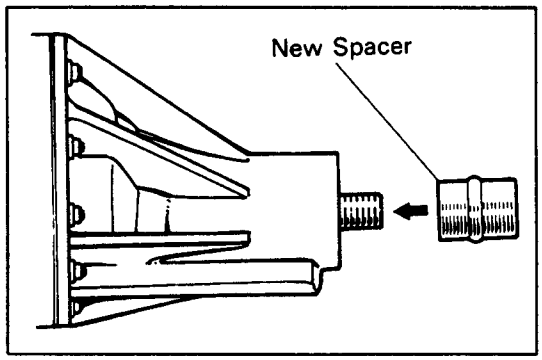


NOTE: If adjusting the meshing of the teeth of the drive pinion and ring gear by changing the extension of the drive pinion, select a thrust washer of the appropriate thickness from the table below.

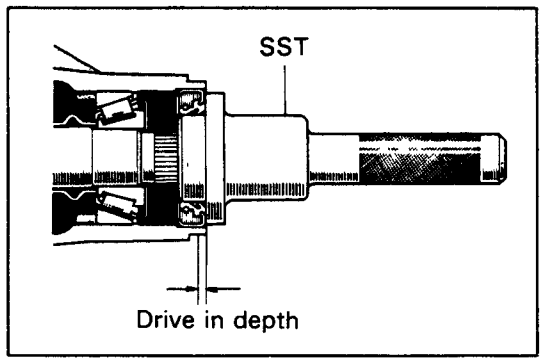
Drive pinion thrust washer thickness mm (in.)	
2.24 (0.0882)	2.48 (0.0976)
2.27 (0.0894)	2.51 (0.0988)
2.30 (0.0906)	2.54 (0.1000)
2.33 (0.0917)	2.57 (0.1012)
2.36 (0.0929)	2.60 (0.1024)
2.39 (0.0941)	2.63 (0.1035)
2.42 (0.0953)	2.66 (0.1047)
2.45 (0.0965)	

7. **REMOVE COMPANION FLANGE**
(See step 7 on page RA-31)

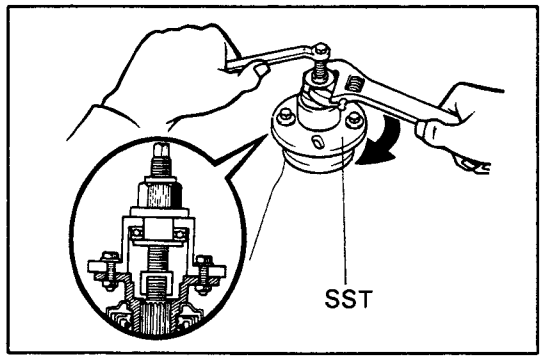
8. **REMOVE FRONT BEARING**
(See step 9 on page RA-31)



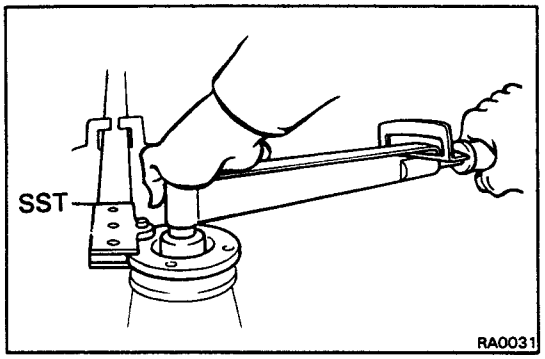
9. **INSTALL NEW BEARING SPACER AND FRONT BEARING**
   (a) Install a new bearing spacer on the shaft.
   (b) Install the front bearing on the shaft.



10. **INSTALL OIL SLINGER AND NEW OIL SEAL**
   (a) Install the oil slinger facing as shown.
   (b) Using SST, drive in a new oil seal as shown.
   SST 09517-12010
   Oil seal drive in depth: 1.0 mm (0.039 in.)
   (c) Apply MP grease to the oil seal lip.



11. **INSTALL COMPANION FLANGE**
   (a) Using SST, install the companion flange.
   SST 09557-22022

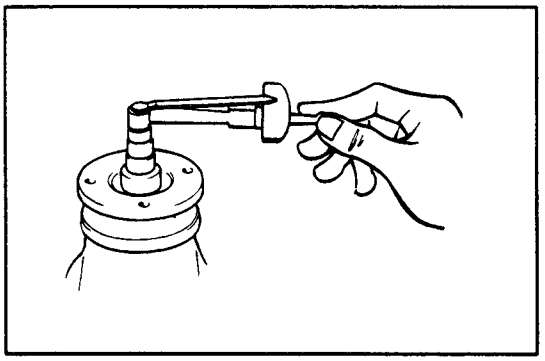


(b) Coat the threads of a new nut with MP grease.

(c) Using SST to hold the flange, tighten the nut. Torque the nut.

SST 09330-00020

Torque: 1,425 kg-cm (103 ft-lb, 140 N·m)



12. ADJUST DRIVE PINION PRELOAD

Using a torque wrench, measure the preload of the backlash between the drive pinion and ring gear.

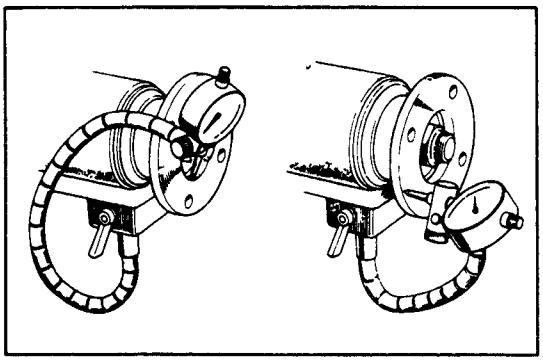
Preload:	**New bearing**	**6.5 – 12.5 kg-cm (5.6 – 10.9 in.-lb) (0.6 – 1.2 N·m)**
	Reused bearing	**4 – 7 kg-cm (3.5 – 6.1 in.-lb) (0.4 – 0.7 N·m)**

(a) If preload is exceeds specification, replace the bearing spacer.

(b) If preload is less than specification, retighten the nut 130 kg-cm (9 ft-lb, 13 N·m) at a time until the specified preload is reached.

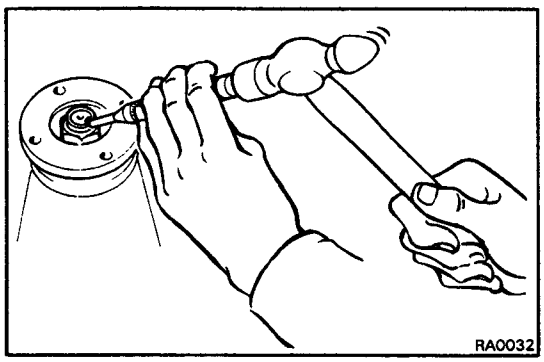
If the maximum torque is exceeded while retightening the nut, replace the bearing spacer and repeat the preload procedure. Do not back off the pinion nut to reduce the preload.

Maximum torque: 2,400 kg-cm (174 ft-lb, 235 N·m)

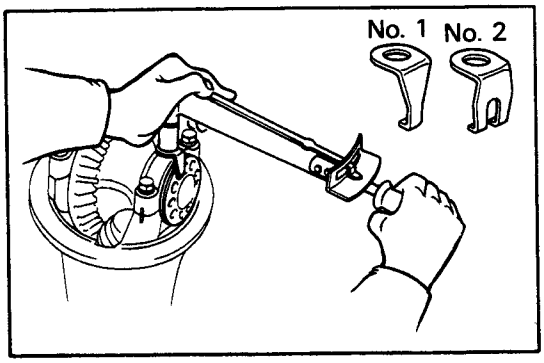


13. CHECK DEVIATION OF COMPANION FLANGE

Maximum lateral runout: 0.10 mm (0.0039 in.)
Maximum radial runout: 0.10 mm (0.0039 in.)



14. STAKE DRIVE PINION NUT



15. INSTALL ADJUSTING NUT LOCKS

(a) Select either a lock plate No. 1 or No. 2 whichever will fit the adjusting nuts.

(b) Install the lock plate on the bearing caps.

Torque: 55 kg-cm (48 in.-lb, 5.4 N·m)

INSTALLATION OF DIFFERENTIAL

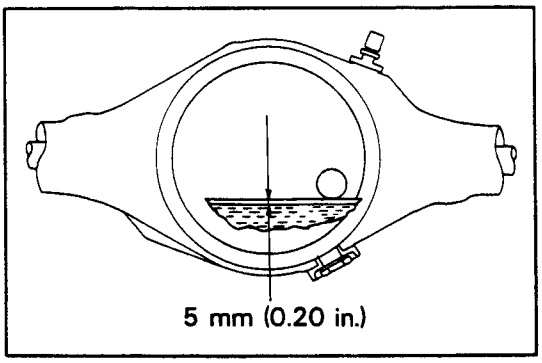
(See page RA-28)

1. INSTALL DIFFERENTIAL CARRIER ASSEMBLY

Install a new gasket and the differential carrier assembly in the axle and install the twelve nuts. Torque the nuts.

Torque: 315 kg-cm (23 ft-lb, 31 N·m)

2. CONNECT PROPELLER SHAFT FLANGE TO COMPANION FLANGE (See page PR-6)



3. INSTALL REAR PLUG AND FILL DIFFERENTIAL WITH GEAR OIL

Torque the drain plug.

Torque: 500 kg-cm (36 ft-lb, 49 N·m)

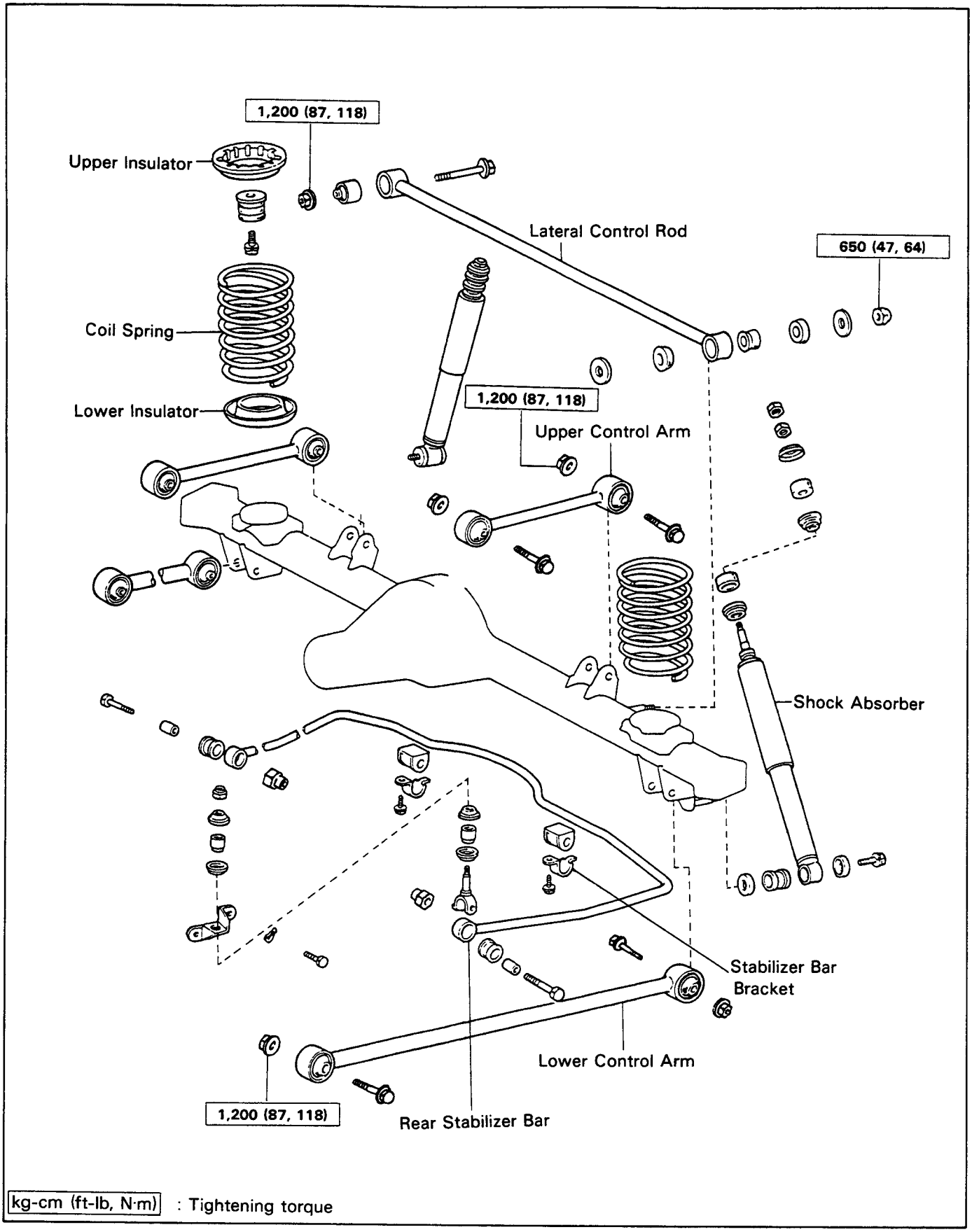
Oil grade: API GL-5 hypoid gear oil
Viscosity: Above − 18°C (0°F) SAE 90
Below − 18°C (0°F) SAE 80W or 80W-90
Capacity: 1.0 liters (1.1 US qts, 0.9 Imp. qts)

Torque the filler plug.

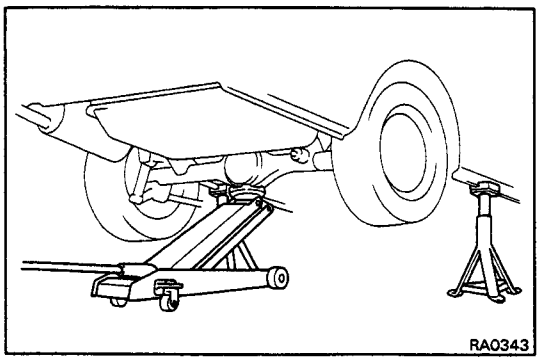
Torque: 500 kg-cm (36 ft-lb, 49 N·m)

FOUR LINK TYPE REAR SUSPENSION (4WD)

COMPONENTS



kg-cm (ft-lb, N·m) : Tightening torque



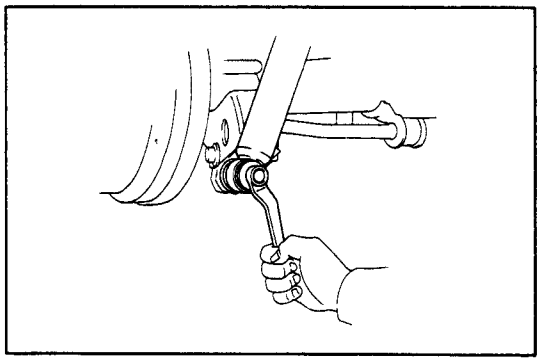
Coil Spring and Rear Shock Absorber

(See page RA-42)

REMOVAL OF COIL SPRING AND SHOCK ABSORBER

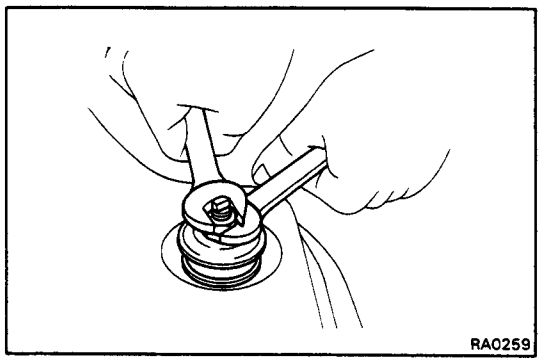
1. JACK UP VEHICLE

Jack up the rear axle housing and support the body with stands. Leave the jack under the rear axle.

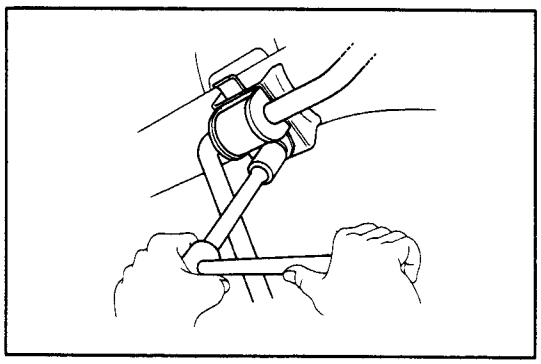


2. REMOVE REAR SHOCK ABSORBER

(a) Remove the bolt holding the shock absorber to the rear axle housing and disconnect the shock absorber.

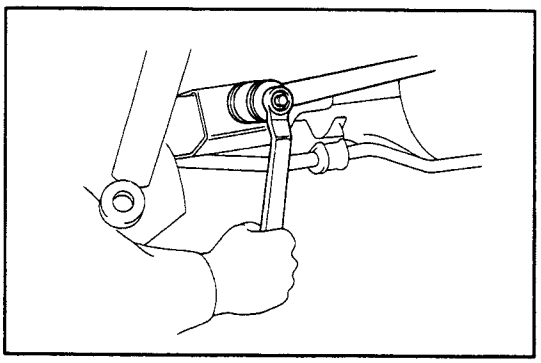


(b) Remove the nuts holding the shock absorber to the body, and remove the shock absorber.



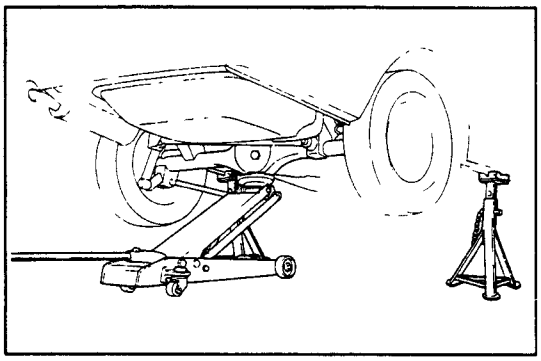
3. REMOVE STABILIZER BAR BUSHING BRACKETS

Remove the bolts holding the stabilizer bar bushing to the rear axle housing.



4. DISCONNECT LATERAL CONTROL ROD FROM REAR AXLE HOUSING

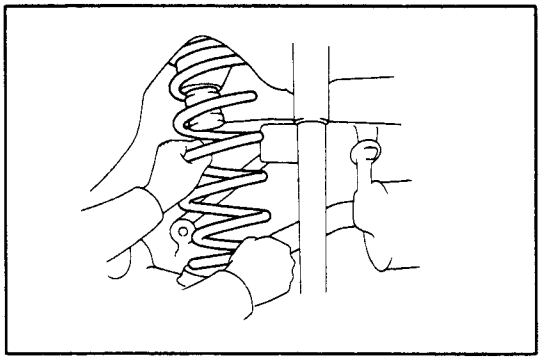
Remove the nut holding the lateral control rod to the rear axle housing and disconnect the lateral control rod.



5. REMOVE COIL SPRING

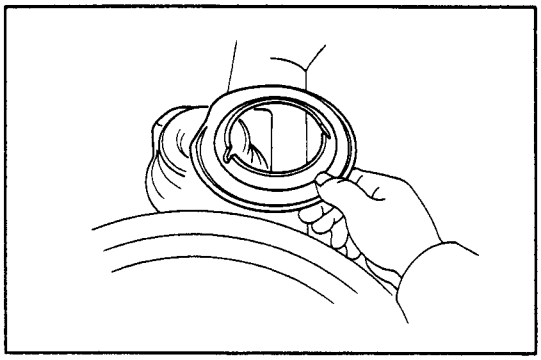
(a) Begin to lower the rear axle housing.

NOTE: Be careful not to pull the brake line and parking brake cable.

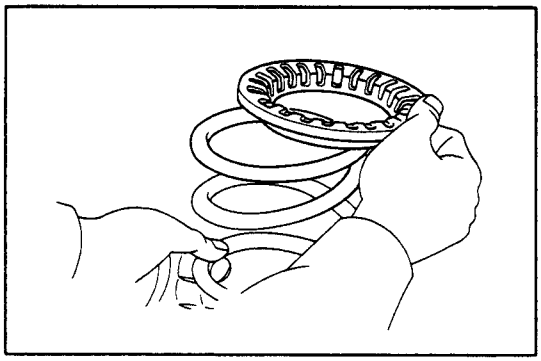


(b) While lowering the rear axle housing, remove the coil spring and the upper and lower insulators.

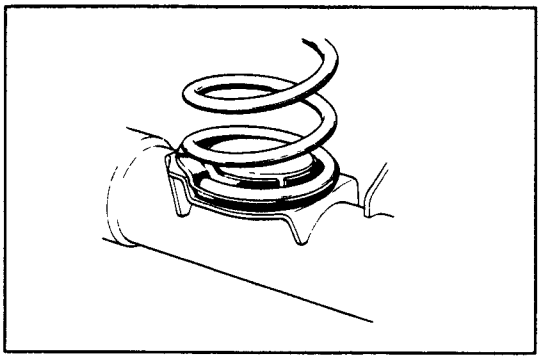
INSTALLATION OF COIL SPRING AND SHOCK ABSORBER



1. PUT LOWER INSULATOR ON AXLE HOUSING



2. PUT UPPER INSULATOR ON COIL SPRING

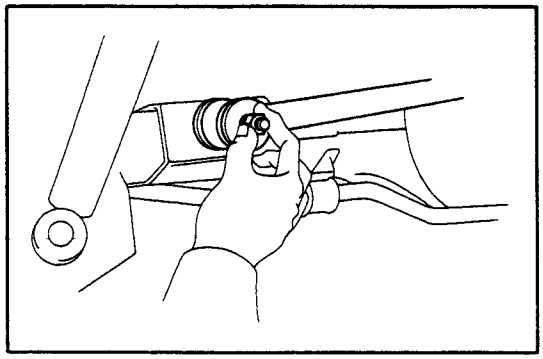


3. INSTALL COIL SPRING

4. CHECK POSITION OF LOWER INSULATOR

(a) Jack up the rear axle housing.

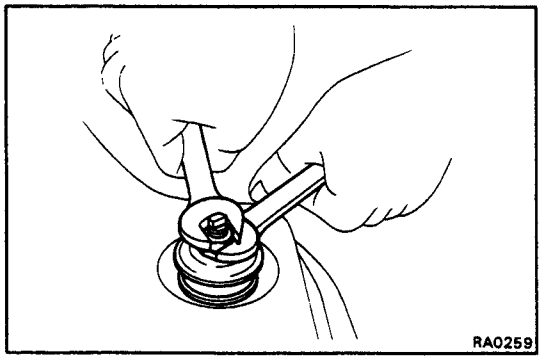
(b) Check that the lower insulator is installed correctly. If the insulator is not in correct position, reinstall the coil spring.



5. INSTALL LATERAL CONTROL ROD

In order, install a washer, bushing, spacer, lateral control rod, bushing, washer and nut on the rear axle housing.

Do not tighten the nut yet.

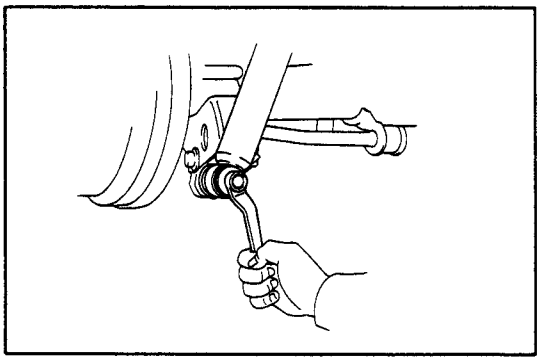


6. INSTALL SHOCK ABSORBER

(a) Connect the shock absorber to the body with the nut.

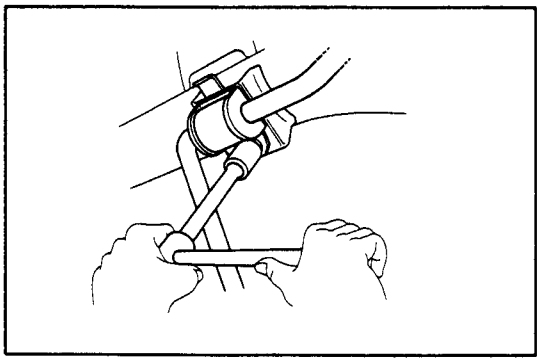
Hold the shaft with an adjustable wrench. Torque the nut.

Torque: 250 kg-cm (18 ft-lb, 25 N·m)

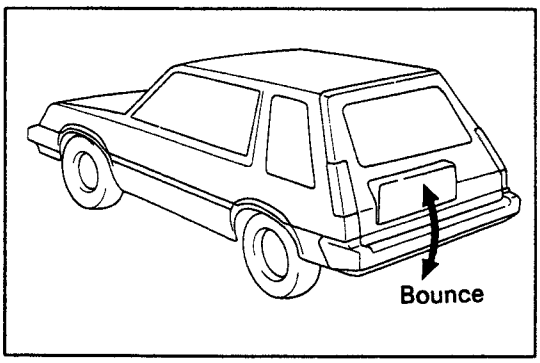


(b) Connect the shock absorber to the rear axle housing with the nut. Torque the bolt.

Torque: 375 kg-cm (27 ft-lb, 37 N·m)

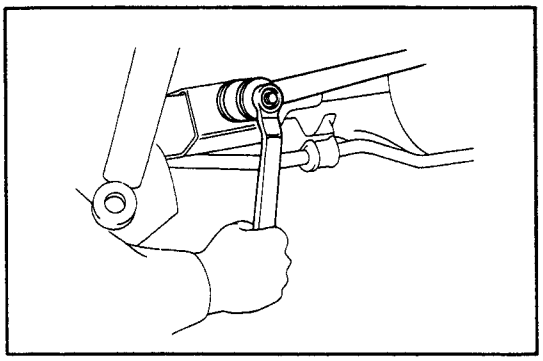


7. INSTALL STABILIZER BAR BUSHING BRACKETS TO REAR AXLE



8. STABILIZE SUSPENSION

Remove the stands and bounce the car to stabilize the suspension.

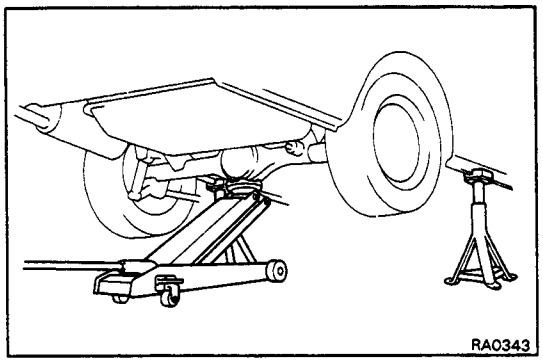


9. TIGHTEN LATERAL CONTROL ROD NUT

(a) Raise the axle housing until the body is free from the stands.

(b) Torque the lateral control rod nut.

Torque: 650 kg-cm (47 ft-lb, 64 N·m)



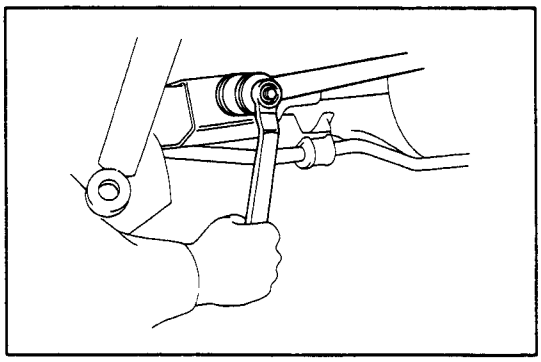
Lateral Control Rod

(See page RA-42)

REMOVAL OF LATERAL CONTROL ROD

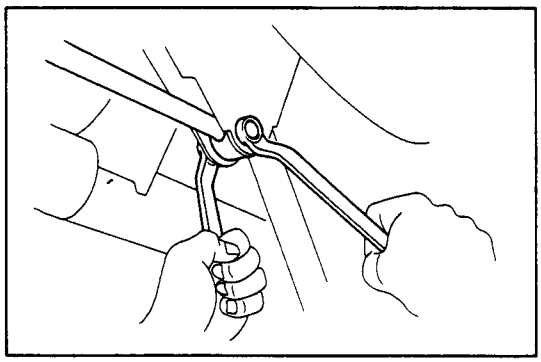
1. SUPPORT REAR AXLE HOUSING

Jack up the rear axle housing and support it with stands.



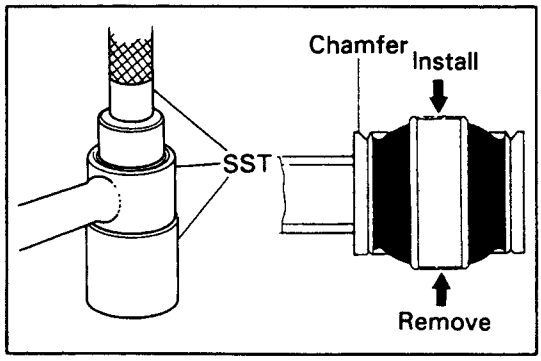
2. DISCONNECT LATERAL CONTROL ROD FROM REAR AXLE HOUSING

Remove the nut holding the lateral control rod to the rear axle housing, and disconnect the lateral control rod.



3. DISCONNECT LATERAL CONTROL ROD FROM BODY

Remove the nut holding the lateral control rod to the body and remove the lateral control rod.



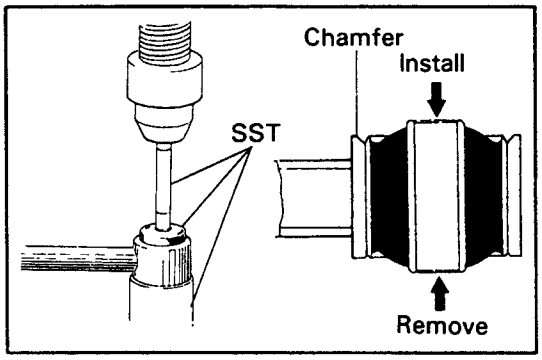
REPLACEMENT OF LATERAL CONTROL ROD BUSHING

1. REMOVE BUSHING

Using SST, press out the bushing from the lateral control rod.

SST 09710-14012

NOTE: When inserting and removing the bushing, press or pull from the chamfered side as shown in the figure.

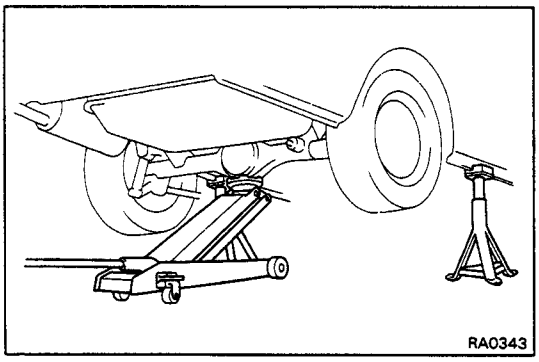


2. INSTALL BUSHING

Using SST and a press, press a new bushing into the lateral control rod.

SST 09710-14012

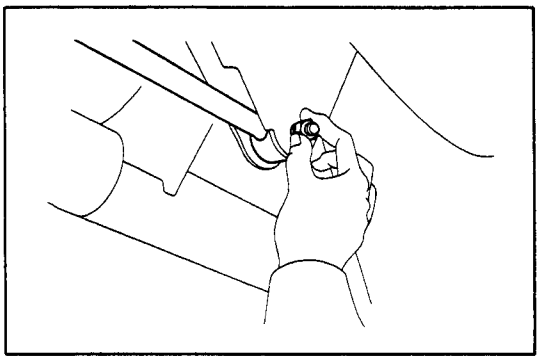
NOTE: Do not use a lubricant when pressing in the bushing.



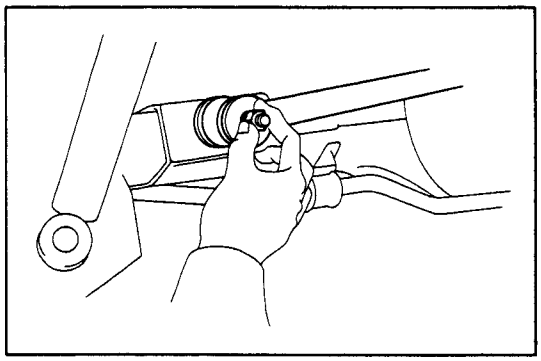
INSTALLATION OF LATERAL CONTROL ROD

1. INSTALL LATERAL CONTROL ROD TO BODY

(a) Raise the axle housing until the housing is free from the stands.

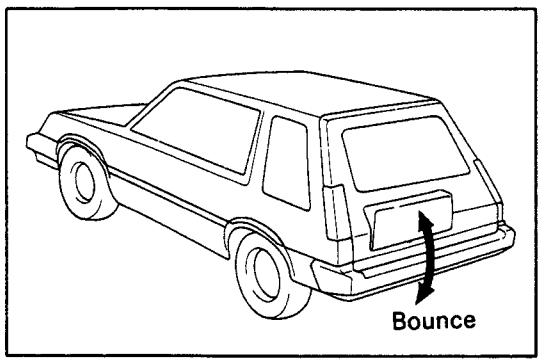


(b) Install the lateral control rod to the body with the nut.

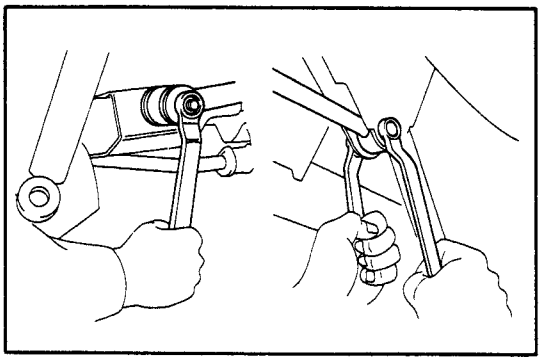


2. INSTALL LATERAL CONTROL ROD TO REAR AXLE HOUSING

(a) Consecutively install the washer, bushing, spacer, lateral control arm, bushing, washer and nut on the rear axle housing.



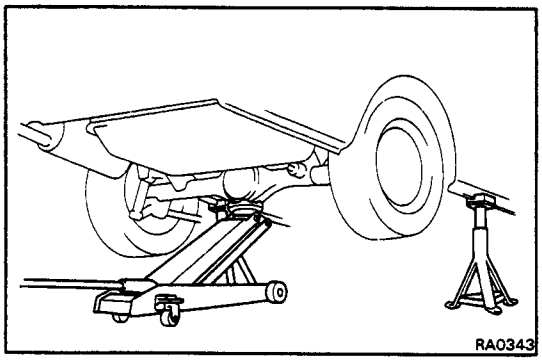
(b) Remove the stands and bounce the car to stabilize the suspension.



(c) Jack up the axle housing.

(d) Torque the nut.

Torque:
Body side
1,200 kg-cm (87 ft-lb, 118 N·m)
Axle housing side
650 kg-cm (47 ft-lb, 64 N·m)



Upper and Lower Control Arm

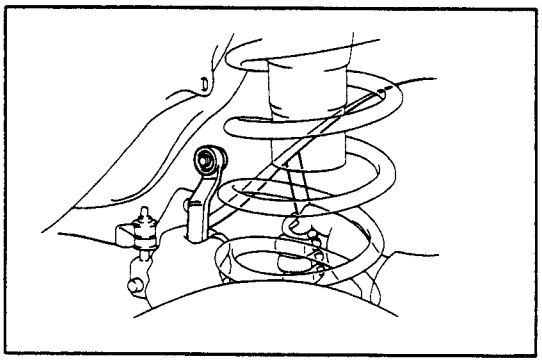
(See page RA-42)

REMOVAL OF UPPER AND LOWER CONTROL ARM

1. JACK UP VEHICLE

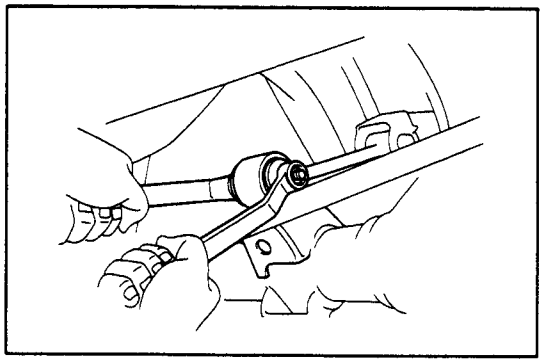
Jack up the vehicle and support the body with stands.

Hold the rear axle housing with a jack.

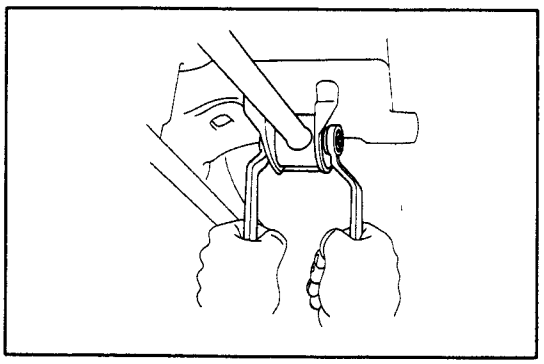


2. REMOVE UPPER CONTROL ARM

(a) Remove the bolt holding the upper control arm to the body.

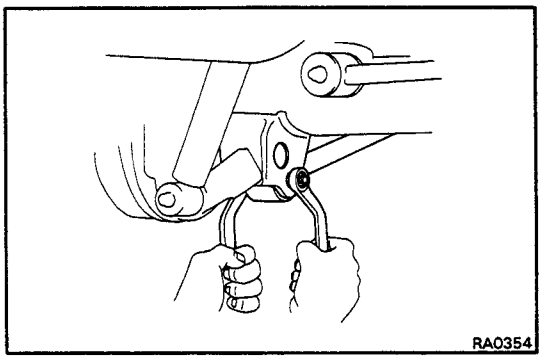


(b) Remove the bolt holding the upper control arm to the rear axle housing, then remove the upper control arm.

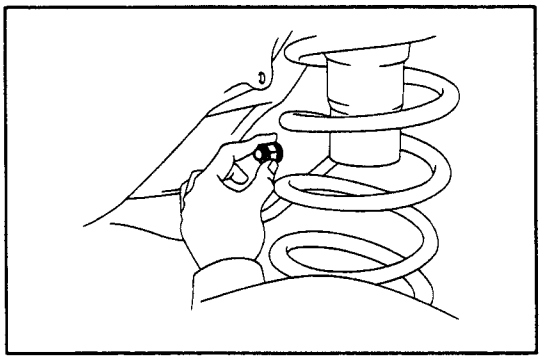


3. REMOVE LOWER CONTROL ARM

(a) Remove the bolt holding the lower control arm to the body.



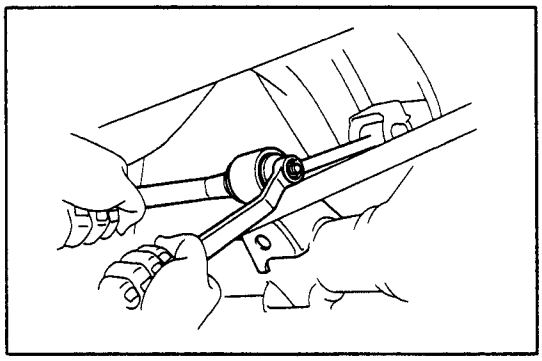
(b) Remove the bolt holding the lower control arm to the rear axle housing, and then remove the lower control arm.



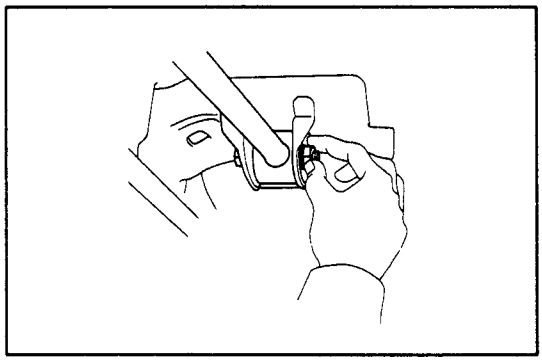
INSTALLATION OF UPPER AND LOWER CONTROL ARM

1. INSTALL UPPER CONTROL ARM

(a) Install the upper control arm on the body with the bolt and nut. Do not tighten the nut yet.

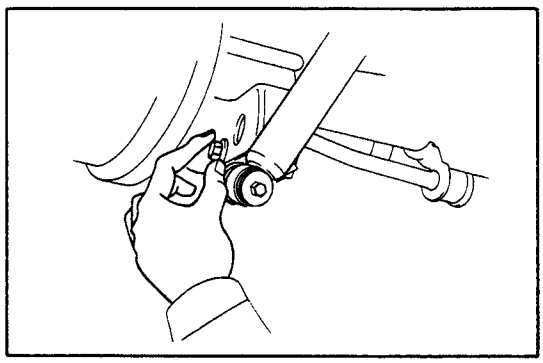


(b) Install the upper control arm on the rear axle housing with the bolt and nut. Do not tighten the nut yet.

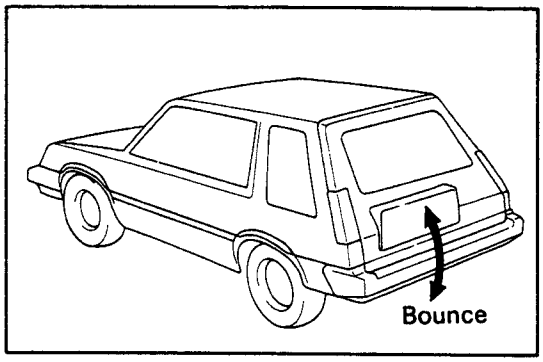


2. INSTALL LOWER CONTROL ARM

(a) Install the lower control arm on the body with the bolt and nut. Do not tighten the nut yet.

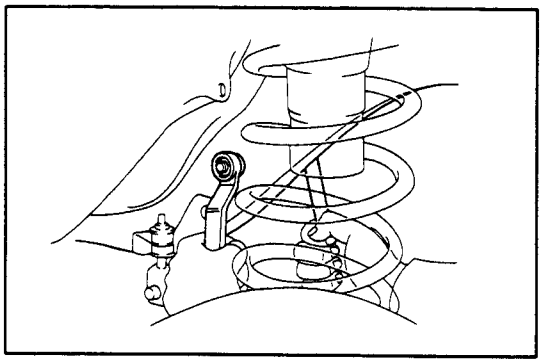


(b) Install the lower control arm on the rear axle housing with the bolt and nut. Do not tighten the nut yet.



3. **STABILIZE SUSPENSION**

Remove the stands and bounce the car to stabilize the suspension.



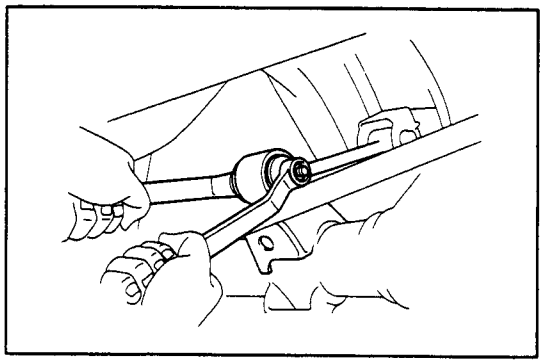
4. **JACK UP VEHICLE**

Raise the axle housing until the body is free from the stands.

5. **TIGHTEN BOLT HOLDING UPPER CONTROL ARM TO BODY**

Torque the bolt.

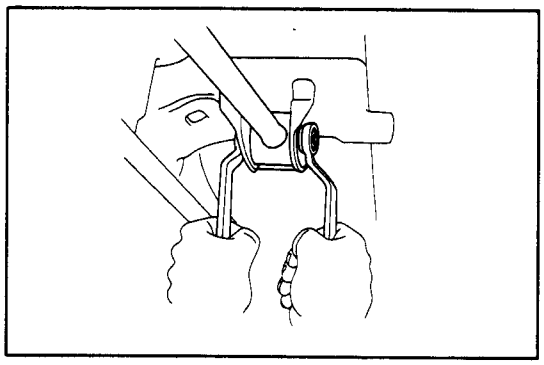
Torque: 1,200 kg-cm (87 ft-lb, 118 N·m)



6. **TIGHTEN BOLT HOLDING UPPER CONTROL ARM TO REAR AXLE HOUSING**

Torque the bolt.

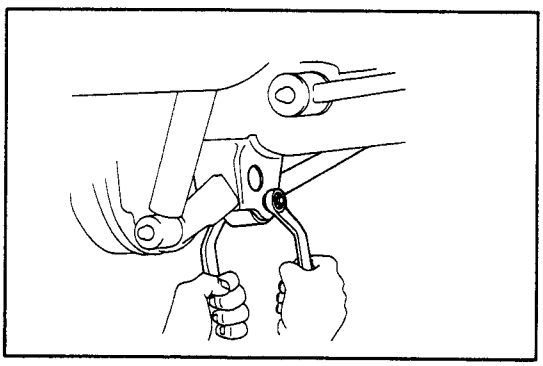
Torque: 1,200 kg-cm (87 ft-lb, 118 N·m)



7. **TIGHTEN BOLT HOLDING LOWER CONTROL ARM TO BODY**

Torque the bolt.

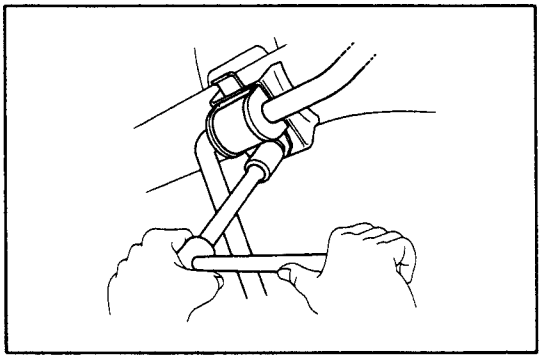
Torque: 1,200 kg-cm (87 ft-lb, 118 N·m)



8. **TIGHTEN BOLT HOLDING LOWER CONTROL ARM TO REAR AXLE HOUSING**

Torque the bolt.

Torque: 1,200 kg-cm (87 ft-lb, 118 N·m)



Rear Stabilizer Bar

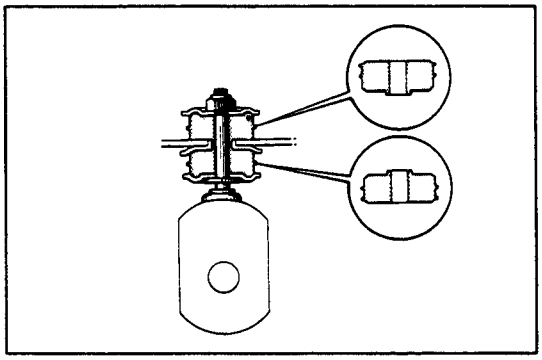
(See page RA-42)

REMOVAL OF REAR STABILIZER BAR

1. REMOVE STABILIZER BAR BUSHING BRACKETS

2. REMOVE REAR STABILIZER BAR FROM BODY

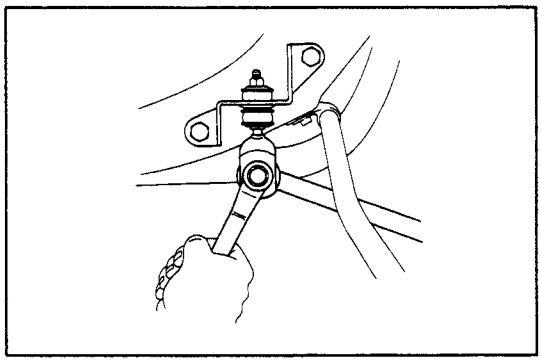
3. DISCONNECT STABILIZER BAR END FROM LINK



INSTALLATION OF REAR STABILIZER BAR

1. INSTALL STABILIZER LINK TO BODY

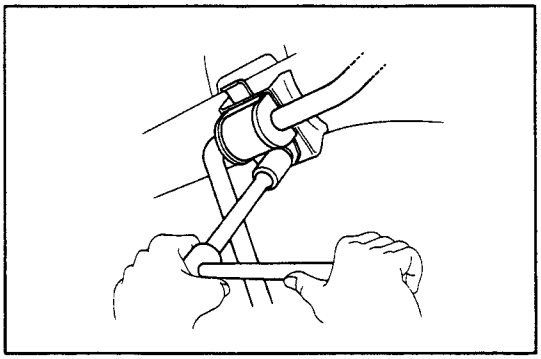
   Install the link onto the body as shown.



2. INSTALL STABILIZER BAR TO LINK

   Connect the stabilizer bar on both sides to the links with bolts, collars, cushions, nut and new cotter pins.

   Torque: 310 kg-cm (22 ft-lb, 30 N·m)



3. INSTALL BRACKETS TO REAR AXLE HOUSING

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

BRAKE SYSTEM

	Page
PRECAUTIONS	BR-2
TROUBLESHOOTING	BR-2
CHECKS AND ADJUSTMENTS	BR-6
MASTER CYLINDER	BR-9
BRAKE BOOSTER	BR-14
FRONT BRAKE	BR-16
REAR BRAKE	BR-22
Sedan	BR-22
Wagon FWD	BR-29
Wagon 4WD	BR-36
BRAKE HOSES AND TUBES	BR-43

PRECAUTIONS

1. **Care must be taken to replace each part properly as it could affect the performance of the brake system and result in a driving hazard. Replace the parts with parts of the same part number or equivalent.**
2. **It is very important to keep parts and the area clean when repairing the brake system.**

TROUBLESHOOTING

Problem	Possible cause	Remedy	Page
Low or spongy pedal	Linings worn	Replace brake shoes or pads	BR-16,22
	Leak in brake system	Repair leak	BR-43
	Master cylinder faulty	Repair or replace master cylinder	BR-9
	Air in brake system	Bleed brake system	BR-7
	Wheel cylinder faulty	Repair wheel cylinder	BR-22
	Piston seals worn or damaged	Repair brake calipers	BR-16
	Rear brake automatic adjuster faulty	Repair or replace adjuster	BR-22
Brakes drag	Parking brake out of adjustment	Adjust parking brake	BR-8
	Parking brake wire binding	Repair as necessary	
	Booster push rod out of adjustment	Adjust push rod	BR-15
	Return spring faulty	Replace spring	BR-22
	Brake line restricted	Repair as necessary	
	Lining cracked or distorted	Replace brake shoe	BR-22
	Wheel cylinder or caliper piston sticking	Repair as necessary	BR-18,22
	Automatic adjuster broken	Replace adjuster	BR-22
	Master cylinder faulty	Repair or replace master cylinder	BR-9
Brakes pull	Tires improperly inflated	Inflate tires to proper pressure	FA-3
	Oil or grease on linings	Check for cause, replace lining	BR-16,22
	Brake shoes distorted, linings worn or glazed	Replace brake shoes	BR-16,22
	Drum or disc out of round	Replace drum or disc	BR-18,22
	Return spring faulty	Replace spring	BR-22
	Wheel cylinder faulty	Repair wheel cylinder	BR-18,22
	Piston frozen in caliper	Repair caliper	BR-18
	Disc brake pad sticking	Replace pads	BR-16
Hard pedal but brakes inefficient	Oil or grease on linings	Check for cause, replace lining	BR-16,22
	Brake shoes distorted, linings worn or glazed, drums worn	Replace brake shoes	BR-16,22
	Disc brake pads worn	Replace pads	BR-16
	Piston frozen in caliper	Repair caliper	BR-16
	Brake booster faulty	Repair booster	BR-14
	Brake line restricted	Repair as necessary	

TROUBLESHOOTING (Cont'd)

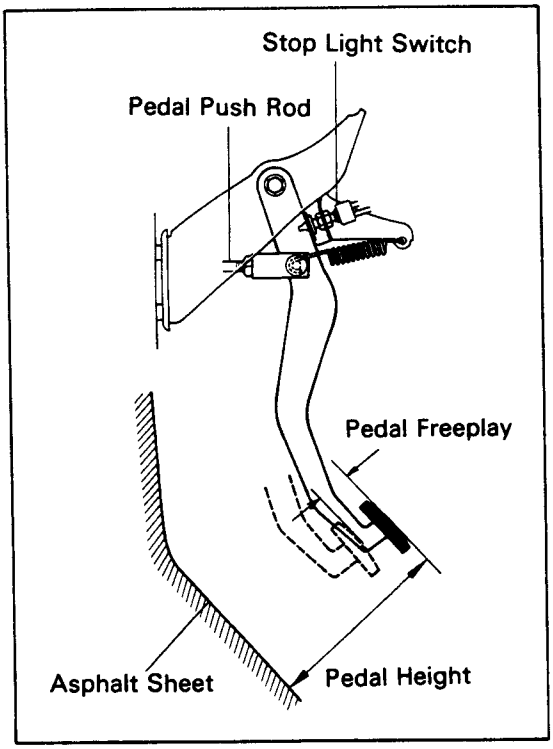
Problem	Possible cause	Remedy	Page
Snapping or clicking noise when brakes are applied	Drum brakes – brake shoes binding at backing plate ledges	Lubricate	BR-22
	Drum brakes – backing plate ledges worn	Replace and lubricate ledges	BR-22
	Drum brakes – loose or missing hold down spring	Replace	BR-22
	Drum brakes – loose set bolt at backing plate	Tighten	BR-22
	Disc brakes – rust on front edge of inboard shoes	Inspect, lubricate, replace if necessary	BR-16
	Disc brakes – loose or missing pad support plate	Replace	BR-16
	Disc brakes – loose installation bolt	Tighten	BR-16
	Disc brakes – wear on slide bushing	Replace	BR-16
Scraping or grinding noise when brakes are applied	Worn brake linings	Replace, refinish drums or rotors if heavily scored	BR-16,22
	Caliper to wheel or rotor interference	Replace as required	BR-18
	Dust cover to rotor or drum interference	Correct or replace	BR-18,22
	Other brake system components: Warped or bent brake backing plate or splash shield, cracked drums or rotors	Inspect or service	BR-18,22
	Tires rubbing against chassis and body	Inspect or service	

TROUBLESHOOTING (Cont'd)

Problem	Possible cause	Remedy	Page
Squeaking, squealing groaning or chattering noise when brakes are applied Note: Brake friction materials inherently generate noise and heat in order to dissipate energy. As a result, occasional squeal is normal and is aggravated by severe environmetal conditions such as cold, heat, wetness, snow, salt, mud, etc. This occasional squeal is not a functional problem and does not indicate any loss of brake effectiveness	Brake drums and linings rotors and pads worn or scored	Inspect, service or repalce	BR-16,22
	Disc brakes – missing or damaged brake pad anti-squeal shim	Replace	BR-16
	Disc brakes – burred or rusted calipers	Clean or deburr	BR-18
	Dirty, greased, contaminated or glazed linings	Clean or replace	BR-16,22
	Improper lining parts	Inspect for correct usage replace	BR-16,22
	Maladjustment of brake pedal or booster push-rod	Inspect and adjust	BR-6,15
	Drum brakes – weak damaged or incorrect shoe hold down springs, loose or damaged shoe hold down spring pins springs and grooved backing plate ledges	Inspect, service or replace	BR-22
Squealing and squeaking noise when brakes are not applied	Bent or warped backing plate causing interference with drum	Service or replace	BR-22
	Improper machining of drum causing interference with backing plate or shoe	Replace drum	BR-22
	Maladjustment of brake pedal or booster push-rod	Inspect and adjust	BR-6,15
	Poor return of brake booster or master cylinder or wheel cylinder	Inspect, service or replace	BR-9,15,22
	Disc brakes – rusted, stuck	Inspect, lubricate as necessary	BR-16
	Other brake system components: Loose or extra parts in brakes Rear drum adjustment too tight causing lining to glaze Worn, damaged or insufficiently lubricated wheel bearings	Inspect, service, replace as required	BR-16,22

TROUBLESHOOTING (Cont'd)

Problem	Possible cause	Remedy	Page
Squealing and squeaking noise when brakes are not applied (cont'd)	Drum brakes – weak, damaged or incorrect shoe hold down springs	Inspect, service or replace	BR-22
	Drum brakes – grooved backing plate ledges	Inspect, service or replace	BR-22
	Improper positioning of pad in caliper	Inspect and service	BR-16
	Outside diameter of rotor rubbing caliper housing	Inspect, service or replace	BR-16
	Housing installation of disc brake pad support plate	Correct	BR-16
Groaning, clicking or rattling noise when brakes are not applied	Stones or foreign material trapped inside wheel covers	Remove stones, etc.	BR-18,22
	Loose wheel hub nuts	Tighten to correct torque and replace if stud holes are elongated	
	Disc brakes – failure of shim	Inspect, replace if necessary	BR-16
	Disc brakes – wear on slide bushing	Inspect, replace if necessary	BR-16
	Disc brakes – loose installation bolt	Inspect, tighten if necessary	BR-16
	Maladjustment of brake pedal or booster push-rod	Inspect and adjust	BR-6,15
	Disc brakes – poor return of piston	Inspect, service or replace	BR-18
	Drum brakes – loose or extra parts	Inspect, remove or service	BR-22
	Worn, damaged or dry wheel bearings	Inspect, lubricate or replace	



CHECKS AND ADJUSTMENTS

CHECK AND ADJUSTMENT OF BRAKE PEDAL

1. CHECK THAT PEDAL HEIGHT IS CORRECT, AS SHOWN

Pedal height from asphalt sheet: 184 – 194 mm (7.24 – 7.64 in.)

2. IF NECESSARY, ADJUST PEDAL HEIGHT

(a) Sufficiently loosen the stop light switch.

(b) Adjust the pedal height by turning the pedal push rod.

(c) Return the stop light switch until it lightly contacts the pedal stopper.

(d) After adjusting the pedal height, check and adjust the pedal freeplay.

3. CHECK THAT PEDAL FREEPLAY IS CORRECT, AS SHOWN

(a) Stop the engine and depress the brake pedal several times until there is no more vacuum left in the booster.

(b) Push in the pedal until the beginning of resistance is felt. Measure the distance, as shown.

Pedal freeplay: 3 – 6 mm (0.12 – 0.24 in.)

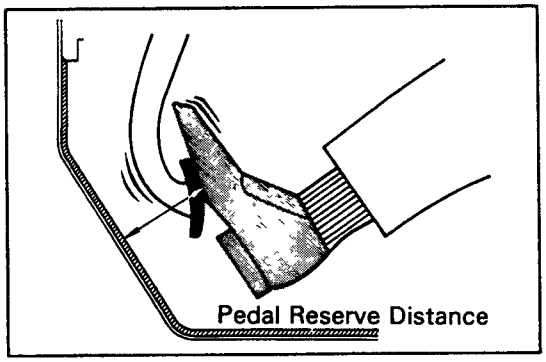
NOTE: The pedal freeplay is the amount of the stroke until the booster air valve is moved by the pedal push rod.

4. IF NECESSARY, ADJUST PEDAL FREEPLAY

(a) If incorrect, adjust the pedal freeplay by turning the pedal push rod.

(b) Start the engine and check that pedal freeplay exists.

(c) After adjusting the pedal freeplay, check the pedal height.



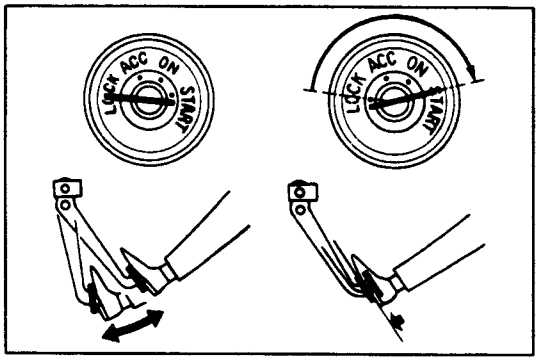
5. CHECK THAT PEDAL RESERVE DISTANCE IS CORRECT, AS SHOWN

(a) Release the parking brake.

(b) With engine running, depress the pedal and measure the pedal reserve distance, as shown.

Pedal reserve distance at 50 kg (110.2 lb, 490 N): More than 90 mm (3.54 in.)

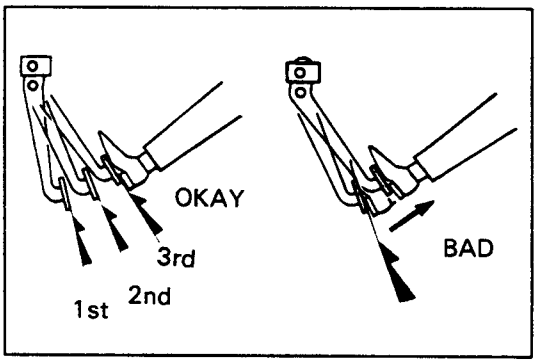
If incorrect, troubleshoot the brake system.



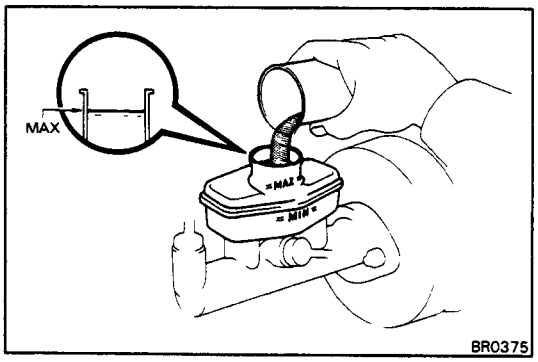
OPERATIONAL TEST OF BRAKE BOOSTER

NOTE: If available, use a brake booster tester to check the booster operating condition.

1. **OPERATING CHECK**
   (a) Depress the brake pedal several times with the engine off, and check that there is no change in the pedal reserve distance.
   (b) Depress the brake pedal and start the engine. If the pedal goes down slightly, operation is normal.



2. **AIR TIGHTNESS**
   (a) Start the engine and stop it after one or two minutes. Then depress the brake pedal several times slowly. If the pedal goes down fartherest the first time, and less the second and third time, the booster is air tight.
   (b) Depress the brake pedal while the engine is running, and stop it with the pedal depressed. If there is no change in pedal reserve travel after holding the pedal for thirty seconds, the booster is air tight.

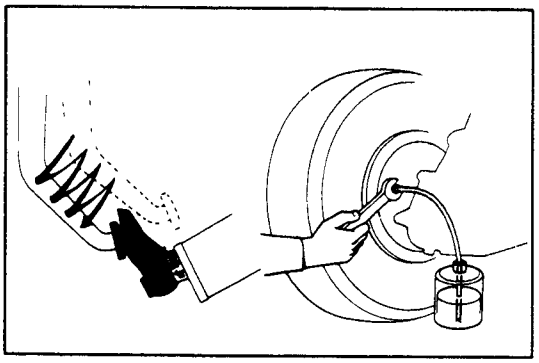


BLEEDING OF BRAKE SYSTEM

NOTE: If any work is done on the brake system or if air is suspected in the brake lines, bleed the system of air.

CAUTION: Do not let brake fluid remain on a painted surface. Wash it off immediately.

1. **FILL BRAKE RESERVOIRS WITH BRAKE FLUID**
   Check the reservoir after bleeding each wheel. Add fluid, if necessary.

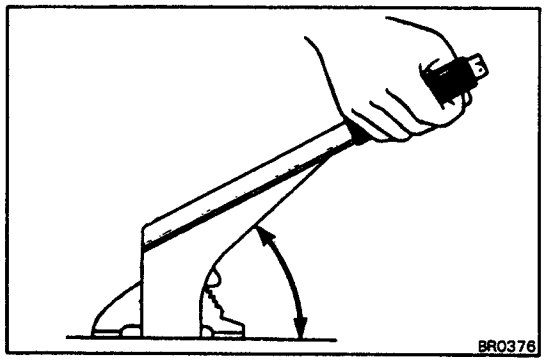


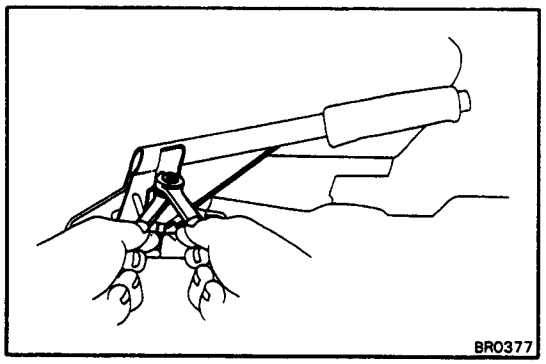
2. **CONNECT VINYL TUBE TO WHEEL CYLINDER BLEEDER PLUG**
   Insert the other end of the tube in a half-full container of brake fluid.

3. **BLEED BRAKE LINE**
   (a) Slowly pump the brake pedal several times.
   (b) While an assistant depresses the pedal, loosen the bleeder plug until fluid starts to runout. Then close the bleeder plug.
   (c) Repeat this procedure until there are no more air bubbles in the fluid.

   Bleeder plug tightening torque:
   85 kg-cm (74 in.-lb, 8.3 N·m)

4. **REPEAT PROCEDURE FOR EACH WHEEL**





CHECK AND ADJUSTMENT OF PARKING BRAKE

1. CHECK THAT PARKING BRAKE LEVER TRAVEL IS CORRECT

Pull the parking brake lever all the way up, and count the number of clicks.

Parking brake lever travel at 20 kg (44.1 lb, 196 N):
Sedan 5 – 8 clicks
Wagon 6 – 8 clicks

2. IF NECESSARY, ADJUST PARKING BRAKE

NOTE: Before adjusting the parking brake, make sure that the rear brake shoe clearance has been adjusted.

For shoe clearance adjustment, see pages BR-28, 35 and 42.

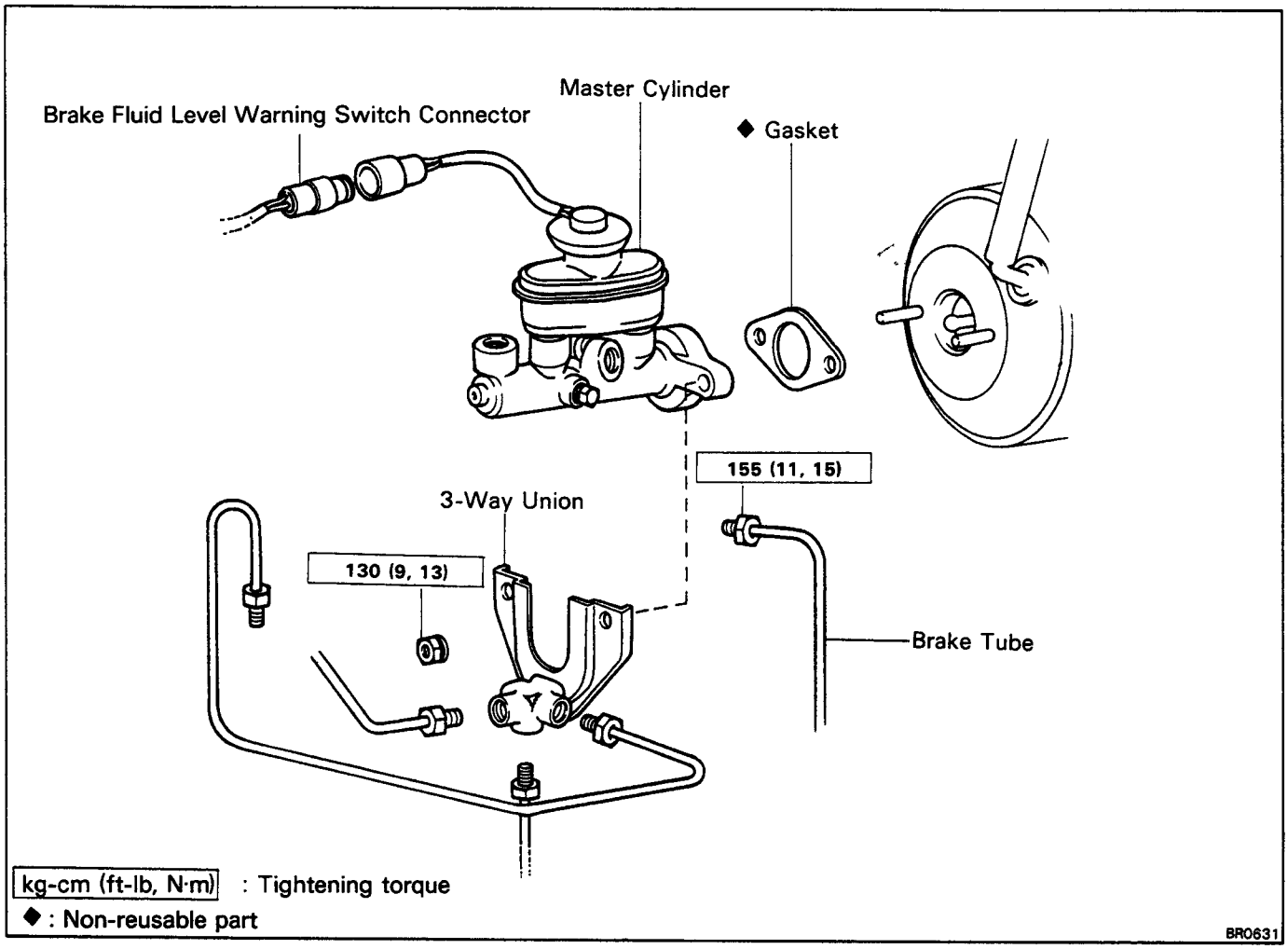
(a) Remove the console box.

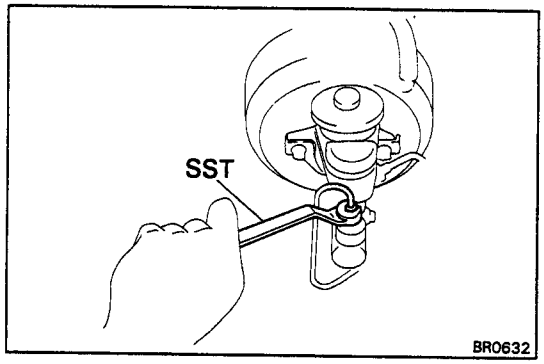
(b) Loosen the lock nut and turn the adjusting nut until the travel is correct.

(c) Tighten the lock nut and install the console box.

MASTER CYLINDER

REMOVAL OF MASTER CYLINDER





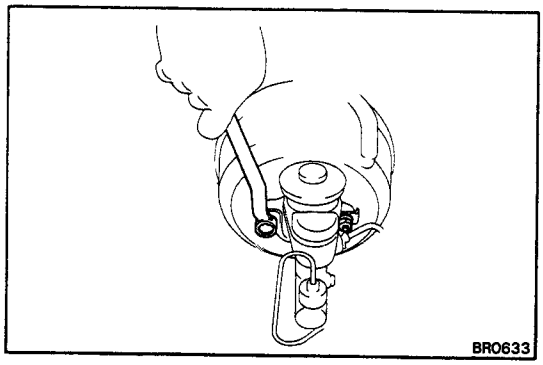
CAUTION: Do not let brake fluid remain on a painted surface. Wash it off immediately.

1. **TAKE OUT FLUID WITH SYRINGE**

2. **DISCONNECT BRAKE TUBES**

   Using SST, disconnect the brake tubes from the master cylinder and 3-way union.

   SST 09751-36011



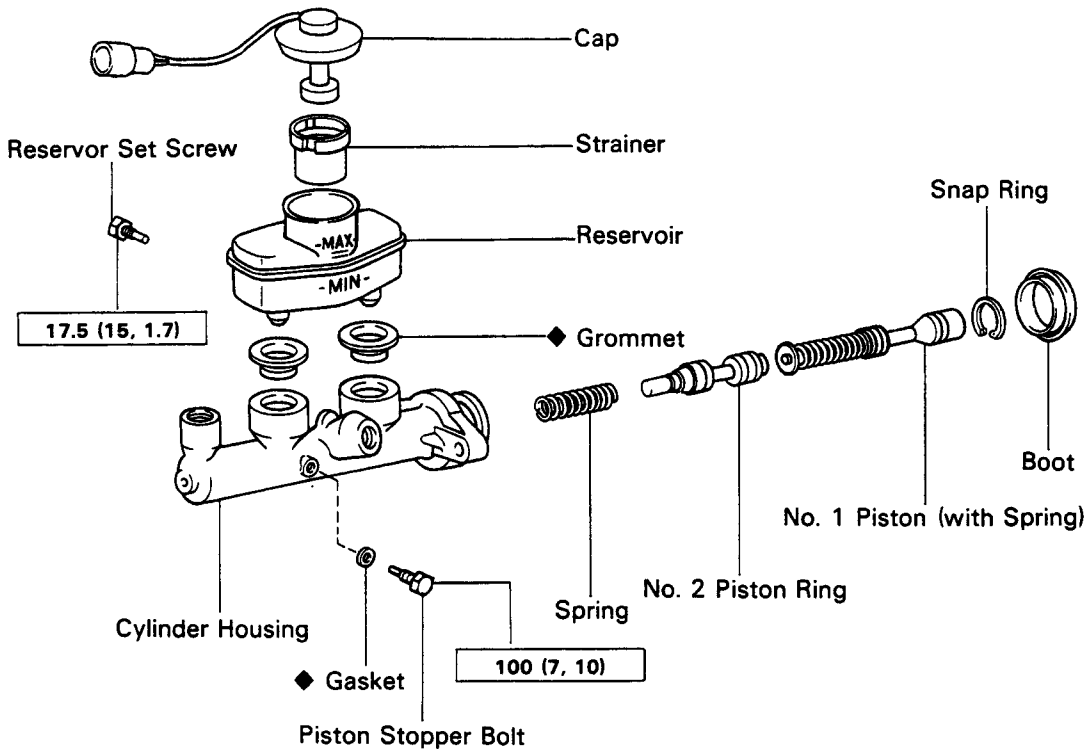
3. **REMOVE MASTER CYLINDER**

   (a) Disconnect the brake fluid level warning switch connector.

   (b) Remove the two nuts.

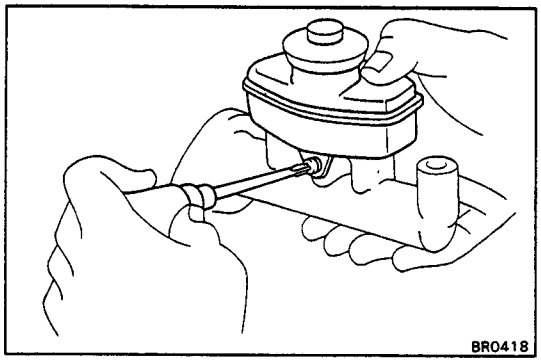
   (c) Remove the master cylinder, 3-way union and gasket from the brake booster.

COMPONENTS

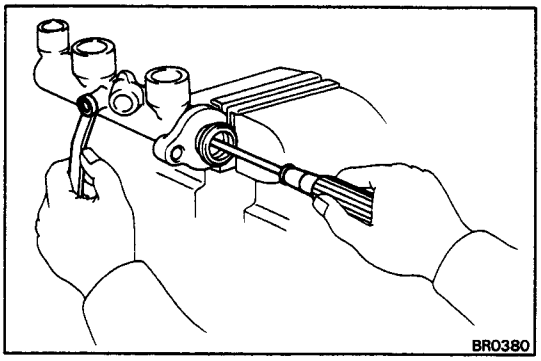


kg-cm (ft-lb, N·m) : Tightening torque
◆ : Non-reusable part

BR0634



BR0418



BR0380

DISASSEMBLY OF MASTER CYLINDER

1. REMOVE RESERVOIR FROM CYLINDER HOUSING

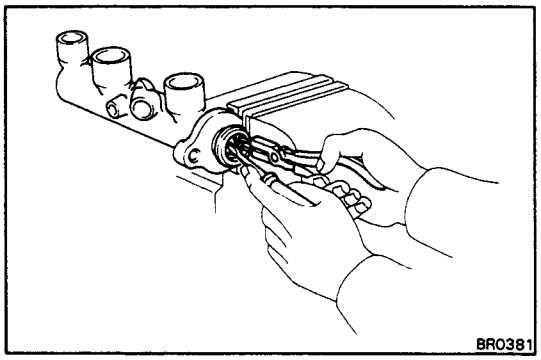
(a) Remove the cap and strainer.
(b) Remove the set screw.
(c) Pull out the reservoir.

2. MOUNT CYLINDER HOUSING IN VISE

3. REMOVE TWO GROMMETS FROM CYLINDER HOUSING

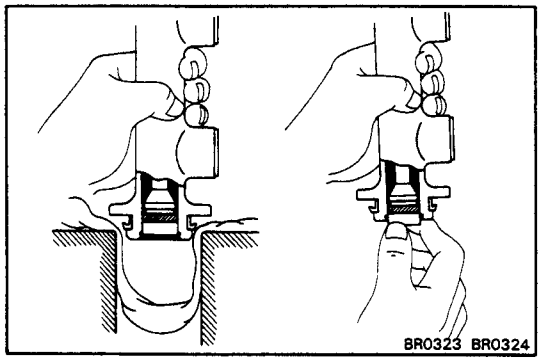
4. REMOVE PISTON STOPPER BOLT

Using a screwdriver, push the pistons in all the way and remove the piston stopper bolt.



5. REMOVE TWO PISTONS AND SPRINGS

(a) Using a screwdriver and snap ring pliers, remove the snap ring.



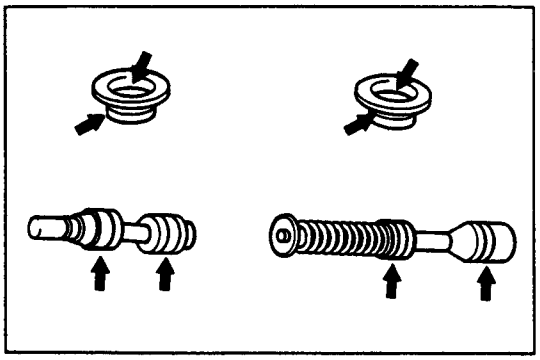
(b) Place a rag on two wooden blocks and lightly tap the cylinder flange between the blocks until the piston tip protrudes.

(c) Remove the piston by hand, pulling straight out, not at an angle.

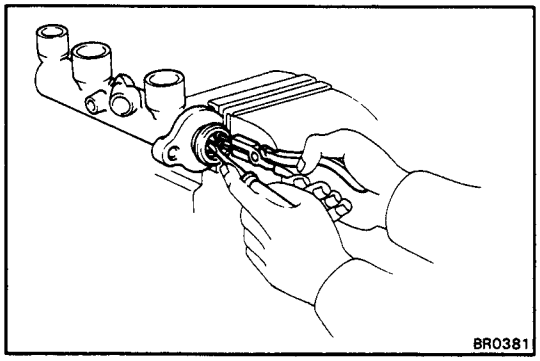
NOTE: If pulled out at an angle, there is a possibility of damaging the cylinder bore.

ASSEMBLY OF MASTER CYLINDER

(See page BR-10)



1. APPLY LITHIUM SOAP BASE GLYCOL GREASE TO RUBBER PARTS INDICATED BY ARROWS

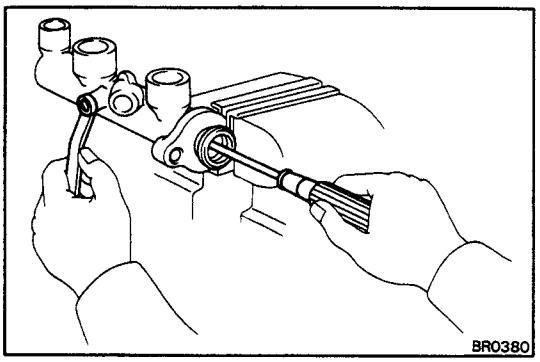


2. INSTALL TWO SPRINGS AND PISTONS

CAUTION: Be careful not to damage the rubber lips on the pistons.

(a) Insert the spring and pistons straight in, not at an angle.

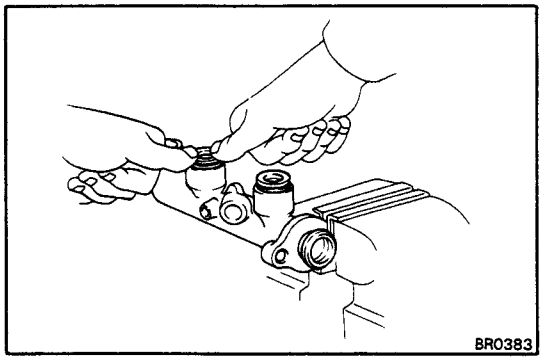
(b) Push in the piston and, using snap ring pliers, install the snap ring.



3. INSTALL PISTON STOPPER BOLT

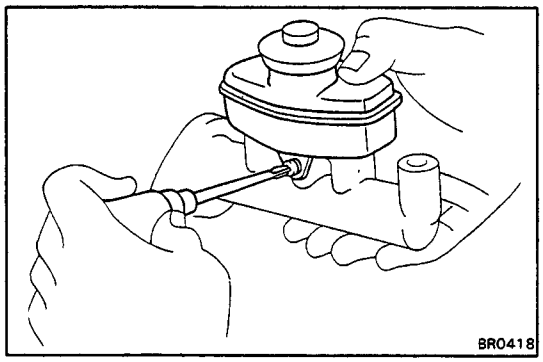
Using a screwdriver, push the pistons in all the way and install the piston stopper bolt with the gasket. Torque the bolt.

Torque: 100 kg-cm (7 ft-lb, 10 N·m)



4. **INSTALL TWO GROMMETS TO CYLINDER HOUSING**

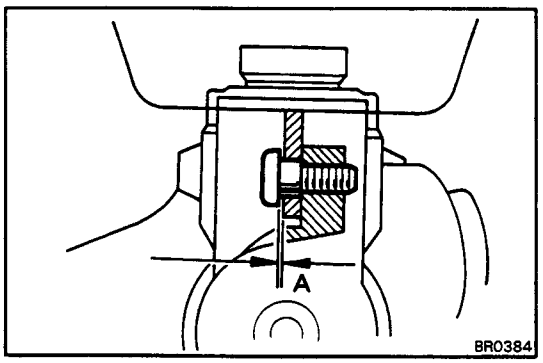
5. **INSTALL CAP AND STRAINER TO RESERVOIR**



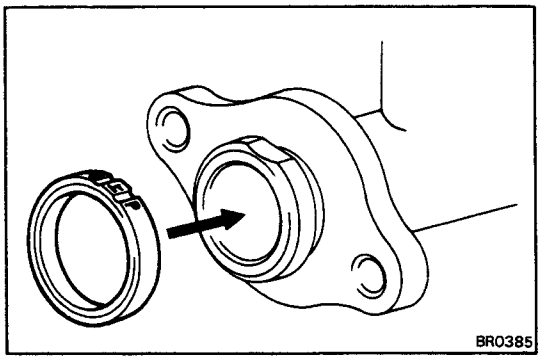
6. **INSTALL RESERVOIR TO CYLINDER HOUSING**

Push the reservoir onto the cylinder and install the screw.

Torque: 10 – 25 kg-cm (9 – 21 in.-lb, 1.0 – 2.4 N·m)



CAUTION: Because the master cylinder and reservoir tank union is a grommet type, the set screw is designed not to separate from the reservoir or cylinder and will not tighten down the reservoir. Therefore, there is a clearance at point A. Do not insert washers or such when tightening.

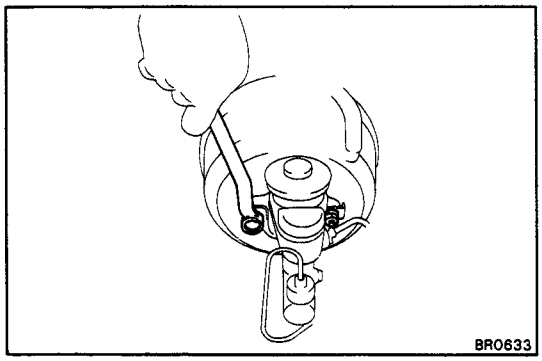


INSTALLATION OF MASTER CYLINDER

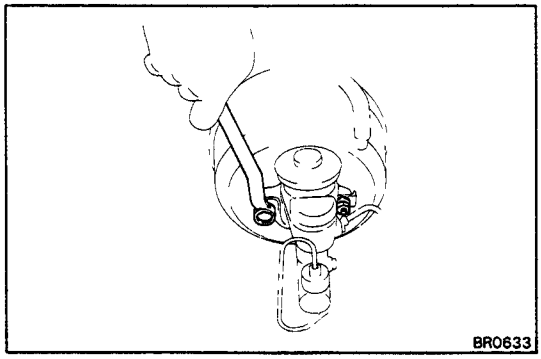
(See page BR-9)

1. **CLEAN OUT GROOVE ON LOWER INSTALLATION SURFACE OF MASTER CYLINDER**

2. **CHECK THAT "UP" MARK ON MASTER CYLINDER BOOT IS IN CORRECT POSITION**



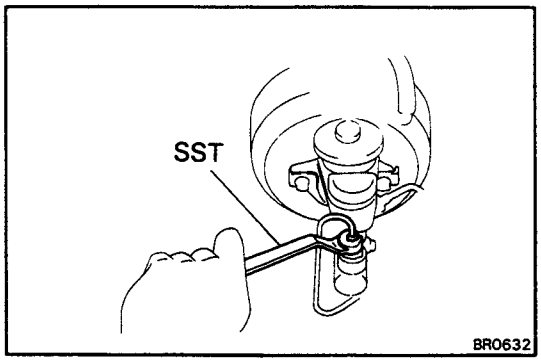
3. **ADJUST LENGTH OF BRAKE BOOSTER PUSH ROD BEFORE INSTALLING MASTER CYLINDER**
(See page BR-15)



4. **INSTALL MASTER CYLINDER**

Install a new gasket, the master cylinder and 3-way union with the two nuts. Torque the nuts.

Torque: 130 kg-cm (9 ft-lb, 13 N·m)



5. **CONNECT BRAKE TUBES**

Using SST, connect the brake tubes to the master cyliner and 3-way union. Torque the nuts.

SST 09751-36011

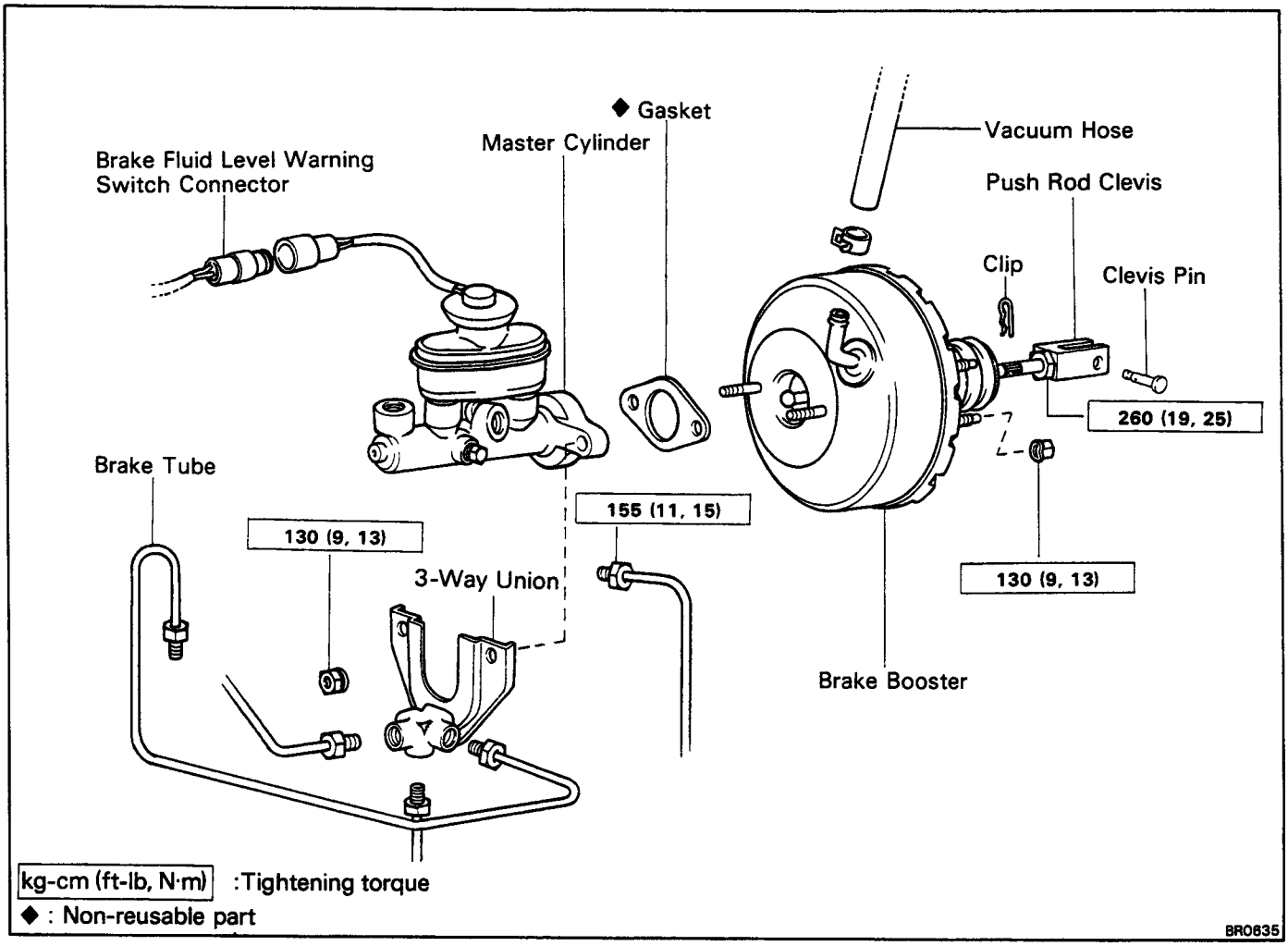
Torque: 155 kg-cm (11 ft-lb, 15 N·m)

6. **FILL BRAKE RESERVOIR WITH BRAKE FLUID AND BLEED BRAKE SYSTEM (See page BR-7)**

7. **CHECK AND ADJUST BRAKE PEDAL (See page BR-6)**

BRAKE BOOSTER

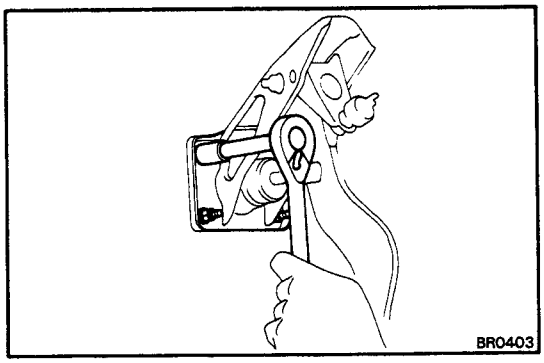
REMOVAL OF BRAKE BOOSTER

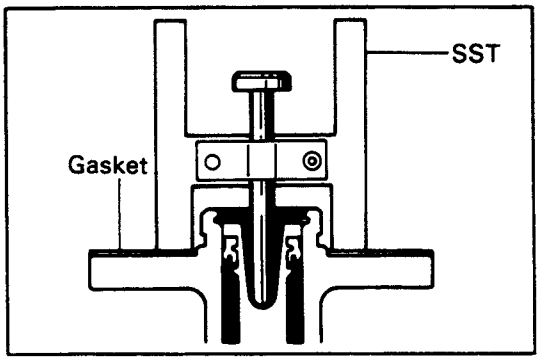


1. **REMOVE MASTER CYLINDER (See page BR-9)**
2. **DISCONNECT VACUUM HOSE FROM BRAKE BOOSTER**
3. **REMOVE DISTRIBUTOR CAP**
4. **REPEAT PROCEDURE FOR EACH WHEEL**
5. **REMOVE HEATER AIR DUCT**
6. **DISCONNECT PEDAL RETURN SPRING FROM BRAKE PEDAL**
7. **DISCONNECT PUSH ROD CLEVIS FROM BRAKE PEDAL**

   Remove the clip and clevis pin.
8. **REMOVE BRAKE BOOSTER**

   Remove the four nuts, and pull out the brake booster.





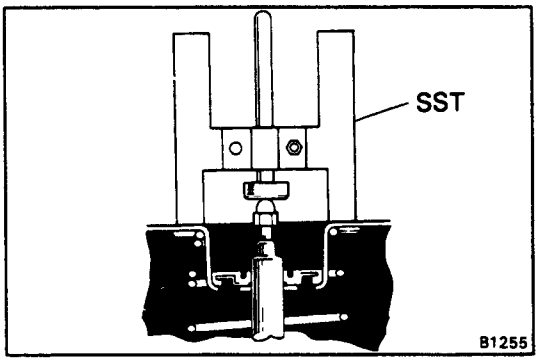
INSTALLATION OF BRAKE BOOSTER

(See page BR-14)

1. **ADJUST LENGTH OF BOOSTER PUSH ROD**

(a) Set SST on the master cylinder with the gasket and lower the pin until its tip slightly touches the piston.

SST 09737-00010

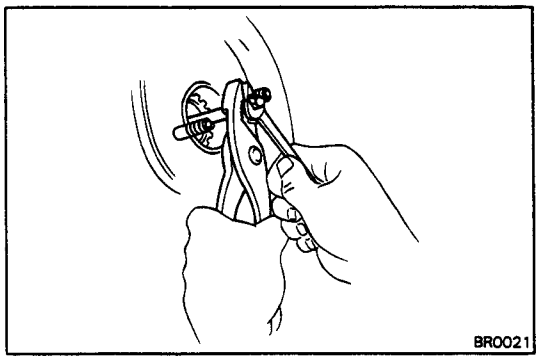


(b) Turn SST upside down, and set it on the booster.

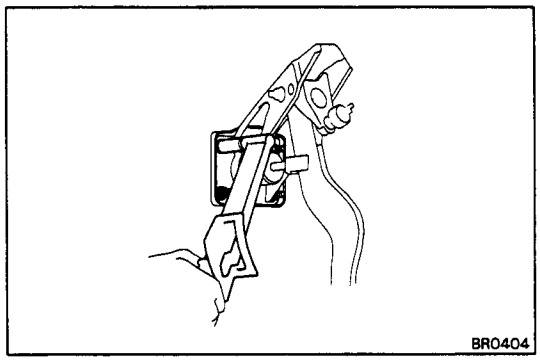
SST 09737-00010

(c) Check that there is no clearance between the booster push rod and pin head of SST.

Clearance: 0 mm (0 in.)



(d) Adjust the booster push rod length until the push rod lightly touches the pin head.



2. **INSTALL BRAKE BOOSTER**

Torque: 130 kg-cm (9 ft-lb, 13 N·m)

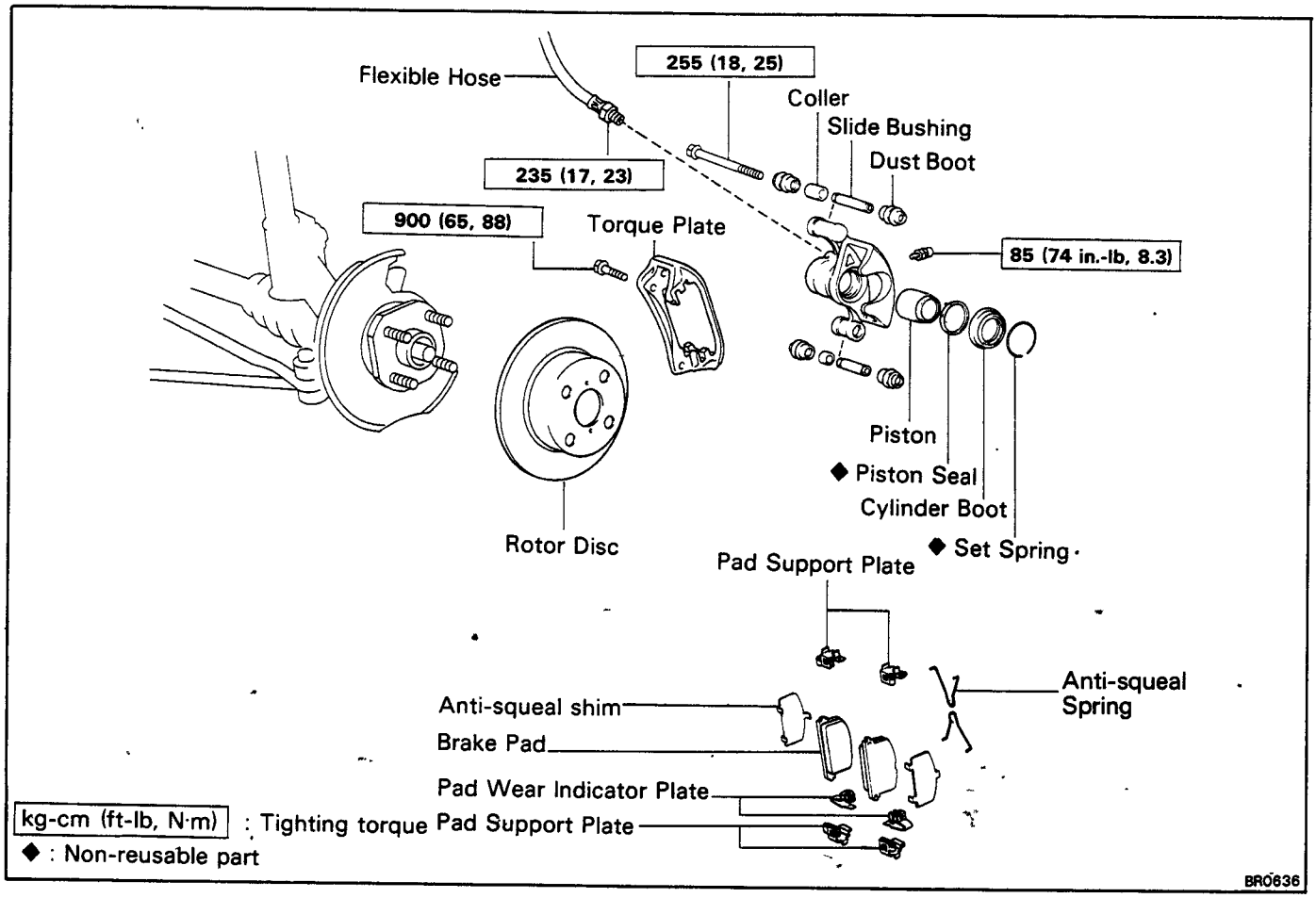
3. **INSTALL MASTER CYLINDER (See page BR-13)**
4. **CONNECT VACUUM HOSE TO BRAKE BOOSTER**
5. **CONNECT PUSH ROD CLEVIS TO BRAKE PEDAL**

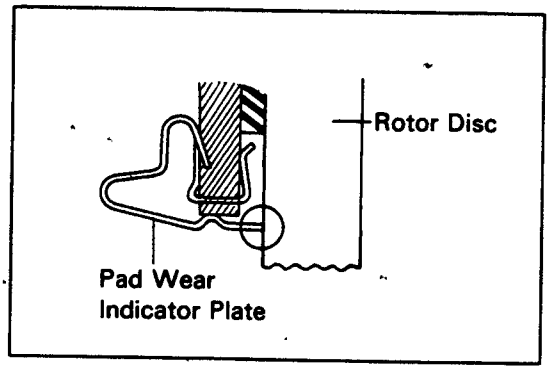
Install the clevis pin and clip.

6. **CONNECT PEDAL RETURN SPRING TO PEDAL SPRING**
7. **INSTALL HEATER AIR DUCT**
8. **INSTALL LOWER FINISH PANEL**
9. **INSTALL IIA CAP**
10. **FILL BRAKE RESERVOIR WITH BRAKE FLUID AND BLEED BRAKE SYSTEM (See page BR-7)**
11. **CHECK BRAKE PEDAL (See page BR-6)**
12. **PERFORM OPERATIONAL CHECK (See page BR-7)**

FRONT BRAKE

COMPONENTS



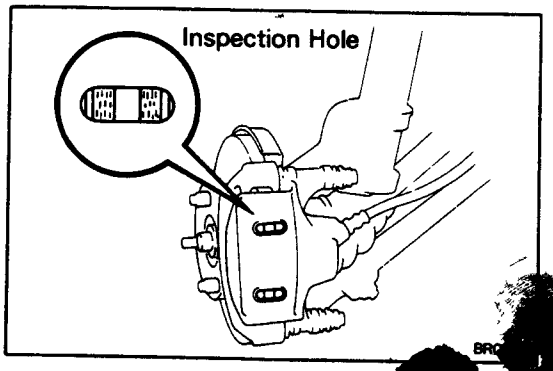


REPLACEMENT OF BRAKE PADS

If a squeaking noise occurs while braking, inspect the brake pads. Brake squeak will occur when the gap between the pad wear indicator plate and rotor disc reaches about 2.5 mm (0.098 in.).

1. REMOVE FRONT WHEEL

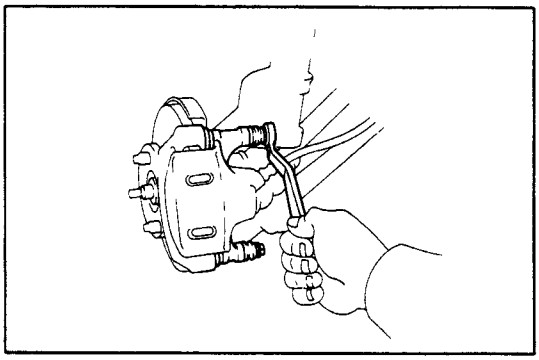
Remove the wheel and temporarily fasten the rotor disc with the wheel nuts.



2. INSPECT PAD LINING THICKNESS

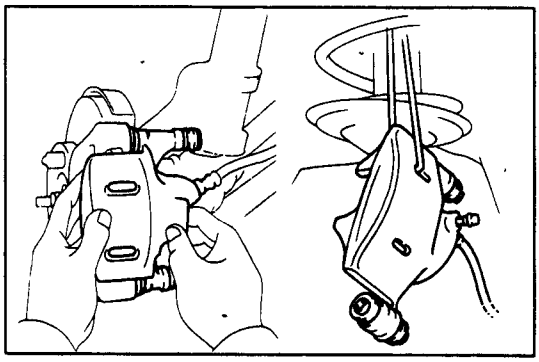
Check the pad thickness through the cylinder inspection hole and replace pads if not within specification.

Standard thickness **10.0 mm (0.394 in.)**
Minimum thickness **1.0 mm (0.039 in.)**



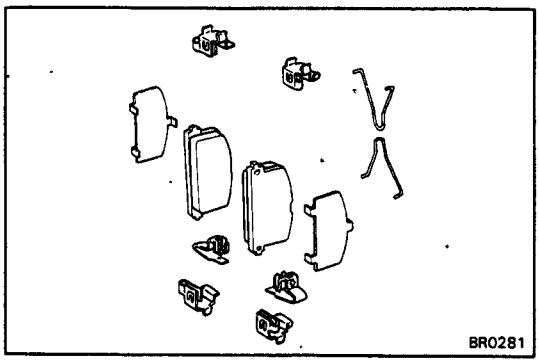
3. REMOVE CYLINDER FROM TORQUE PLATE

(a) Remove the two installation bolts from the torque plate.



(b) Remove the brake cylinder and suspend it so the hose is not stretched.

NOTE: Do not disconnect the brake hose.

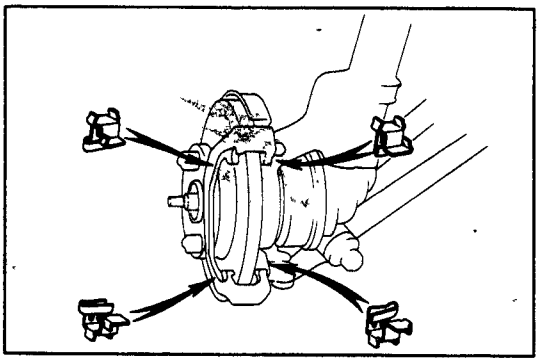


4. REMOVE FOLLOWING PARTS:

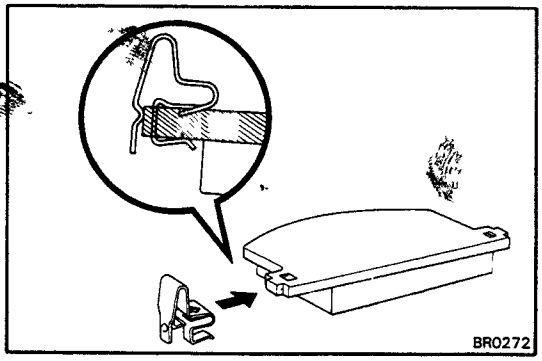
(a) Two anti-squeal springs
(b) Two brake pads
(c) Two anti-squeal shims
(d) Two pad wear indicator plates
(e) Four support plates

5. CHECK ROTOR DISC THICKNESS
(See step 2 on page BR-19)

6. CHECK ROTOR DISC RUNOUT
(See step 3 on page BR-20)



7. INSTALL NEW PAD SUPPORT PLATES

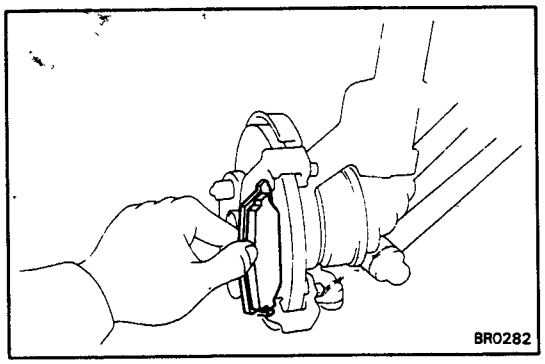


8. INSTALL NEW PADS

(a) Install new pad wear indicator plates to each pad.

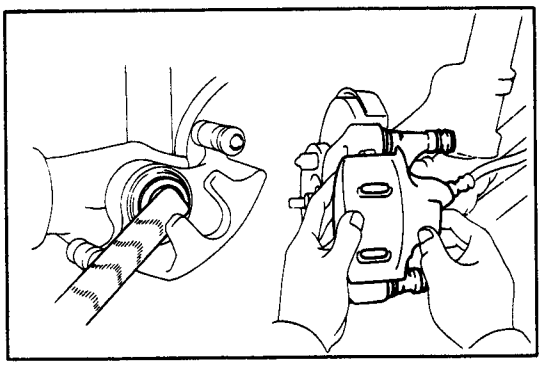
NOTE: Be sure the arrow on the pad wear indicator plate is pointing in the rotating direction of the disc.

(b) Install new anti-squeal shims to each pad.



(c) Install the pads onto each support plate.

9. INSTALL NEW ANTI-SQUEAL SPRINGS



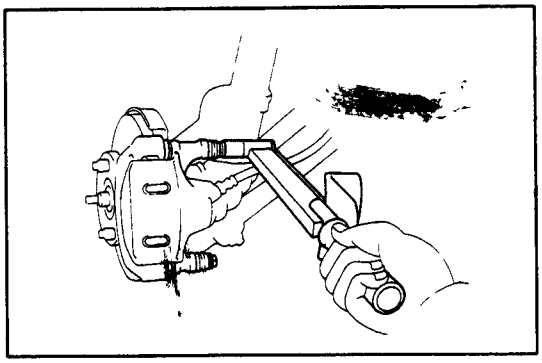
10. INSTALL CYLINDER

(a) Draw out a small amount of brake fluid from the reservoir.

(b) Press in piston with a hammer handle or such.

NOTE: Always change the pad on one wheel at a time as there is possibility of the opposite piston flying out.

(c) Insert the brake cylinder carefully so the dust boot is not wedged.

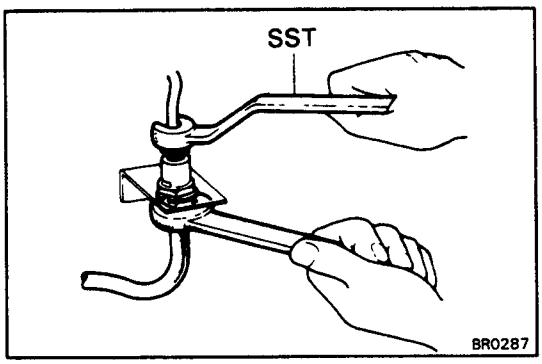


(d) Install and torque the two installation bolts.

Torque: 255 kg-cm (18 ft-lb, 25 N·m)

11. INSTALL FRONT WHEEL

12. CHECK THAT FLUID LEVEL IS AT "MAX" LINE



REMOVAL OF CYLINDER

(See page BR-16)

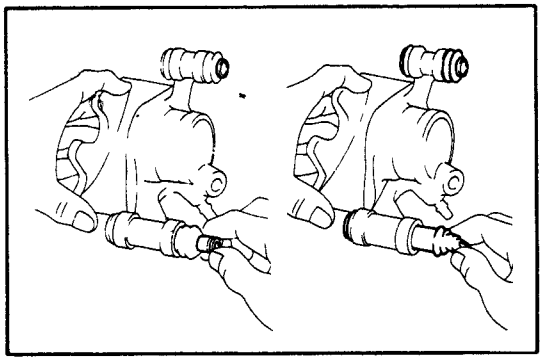
1. REMOVE CYLINDER

(a) Using SST, disconnect the brake line.
Use a container to catch the brake fluid.

SST 09751-36011

(b) Remove the two installation bolts and cylinder.

2. REMOVE PADS (See step 4 on page BR-17)



DISASSEMBLY OF CYLINDER

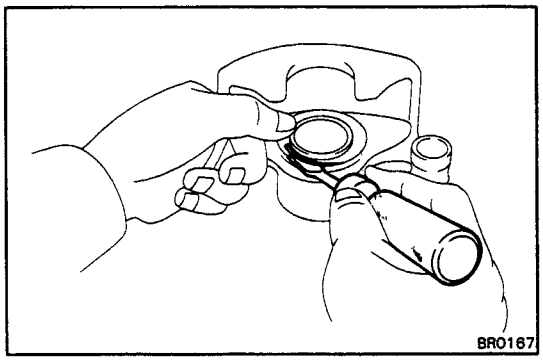
(See page BR-16)

1. REMOVE FOLLOWING PARTS:

(a) Two slide bushings

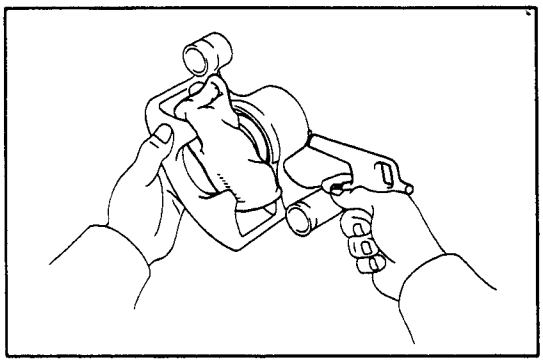
(b) Four dust boots

(c) Two collars



2. REMOVE CYLINDER BOOT SET RING AND CYLINDER BOOT

Using a screwdriver, remove the set ring and boot.

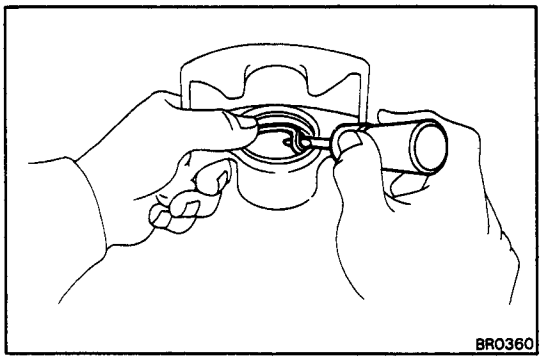


3. REMOVE PISTON FROM CYLINDER

(a) Put a piece of cloth or such between the piston and cylinder.

(b) Use compressed air to remove the piston from the cylinder.

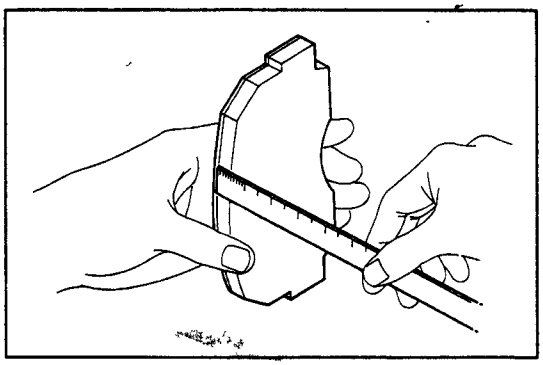
WARNING: Do not place your fingers in front of the piston when using compressed air.



4. REMOVE PISTON SEAL FROM BRAKE CYLINDER

Using a screwdriver, remove the piston seal.

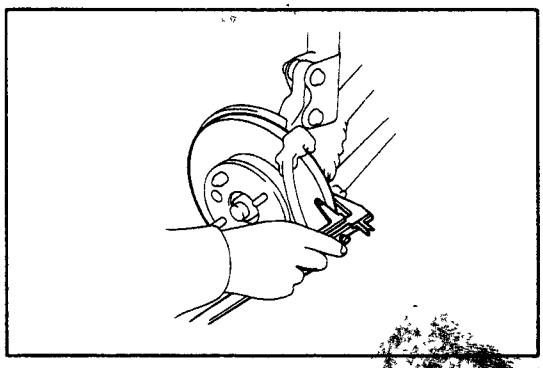
INSPECTION AND REPAIR OF FRONT BRAKE COMPONENTS



1. INSPECT PAD LINING THICKNESS

Standard thickness: 10.0 mm (0.394 in.)
Minimum thickness: 1.0 mm (0.039 in.)

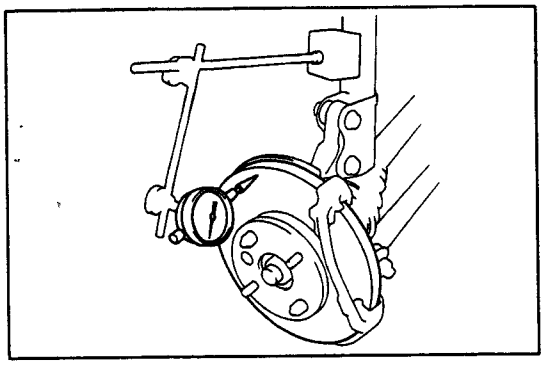
Replace the pad if the thickness is less than minimum (the 1.0 mm slit is no longer visible) or if it shows signs of uneven wear.



2. INSPECT ROTOR DISC THICKNESS

Standard thickness: 11.0 mm (0.433 in.)
Minimum thickness: 10.0 mm (0.394 in.)

If the disc is scored or worn, or if thickness is less than minimum, repair or replace the disc.



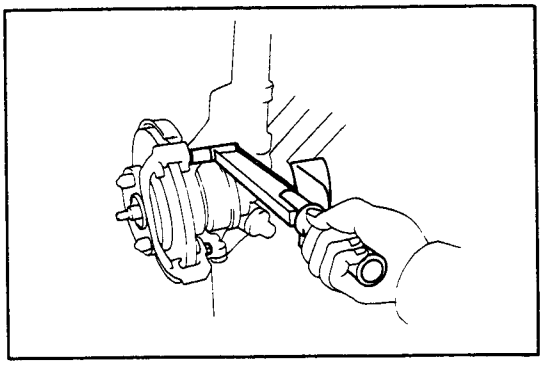
3. INSPECT ROTOR DISC RUNOUT

Measure the rotor disc runout at 10 mm (0.39 in.) from the outer edge of the rotor disc.

Maximum disc runout: 0.15 mm (0.0059 in.)

If the runout is greater than maximum, replace the disc.

NOTE: Before measuring the runout, check that the front bearing play is within specification.



4. IF NECESSARY, REPLACE ROTOR DISC

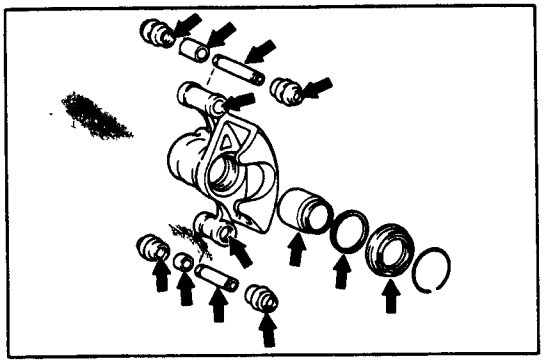
(a) Remove the torque plate from the knuckle.

(b) Remove the wheel nuts of the temporarily installed disc and pull off the rotor disc from the axle hub.

(c) Temporarily install a new rotor disc with the wheel nuts.

(d) Install the torque plate onto the knuckle.

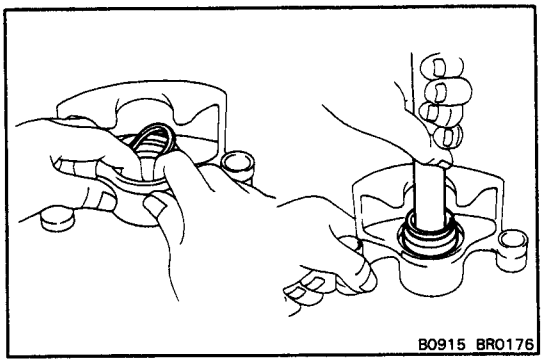
Torque: 900 kg-cm (65 ft-lb, 88 N·m)



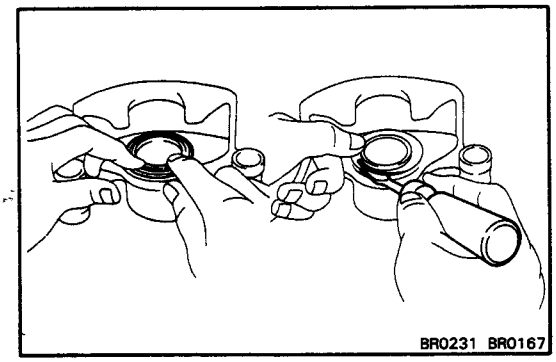
ASSEMBLY OF CYLINDER

(See page BR-16)

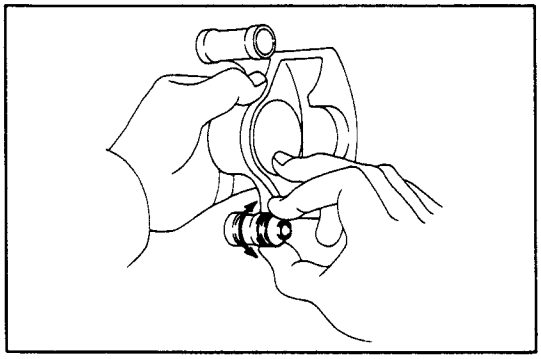
1. APPLY LITHUM SOAP BASE GLYCOL GREASE TO PARTS INDICATED BY ARROWS



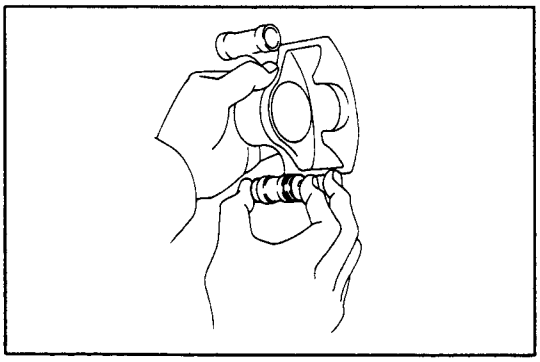
2. INSTALL PISTON SEAL AND PISTON IN CYLINDER



3. INSTALL CYLINDER BOOT AND SET RING IN CYLINDER



4. **INSTALL COLLAR, DUST BOOT AND CYLINDER SLIDE BUSHING**
   (a) Install the collar and dust boot into the brake cylinder.
   (b) Check that the boot is secured firmly to the brake cylinder groove.

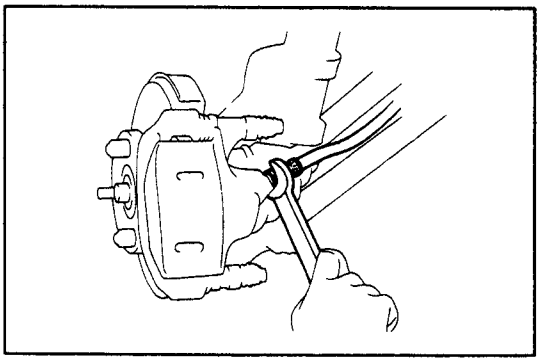


   (c) Install the bushing into the boot.
   (d) Check that the boot is secured firmly to the bushing groove.

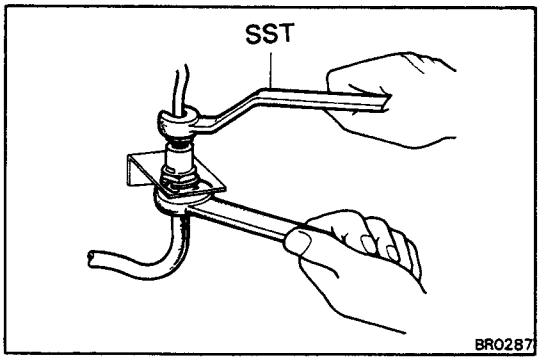
INSTALLATION OF CYLINDER

(See page BR-16)

1. **INSTALL PADS**
   (See steps 7 to 9 on pages BR-17 and 18)
2. **INSTALL CYLINDER**
   (See step 11 on page BR-27)



3. **INSTALL FLEXIBLE HOSE TO BRAKE CYLINDER**
   Torque: 235 kg-cm (17 ft-lb, 23 N·m)

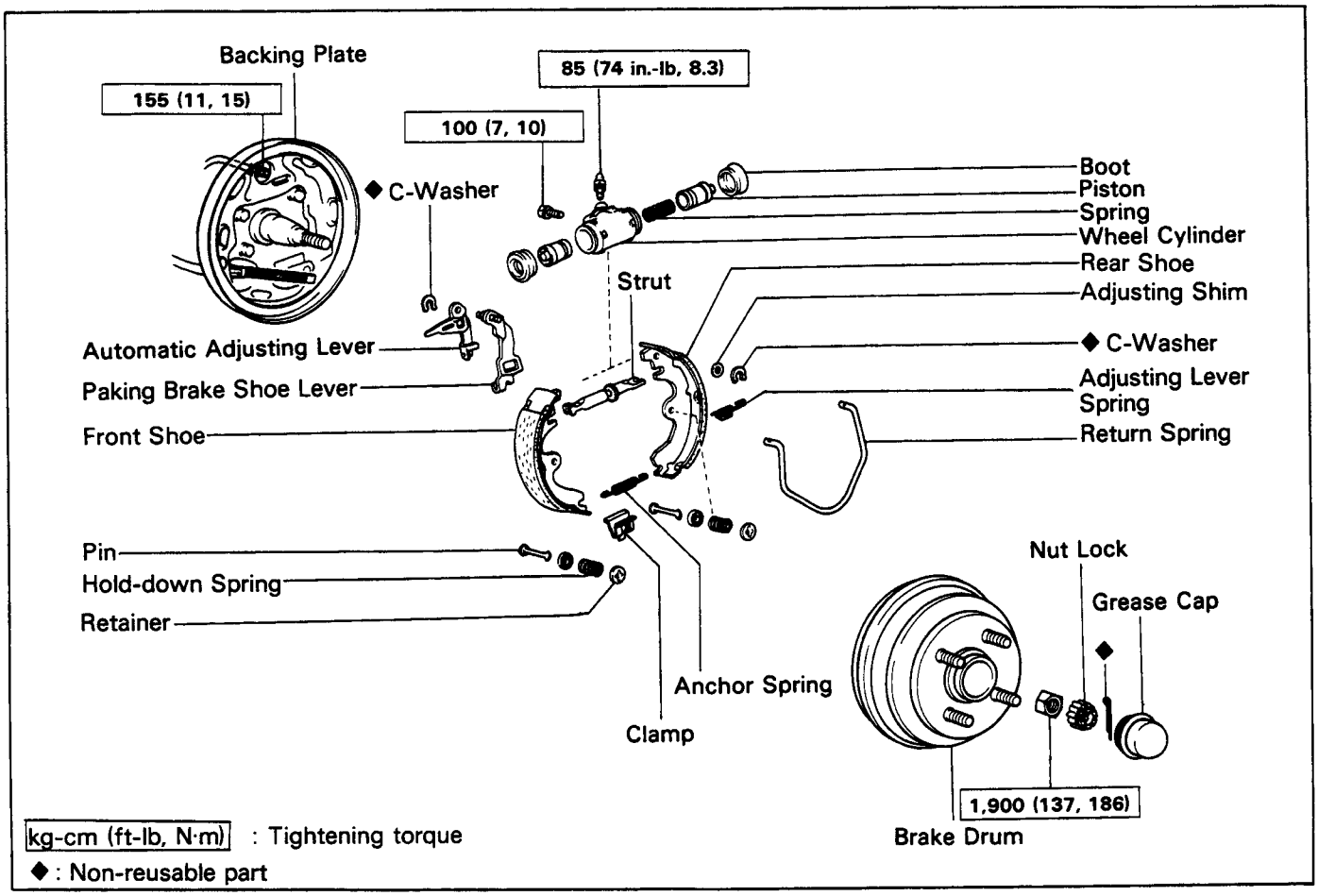


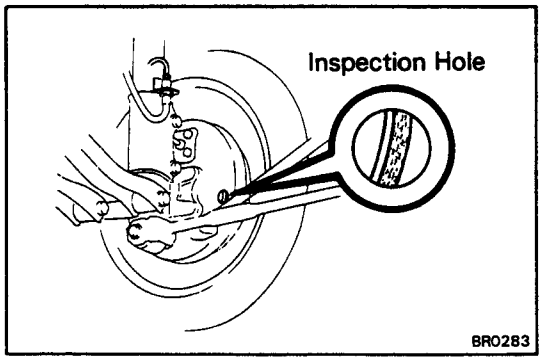
4. **CONNECT FLEXIBLE HOSE TO BRAKE TUBE**
   Using SST, connect the flexible hose.
   SST 09751-36011
   Torque: 155 kg-cm (11 ft-lb, 15 N·m)
5. **FILL BRAKE RESERVOIR WITH BRAKE FLUID AND BLEED BRAKE SYSTEM (See page BR-7)**

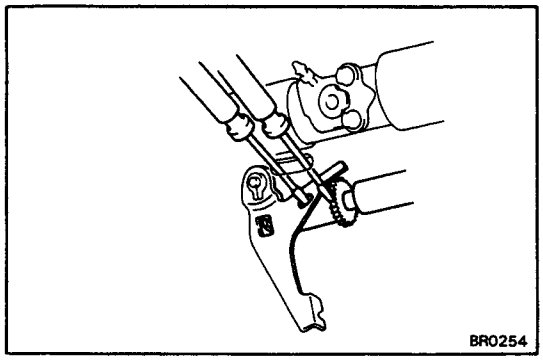
REAR BRAKE

Sedan

COMPONENTS







REMOVAL OF REAR BRAKE

1. INSPECT SHOE LINING THICKNESS

Remove the inspection hole plug, and check the shoe lining thickness through the hole.
If less than minimum, replace the shoes.

Standard thickness: 4.0 mm (0.157 in.)
Minimum thickness: 1.0 mm (0.039 in.)

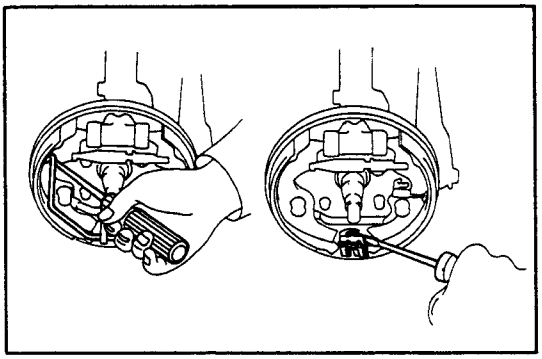
2. REMOVE REAR WHEEL

3. REMOVE BRAKE DRUM
(See step 2 on page RA-5)

If the brake drum cannot be easily removed, do the following procedure:

(a) Insert a screwdriver through the hole in the backing plate, and hold the automatic adjusting lever away from the adjusting bolt.

(b) Using another screwdriver, reduce the brake shoe adjustment by turning the adjusting bolt.

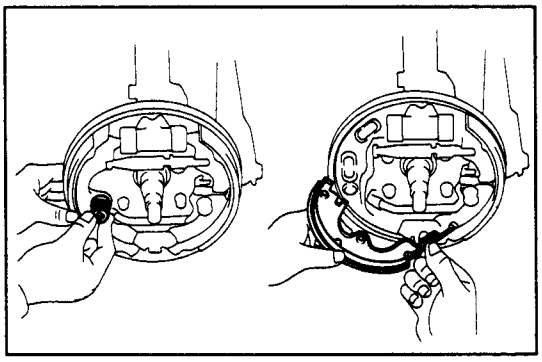


4. REMOVE SHOE RETURN SPRING

Using a screwdriver, remove the return spring.

5. REMOVE SHOE RETURN SPRING CLAMP

Using a screwdriver, remove the clamp.

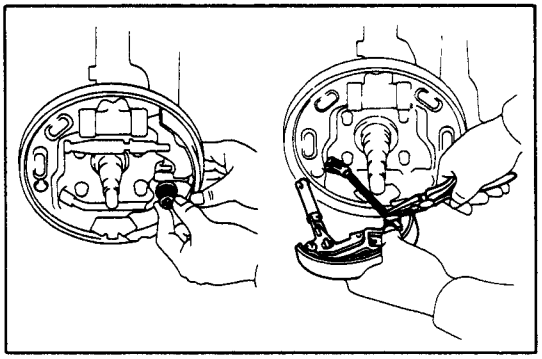


6. REMOVE FRONT SHOE

(a) Remove the hold-down spring, retainers and pin.

(b) Disconnect the anchor spring from the front shoe and remove it.

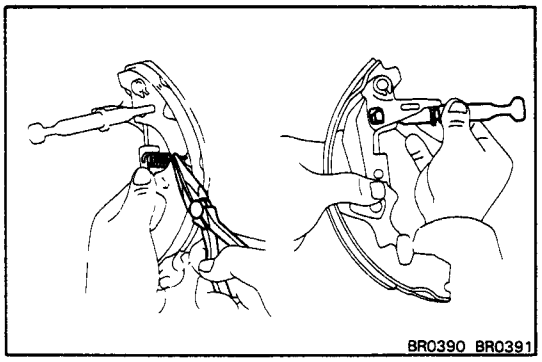
7. REMOVE ANCHOR SPRING



8. REMOVE REAR SHOE

(a) Remove the hold-down spring, retainers and pin.

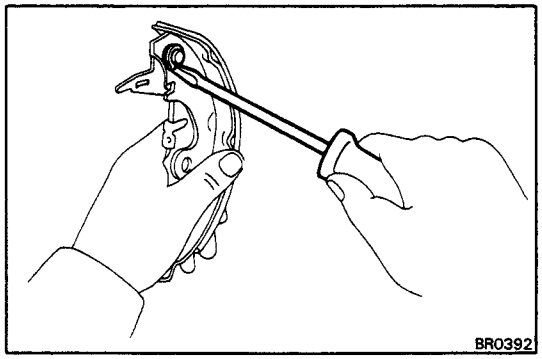
(b) Using pliers, disconnect the parking brake cable from the lever and remove the rear shoe together with the strut.



9. REMOVE STRUT FROM REAR SHOE

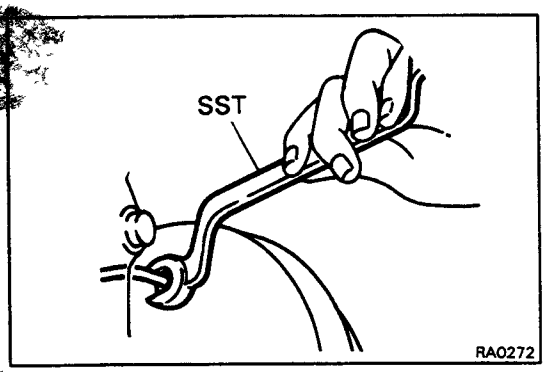
(a) Remove the adjusting lever spring.

(b) Remove the strut.



10. REMOVE PARKING BRAKE LEVER AND AUTOMATIC ADJUSTING LEVER FROM REAR SHOE

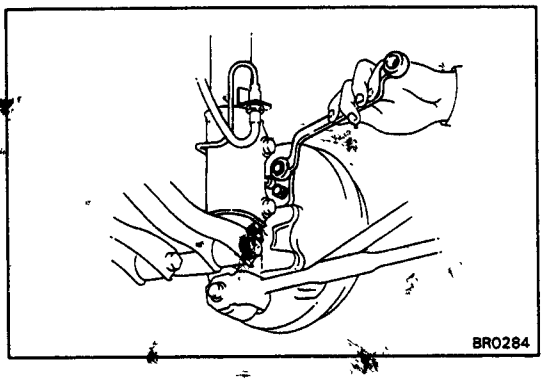
Using a screwdriver, pry out the C-washer and remove the shim and levers.



11. DISCONNECT BRAKE TUBE FROM WHEEL CYLINDER

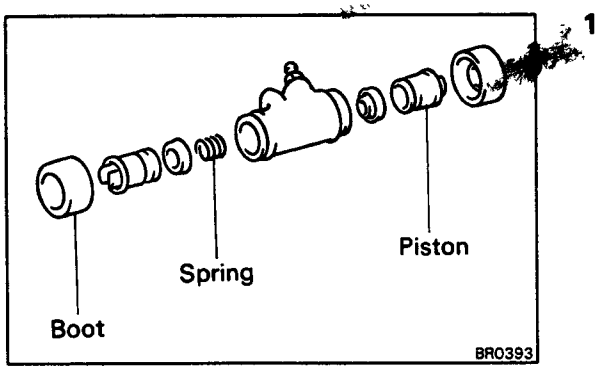
Using SST, disconnect the line. Use a container to catch the brake fluid.

SST 09751-36011



12. REMOVE WHEEL CYLINDER

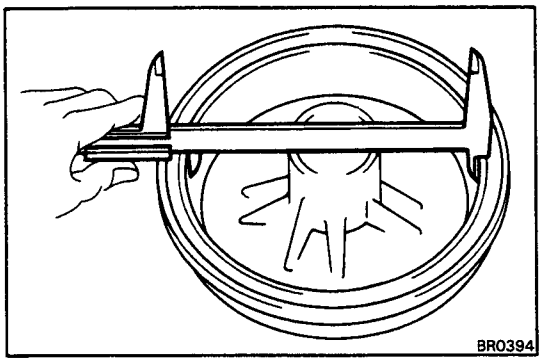
Remove the two bolts and wheel cylinder.



13. REMOVE FOLLOWING PARTS FROM WHEEL CYLINDER:

(a) Two boots
(b) Two pistons
(c) Two piston cups
(d) Spring

INSPECTION OF REAR BRAKE COMPONENTS



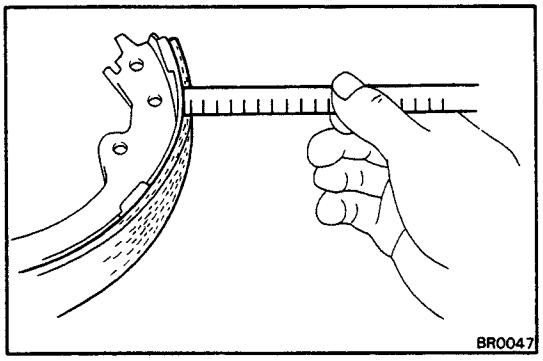
1. INSPECT BRAKE DRUM INSIDE DIAMETER

Standard inside diameter: 180.0 mm (7.087 in.)
Maximum inside diameter: 181.0 mm (7.126 in.)

If the drum is scored or worn, the brake drum may be lathed to the maximum inside diameter.

NOTE: Perform operations with the following parts removed:

(a) Oil seal
(b) Inner and outer bearing

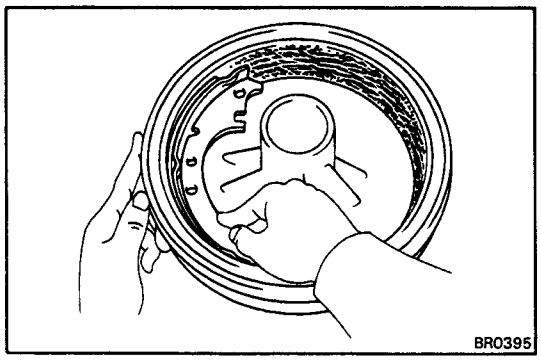


2. INSPECT BRAKE SHOE LINING THICKNESS

Standard thickness: 4.0 mm (0.157 in.)
Minimum thickness: 1.0 mm (0.039 in.)

If the shoe lining is less than minimum or shows signs of uneven wear, replace the brake shoes.

NOTE: If the thickness of any brake shoe is not within specification, replace all of the brake shoes.

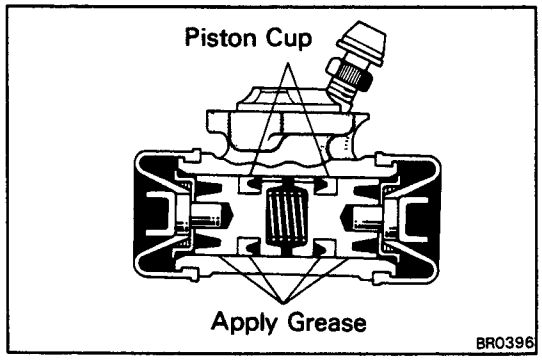


3. **INSPECT BRAKE LINING AND DRUM FOR PROPER CONTACT**

   Replace the brake shoe or lathe the brake drum as necessary.

4. **INSPECT WHEEL CYLINDER FOR CORROSION OR DAMAGE**

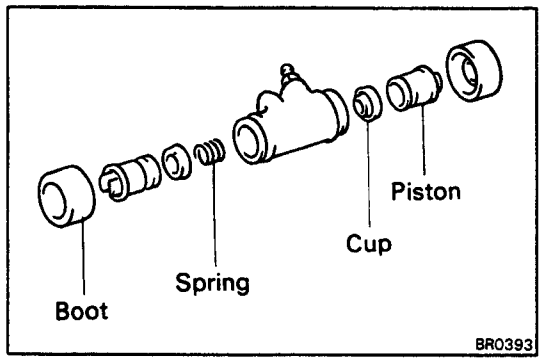
5. **INSPECT BACKING PLATE FOR WEAR OR DAMAGE**



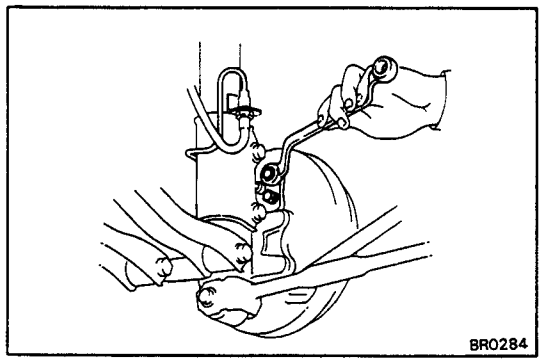
INSTALLATION OF REAR BRAKE

(See page BR-22)

1. **APPLY LITHIUM SOAP BASE GILYCOL GREASE TO FOLLOWING PARTS:**
   (a) Two piston cups
   (b) Two pistons



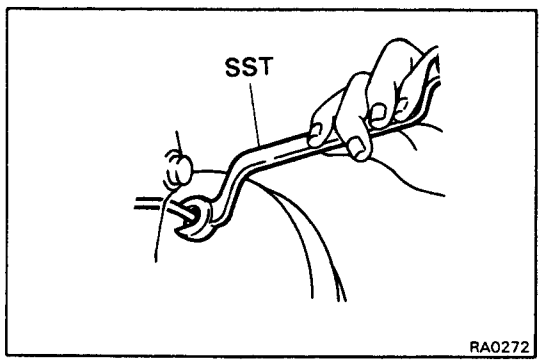
2. **ASSEMBLE WHEEL CYLINDER**
   (a) Install two new piston cups to the pistons.
   (b) Install the two pistons and spring into the wheel cylinder. Check that the flange of the pistons are pointed inward.
   (c) Install two new boots.



3. **INSTALL WHEEL CYLINDER**

   Install the wheel cylinder on the backing plate with the two bolts.

   Torque: 100 kg-cm (7 ft-lb, 10 N·m)

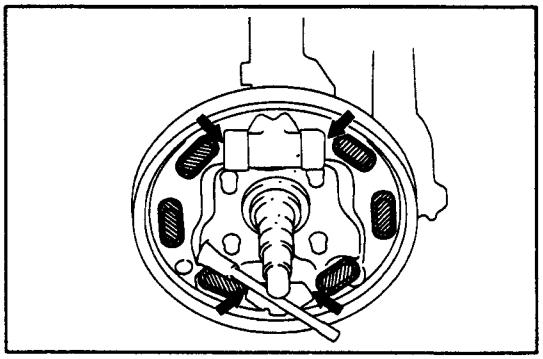


4. **CONNECT BRAKE TUBE TO WHEEL CYLINDER**

   Using SST, connect the brake tube.

   SST 09751-36011

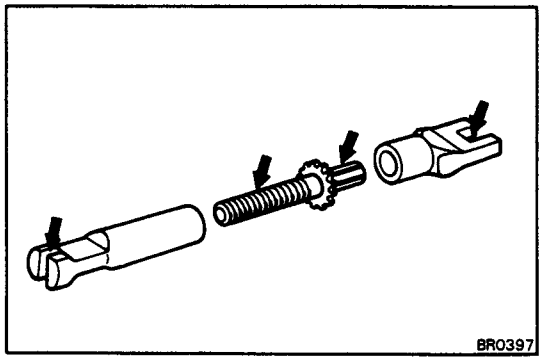
   Torque: 155 kg-cm (11 ft-lb, 15 N·m)



5. APPLY HIGH TEMPERATURE GREASE TO FOLLOWING PARTS:

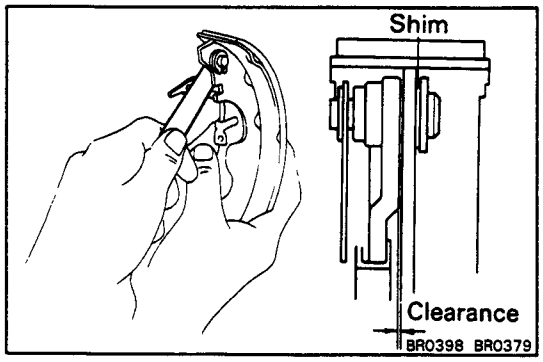
(a) Backing plate and brake shoe contact points

(b) Anchor plate and brake shoe contact points



(c) Strut and adjusting bolt contact points

(d) Strut and brake shoe contact points



6. INSTALL PARKING BRAKE LEVER AND AUTOMATIC ADJUSTING LEVER TO REAR SHOE

(a) Temporarily install the levers with the shim and a new C-washer.

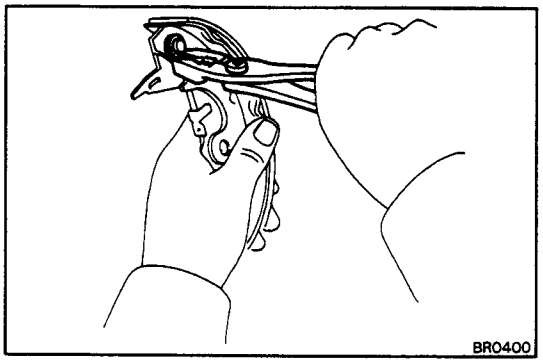
(b) Using a feeler gauge, measure the clearance between the shoe and lever.

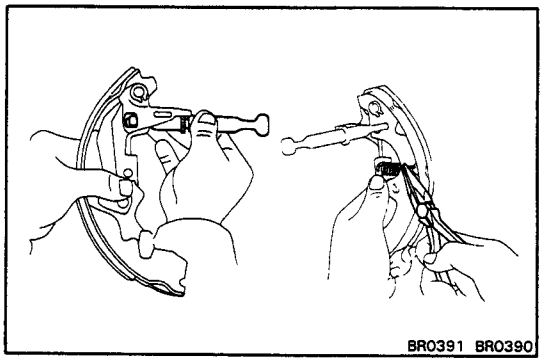
Standard clearance: 0 – 0.35 mm (0 – 0.0138 in.)

If not within specification, adjust with a shim.

Shim thicknesses	mm (in.)
0.2 (0.008)	0.5 (0.020)
0.3 (0.012)	0.6 (0.024)
0.4 (0.016)	0.9 (0.035)

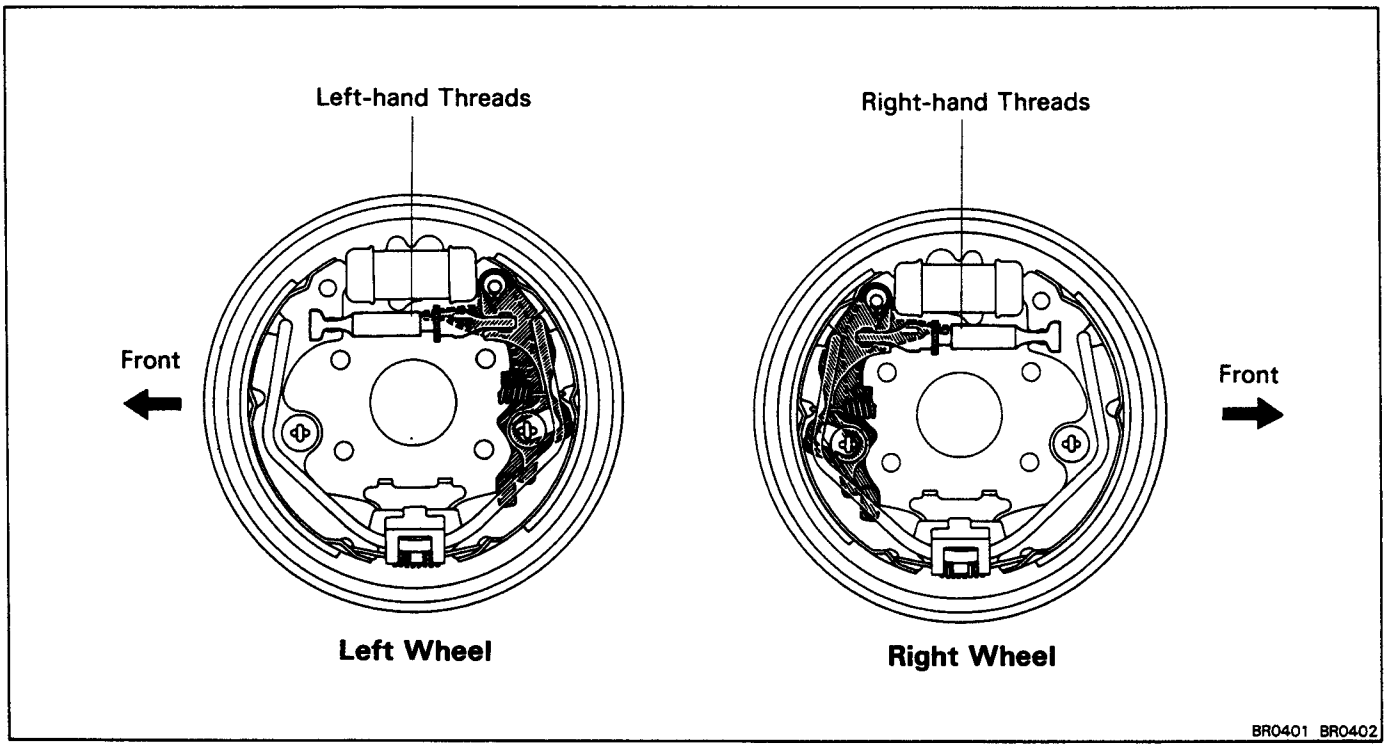
(c) Using pliers, stake the C-washer.

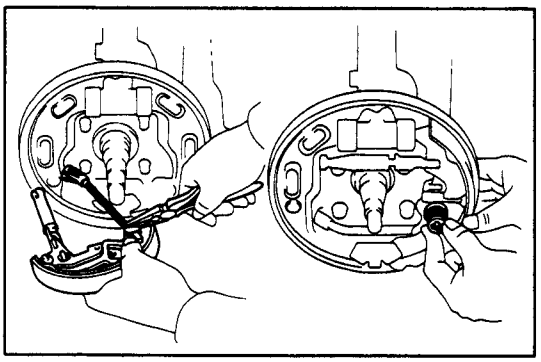




7. INSTALL STRUT ONTO REAR SHOE

Set the strut in place and intall the adjusting lever spring.





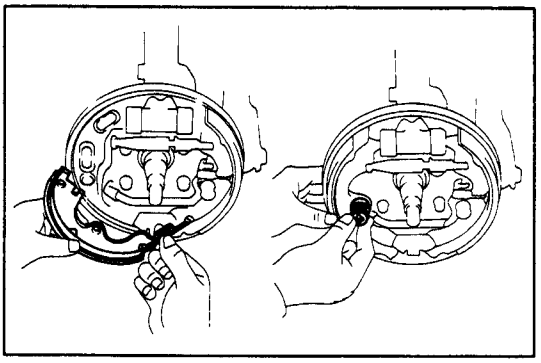
8. INSTALL REAR SHOE

CAUTION: Do not allow grease to get on the rubbing face

(a) Using pliers, connect the parking brake cable to the lever.

(b) Set the rear shoe in place with the end of the shoe inserted in the wheel cylinder and the other end in the anchor plate.

(c) Install the pin and the shoe hold-down spring.



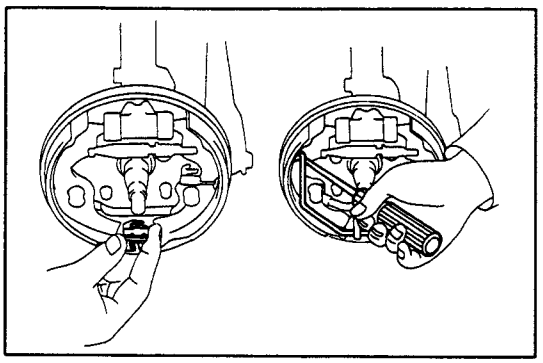
9. INSTALL FRONT SHOE

CAUTION: Do not allow grease to get on the rubbing face

(a) Install the anchor spring between the front and rear shoes.

(b) Set the front shoe in place with the end of the shoe inserted in the wheel cylinder and the strut in place.

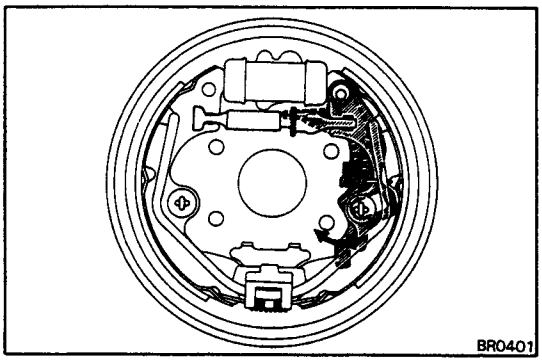
(c) Install the shoe hold-down spring, retainers and pin.



10. INSTALL SHOE RETURN SPRING CLAMP

11. INSTALL SHOE RETURN SPRING

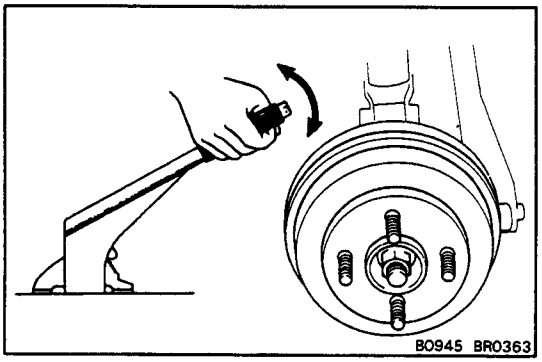
Using a screwdriver, install the return spring.



12. CHECK OPERATION OF AUTOMATIC ADJUSTER MECHANISM

(a) Move the parking brake lever of the rear shoe back and forth, as shown. Check that the adjusting bolt turns.

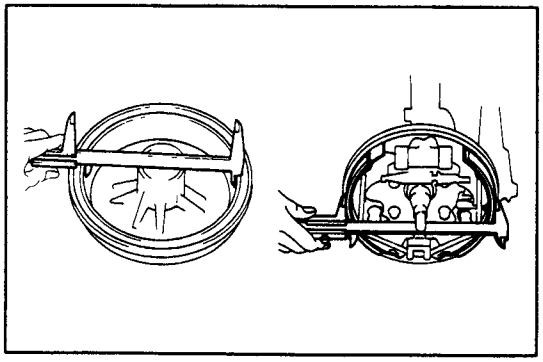
If the bolt does not turn, check for incorrect installation of the rear brakes.



(b) Adjust the strut length to the shortest possible amount.

(c) Install the drum.

(d) Pull the parking brake lever all the way up.



13. CHECK CLEARANCE BETWEEN BRAKE SHOES AND DRUM

(a) Remove the drum.

(b) Measure the brake drum inside diameter and diameter of the brake shoes. Check that the difference between the diameters is the correct shoe clearance.

Shoe clearance: 0.6 mm (0.024 in.)

If incorrect, check the parking brake system.

14. INSTALL BRAKE DRUM AND ADJUST PRELOAD (See page RA-6)

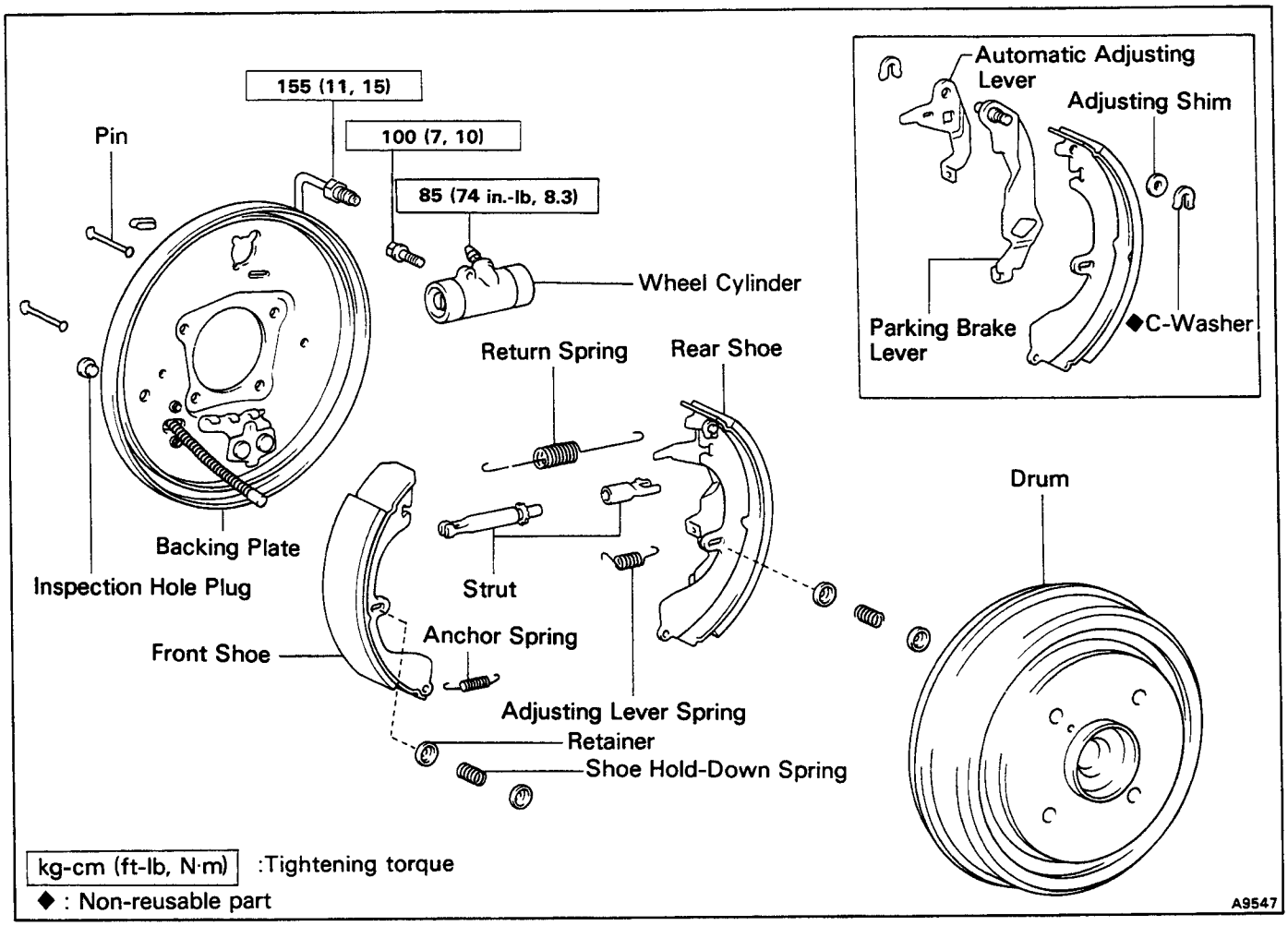
15. INSTALL REAR WHEEL

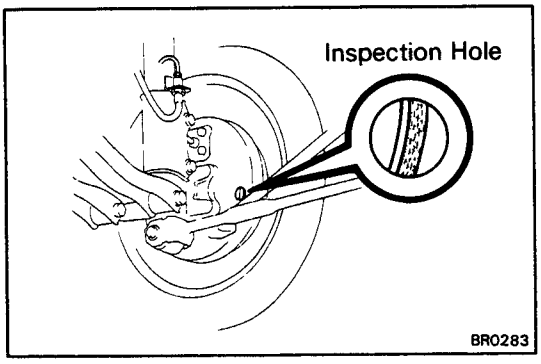
16. FILL BRAKE RESERVOIR WITH BRAKE FLUID AND BLEED BRAKE SYSTEM (See page BR-7)

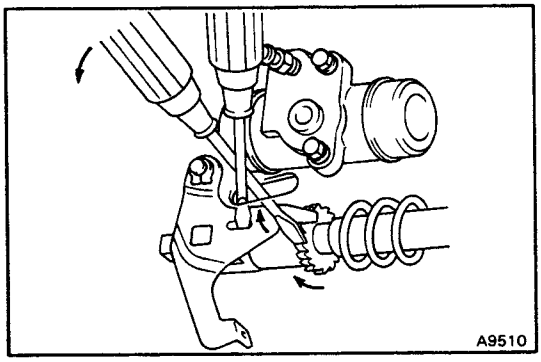
17. CHECK FOR FLUID LEAKAGE

Wagon FWD

COMPONENTS







REMOVAL OF REAR BRAKE

1. INSPECT SHOE LINING THICKNESS

Remove the inspection hole plug, and check the shoe lining thickness through the hole.
If less than minimum, replace the shoes.

Standard thickness: 4.0 mm (0.157 in.)
Minimum thickness: 1.0 mm (0.039 in.)

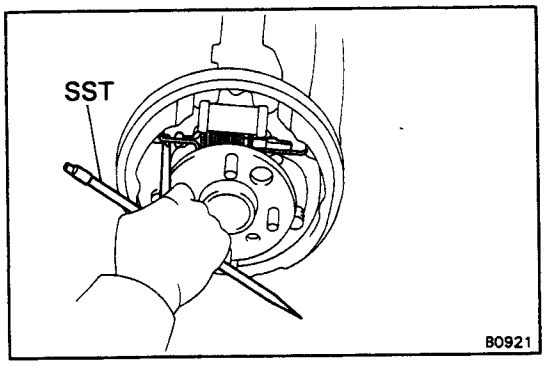
2. REMOVE REAR WHEEL

3. REMOVE BRAKE DRUM

If the brake drum cannot be easily removed, do the following procedure:

(a) Insert a screwdriver through the hole in the backing plate, and hold the automatic adjusting lever away from the adjusting bolt.

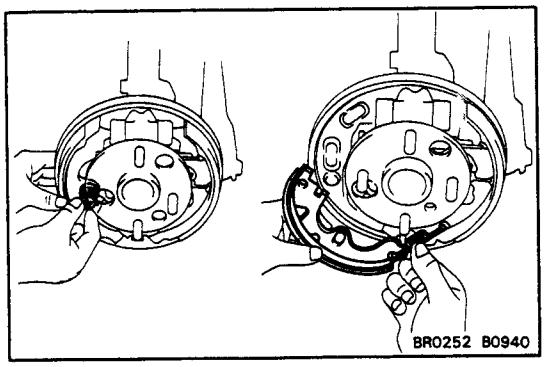
(b) Using another screwdriver, reduce the brake shoe adjustment by turning the adjusting bolt.



4. REMOVE FRONT SHOE

(a) Using SST, disconnect the return spring.

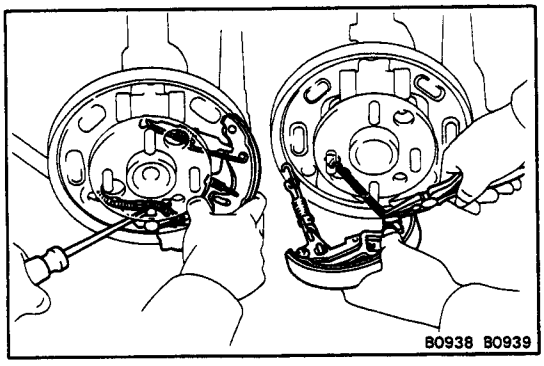
SST 09703-30010



(b) Remove the hold-down spring, retainers and pin.

(c) Disconnect the anchor spring from the front shoe and remove it.

5. REMOVE ANCHOR SPRING

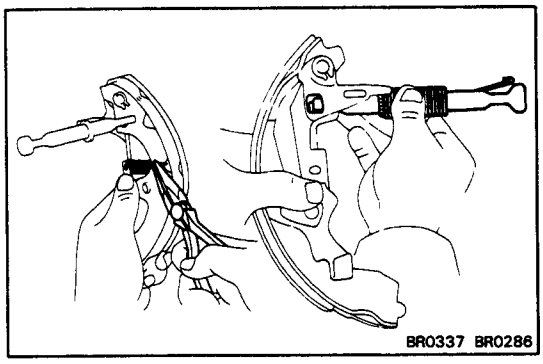


6. REMOVE REAR SHOE

(a) Remove the hold-down spring, retainers and pin.

(b) Using a screwdriver, disconnect the parking brake cable from the anchor plate.

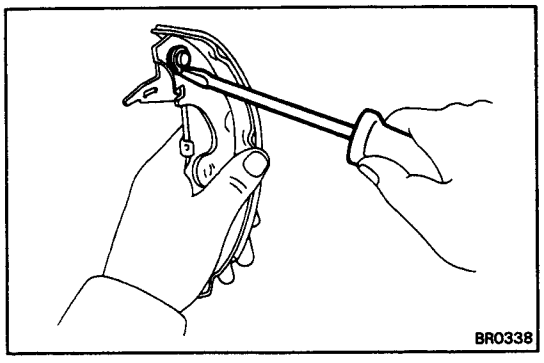
(c) Using pliers, disconnect the parking brake cable from the lever and remove the rear shoe together with the strut.



7. REMOVE STRUT FROM REAR SHOE

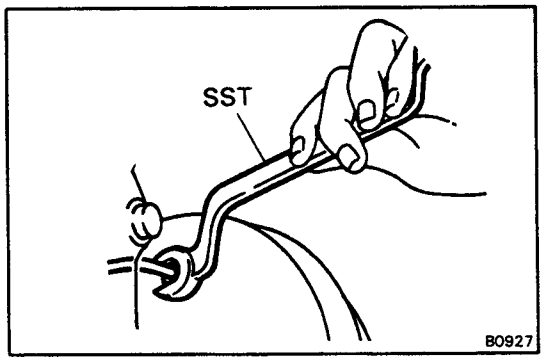
(a) Remove the adjusting lever spring.

(b) Remove the strut together with the return spring.



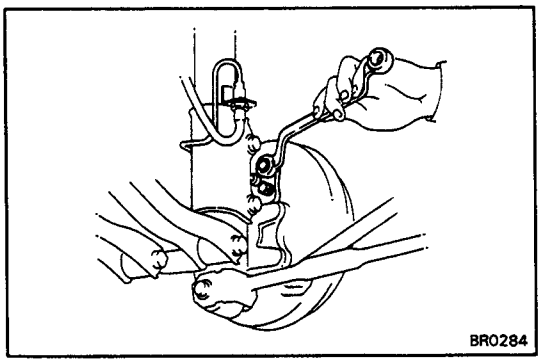
8. REMOVE PARKING BRAKE LEVER AND AUTOMATIC ADJUSTING LEVER FROM REAR SHOE

Using a screwdriver, pry out the C-washer and remove the shim and levers.



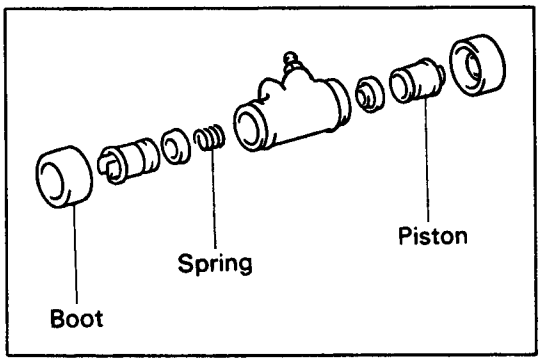
9. DISCONNECT BRAKE TUBE FROM WHEEL CYLINDER

Using SST, disconnect the line. Use a container to catch the brake fluid.



10. REMOVE WHEEL CYLINDER

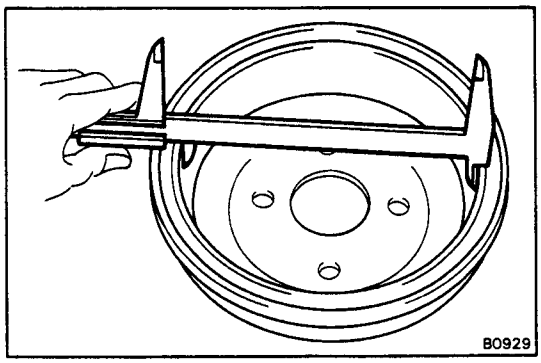
Remove the two bolts and wheel cylinder.



11. REMOVE FOLLOWING PARTS FROM WHEEL CYLINDER:

(a) Two boots
(b) Two pistons
(c) Two piston cups
(d) Spring

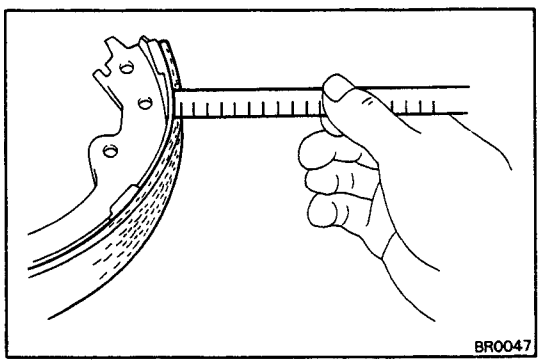
INSPECTION OF REAR BRAKE COMPONENTS



1. INSPECT BRAKE DRUM INSIDE DIAMETER

Standard inside diameter: 200.0 mm (7.874 in.)
Maximum inside diameter: 201.0 mm (7.913 in.)

If the drum is scored or worn, the brake drum may be lathed to the maximum inside diameter.

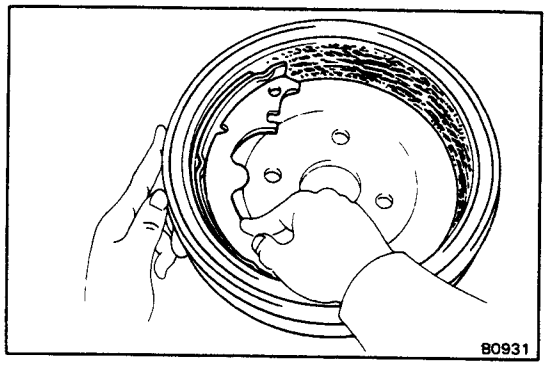


2. INSPECT BRAKE SHOE LINING THICKNESS

Standard thickness: 4.0 mm (0.157 in.)
Minimum thickness: 1.0 mm (0.039 in.)

If the shoe lining is less than minimum or shows signs of uneven wear, replace the brake shoes.

NOTE: If the thickness of any brake shoe is not within specification, replace the all of the brake shoes.

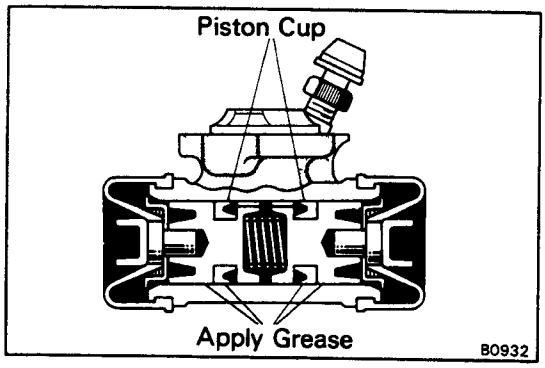


3. **INSPECT BRAKE LINING AND DRUM FOR PROPER CONTACT**

   Replace the brake shoe or lathe the brake drum as necessary.

4. **INSPECT WHEEL CYLINDER FOR CORROSION OR DAMAGE**

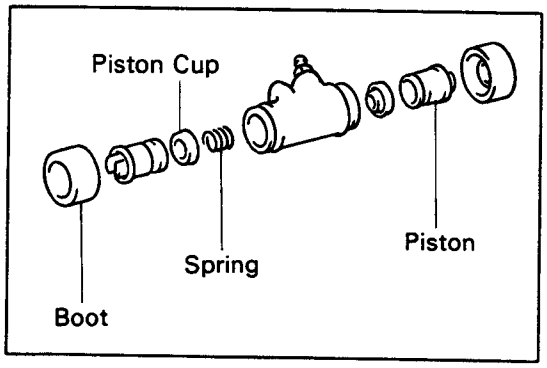
5. **INSPECT BACKING PLATE FOR WEAR OR DAMAGE**



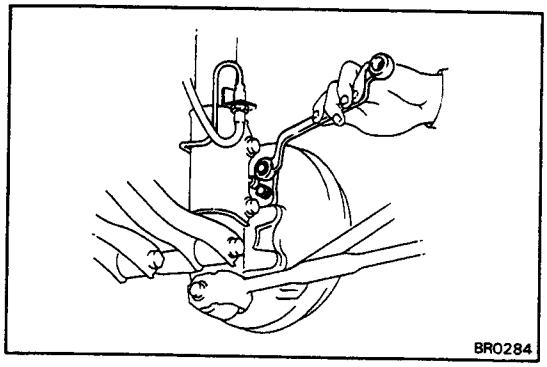
INSTALLATION OF REAR BRAKE

(See page BR-29)

1. **APPLY LITHIUM SOAP BASE GLYCOL GREASE TO FOLLOWING PARTS:**
   (a) Two piston cups
   (b) Two pistons



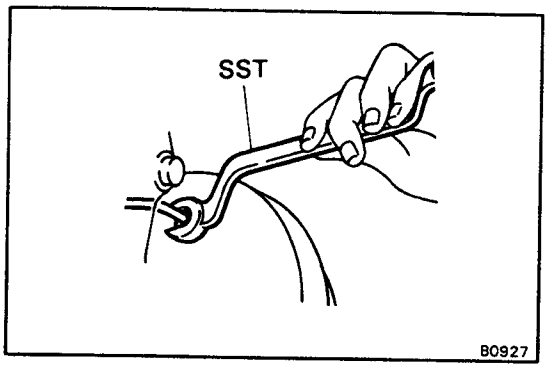
2. **ASSEMBLE WHEEL CYLINDER**
   (a) Install two new piston cups to each piston, check that the flanges of the cups are pointed inward.
   (b) Install the two pistons and spring into the wheel cylinder.
   (c) Install two new boots.



3. **INSTALL WHEEL CYLINDER**

   Install the wheel cylinder on the backing plate with the two bolts.

   Torque: 100 kg-cm (7 ft-lb, 10 N·m)

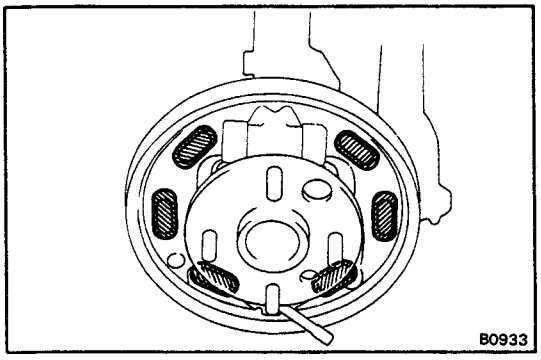


4. **CONNECT BRAKE TUBE TO WHEEL CYLINDER**

   Using SST, connect the brake tube

   SST 09751-36011

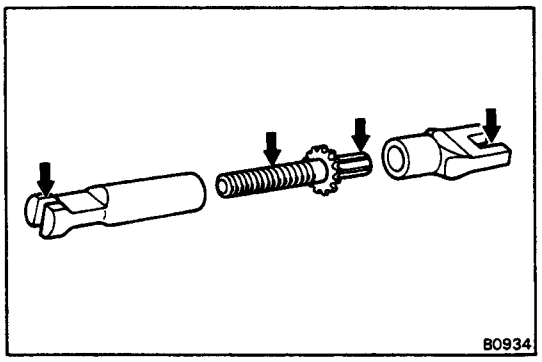
   Torque: 155 kg-cm (11 ft-lb, 15 N·m)



5. APPLY HIGH-TEMPERATURE GREASE TO FOLLOWING PARTS:

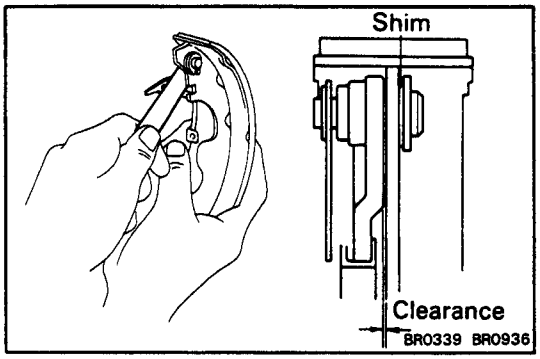
(a) Backing plate and brake shoe contact points

(b) Anchor plate and brake shoe contact points



(c) Strut and adjusting bolt contact points

(d) Strut and brake shoe contact points



6. INSTALL PARKING BRAKE LEVER AND AUTOMATIC ADJUSTING LEVER TO REAR SHOE

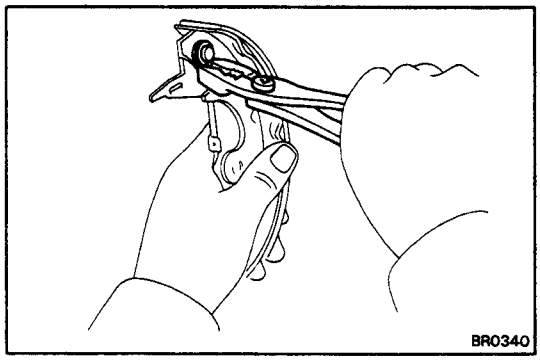
(a) Temporarily install the levers and shim with a new C-washer.

(b) Using a feeler gauge, measure the clearance between the shoe and lever.

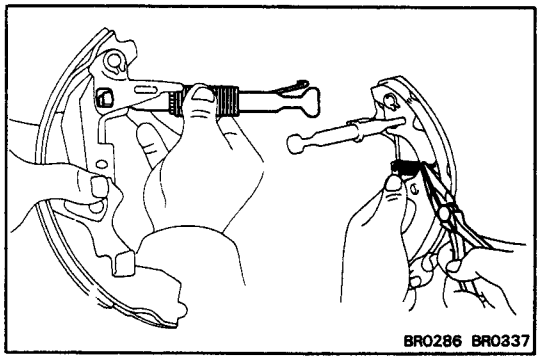
Standard clearance: 0 – 0.35 mm (0 – 0.0138 in.)

If not within specification, adjust with a shim.

Shim thicknesses			mm (in.)
0.2	(0.008)	0.5	(0.020)
0.3	(0.012)	0.6	(0.024)
0.4	(0.016)	0.9	(0.035)

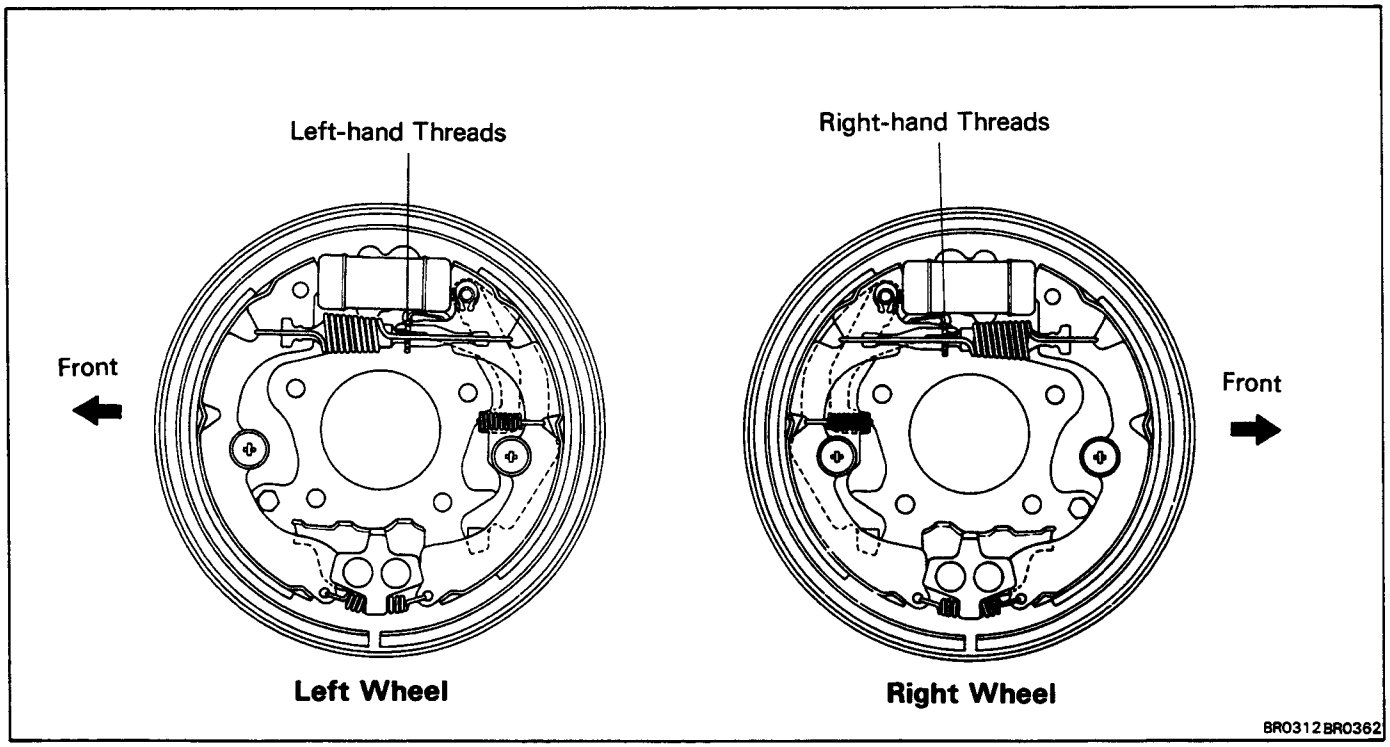


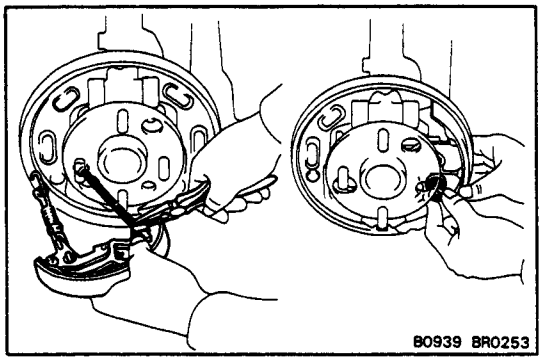
(c) Using pliers, stake the C-washer.

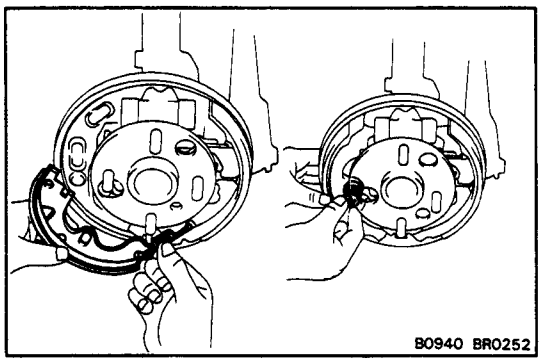


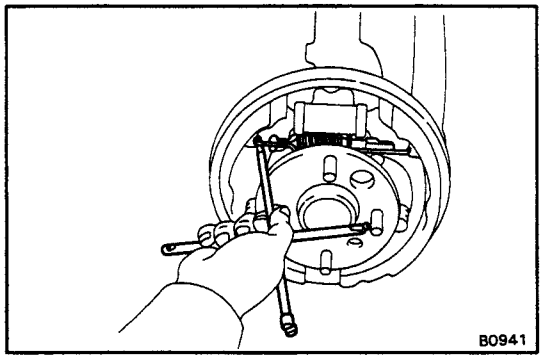
7. INSTALL STRUT ONTO REAR SHOE

Set the strut and return spring in place and install the adjusting lever spring.









8. INSTALL REAR SHOE

CAUTION: Do not allow oil or grease to get on the rubbing face.

(a) Using pliers, connect the parking brake cable to the lever.

(b) Pass the parking brake cable through the notch in the anchor plate.

(c) Set the rear shoe in place with the end of the shoe inserted in the wheel cylinder and the other end in the anchor plate.

(d) Install the hold-down spring, retainers and pin.

9. INSTALL FRONT SHOE

CAUTION: Do not allow oil or grease to get on the rubbing face.

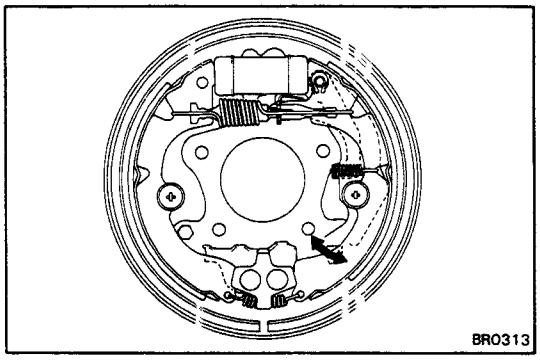
(a) Install the anchor spring between the front and rear shoes.

(b) Set the front shoe in place with the end of the shoe inserted in the wheel cylinder and the strut in place.

(c) Install the hold-down spring, retainers and pin.

(d) Using SST, connect the return spring.

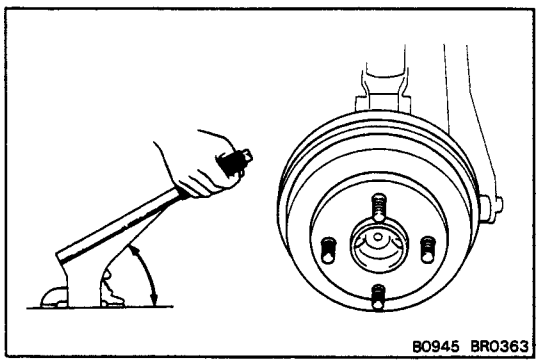
SST 09703-30010



10. CHECK OPERATION OF AUTOMATIC ADJUSTER MECHANISM

(a) Move the parking brake lever of the rear shoe back and forth, as shown. Check that the adjusting bolt turns.

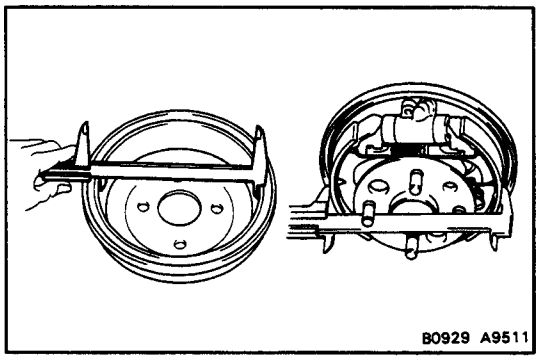
If the bolt does not turn, check for incorrect installation of the rear brakes.



(b) Adjust the strut length to the shortest possible amount.

(c) Install the drum.

(d) Pull the parking brake lever all the way up.



11. CHECK CLEARANCE BETWEEN BRAKE SHOES AND DRUM

(a) Remove the drum.

(b) Measure the brake drum inside diameter and diameter of the brake shoes. Check that the difference between the diameters is the correct shoe clearance.

Shoe clearance: 0.6 mm (0.024 in.)

If incorrect, check the parking brake system.

12. INSTALL BRAKE DRUM

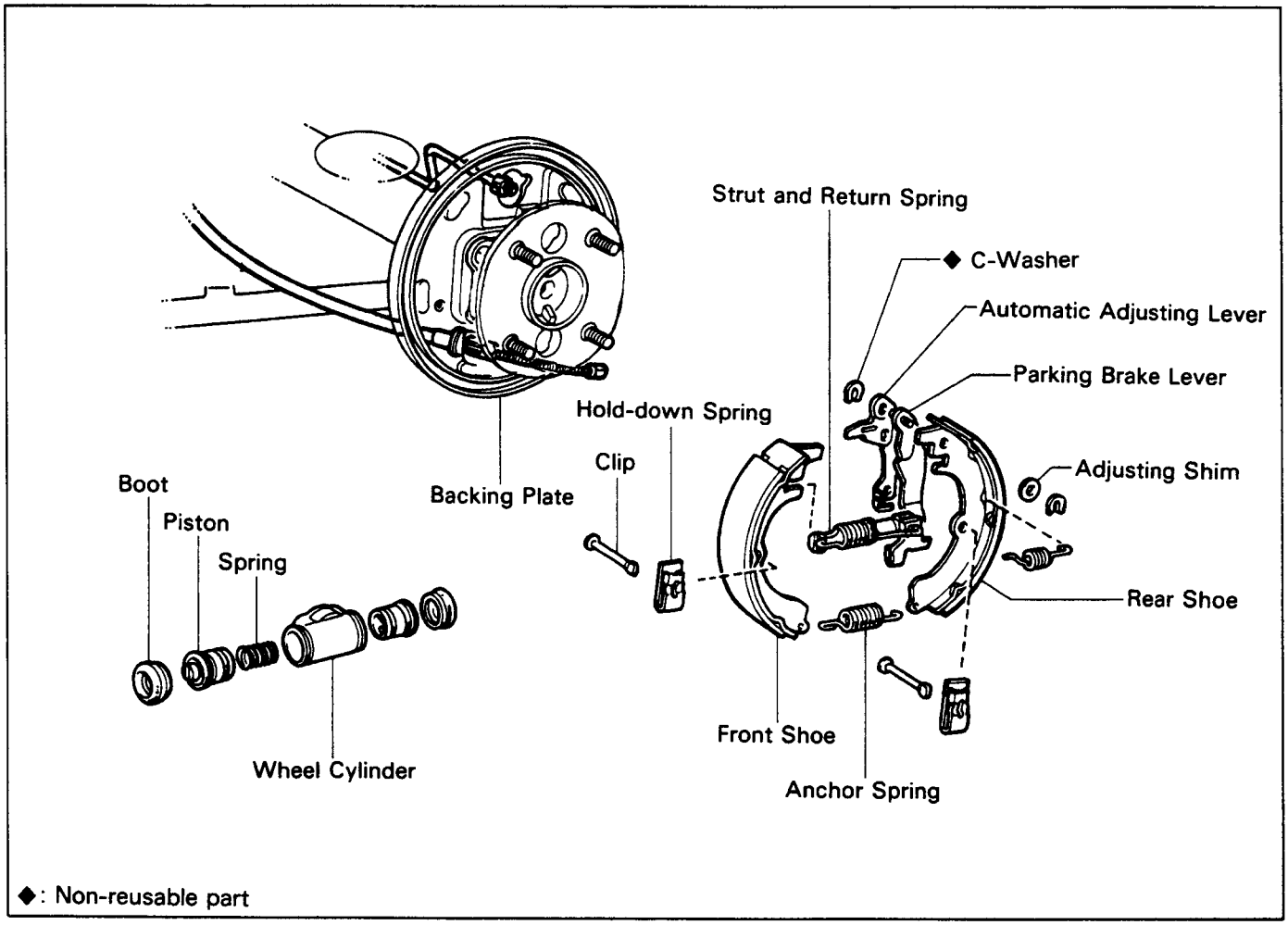
13. INSTALL REAR WHEEL

14. FILL BRAKE RESERVOIR WITH BRAKE FLUID AND BLEED BRAKE SYSTEM
(See page BR-7)

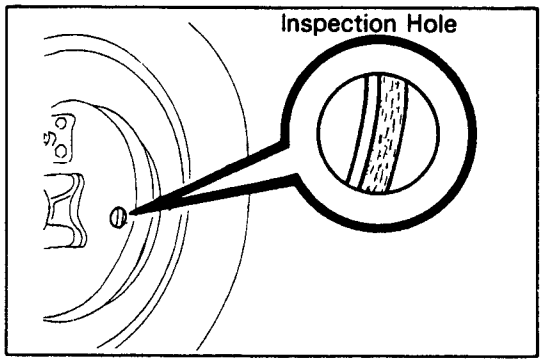
15. CHECK FOR FLUID LEAKAGE

Wagon 4WD

COMPONENTS



◆: Non-reusable part



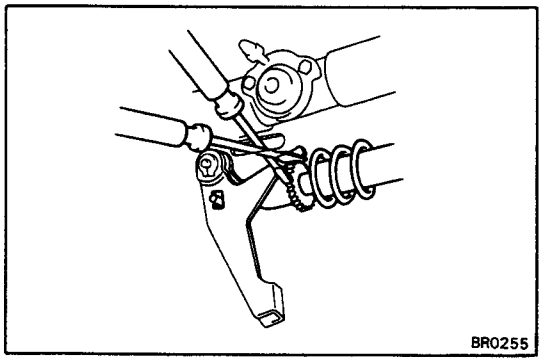
REMOVAL OF REAR BRAKE

1. INSPECT SHOE LINING THICKNESS

Remove the inspection hole plug, and check the shoe lining thickness through the hole.
If less than minimum, replace the shoes.

Standard thickness: 4.0 mm (0.157 in.)
Minimum thickness: 1.0 mm (0.039 in.)

2. REMOVE REAR WHEEL

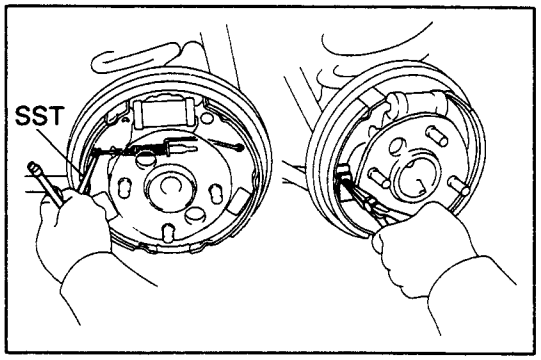


3. REMOVE BRAKE DRUM

If the brake drum cannot be easily removed, do the following procedure:

(a) Insert a screwdriver through the hole in the backing plate, and hold the automatic adjusting lever away from the adjusting bolt.

(b) Using another screwdriver, reduce the brake shoe adjustment by turning the adjusting bolt.



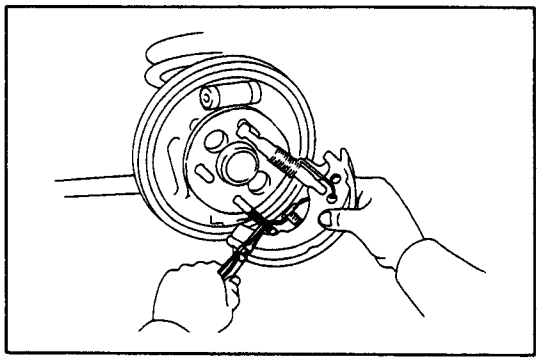
4. REMOVE FRONT SHOE

(a) Using SST, remove the return spring.

SST 09703-30010

(b) Remove the hold-down spring.

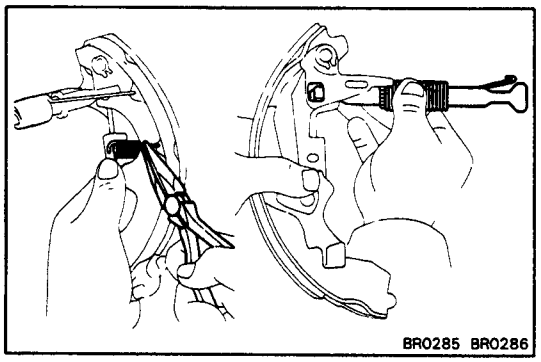
(c) Remove the front shoe and the anchor spring.



5. REMOVE REAR SHOE

(a) Remove the hold-down spring.

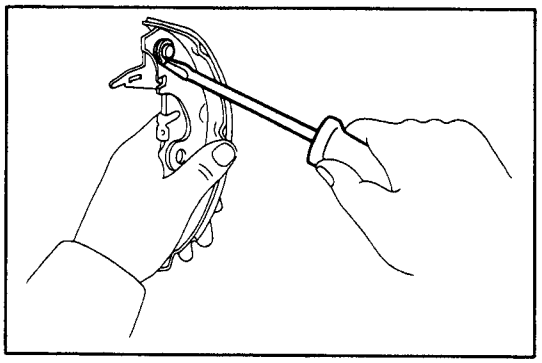
(b) Using pliers, disconnect the parking brake cable from the lever and remove the rear shoe together with the strut.



6. REMOVE STRUT FROM REAR SHOE

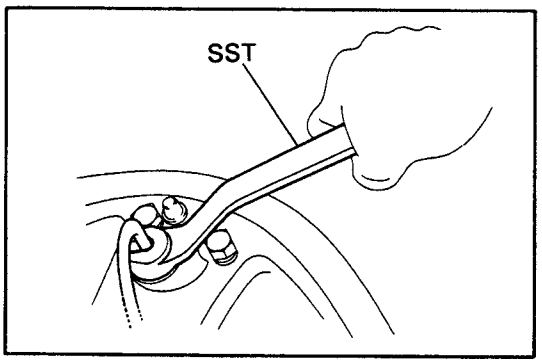
(a) Remove the adjusting lever spring.

(b) Remove the strut.



7. REMOVE PARKING BRAKE LEVER AND AUTOMATIC ADJUSTING LEVER FROM REAR SHOE

Using a screwdriver, pry out the C-washer and remove the shim and levers.



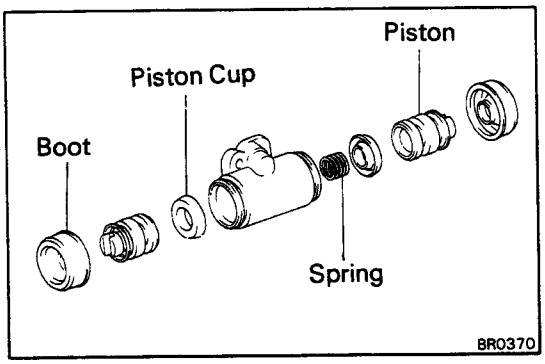
8. DISCONNECT BRAKE TUBE FROM WHEEL CYLINDER

Using SST, disconnect the line. Use a container to catch the brake fluid.

SST 09751-36011

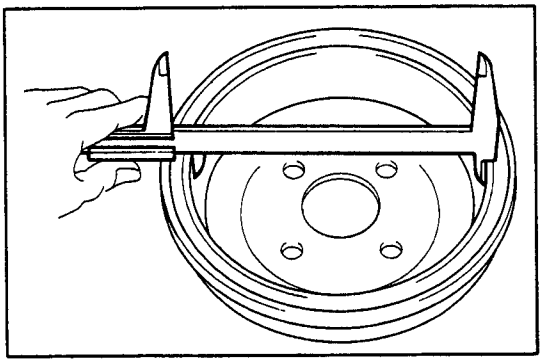
9. REMOVE WHEEL CYLINDER

Remove the two bolts and wheel cylinder.



10. **REMOVE FOLLOWING PARTS FROM WHEEL CYLINDER:**
    (a) Two boots
    (b) Two pistons
    (c) Spring

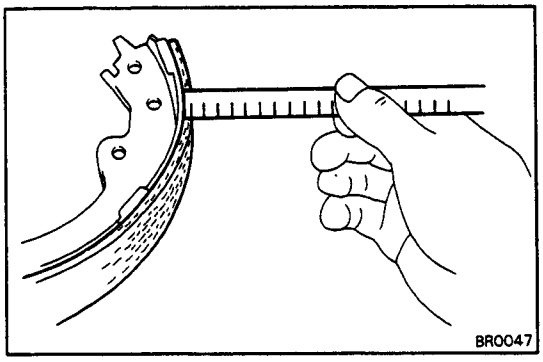
INSPECTION OF REAR BRAKE COMPONENTS



1. **INSPECT BRAKE DRUM INSIDE DIAMETER**

   Standard inside diameter: 200.0 mm (7.874 in.)
   Maximum inside diameter: 201.0 mm (7.913 in.)

   If the drum is scored or worn, the brake drum may be lathed to the maximum inside diameter.

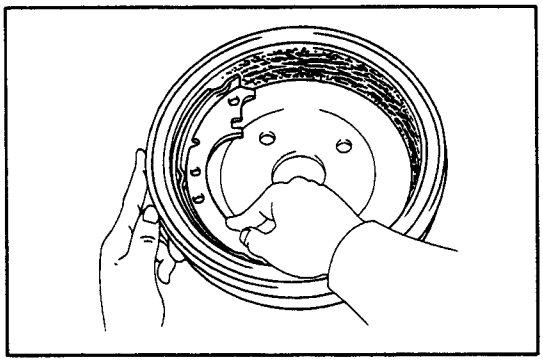


2. **INSPECT BRAKE SHOE LINING THICKNESS**

   Standard thickness: 4.0 mm (0.157 in.)
   Minimum thickness: 1.0 mm (0.039 in.)

   If the shoe lining is less than minimum or shows signs of uneven wear, replace the brake shoes.

   NOTE: If the thickness of any brake shoe is not within specification, replace all of the brake shoes.

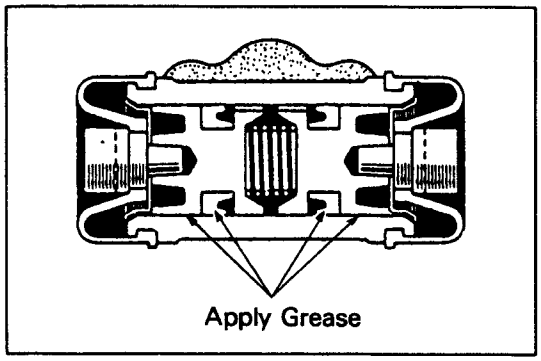


3. **INSPECT BRAKE LINING AND DRUM FOR PROPER CONTACT**

   Replace the brake shoe or lathe the brake drum as necessary.

4. **INSPECT WHEEL CYLINDER FOR CORROSION OR DAMAGE**

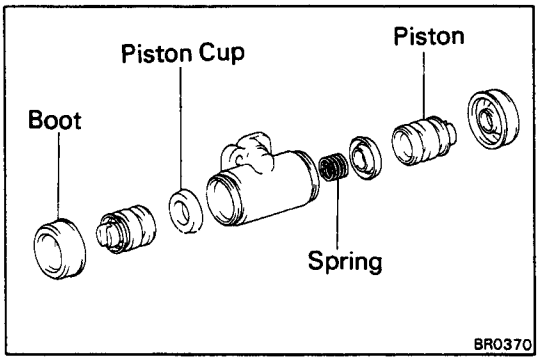
5. **INSPECT BACKING PLATE FOR WEAR OR DAMAGE**



INSTALLATION OF REAR BRAKE

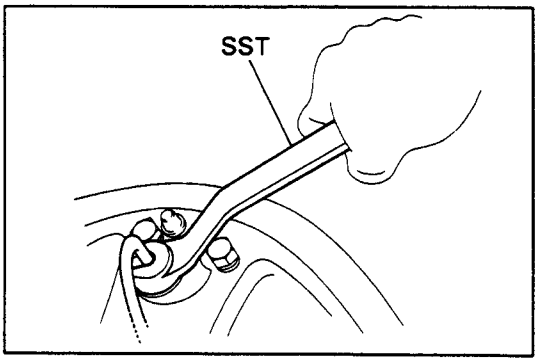
(See page BR-36)

1. **APPLY LITHIUM SOAP BASE GLYCOL GREASE TO FOLLOWING PARTS:**
   (a) Two piston cups
   (b) Two pistons

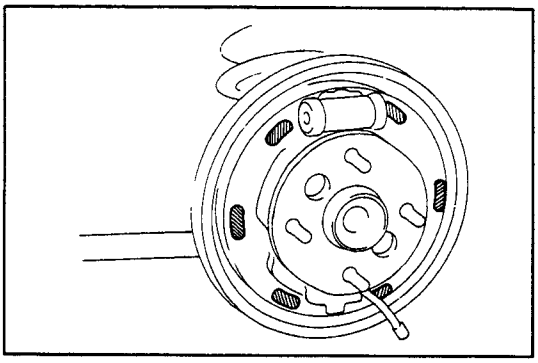


2. **ASSEMBLE WHEEL CYLINDER**
   (a) Install two new piston cups to the pistons.
   (b) Install the two pistons and spring into the wheel cylinder. Check that the flanges of the piston are pointed inward.
   (c) Install two new boots.

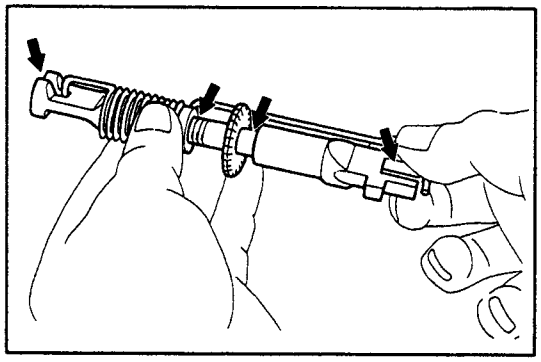
3. **INSTALL WHEEL CYLINDER**
   Install the wheel cylinder on the backing plate with the two bolts.
   Torque: 100 kg-cm (7 ft-lb, 10 N·m)



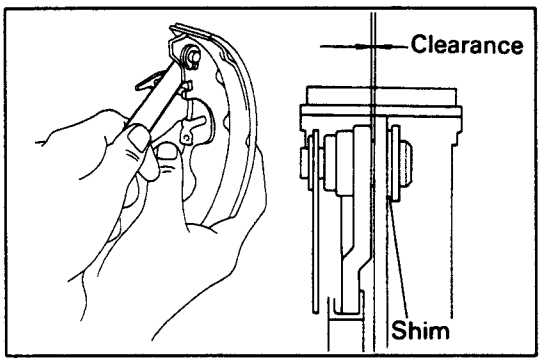
4. **CONNECT BRAKE TUBE TO WHEEL CYLINDER**
   Using SST, connect the brake tube.
   SST 09751-36011
   Torque: 155 kg-cm (11 ft-lb, 15 N·m)

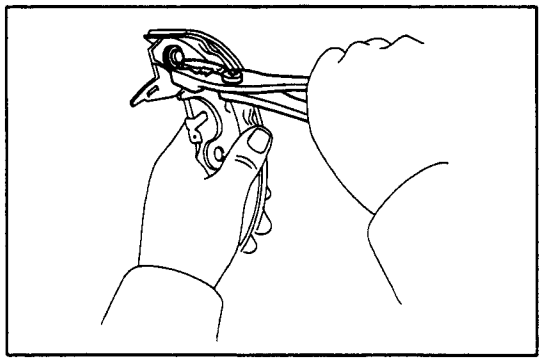


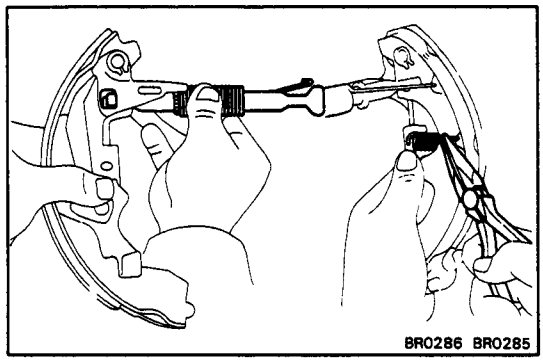
5. **APPLY HIGH TEMPERATURE GREASE TO FOLLOWING PARTS:**
   (a) Backing plate and brake shoe contact points
   (b) Anchor plate and brake shoe contact points



   (c) Strut and adjusting bolt contact points
   (d) Strut and brake shoe contact points







6. INSTALL PARKING BRAKE LEVER AND AUTOMATIC ADJUSTING LEVER TO REAR SHOE

(a) Temporarily install the levers and the shim and a new C-washer.

(b) Using a feeler gauge, measure the clearance between the shoe and lever.

Standard clearance: 0 – 0.35 mm (0 – 0.0138 in.)

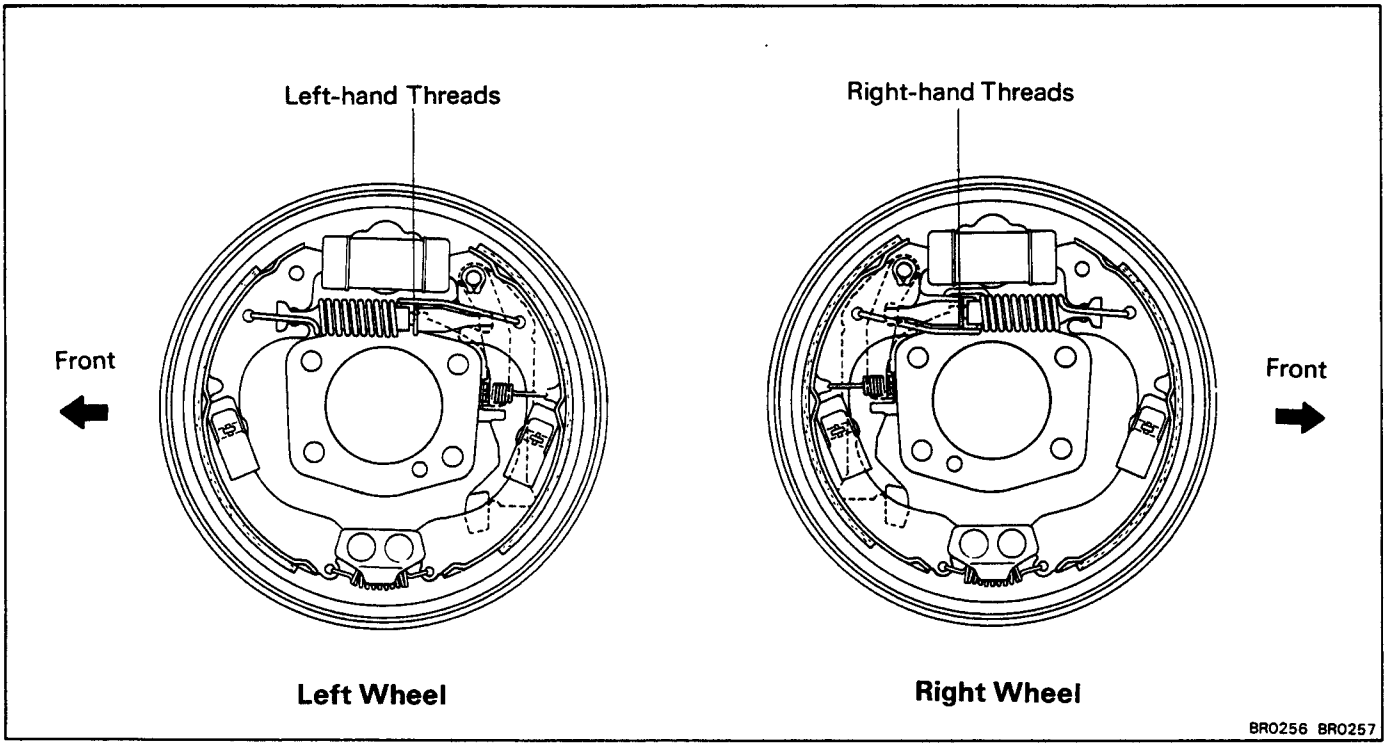
If not within specification, adjust with a shim.

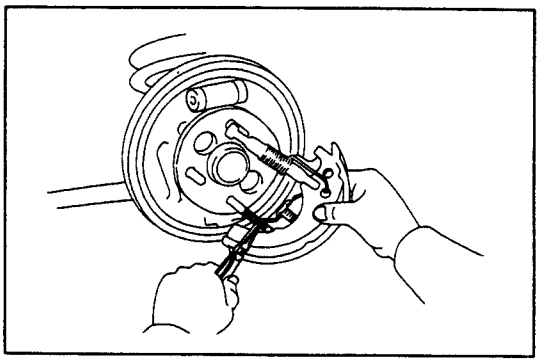
Shim thicknesses	mm (in.)
0.2 (0.008)	0.5 (0.020)
0.3 (0.012)	0.6 (0.024)
0.4 (0.016)	0.9 (0.035)

(c) Using pliers, stake the C-washer.

7. INSTALL STRUT ONTO REAR SHOE

Set the strut and return spring in place and install the adjusting lever spring.

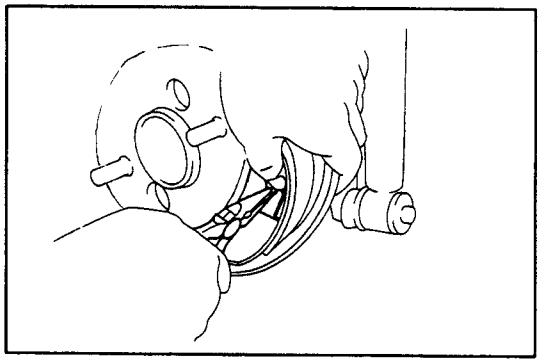




8. INSTALL REAR SHOE

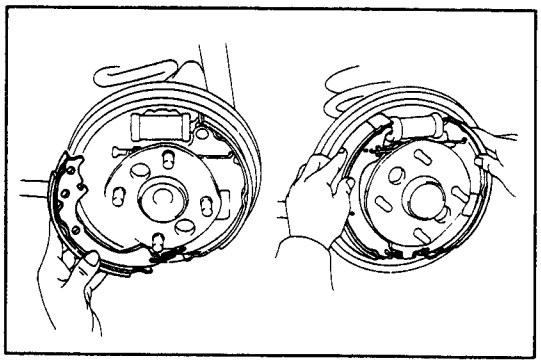
CAUTION: Do not allow oil or grease to get on the rubbing face.

(a) Using pliers, connect the parking brake cable to the lever.



(b) Set the rear shoe in place with the end of the shoe inserted in the wheel cylinder and the other end in the anchor plate.

(c) Install the pin and the shoe hold-down spring.

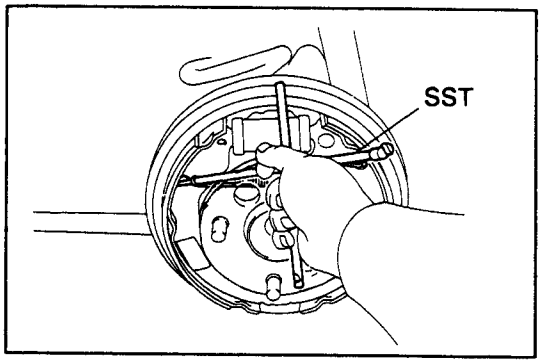


9. INSTALL FRONT SHOE

CAUTION: Do not allow oil or grease to get on the rubbing face.

(a) Install the anchor spring between the front and rear shoes.

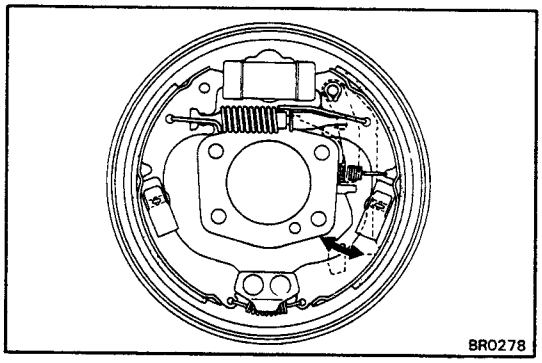
(b) Set the front shoe in place with the end of the shoe inserted in the wheel cylinder and the strut in place.



(c) Install the shoe hold-down spring and pin.

(d) Using SST, connect the return spring.

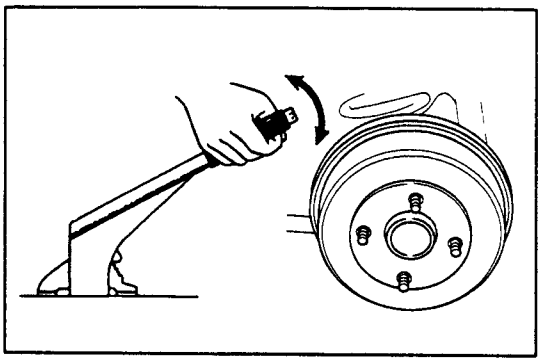
SST 09703-30010



10. CHECK OPERATION OF AUTOMATIC ADJUSTER MECHANISM

(a) Move the parking brake lever of the rear shoe back and forth, as shown. Check that the adjusting bolt turns.

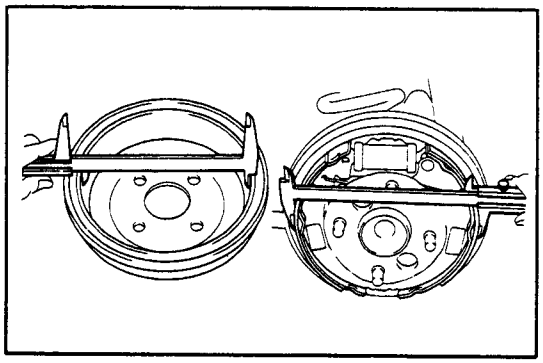
If the bolt does not turn, check for incorrect installation of the rear brakes.



(b) Adjust the strut length to the shortest possible amount.

(c) Install the drum.

(d) Pull the parking brake lever all the way up.



11. CHECK CLEARANCE BETWEEN BRAKE SHOES AND DRUM

(a) Remove the drum.

(b) Measure the brake drum inside diameter and diameter of the brake shoes. Check that the difference between the diameters is the correct shoe clearance.

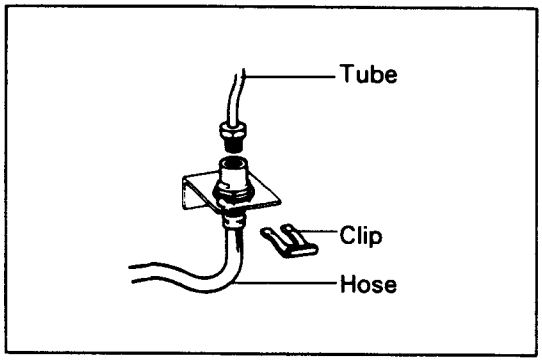
Shoe clearance: 0.6 mm (0.024 in.)

If incorrect, check the parking brake system.

12. INSTALL BRAKE DRUM AND REAR WHEEL

13. FILL BRAKE RESERVOIR WITH BRAKE FLUID AND BLEED BRAKE SYSTEM (See page BR-7)

14. CHECK FOR FLUID LEAKAGE



BRAKE HOSES AND TUBES

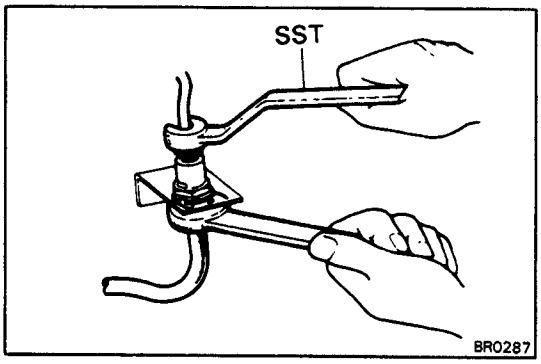
DISCONNECT AND CONNECT HOSE AND TUBE

1. DISCONNECT HOSE AND TUBE

(a) Diconnect the clip.

(b) Using a wrench to hold the hose, and SST to hold the tube, disconnect the tube and hose.

SST 09751-36011



2. CONNECT HOSE AND TUBE

(a) Connect the hose and tube by hand.

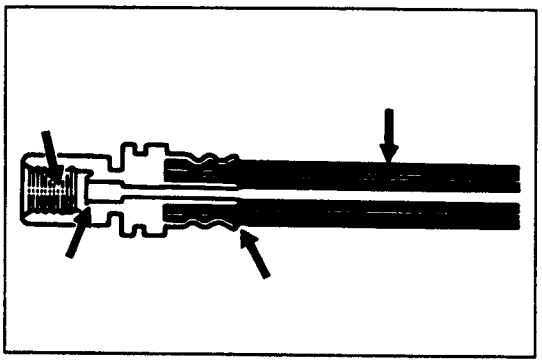
(b) Using a wrench to hold the hose, and SST to hold the tube, torque the connection.

SST 09751-36011

Torque: 155 kg-cm (11 ft-lb, 15 N·m)

(c) Install a new hose clip.

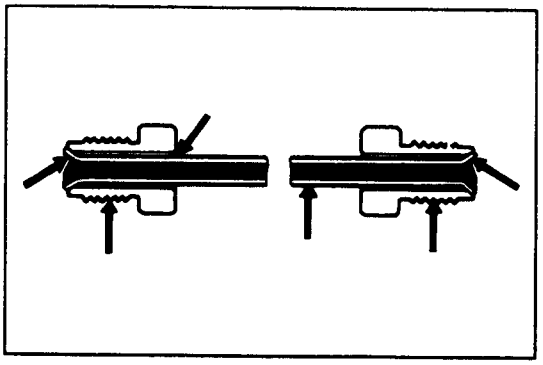
INSPECTION OF BRAKE HOSES AND TUBES



1. INSPECT BRAKE HOSES

(a) Inspect the hose for damage, cracks or swelling.

(b) Inspect the threads for damage.



2. INSPECT BRAKE TUBES

(a) Inspect the tube for damage, cracks, dents or corrosion.

(b) Inspect the threads for damage.

STEERING

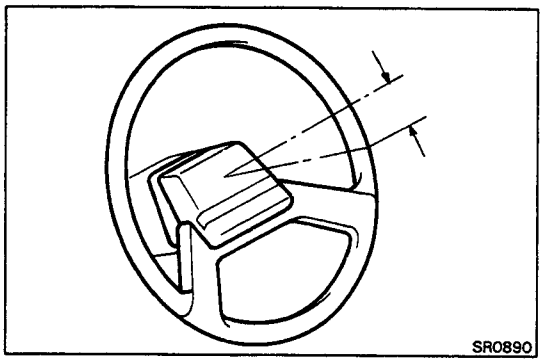
	Page
PRECAUTIONS	SR-2
TROUBLESHOOTING	SR-2
STEERING CHECK	SR-2
STEERING MAIN SHAFT	SR-3
STEERING GEAR HOUSING (MANUAL STEERING)	SR-14
POWER STEERING	SR-24
On-Vehicle Inspection	SR-24
Bleeding of Power Steering System	SR-26
Oil Pressure Check	SR-26
Power Steering Pump	SR-28
Steering Gear Housing	SR-36

PRECAUTIONS

Care must be taken to replace parts properly, because they could affect the performance of the steering system and result in a driving hazard.

TROUBLESHOOTING

Problem	Possible cause	Remedy	Page
Hard steering	Tires improperly inflated	Inflate tires to proper pressure	
	Insufficient lubricant	Lubricate suspension and steering linkage	
	Excessive caster	Check front wheel alignment	FA-3
	Steering system joint worn	Replace steering system joints	SR-14, 36
	Steering bushing worn	Replace steering bushing	SR-14, 36
	Lower arm ball joints worn	Replace lower arm ball joints	FA-29
	Steering column binding	Inspect steering column	SR-3
	Steering gear out of adjustment or broken	Adjust or repair steering gear	SR-14, 36
	Power steering belt loose	Tighten belt	SR-24
	Oil level in reservoir low	Check reservoir	SR-24
	Power steering unit faulty	Check power steering unit	SR-24
Poor return	Tires improperly inflated	Inflate tires to proper pressure	
	Insufficient lubricant	Lubricate suspension and steering linkage	
	Wheel alignment incorrect	Check front wheel alignment	FA-3
	Steering column binding	Inspect steering column	SR-3
	Steering gear out of adjustment or broken	Adjust or repair steering gear	SR-14, 36
Excessive play	Front wheel bearing worn	Replace front wheel bearing	FA-8
	Main shaft yoke or intermediate shaft yoke worn	Replace main shaft or intermediate shaft	SR-3
	Lower arm ball joints worn	Replace lower arm ball joints	FA-29
	Steering system joints worn	Replace steering system joints	SR-14, 36
	Steering gear out of adjustment or broken	Adjust or repair steering gear	SR-14, 36
Abnormal noise	Steering linkage loose	Tighten steering linkage	SR-14, 36
	Steering system joints worn	Replace steering system joints	SR-14, 36
	Steering gear out of adjustment or broken	Adjust or repair steering gear	SR-14, 36



STEERING CHECK

1. **CHECK THAT STEERING WHEEL FREEPLAY IS CORRECT**

With the vehicle stopped and pointed straight ahead, rock the steering wheel gently back and forth with light finger pressure. Freeplay should not exceed the maximum limit.

Maximum freeplay: 30 mm (1.18 in.)

If incorrect, adjust or repair.

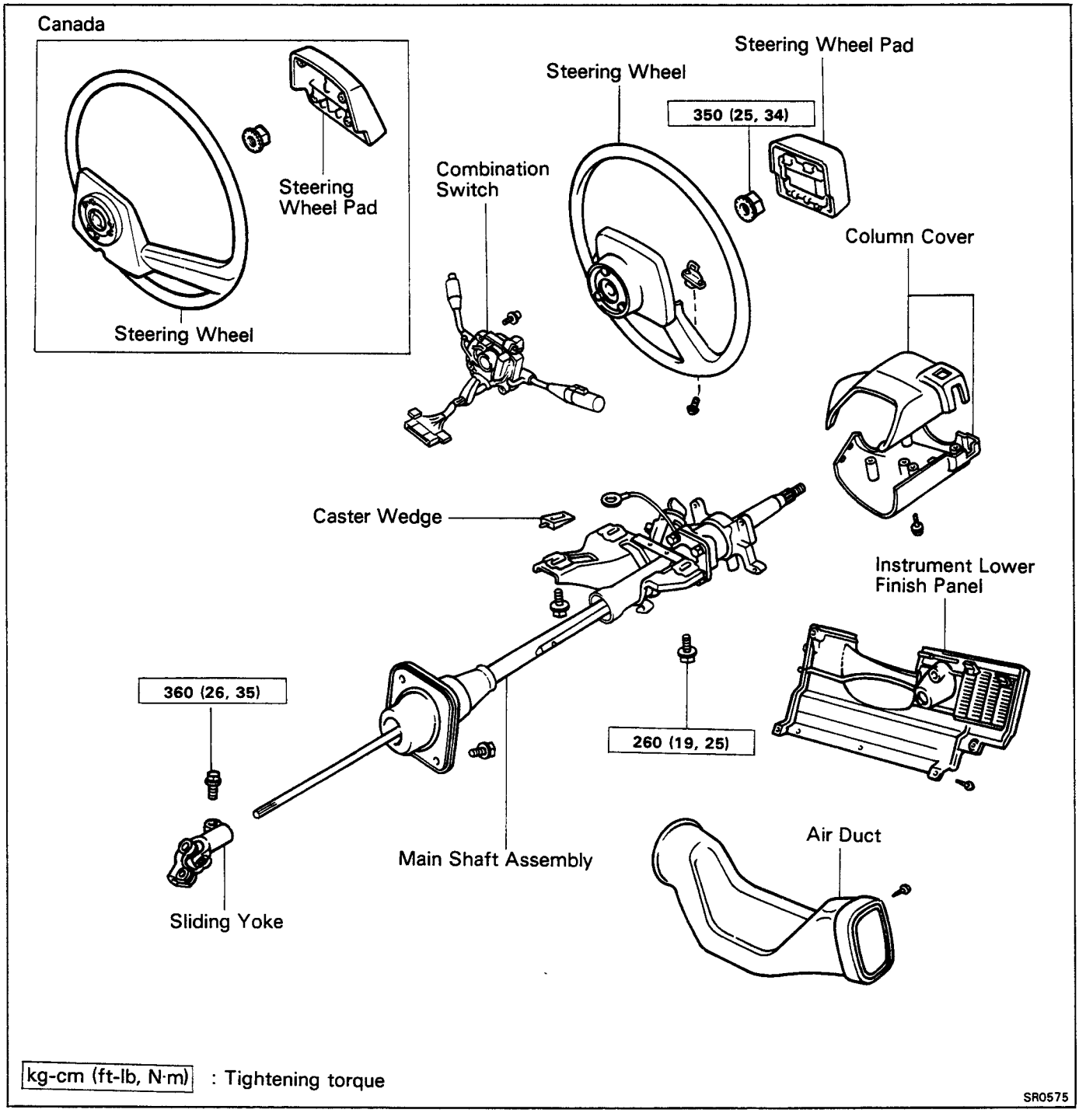
2. **CHECK STEERING LINKAGE AND GEAR HOUSING**

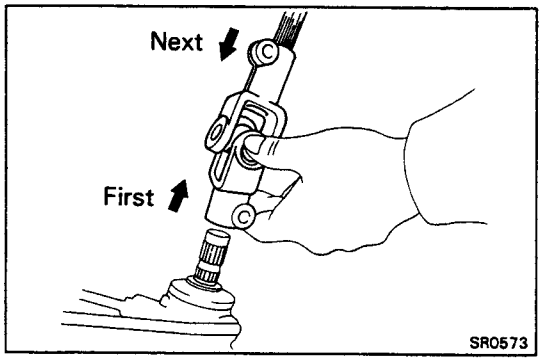
(a) Check the steering linkage for looseness or damage. Check that:
- Tie rod ends do not have excessive play.
- Boots are not damaged.
- Boot clamps are not loose.

(b) Check gear housing for grease leakage or oozing.

STEERING MAIN SHAFT

REMOVAL OF STEERING MAIN SHAFT



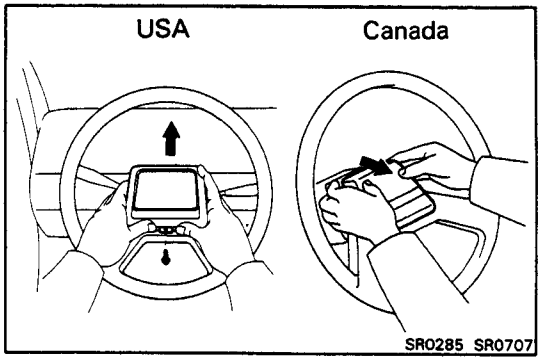


1. DISCONNECT CABLE FROM NEGATIVE TERMINAL OF BATTERY

2. REMOVE SLIDING YOKE

(a) Remove the two mount bolts.

(b) First pull the slinding yoke from the gear housing, and then pull it out from the main shaft.



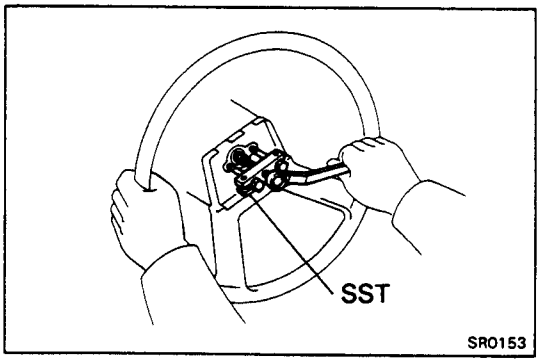
3 REMOVE STEERING WHEEL

(a) (USA)

(1) Remove the screw at the lower portion of the steering wheel pad and push out the pad.

(2) Remove pad set spring from the steering wheel.

(Canada)
Pull out the pad.



(b) Remove the steering wheel nut.

(c) Using SST, remove the steering wheel.

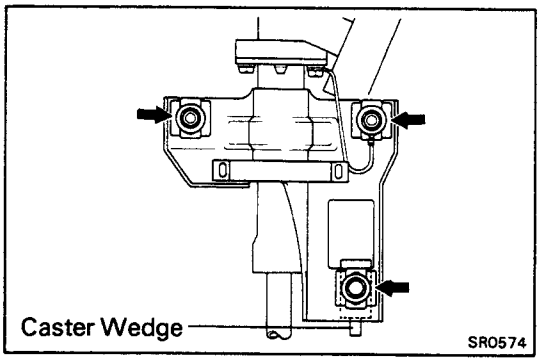
SST 09609-20011

4. REMOVE INSTRUMENT LOWER FINISH PANEL, AIR DUCT AND COLUMN COVERS

5. REMOVE COMBINATION SWITCH

6. DISCONNECT IGNITION SWITCH CONNECTOR

7. REMOVE FOUR COLUMN HOLE COVER BOLTS

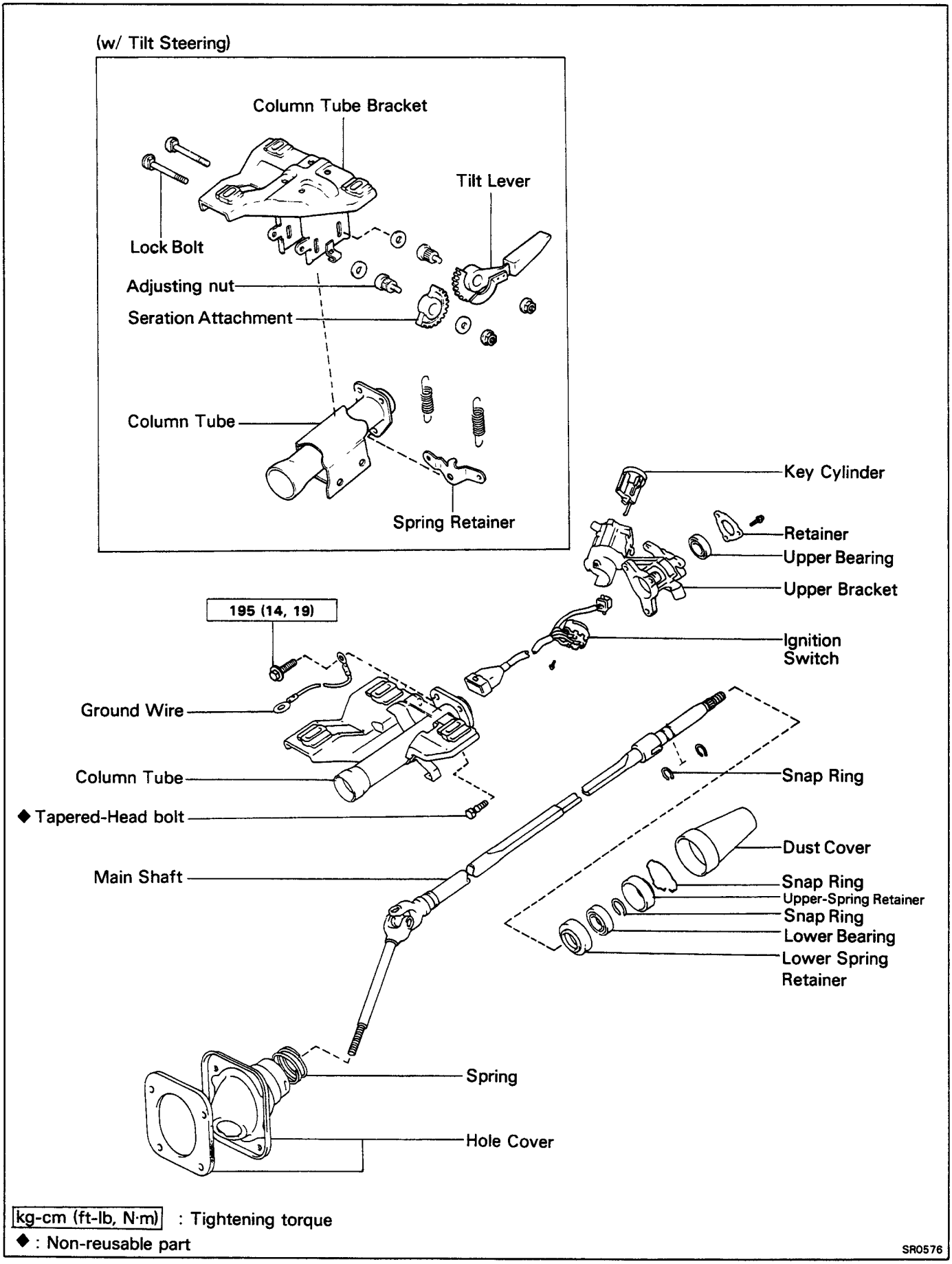


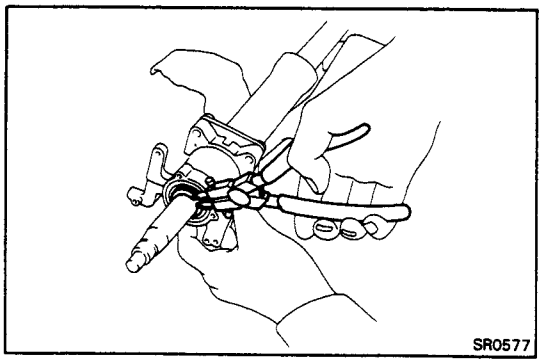
8. REMOVE MAIN SHAFT

(a) Remove the three column bracket mount bolts and caster wedge.

(b) Pull out the main shaft.

COMPONENTS

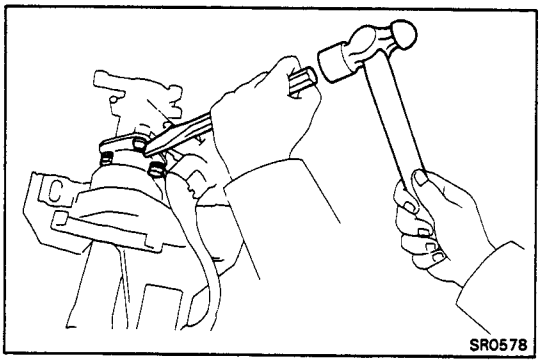

(w/ Tilt Steering)
Column Tube Bracket
Tilt Lever
Lock Bolt
Adjusting nut
Seration Attachment
Column Tube
Spring Retainer
Key Cylinder
Retainer
Upper Bearing
Upper Bracket
195 (14, 19)
Ignition Switch
Ground Wire
Column Tube
◆ Tapered-Head bolt
Snap Ring
Dust Cover
Main Shaft
Snap Ring
Upper-Spring Retainer
Snap Ring
Lower Bearing
Lower Spring Retainer
Spring
Hole Cover
kg-cm (ft-lb, N·m) : Tightening torque
◆ : Non-reusable part
SR0576



DISASSEMBLY OF STEERING MAIN SHAFT

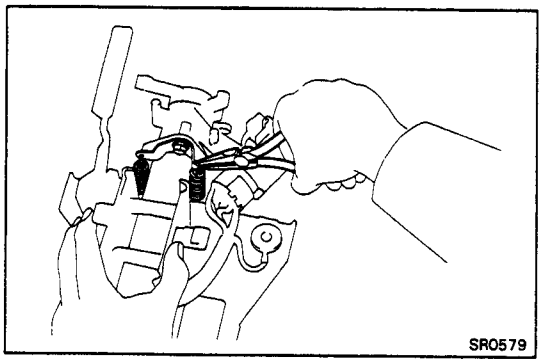
(See page SR-5)

1. **REMOVE COLUMN TUBE TOGETHER WITH UPPER BRACKET FROM MAIN SHAFT**
   (a) Remove the three screws and bearing retainer.
   (b) Using snap ring pliers, remove the snap ring.
   (c) Release the steering lock.
   (d) Pull out the column tube together with the upper bracket.

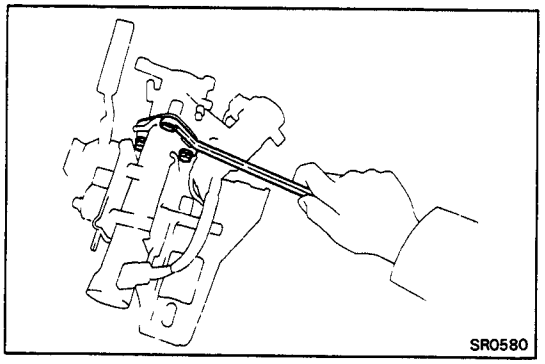


2. **SEPARATE UPPER BRACKET AND COLUMN TUBE**

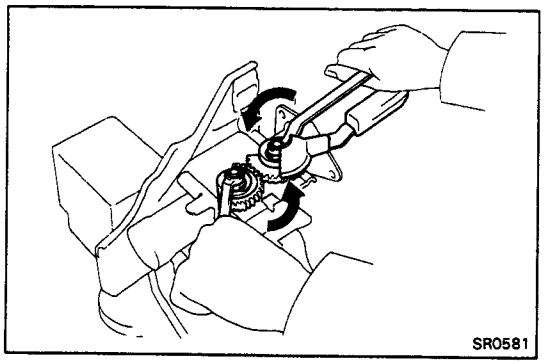
(w/o Tilt Steering)
(a) Using a chisel and hammer, remove the tapered-head bolt.
(b) Remove the two bolts and grand wire.
(c) Separete the upper bracket and column tube.



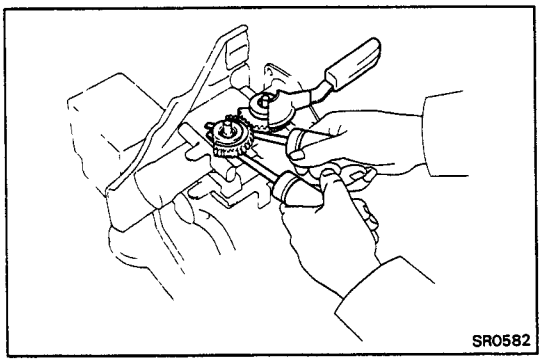
(w/ Tilt Steering)
(a) Remove the two tension springs.



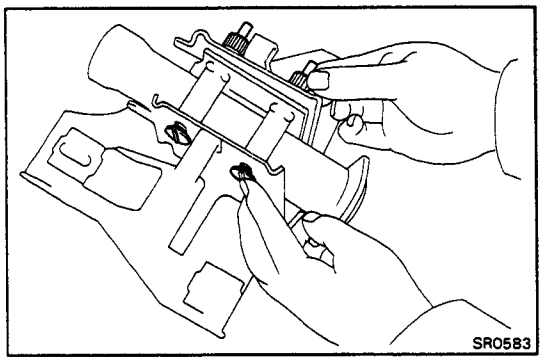
(b) Remove the three bolts, spring retainer and ground wire.
(c) Separate the upper bracket and column tube.



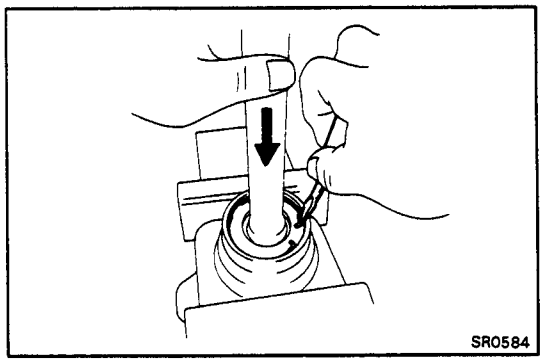
3. **(w/ TILT STEERING)**
IF NECESSARY, DISASSEMBLE TILT MECHANISM
(a) Loosen the two nuts as shown.
(b) Remove the two nuts and plate washer.



(c) Using two screwdrivers, pry out the tilt lever and seration attachment.



(d) Remove the two adjusting nuts, plate washers, lock bolts and column tube.



3. REMOVE FOLLOWING PARTS FROM MAIN SHAFT:

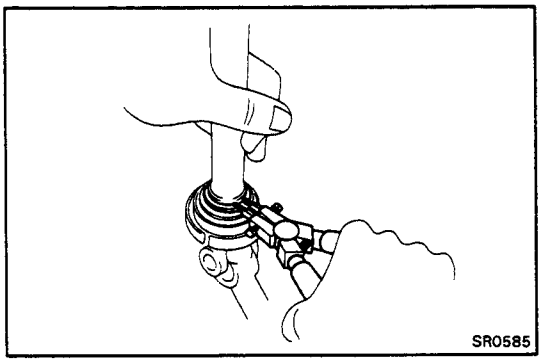
(a) Dust cover

(b) Snap ring
Using a screwdriver, push in the main shaft and pry out the snap ring.

(c) Hole cover

(d) Spring

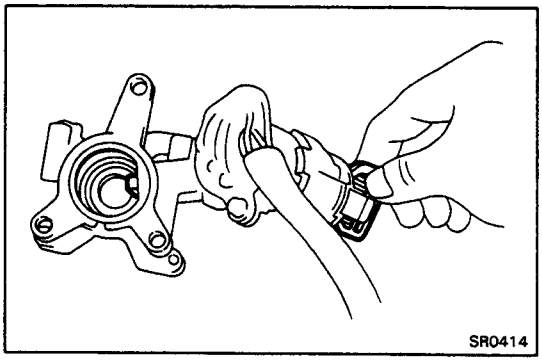
(e) Upper spring retainer



(f) Snap ring
Using snap ring pliers, remove the snap ring.

(g) Lower bearing

(h) Lower spring retainer



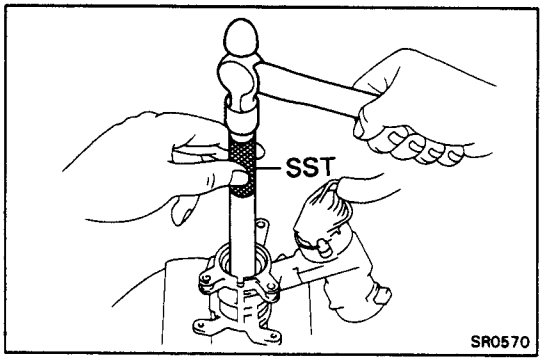
INSPECTION AND REPAIR OF STEERING MAIN SHAFT

1. INSPECT STEERING LOCK OPERATION

Check that the steering lock mechanism operates properly.

2. INSPECT BEARINGS

Check the bearing rotation condition and for abnormal noise.

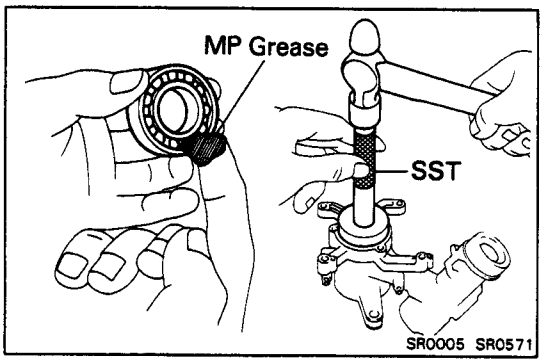


3. IF NECESSARY, REPLACE UPPER BEARING

(a) Release the steering lock.

(b) Using SST and hammer, drive out the bearing.

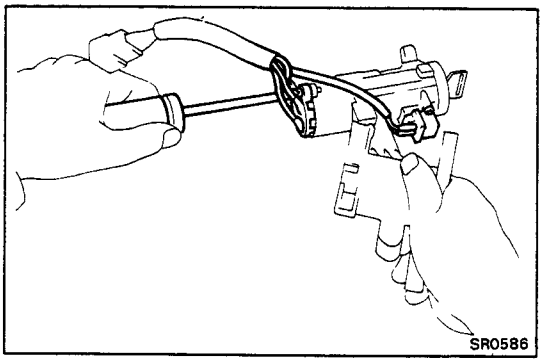
SST 09620-30010



(c) Pack a new bearing with MP grease.

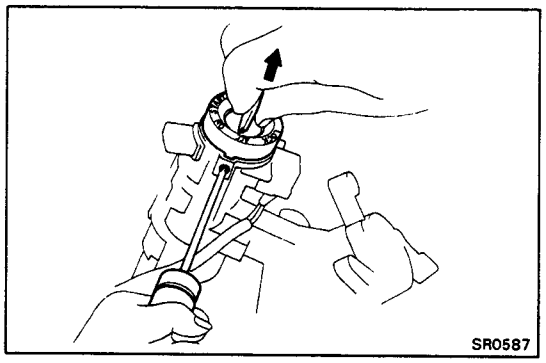
(d) Using SST and hammer, drive in the bearing.

SST 09620-30010



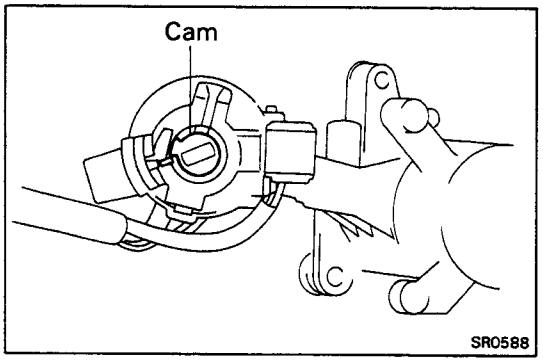
4. IF NECESSARY REPLACE UPPER BRACKET (OR KEY CYLINDER AND IGNITION SWITCH)

(a) Remove the two screws and ignition switch.



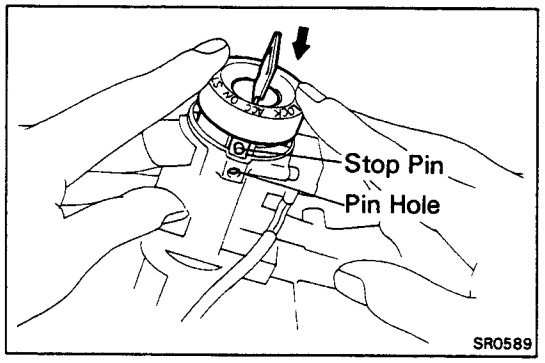
(b) Place the ignition key in position ACC.

(c) Using a small screwdriver, push down stop pin and pull out the key cylinder.

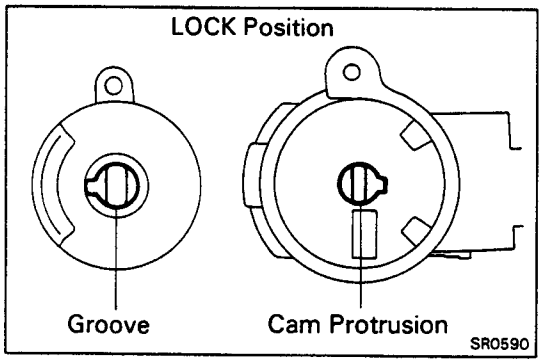


(d) Place the cam groove of a new upper bracket in position ACC.

(e) Place the ignition key in position ACC.



(f) Push in the key cylinder.



(g) Place the groove of the ignition switch and the cam protrusion of the upper bracket in position LOCK, (ACC or ON)

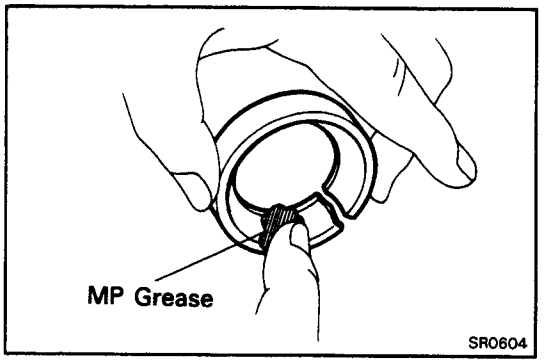
(h) Install the ignition switch with the two screws.

(i) Remove and install the upper bearing.
(See step 3 on page SR-8)

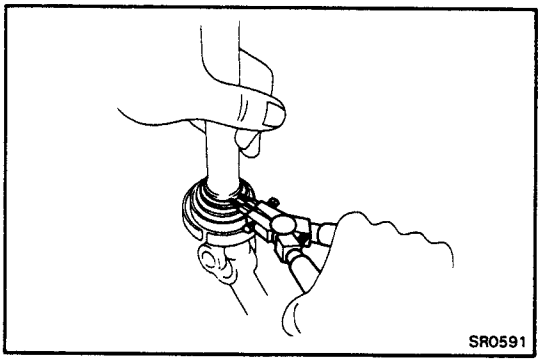
ASSEMBLY OF STEERING MAIN SHAFT

(See page SR-5)

1. APPLY MP GREASE TO SPRING RETAINERS



2. ASSEMBLE FOLLOWING PARTS ONTO MAIN SHAFT



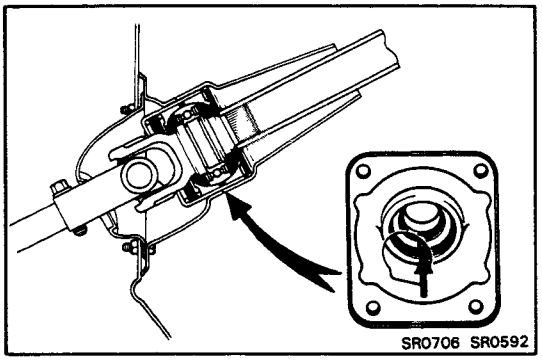
(a) Lower spring retainer

(b) Lower bearing

(c) Snap ring
Using snap ring pliers, install the snap ring.

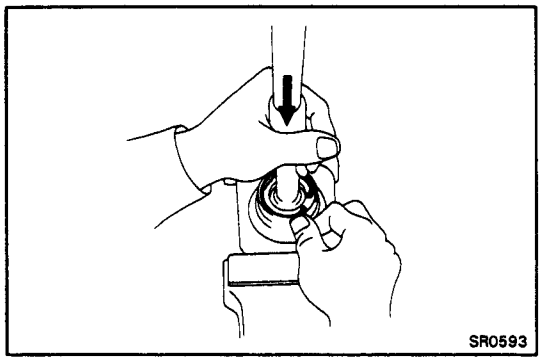
(d) Upper spring retainer

(e) Spring


SR0706 SR0592

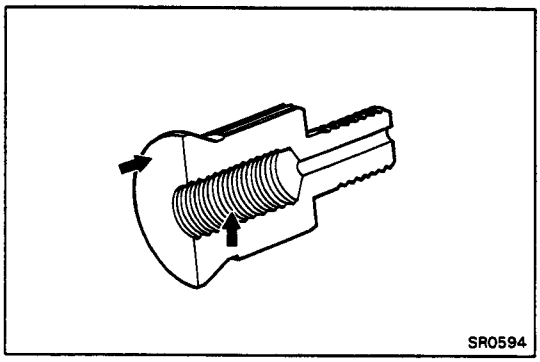
(f) Hole cover

NOTE: When installing the hole cover, be sure the notched portion of the spring retainer is facing downward.


SR0593

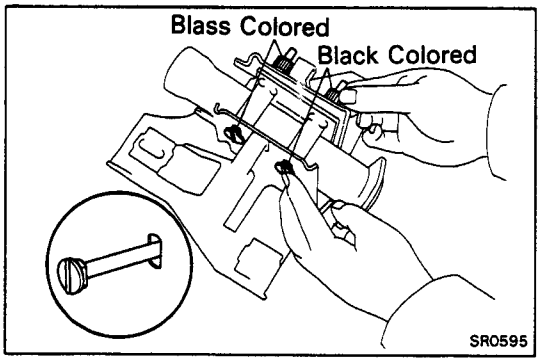
(g) Snap ring
Push in the main shaft and install the snap ring.

(h) Dust cover


SR0594

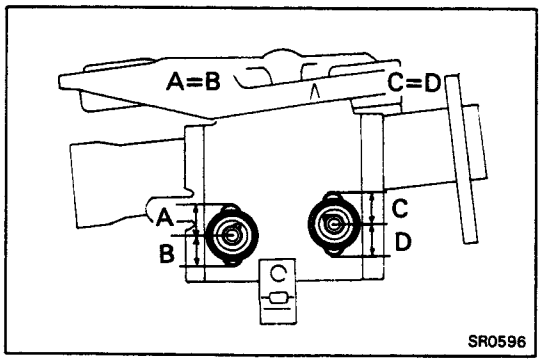
3. (w/ TILT STEERING)
ASSEMBLE TILT MECHANISM

(a) Apply molybdenum disulphite lithim base grease on the threads and under the adjusting nuts.



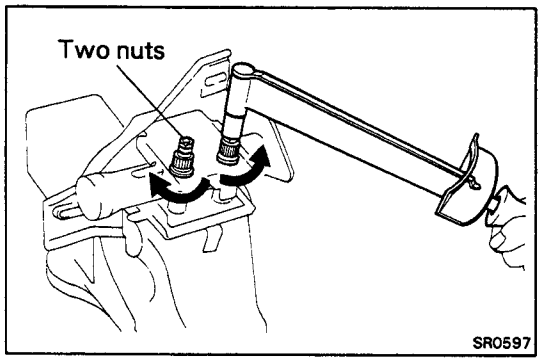
SR0595

(b) Assemble the column tube and bracket with the two lock bolts, plate washers and adjusting nuts. Do not torque the adjusting nuts yet.



SR0596

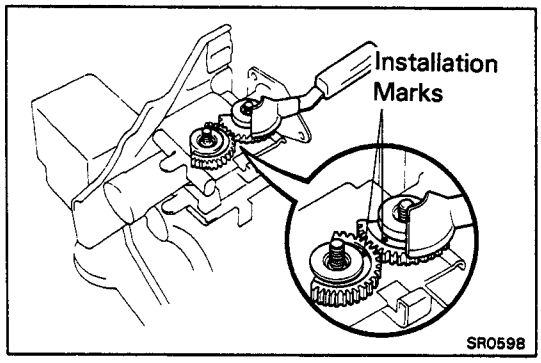
(c) Position the column tube as shown.



(d) Mount the column tube in a soft jam vise.

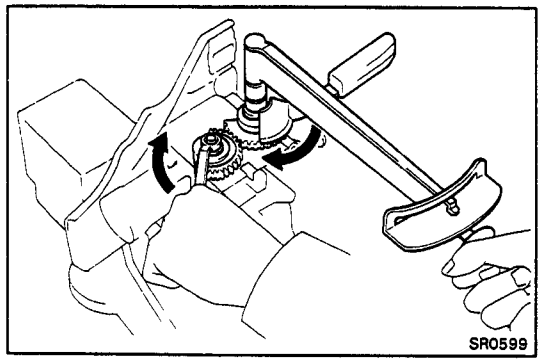
(e) Using two nuts, Torque the adjusting nuts.

Torque: 90 kg-cm (78 in.-lb, 8.8 N·m)



(f) Align the installation marks of the tilt lever and seration attachment.

(g) Using ta plastic-faced hammer, Uniformly drive in the tilt lever and seration attachment.

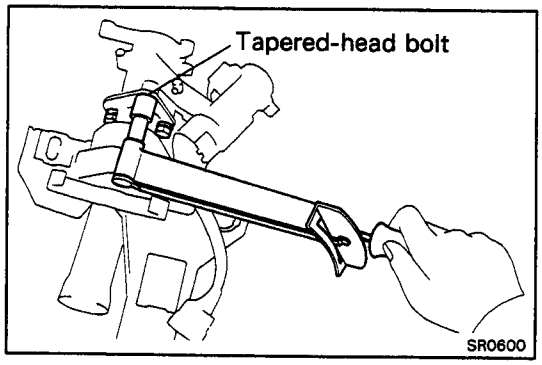


(h) Install the nut to the tilt lever side adjusting nut.

(i) Install the plate washer and nut to the adjusting nut of the seration lever side.

(j) Torque the nuts.

Torque: 240 kg-cm (17 ft-lb, 24 N·m)



4. ASSEMBLE UPPER BRACKET AND COLUMN TUBE

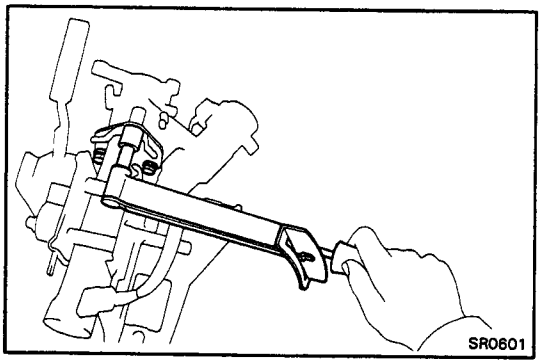
(w/o Tilt Steering)

(a) Assemble the upper bracket and column tube.

(b) Install the ground wire and two bolts. Torque the two bolts.

Torque: 195 kg-cm (14 ft-lb, 19 N·m)

(c) Install a new tapered-head bolt and tighten it until the bolt head breaks off.

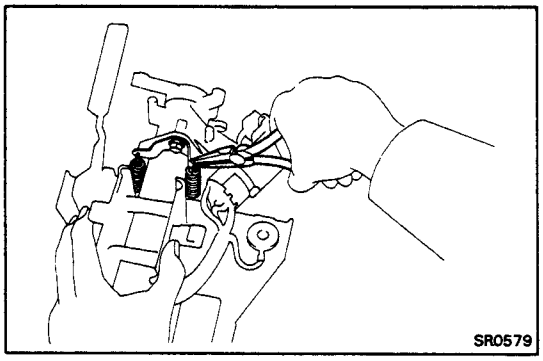


(w/ Tilt Steering)

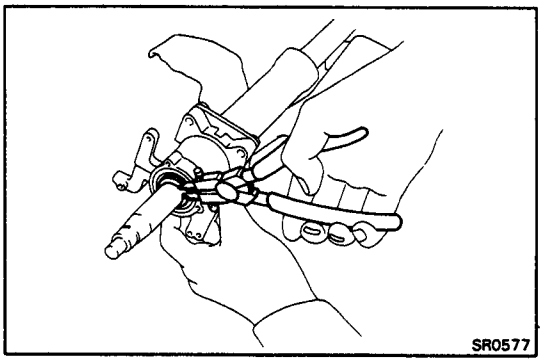
(a) Assemble the upper bracket and column tube.

(b) Install the spring retainer, ground wire and three bolts. Torque the bolts.

Torque: 195 kg-cm (14 ft-lb, 19 N·m)



(c) Install the two tension springs.



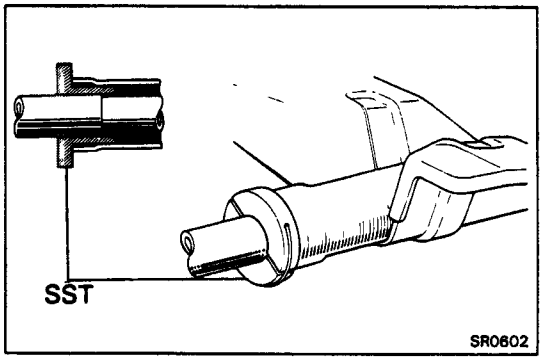
5. INSTALL UPPER BRACKET AND COLUMN TUBE ASSEMBLY TO MAIN SHAFT

(a) Release the steering lock.

(b) Install the upper bracket and column tube assembly.

(c) Using snap ring pliers, install the snap ring.

(d) Install the bearing retainer to the upper bracket with the three screws.



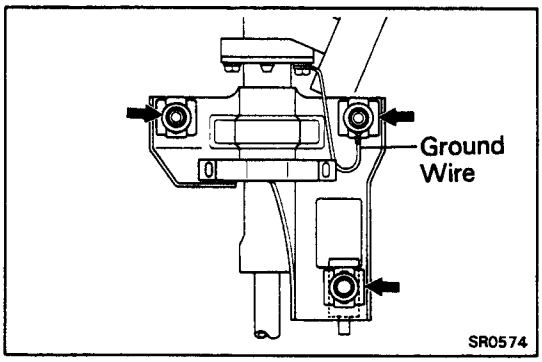
INSTALLATION OF STEERING MAIN SHAFT

(See page SR-3)

1. PLACE MAIN SHAFT IN INSTALLED POSITION

(a) Install SST between the column tube and main shaft.

SST 09612-10092

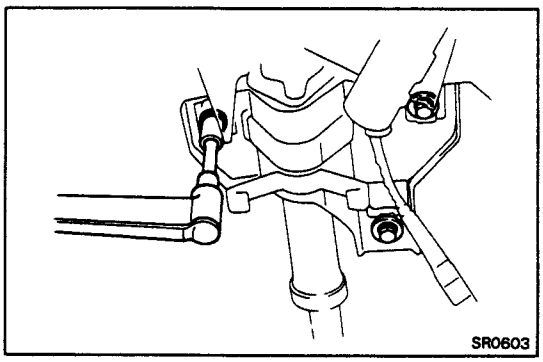


(b) Place the main shaft in position.

(c) Install the caster wedge, ground wire and three column tube mount bolts. Do not torque the column tube mount bolts yet.

2. INSTALL COLUMN HOLE COVER

Install the hole cover with the four bolts.



3. TORQUE COLUMN TUBE MOUNT BOLTS

(a) First torque the two upper bolts.

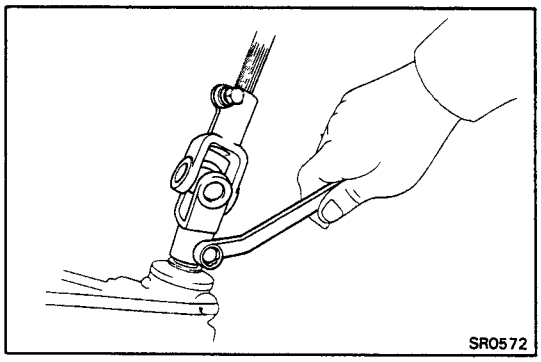
(b) Raise the caster wedge upward to eliminate the play, and then torque the lower bolt.

Torque: 260 kg-cm (19 ft-lb, 25 N·m)

(c) Remove SST.

SST 09612-10092

4. **CONNECT IGNITION SWITCH CONNECTOR**
5. **INSTALL COMBINATION SWITCH**
6. **INSTALL COLUMN COVERS, AIR DUCT AND INSTRUMENT LOWER FINISH PANEL**

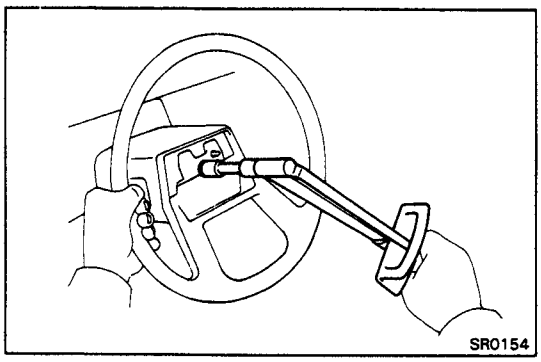


7. **INSTALL SLIDING YOKE**

Install the sliding yoke with the two bolts.

Torque the bolts.

Torque: 360 kg-cm (26 ft-lb, 35 N·m)



8. **INSTALL STEERING WHEEL**

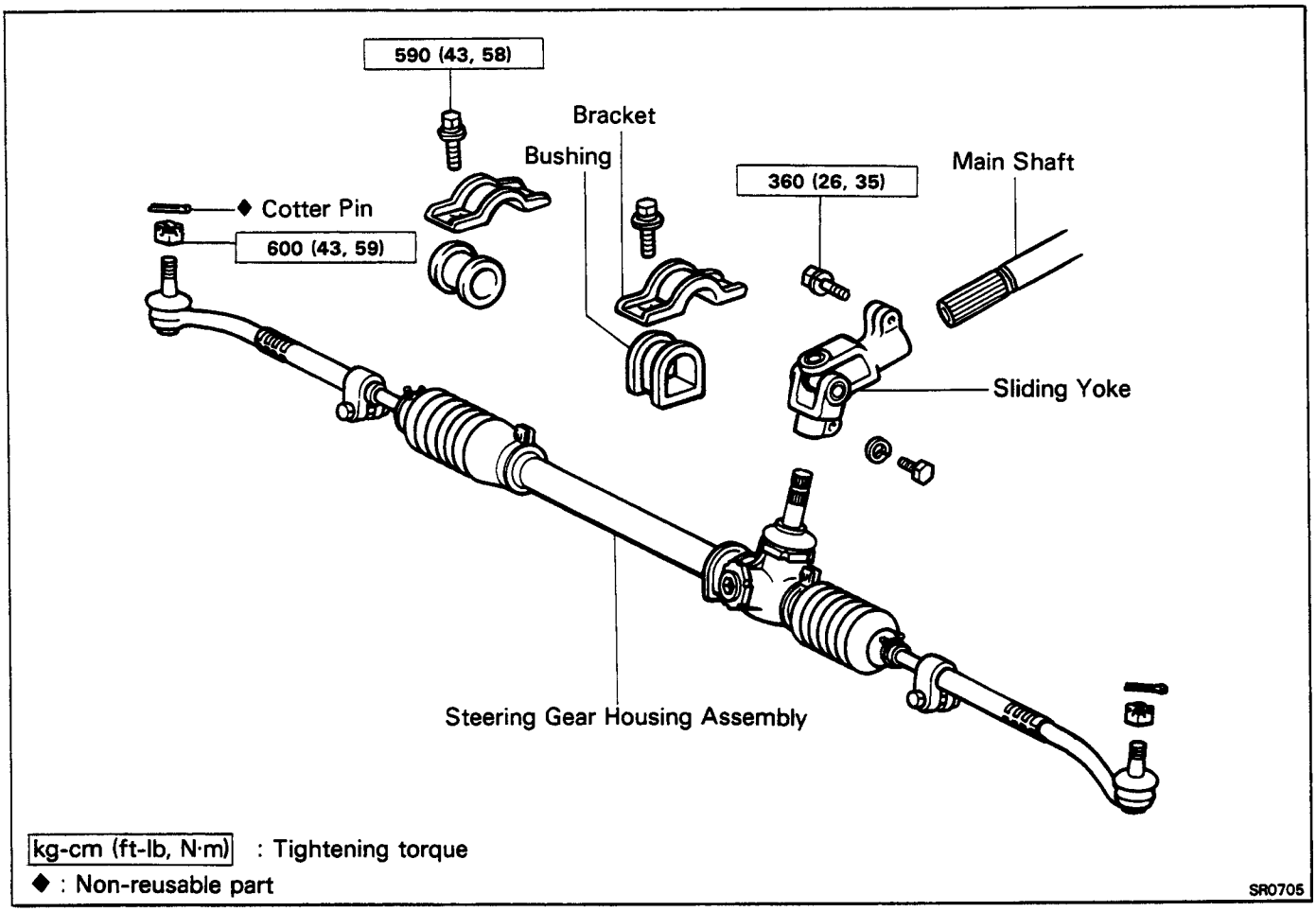
Install the steering wheel with the nut. Torque the nut.

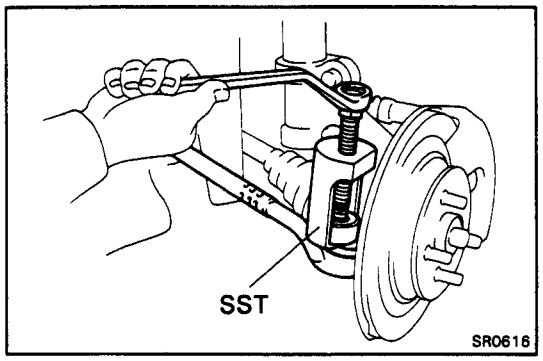
Torque: 350 kg-cm (25 ft-lb, 34 N·m)

9. **CONNECT CABLE TO NEGATIVE TERMINAL OF BATTERY**
10. **CHECK STEERING CENTER POINT**
11. **INSTALL STEERING WHEEL PAD**

STEERING GEAR HOUSING (MANUAL STEERING)

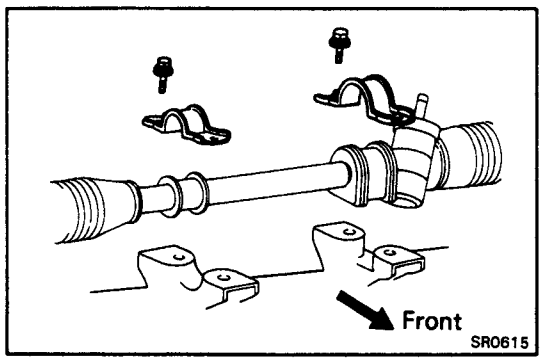
REMOVAL OF STEERING GEAR HOUSING





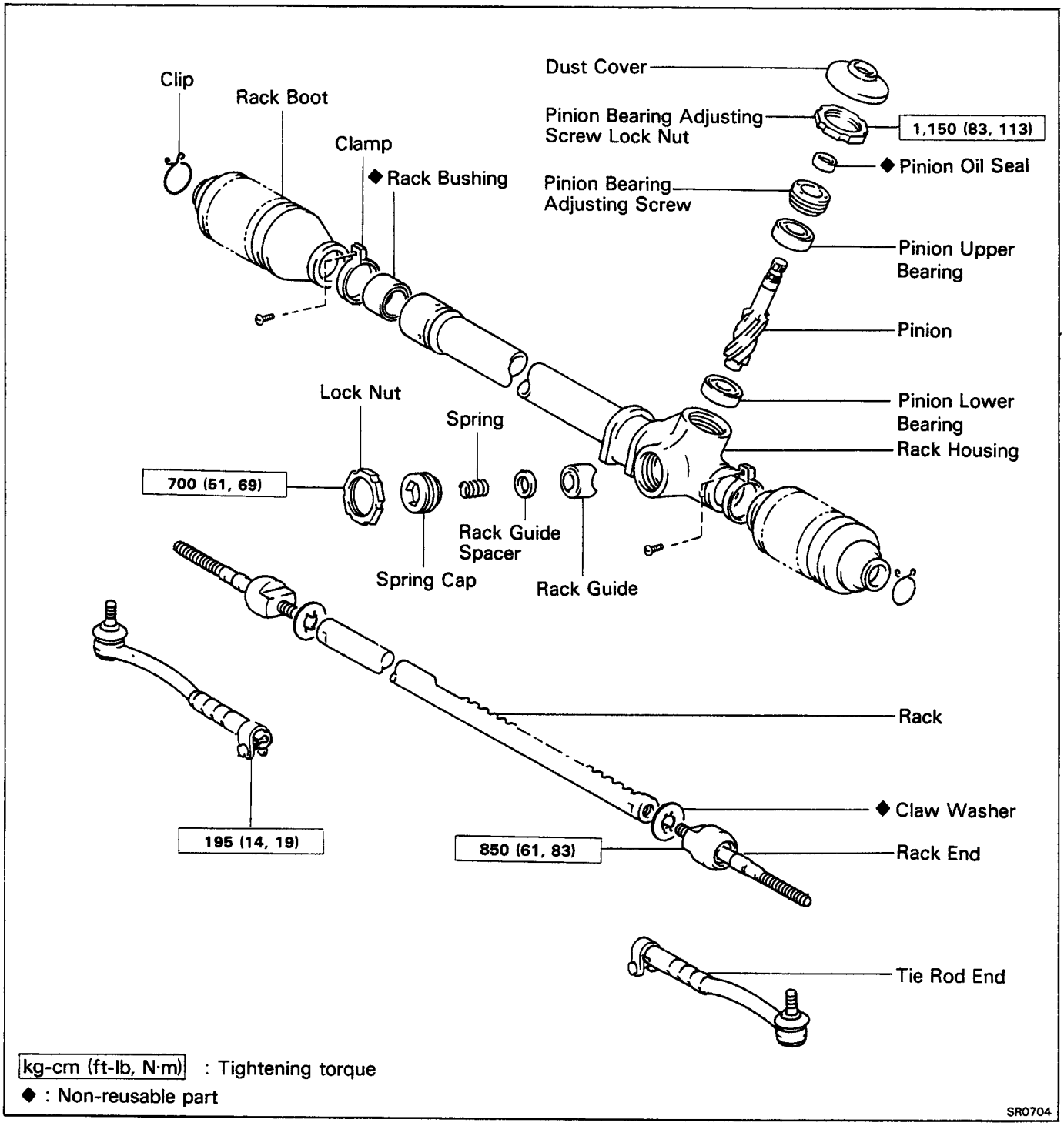
1. **REMOVE SLIDING YOKE**
(See step 2 on page SR-4)

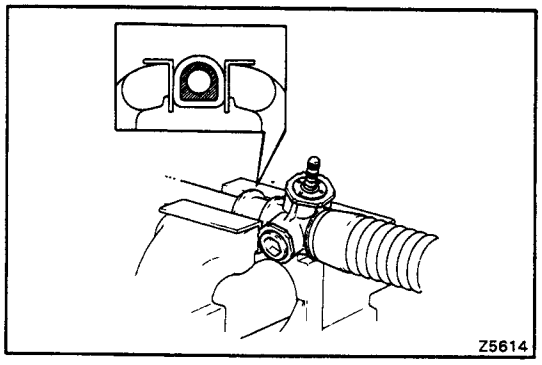
2. **DISCONNECT TIE ROD ENDS FROM STEERING KNUCKLES**
   (a) Remove the cotter pin and nut.
   (b) Using SST, disconnect the tie rod end.
   SST 09610-20012



3. **REMOVE GEAR HOUSING ASSEMBLY**
   (a) Remove the four bolts and two gear housing brackets.
   (b) Remove the gear housing assembly and two busings.
   CAUTION: Be careful not to damage the rack boots.

COMPONENTS



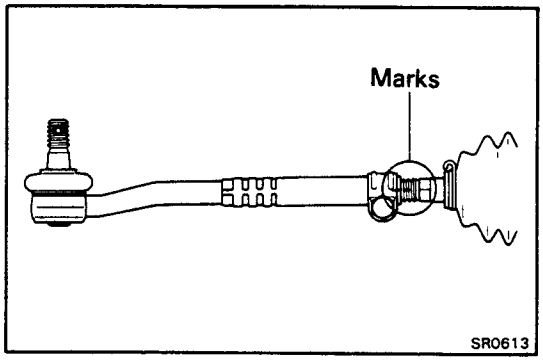


DISASSEMBLY OF STEERING GEAR HOUSING

1. MOUNT STEERING LINK ASSEMBLY IN VISE

NOTE:

- The rack housing is made of aluminum so always use a clasp on the vise and clamp onto the area shown.
- If clamping onto the center tube, wrap a piece of cloth around the tube and do not tighten to the point where the tube bends.



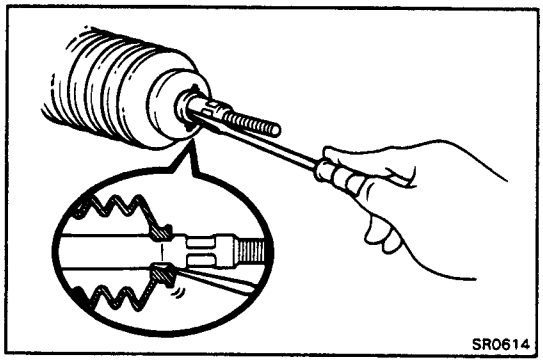
2. REMOVE TIE ROD ENDS

(a) Place the matchmarks on the tie rod end and rack end.

(b) Loosen the clamp bolt.

(c) Remove the tie rod end and clamp.

NOTE: Arrange the left and right tie rod ends in correct order.

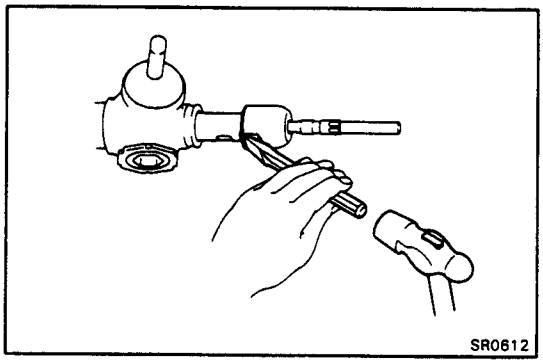


3. REMOVE RACK BOOTS

(a) Remove the clip and clamp.

(b) Remove the rack boots.

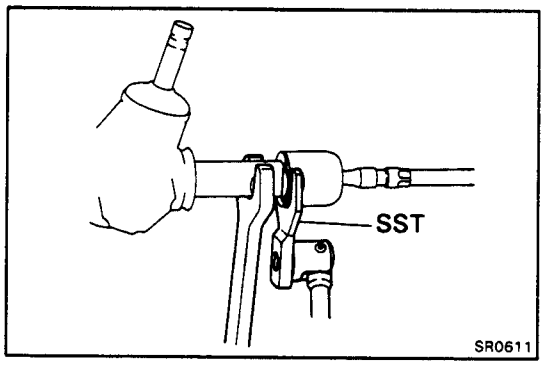
NOTE: Arrange the left and right rack boots in correct order.



4. REMOVE RACK ENDS

(a) Bend back the claw washer.

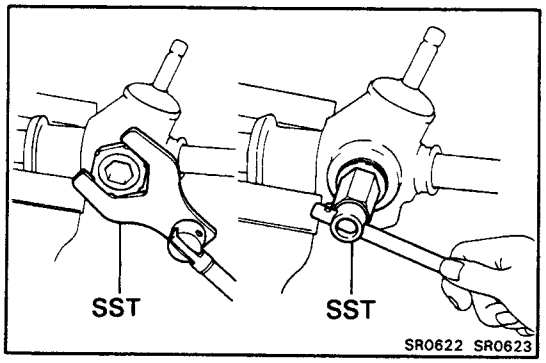
CAUTION: Avoid any impact to the rack.



(b) Using SST, remove the rack end.

SST 09612-10092

NOTE: Arrange the left and right rack ends in correct order.



5. REMOVE RACK GUIDE SPRING CAP LOCK NUT

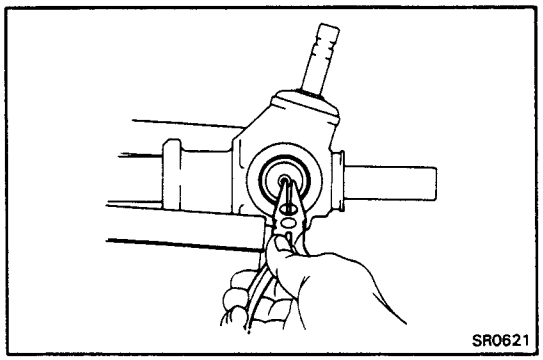
Using SST, remove the spring cap lock nut.

SST 09612-10092

6. REMOVE RACK GUIDE SPRING CAP AND SPRING

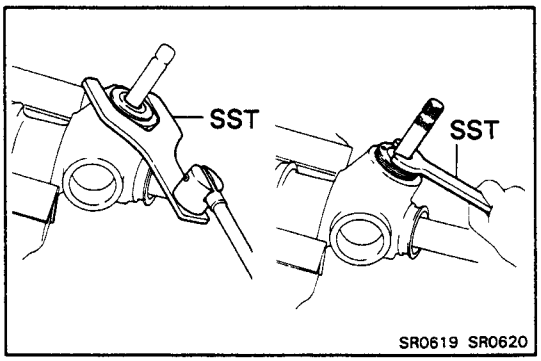
Using SST, remove the spring cap and spring.

SST 09612-10092


SR0621

7. REMOVE RACK GUIDE

Using needle-nose pliers, pull out the rack guide.



SR0619 SR0620

8. REMOVE LOCK NUT ON PINION BEARING ADJUSTING SCREW

(a) Remove the dust cover.

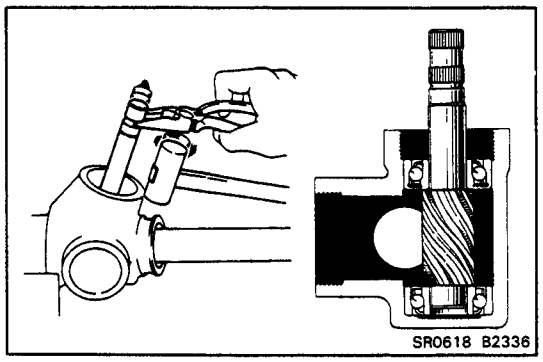
(b) Using SST, remove the adjusting screw lock nut.

SST 09612-10092

9. REMOVE BEARING ADJUSTING SCREW ON PINION

Using SST, remove the adjusting screw.

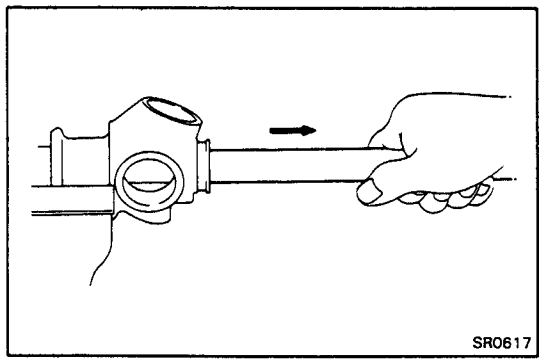
SST 09612-10092


SR0618 B2336

10. REMOVE PINION

(a) Fully pull the rack from the housing side and align the rack notched portion with the pinion.

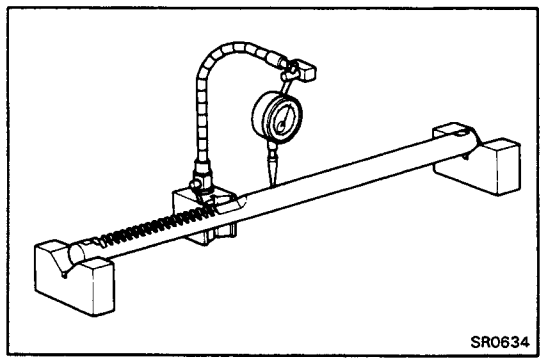
(b) Remove the pinion together with the upper bearing.


SR0617

11. REMOVE RACK

Remove the rack without revolving it from the pinion side.

CAUTION: If the rack is pulled from the tube side, there is a possiblity of damaging the bushing with the rack teeth surface.


SR0634

INSPECTION AND REPAIR OF STEERING GEAR HOUSING

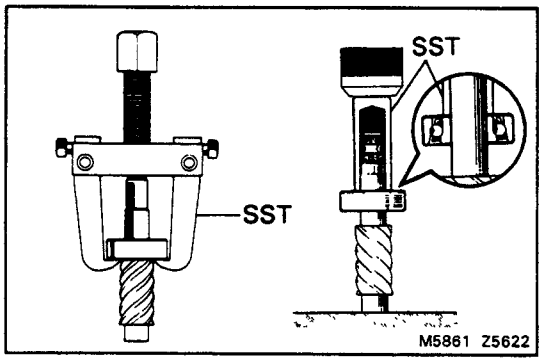
1. INSPECT RACK

(a) Place the rack on V-blocks.

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

Maximum circle runout: 0.3 mm (0.012 in.)

If the circle runout is greater than maximum, replace the rack.



2. IF NECESSARY, REPLACE PINION UPPER BEARING

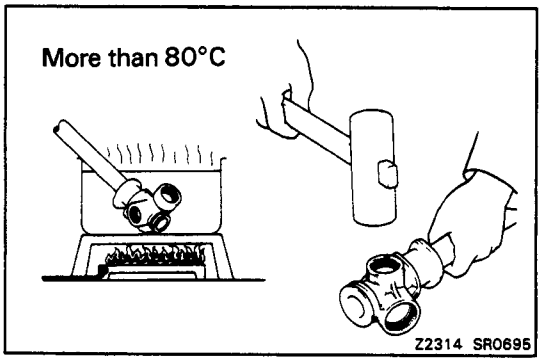
(a) Using SST, remove the bearing.

SST 09628-62011

(b) Using SST, install a new bearing.

SST 09612-10092

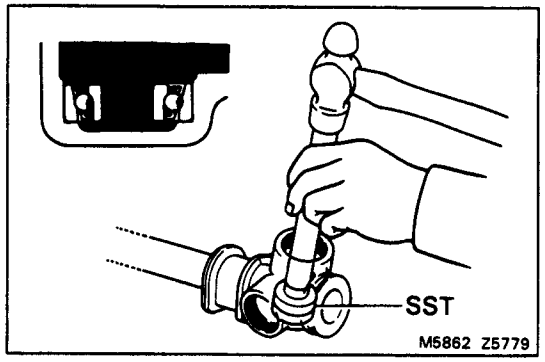
CAUTION: Observe the correct bearing direction.



3. IF NECESSARY, REPLACE PINION LOWER BEARING

(a) Gradually heat the rack housing above 80°C (176°F).

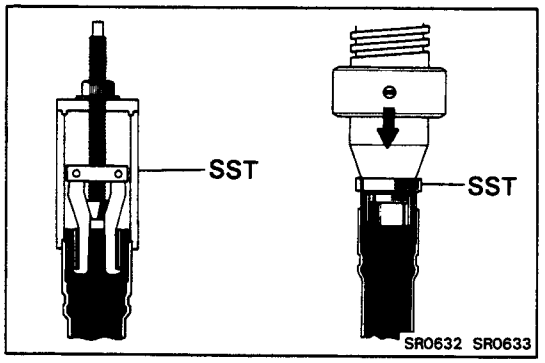
(b) Tap the rack housing with a plastic-faced hammer and remove the bearing by recoil.



(c) Gradually heat the rack housing above 80°C (176°F). Then using a driver and hammer, carefully tap in a new bearing.

SST 09304-47010

CAUTION: Observe the correct bearing direction.



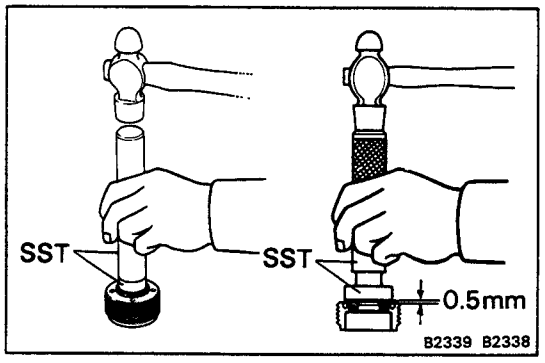
4. IF NECESSARY, REPLACE RACK BUSHING

(a) Using SST, remove the bushing.

SST 09612-10092

(b) Using SST and a press, press in a new bushing until the rack housing edge surface is even with the SST surface.

SST 09612-24012



5. REPLACEMENT OF PINION OIL SEAL

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

SST 09620-30010 and 09630-24013

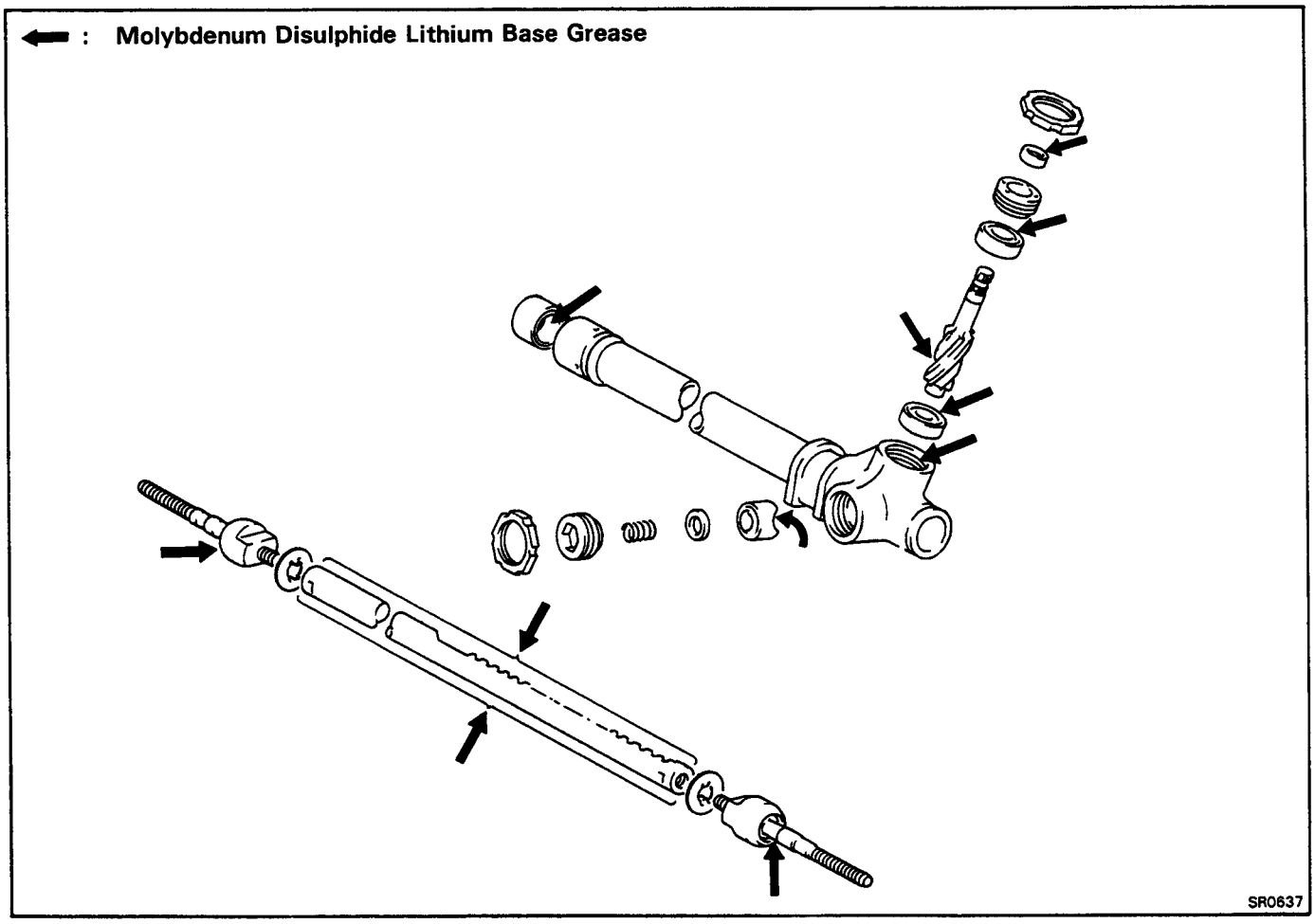
(b) Using SST and a hammer, drive in a new oil seal until it is protruding 0.5 mm (0.020 in.)

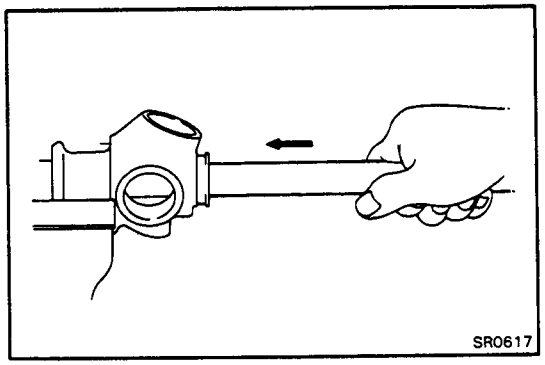
SST 09620-30010 and 09630-24013

ASSEMBLY OF STEERING GEAR HOUSING

(See page SR-15)

1. COAT GREASE ON PARTS INDICATED BY ARROWS:

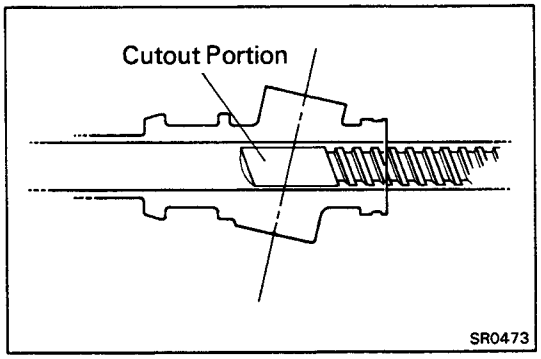




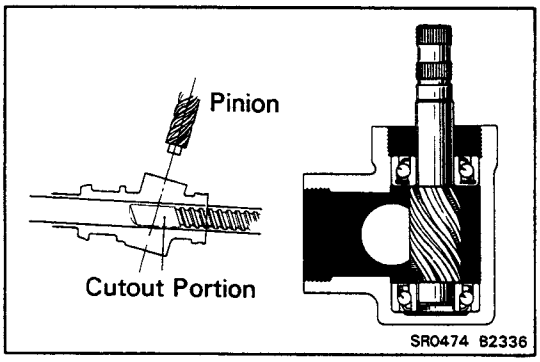
2. INSTALL RACK INTO RACK HOUSING

(a) Install the rack without revoling it from the pinion side into the rack housing.

(b) Set the rack notched portion so that the pinion can be positioned inside.



(c) Line up the cutout portion of the rack with the pinion.



3. INSTALL PINION INTO GEAR HOUSING

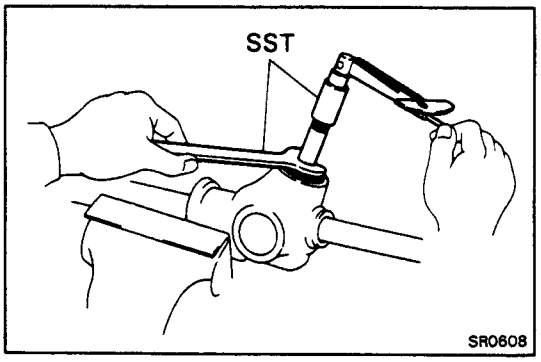
(a) Insert the pinion into the gear housing.

(b) Check that the pinion end is securely in the lower bearing.

4. INSTALL PINION BEARING ADJUSTING SCREW

(a) Apply liquid sealer to the screw surface of the adjusting screw.

(b) Temporarily install the adjusting screw.



5. ADJUST PINION PRELOAD

(a) Line up the cutout portion of the rack with the pinion.

(b) Using SST, tighten the adjusting screw until the pinion preload is 3.7 kg-cm (3.2 in.-lb 0.4 N·m).

SST 09612-10092

(c) Loosen the adjusting screw until the pinion preload 2.3 – 3.3 kg-cm (2.0 – 2.9 in.-lb, 0.2 – 0.3 N·m)

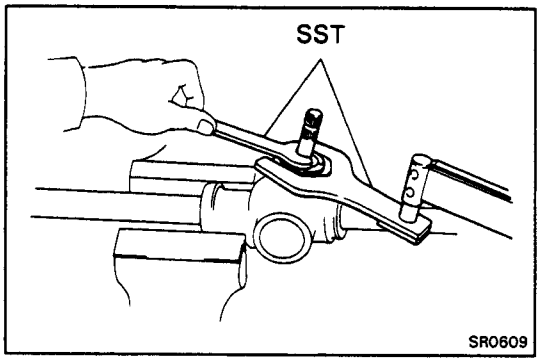
(d) Apply liquid sealer onto the lock nut and gear housing contact surfaces, and install the lock nut.

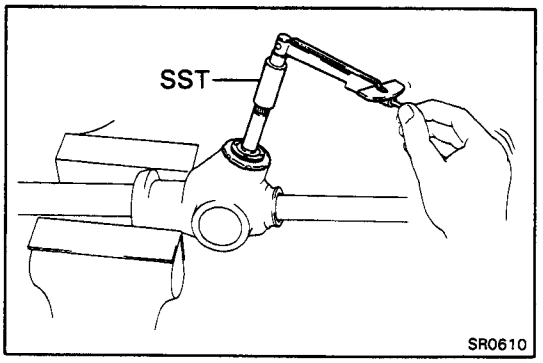
(e) Hold the adjusting screw in position with SST, and tighten the lock nut with SST.

SST 09612-10092

Torque: 1,150 kg-cm (83 ft-lb, 113 N·m)

NOTE: The pinion preload will by decrease by 0.8 kg-cm (0.7 in.-lb, 0.08 N·m) with torquing.





(f) Using SST, check the pinion preload.

SST 09612-10092

Adjusted preload (turning):
1.5 – 2.5 kg-cm (1.3 – 2.2 in.-lb, 0.15 – 0.24 N·m)

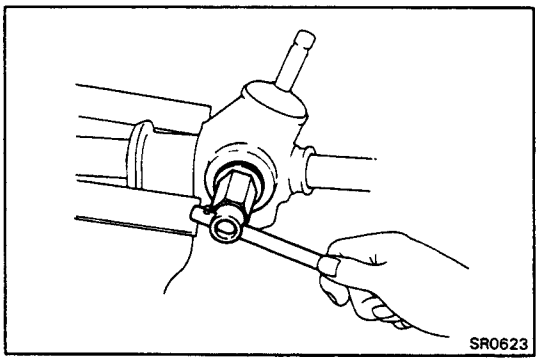
6. MESH RACK AND PINION

CAUTION: When meshing, guide the rack with your finger to protect the rack bushing from damage.

7. INSTALL RACK GUIDE

8. INSTALL RACK GUIDE SPACER

9. INSTALL RACK GUIDE SPRING

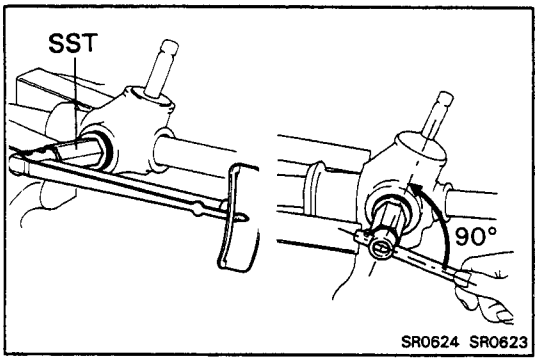


10. INSTALL RACK GUIDE SPRING CAP

(a) Apply liquid sealer to the screw surface of the spring cap.

(b) Using SST, temporarily install the spring cap.

SST 09612-10092



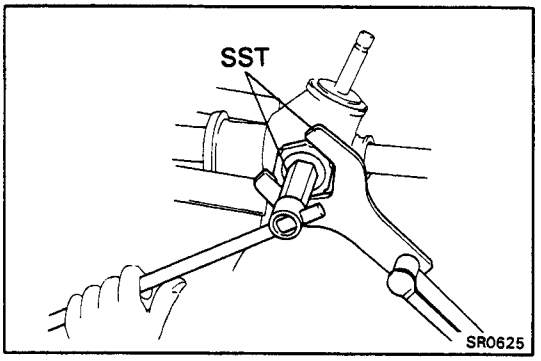
11. ADJUST TOTAL PRELOAD

(a) Using SST, tighten the rack guide spring cap several times.

SST 09612-10092

Torque: 250 kg-cm (18 ft-lb, 25 N·m)

(b) From this position, loosen the cap about 90°.

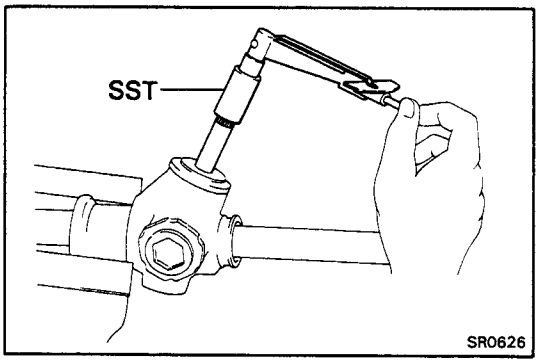


(c) Apply liquid sealer onto the lock nut and gear housing contact surfaces, and install the lock nut.

(d) Hold the rack guide spring cap in position with SST, and tighten the lock nut with SST.

SST 09612-10092

Torque: 700 kg-cm (51 ft-lb, 69 N·m)

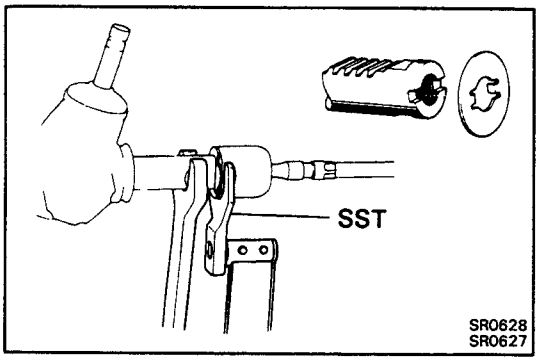


(e) Using SST, check the total preload with a full stroke of the rack.

SST 09612-10092

Preload (turning):
Little resistance
5 kg-cm (4.3 in.-lb, 0.5 N·m) or more
Strong resistance
10 – 13 kg-cm (8.7 – 11.3 in.-lb, 1.0 – 1.2 N·m)

If the preload is not within specification, readjust by turning the spring cap.



12. INSTALL RACK ENDS

(a) Align the claw of the claw washer with the rack groove, and install the claw washer and rack end.

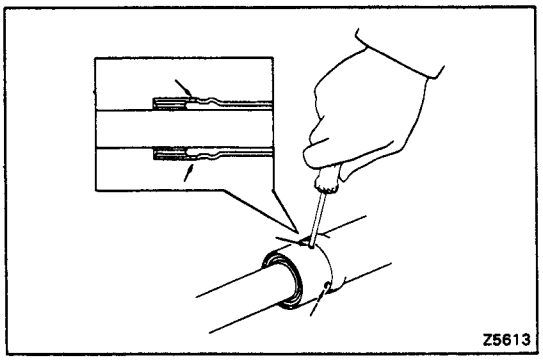
(b) Using SST, tighten the rack end.

SST 09612-10092

Torque: 850 kg-cm (61 ft-lb, 83 N·m)

(c) Stake the claw washer.

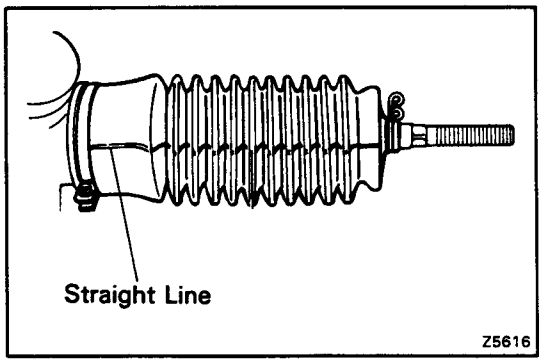
CAUTION: Be careful not to jolt the rack.



13. INSTALL RACK BOOTS

(a) Insure that the tube hole is not clogged with grease.

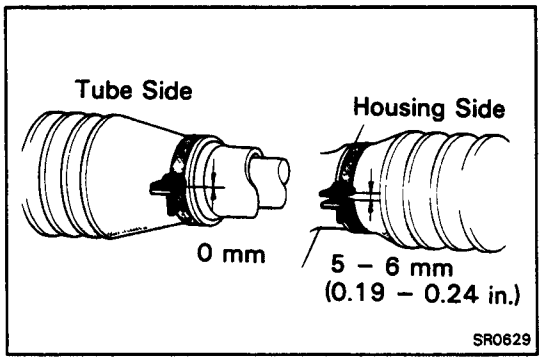
NOTE: If the tube hole is clogged, the pressure inside the boot will change after it is assembled and the handle turned.



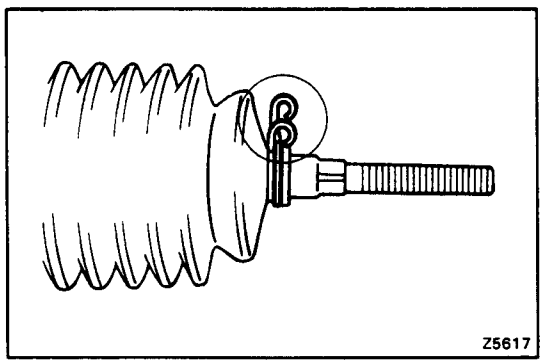
(b) Install the rack boot to the housing.

CAUTION:

- **As the left and right boots are different, be careful not to intercharge them.**
- **The tapered edge goes toward the tube side.**
- **Be careful not to damage the boots.**
- **Do not twist the boots.**

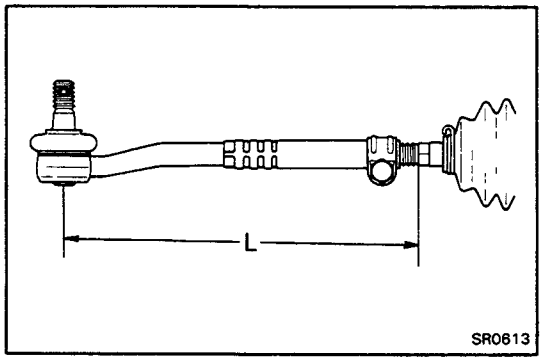


(c) Install the clamps as shown.



(d) Install the clip so that the ends are facing outward.

14. INSTALL PINION DUST COVER

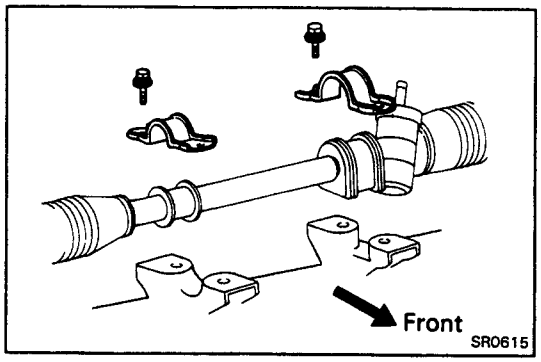


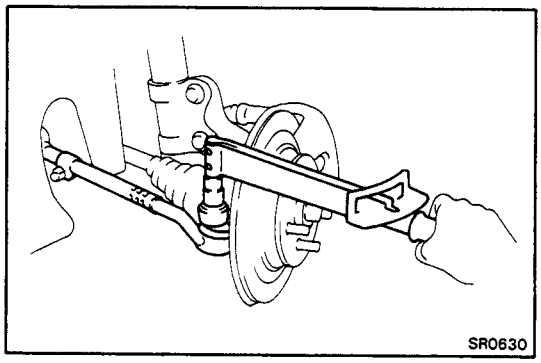
15. INSTALL TIE ROD ENDS

Screw the tie rod end onto the rack end until the matchmarks are aligned.

Do not tighten the clamp bolt of the tie rod end yet.

NOTE: The length of L in the figure should be approximately 289 mm (11.38 in.).





INSTALLATION OF STEERING GEAR HOUSING

(See page SR-14)

1. **INSTALL GEAR HOUSING ASSEMBLY**

   CAUTION: Be careful not to damage the rack boots.

   (a) Install the two bushings to the tube of the gear housing.

   (b) Install the gear housing with the two brackets and four bolts. Torque the bolts.

   Torque: 590 kg-cm (43 ft-lb, 58 N·m)

2. **CONNECT TIE ROD ENDS TO STEERING KNUCKLES**

   (a) Connect the tie rod end with the castle nut. Torque the nut.

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

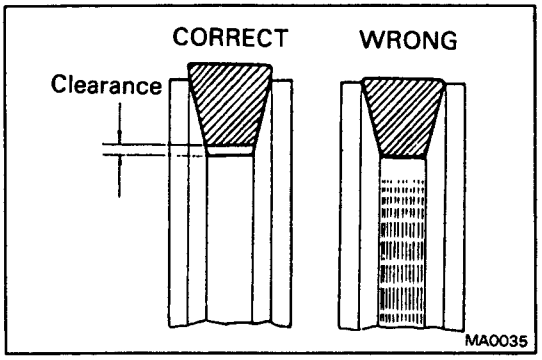
   (b) Secure the castle nut with a new cotter pin.

3. **INSTALL SLIDING YOKE**
   (See step 8 on page SR-8)

4. **ADJUST TOE-IN** **(See page FA-3)**

5. **INSURE THAT BOOTS ARE NOT TWISTED BY CHECKING LINE ON BOOT**

6. **CHECK STEERING WHEEL CENTER POINT**



POWER STEERING

On-Vehicle Inspection

INSPECTION OF INSPECT DRIVE BELT

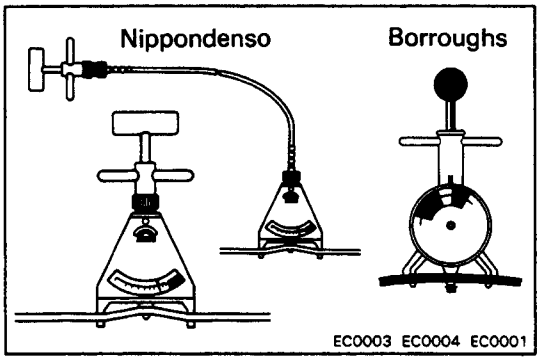
INSPECT DRIVE BELT

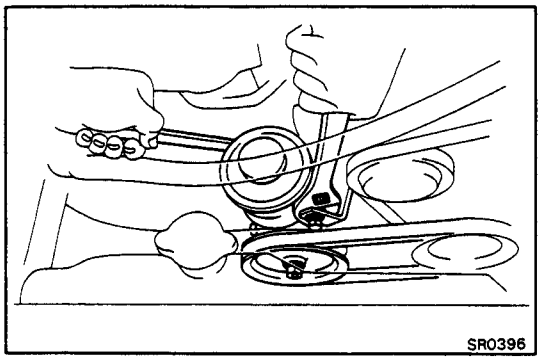
(a) Visually check the drive belt for cracks, oiliness or wear. Check that the belt does not trouch the bottom of the pulley groove.
If necessary, replace the drive belt.

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

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

Drive belt tension: Used belt 80 ± 20 lb
New belt 125 ± 25 lb





If necessary, adjust the drive belt tension.

NOTE:
- "New belt" refers to a brand new belt which has never been used.
- "Used belt" refers to a belt which has been run on an engine for 5 minutes or more.

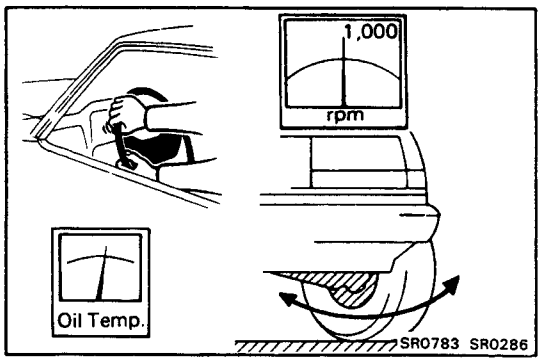
FLUID LEVE CHECK

1. **KEEP VEHICLE LEVEL**

2. **BOOST FLUID TEMPERATURE**

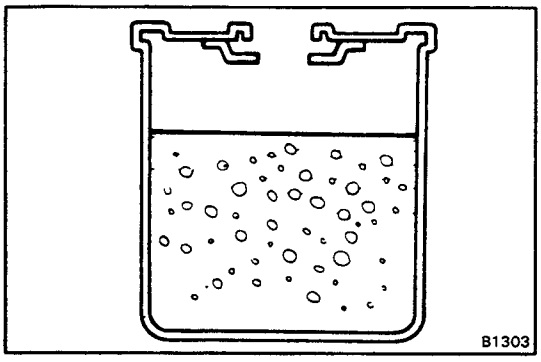
With the engine idling at 1,000 rpm's or less, turn the steering wheel from lock to lock several times to boost fluid temperature.

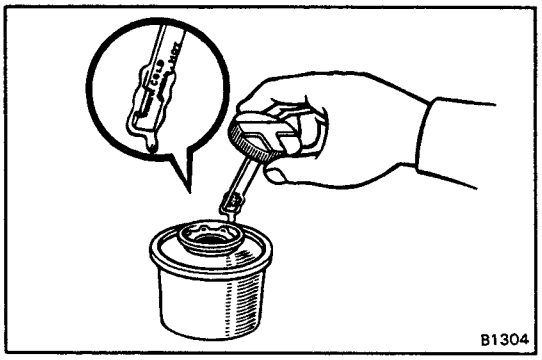
Fluid temperature: 80°C (176°F)



3. **CHECK FOR FOAMING OR EMULSIFICATION**

NOTE: Foaming and emulsification indicate the existence of air in the system or that the fluid level is too low.





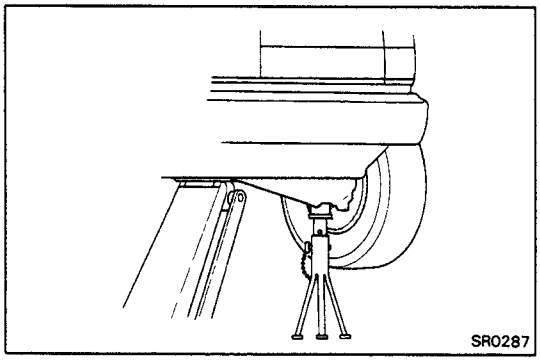
4. **CHECK FLUID LEVEL IN RESERVOIR**

Check the fluid level and add fluid if necessary.

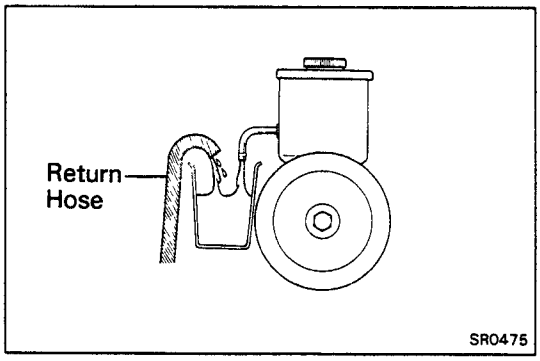
Fluid: ATF DEXRON or DEXRON II

NOTE: Check that fluid level is within the "HOT" level of the dipstick. If the fluid is cold, check that it is within the "COLD" level of the dipstick.

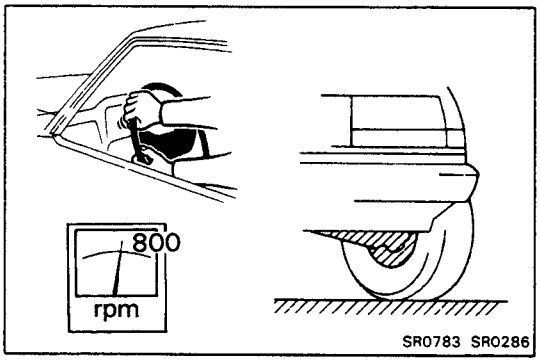
REPLACEMENT OF POWER STEERING FLUID



1. **JACK UP FRONT OF VEHICLE AND SUPPORT IT WITH STANDS**

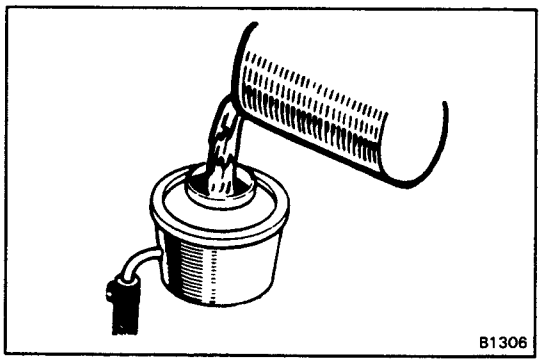


2. **REMOVE FLUID RETURN HOSE FROM OIL RESERVOIR AND DRAIN FLUID INTO CONTAINER**



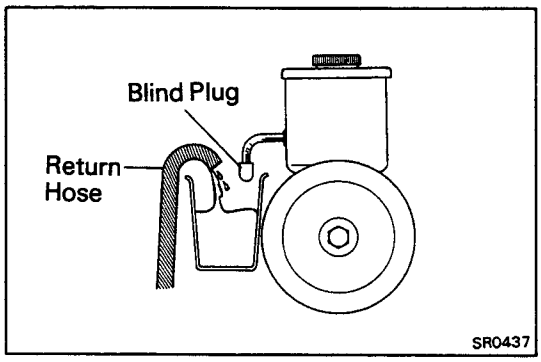
3. **WITH ENGINE IDLING, TURN STEERING WHEEL FROM LOCK TO LOCK WHILE DRAINING FLUID**

4. **STOP ENGINE**



5. **FILL RESERVOIR WITH FRESH FLUID**

Fluid grade: ATF DEXRON or DEXRON II
Total capacity: 800 cc (48.8 cu in.)



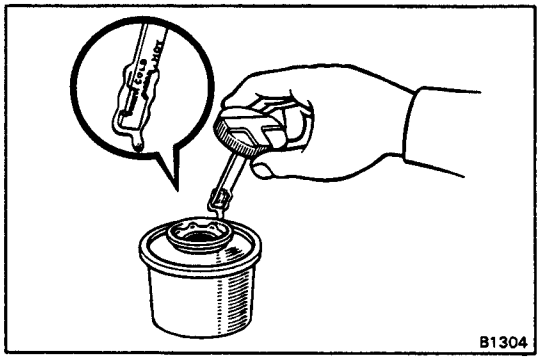
6. START ENGINE AND RUN IT AT 1,000 RPM'S

After 1 or 2 seconds, fluid will begin to discharge from the return hose. Stop the engine immediately at this time.

7. REPEAT STEPS 5 AND 6 FOUR OR FIVE TIMES UNTIL THERE IS NO MORE AIR IN FLUID

8. CONNECT RETURN HOSE TO OIL RESERVOIR

9. BLEED POWER STEERING SYSTEM



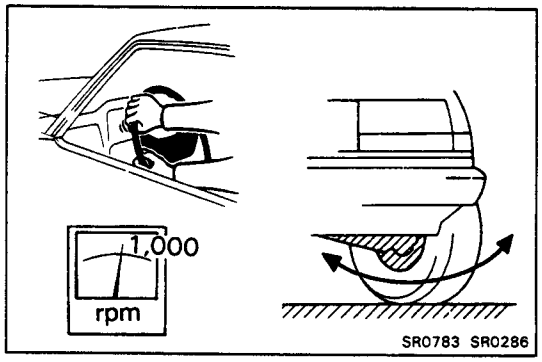
Bleeding of Power Steering System

1. CHECK FLUID LEVEL IN RESERVOIR

Check the fluid level and add fluid if necessary.

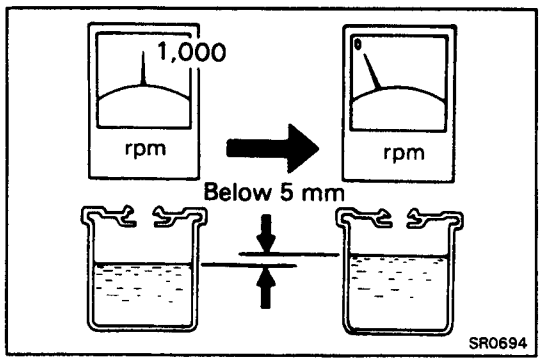
Fluid grade: ATF DEXRON or DEXRON II

NOTE: Check that the fluid level is within the "HOT" level of the dipstick. If the fluid is cold, check that it is within the "COLD" level.



2. START ENGINE AND TURN STEERING WHEEL LOCK TO LOCK THREE OR FOUR TIMES

Run the engine at 1,000 rpm's or less.

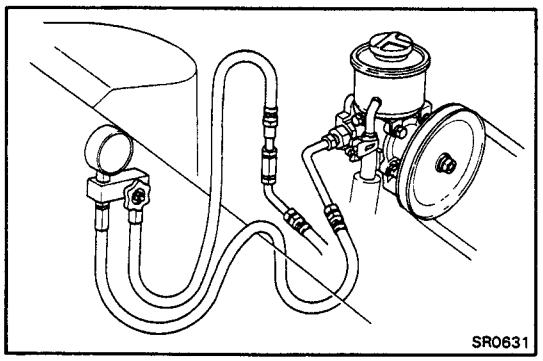


3. CHECK THAT FLUID IN RESERVOIR IS NOT CLOUDY OR FOAMY AND DOES NOT RISE OVER MAXIMUM WHEN ENGINE IS STOPPED

Measure the fluid level with the engine running. Stop the engine and measure the fluid level.

Maximum rise: 5 mm (0.20 in.)

If a problem is found, repeat steps 7 and 8. Repair the ps pump. If the problem persists.



Oil Pressure Check

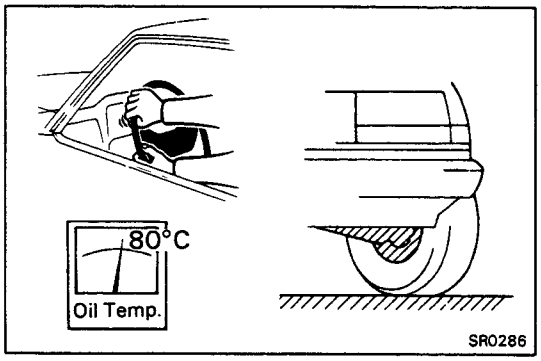
1. CONNECT PRESSURE GAUGE

(a) Using SST, remove the pressure line from the power steering pump.

SST 09631-22020

(b) Connect the gauge side of the pressure gauge to the power steering pump.

(c) Connect the valve side of the pressure gauge to the pressure line.

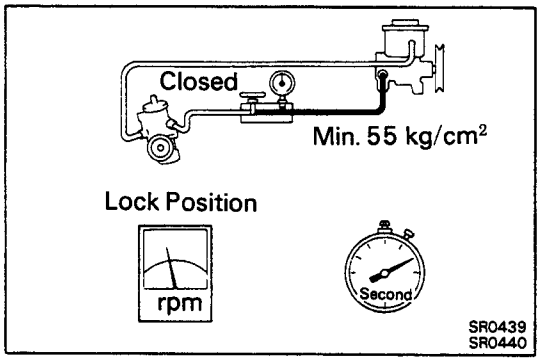


(d) Bleed the system. Then start the engine and turn the steering wheel from lock to lock two or three times.

(e) Check that the fluid level is correct.

2. CHECK THAT FLUID TEMPERATURE IS AT LEAST 80°C (176°F)

3. START ENGINE AND RUN IT AT IDLE



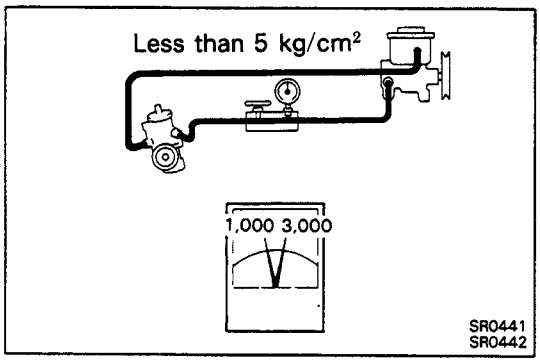
4. CHECK FLUID PRESSURE READING WITH VALVE CLOSED

Close the pressure gauge valve and observe the reading on the gauge.

Minimum pressure: 55 kg/cm² (782 psi, 5,394 kPa)

NOTE: Do not keep the valve closed for more than 10 seconds.

If pressure is low, repair or replace the vane pump.



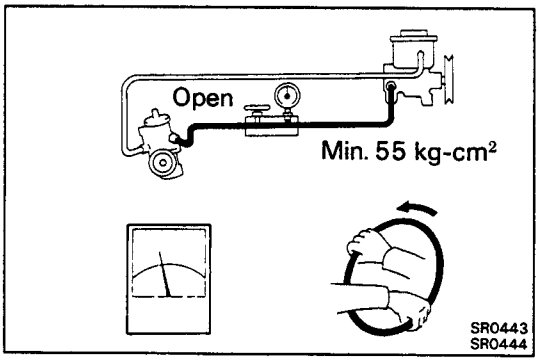
5. OPEN VALVE FULLY

6. CHECK AND RECORD PRESSURE READING AT 1,000 RPM'S

7. CHECK AND RECORD PRESSURE READING AT 3,000 RPM'S

Check that there is less than 5 kg/cm² (71 psi, 490 kPa) difference in pressure between the 1,000 rpm and 3,000 rpm checks.

If the difference is greater, repair or replace the vane pump flow control valve.

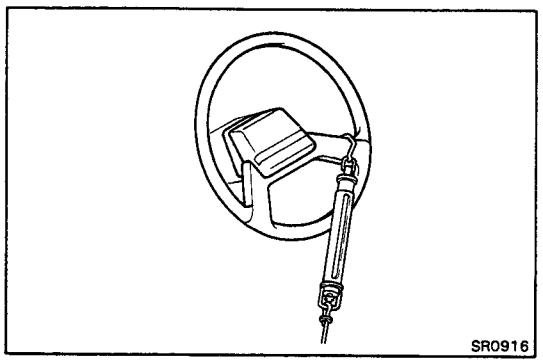


8. CHECK PRESSURE READING WITH STEERING WHEEL TURNED TO FULL LOCK

Be sure the pressure gauge valve is fully opened and the engine idling.

Minimum pressure: 55 kg/cm² (782 psi, 5,394 kPa)

If pressure is low, the gear housing has an internal leak and must be repaired or replaced.



9. MEASURE STEERING EFFORT

Center the steering wheel and run the engine at idle.

Using a scale, measure the steering effort in both directions.

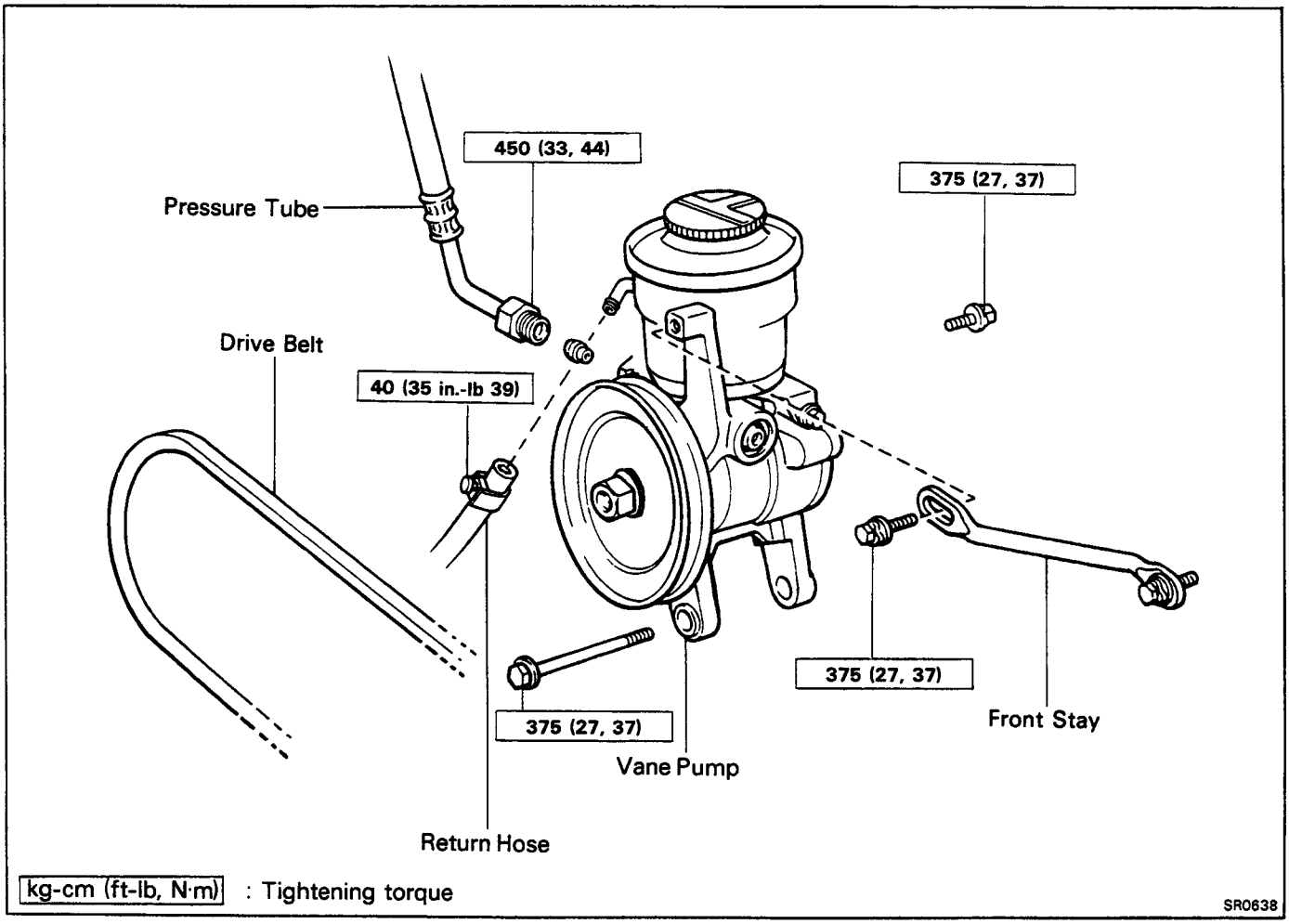
Maximum steering effort: 5.5 kg (12.1 lb, 54 N)

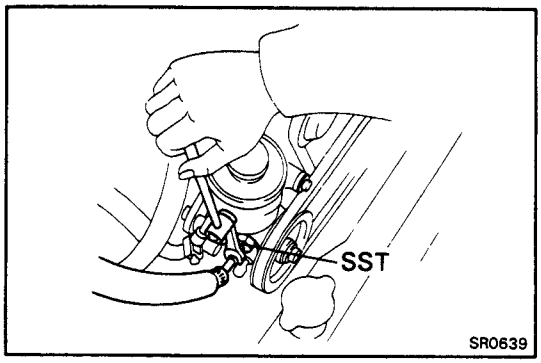
If steering effort is excessive, repair the power steering unit.

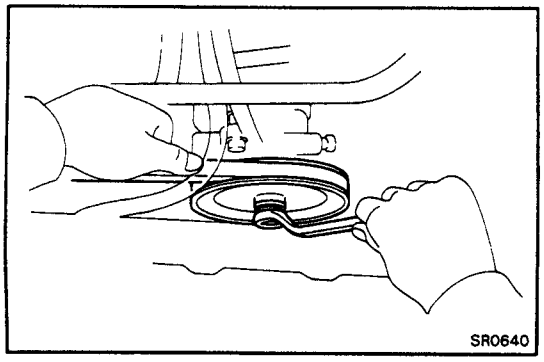
NOTE: Be sure to consider the tire type, pressure and contact surface before making your diagnosis.

Power Steering Pump

REMOVAL OF POWER STEERING PUMP

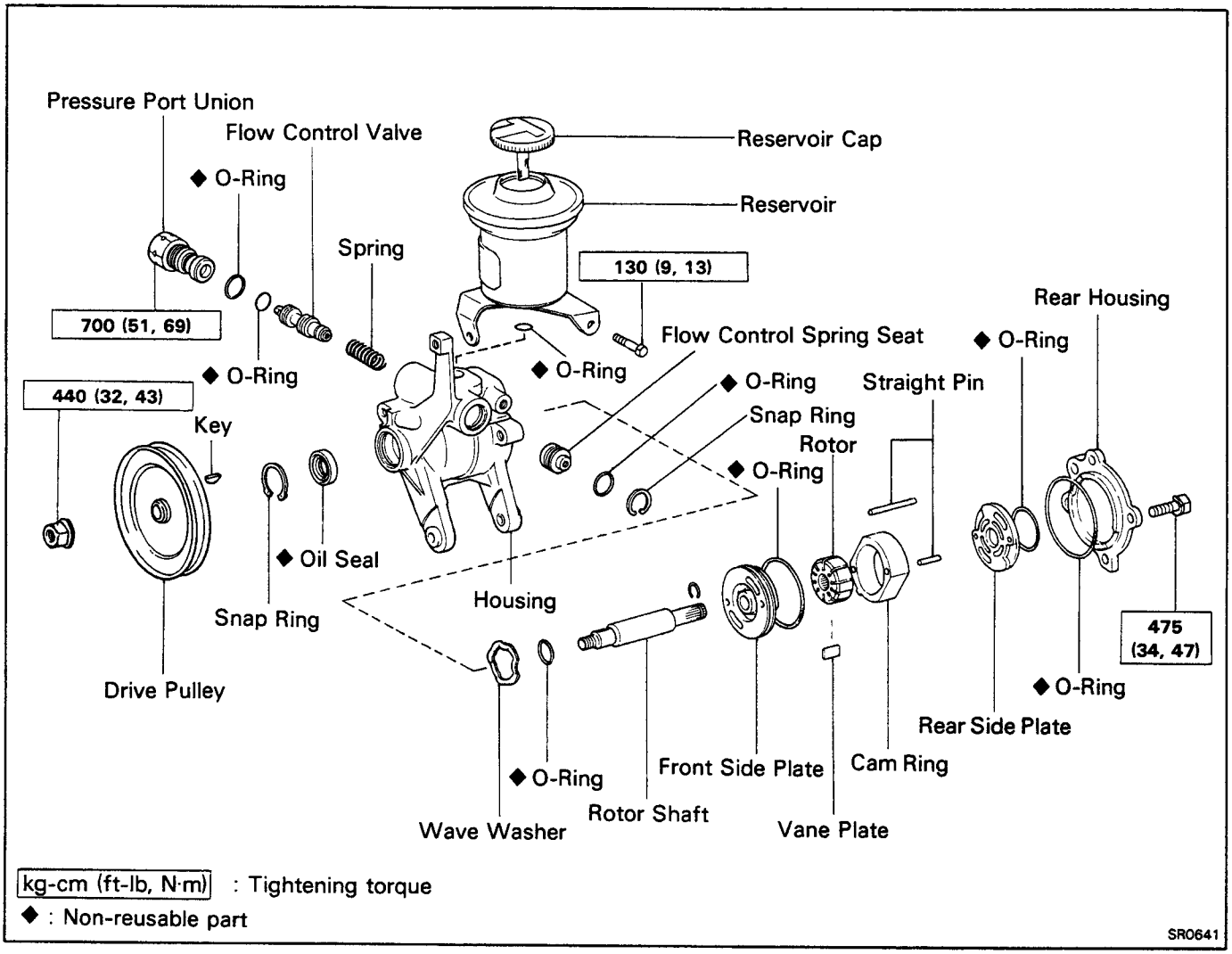






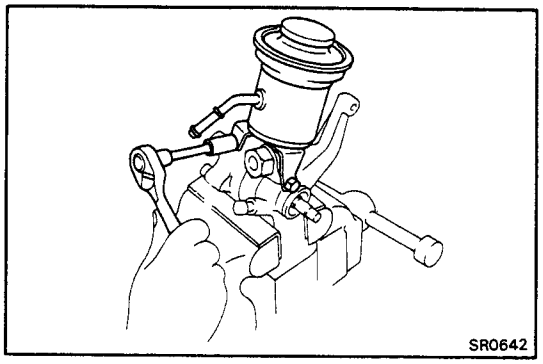
1. **TAKE OUT FLUID FROM RESERVOIR WITH SYRINGE OR SUCH**
2. **DISCONNECT PRESSURE TUBE**
   (a) Using SST, disconnect the tube.
   SST 09631-22020
   (b) Remove the union seat from the pressure port union.
3. **DISCONNECT RETURN HOSE**
   Loosen the hose clamp and pull off the hose.
4. **RAISE VEHICLE**
5. **REMOVE ENGINE FRONT UNDER COVER**
6. **LOOSEN DRIVE PULLEY MOUNT NUT**
   Push on the drive belt to hold the pulley in place and loosen the nut.
7. **REMOVE FRONT STAY**
8. **REMOVE DRIVE BELT**
9. **REMOVE POWER STEERING (PS) PUMP**
   Remove the two bolts and ps pump.

COMPONENTS

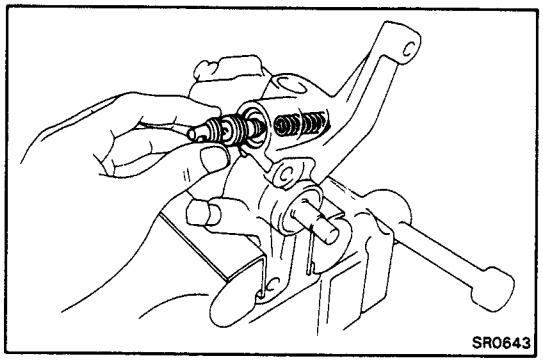


kg-cm (ft-lb, N·m) : Tightening torque
◆ : Non-reusable part

SR0641



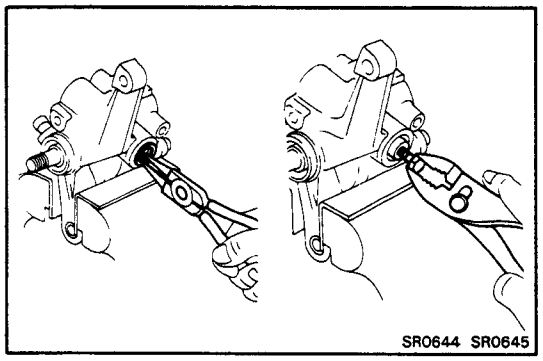
SR0642



SR0643

DISASSEMBLY OF POWER STEERING PUMP

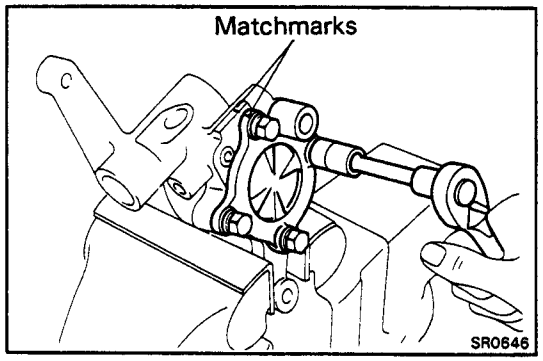
1. **REMOVE DRIVE PULLEY**
2. **MOUNT POWER STEERING PUMP IN VISE**
   CAUTION: Do not tighten the vise too tight.
3. **REMOVE RESERVOIR**
   Remove the three bolts and pull out the reservoir.
4. **REMOVE FLOW CONTROL VALVE AND SPRING**
   Remove the pressure port union, and remove the valve and spring.



5. REMOVE FLOW CONTROL SPRING SEAT

(a) Using snap ring pliers, remove the snap ring.

(b) Temporarily install a bolt and pull out the seat.



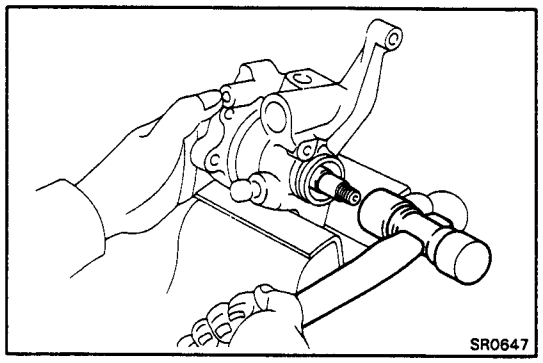
6. REMOVE REAR HOUSING

(a) Place matchmarks on the front and rear housings.

(b) Remove the four bolts and rear housing.

7. REMOVE REAR SIDE PLATE, VANE PLATE, CAM RING AND STRAIGHT PINS

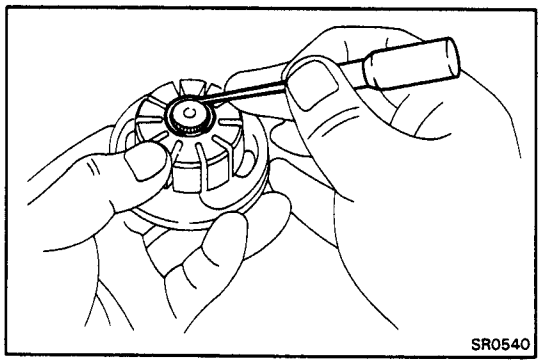
CAUTION: Be careful not to scratch the parts.



8. REMOVE ROTOR SHAFT

(a) Using a plastic-faced hammer, tap out the rotor assembly.

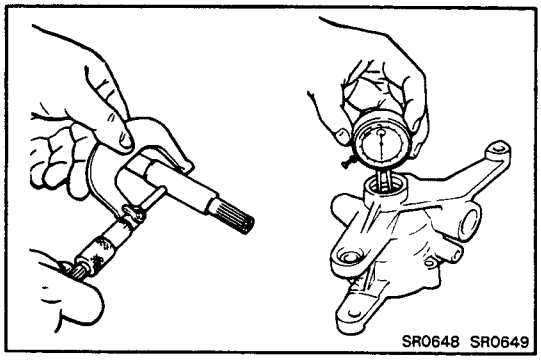
(b) Remove the wave washer.

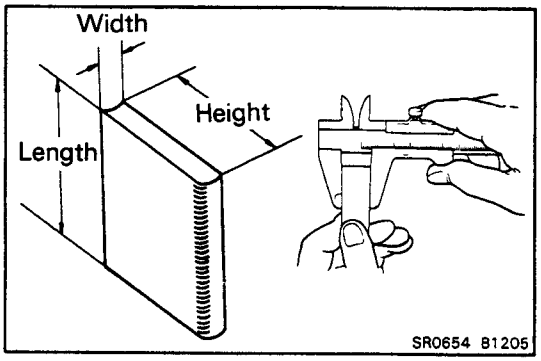


9. DISASSEMBLE ROTOR, SHAFT AND FRONT SIDE PLATE

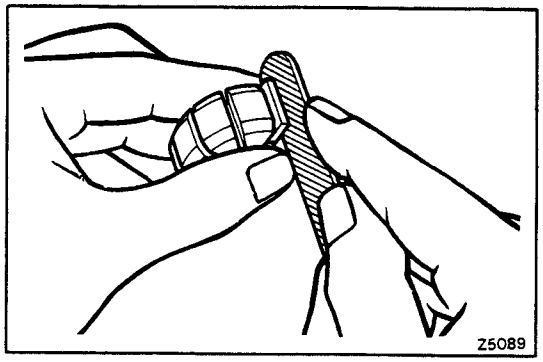
Using a small screwdriver, pry out the snap ring and remove the rotor and plate from the shaft.

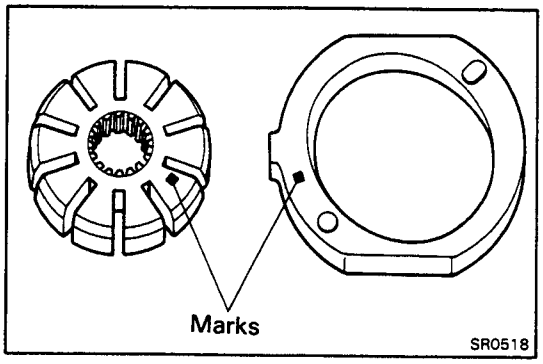
CAUTION: Be careful not to scratch the rotor.


SR0648 SR0649

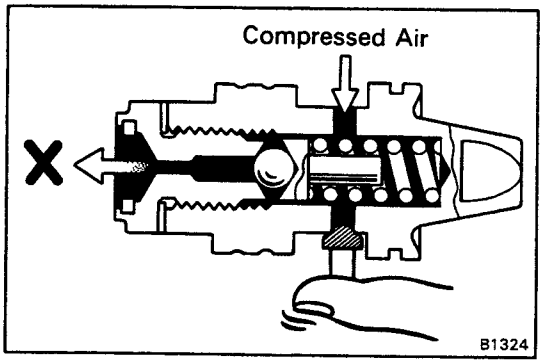


SR0654 B1205


Z5089



SR0518



B1324

INSPECTION AND REPAIR OF POWER STEERING PUMP

1. INSPECT OIL CLEARANCE BETWEEN ROTOR SHAFT AND BUSHING

Using a micrometer and calipers, measure the oil clearance.

Standard clearance: **0.01 – 0.03 mm (0.0004 – 0.0012 in.)**
Maximum clearance: **0.07 mm (0.0028 in.)**

If the clearane is greater than maximum, replace the entire vane pump.

2. INSPECT ROTOR AND VANE PLATES

(a) Using calipers, measure the height, width and length of the vane plates.

Minimum height: **8.1 mm (0.319 in.)**
Minimum width: **1.797 mm (0.0707 in.)**
Minimum length: **14.988 mm (0.5901 in.)**

(b) Using a feeler gauge, measure the clearance between the vane plate land and vane plate.

Maximum clearance: **0.028 mm (0.0011 in.)**

If the clearance is greater than maximum, replace the vane plate and/or rotor with one stamped with the same mark on the cam ring.

Inscribed mark: **1, 2, 3, 4 or None**

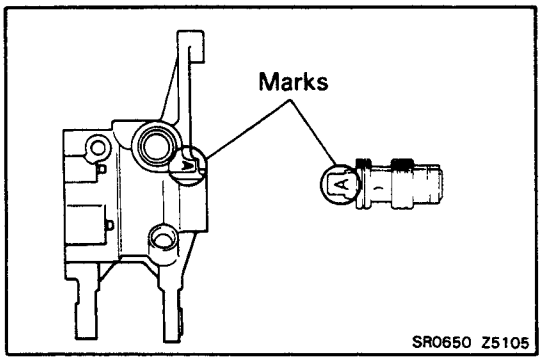
NOTE: There are five vane plate lengths with the following rotor and cam ring marks:

Rotor and cam ring mark	Vane plate length mm (in.)
None	14.996 – 14.998 (0.5904 – 0.5905)
1	14.994 – 14.996 (0.5903 – 0.5904)
2	14.992 – 14.994 (0.5902 – 0.5903)
3	14.990 – 14.992 (0.59016 – 0.59024)
4	14.988 – 14.990 (0.5901 – 0.5902)

3. INSPECT FLOW CONTROL VALVE

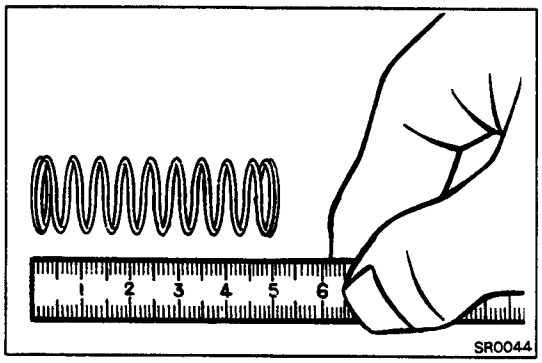
(a) Coat fluid to the valve and check that it falls smoothly into the valve hole by its own weight.

(b) Check the flow control valve for leakage.
Close one of the holes and apply compressed air [4 or 5 kg/cm^2 (57 or 71 psi, 392 or 490 kPa)] into the opposite side, and confirm that air does not come out of the end hole.



If necessary, replace the valve with one having the same letter as on the front housing.

Inscribed mark: A, B, C, D, E or F

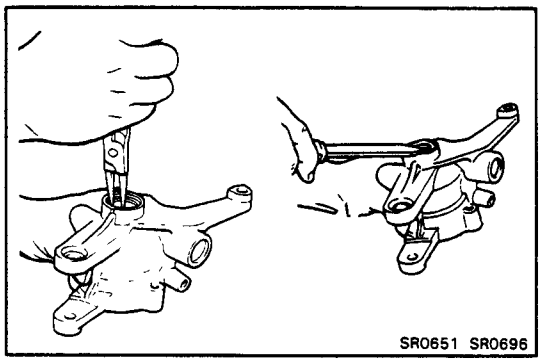


4. INSPECT FLOW CONTROL VALVE SPRING

Using a scale, measure the free length of the spring.

Free length: 47 – 50 mm (1.85 – 1.97 in.)

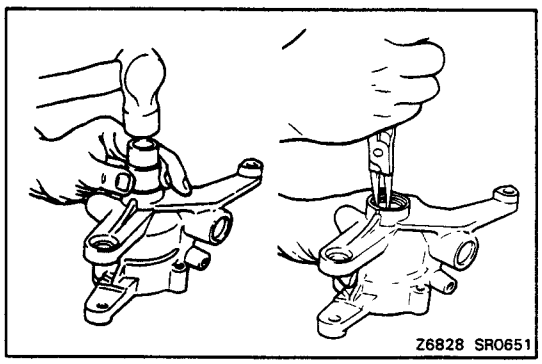
If the free length is not within specification, replace the spring.



5. REPLACEMENT OF OIL SEAL

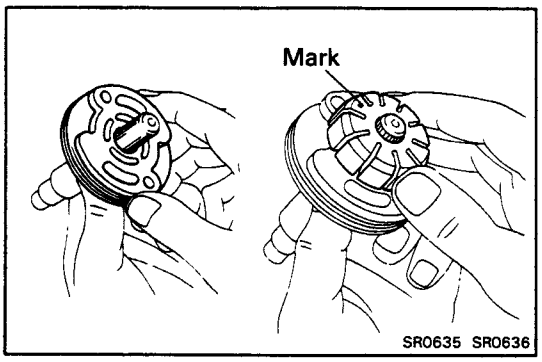
(a) Using snap ring pliers, remove the snap ring.

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



(c) Using a 21 mm (0.83 in.) socket wrench and hammer, drive in a new oil seal.

(d) Using snap ring pliers, install the snap ring.



ASSEMBLY OF POWER STEERING PUMP

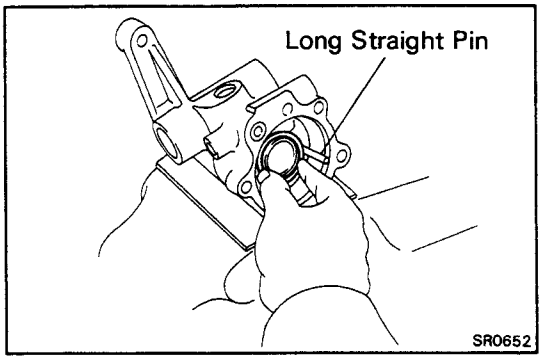
(See page SR-29)

NOTE: Coat all sliding surfaces with fluid before assembling.

1. ASSEMBLE ROTOR, FRONT SIDE PLATE AND SHAFT

(a) Place the side plate on the shaft.

(b) Place the rotor on the shaft with the inscribed mark facing upward, and secure them with the snap ring.



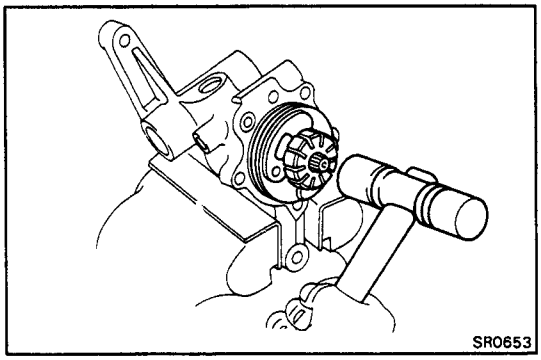
2. INSTALL ROTOR ASSEMBLY TO FRONT HOUSING

(a) Install a new O-ring in the groove of the front side plate.

(b) Install a new O-ring in the inside groove of the front housing.

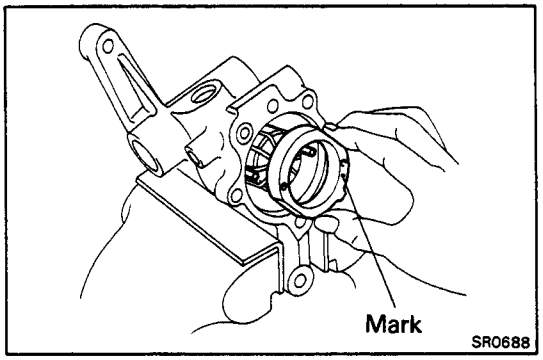
(c) Apply MP grease to the oil seal.

(d) Install the wave washer and long straight pin in the rear housing.



(e) Using a plastic-faced hammer, tap in the rotor assembly.

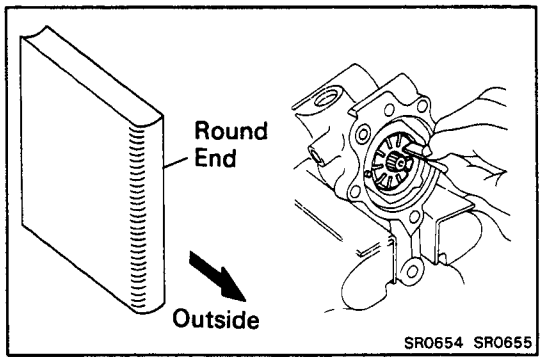
CAUTION: Be careful not to damage the oil seal and O-rings.



3. INSTALL CAM RING

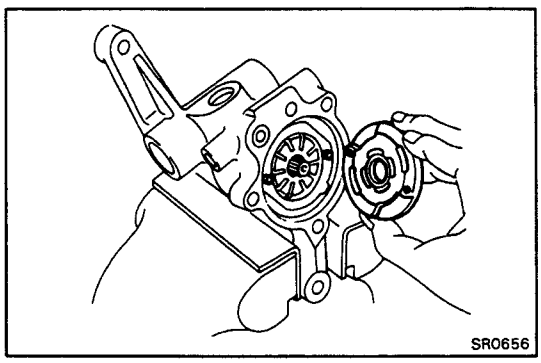
(a) Install the straight pin.

(b) Insert the cam ring, with the inscribed mark facing outward.



4. INSTALL VANE PLATES

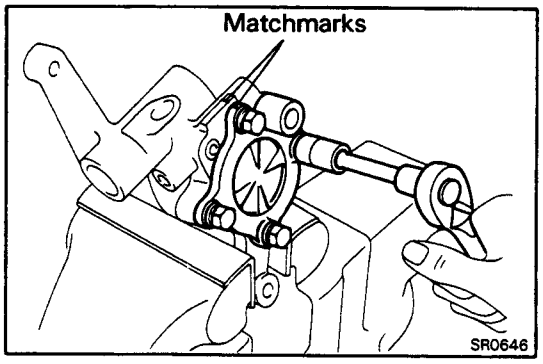
Install the ten vane plates with the round end facing outward.



5. INSTALL REAR SIDE PLATE

(a) Install a new O-ring in the groove of the side plate.

(b) Align the hole of the side plate with the pins, and install the side plate.

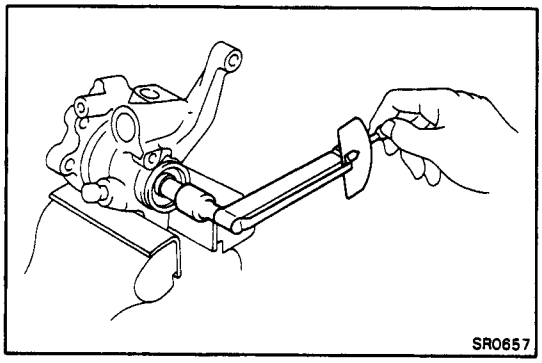


6. INSTALL REAR HOUSING

(a) Align the matchmarks on the housings and install two new O-rings and the rear housing with the four bolts.

(b) Torque the bolts.

Torque: 475 kg-cm (34 ft-lb, 47 N·m)

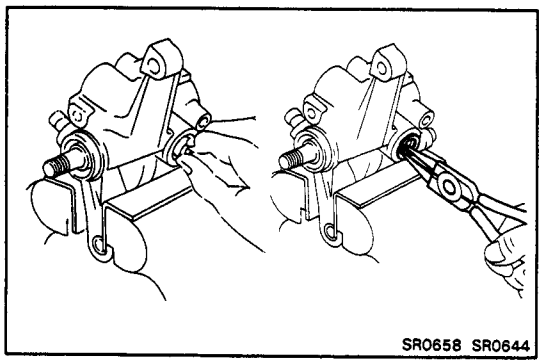


7. CHECK ROTOR SHAFT ROTATION CONDITION

(a) Check that the rotor shaft rotates smoothly without any abnormal noise.

(b) Temporarily install the pulley nut and check the rotating torque.

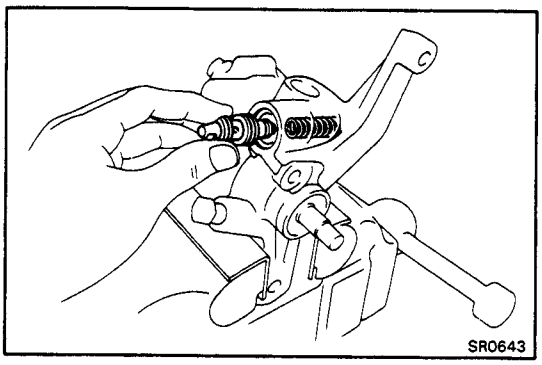
Rotating torque:
2.8 kg-cm(2.4 in.-lb, 0.3 N·m) or less



8. INSTALL FLOW CONTROL SPRING SEAT

(a) Install a new O-ring in the spring seat.

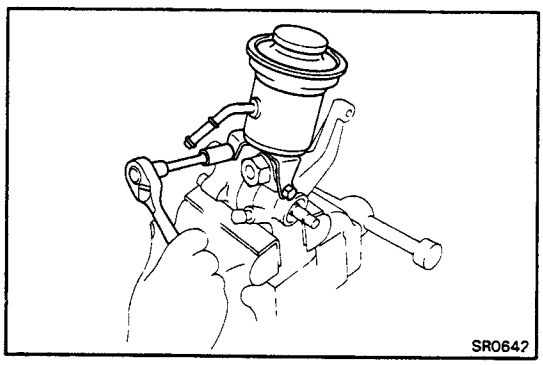
(b) Insert the spring seat and, using snap ring pliers, install the snap ring.



9. INSTALL FLOW CONTROL VALVE AND SPRING

Insert the spring and valve into the housing, and install and torque the pressure port union.

Torque: 700 kg-cm (51 ft-lb, 69 N·m)



10. INSTALL RESERVOIR

(a) Install a new O-ring in the reservoir.

(b) Push in the reservoir, and install the three bolts.

(c) Torque the bolts.

Torque: 130 kg-cm (9 ft-lb, 13 N·m)

11. TEMPORARILY INSTALL DRIVE PULLEY

INSTALLATION OF POWER STEERING PUMP

(See page SR-28)

1. **INSTALL POWER STEERING PUMP**

   Place the pump in position and provisionally install the two mount bolts.

2. **INSTALL DRIVE BELT**

   Place the belt on the pulleys and install the front stay with the two bolts.

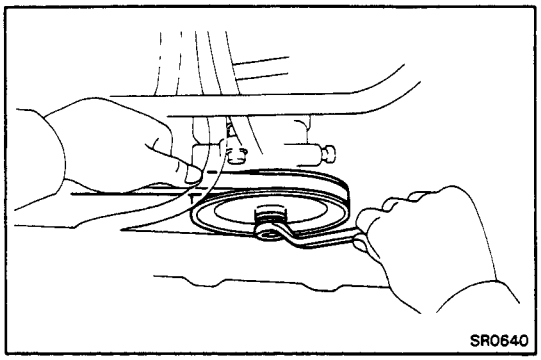
3. **TIGHTEN PUMP AND FRONT STAY MOUNT BOLTS**

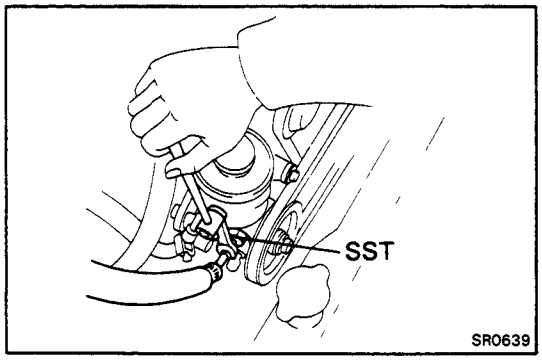
   Torque: 375 kg-cm (27 ft-lb, 37 N·m)

4. **TIGHTEN PULLEY NUT**

   Push down on the belt to hold the pulley in place and torque the pulley nut.

   Torque: 445 kg-cm (32 ft-lb, 44 N·m)


SR0640



SR0639

5. **CONNECT RETURN HOSE**

   Push the hose onto the fitting and tighten the clamp.

   Torque: 40 kg-cm (35 in.-lb, 3.4 N·m)

6. **CONNECT PRESSURE TUBE**

   Connect the union nuts of the hose and tighten them with SST.

   SST 09631-22020

   Torque: 450 kg-cm (33 ft-lb, 44 N·m)

7. **ADJUST DRIVE BELT TENSION (See page SR-24)**

8. **FILL RESERVOIR WITH FLUID**

   Fluid grade: ATF DEXRON II or DEXRON
   Pump capacity: 800 cc (48.8 cu in.)

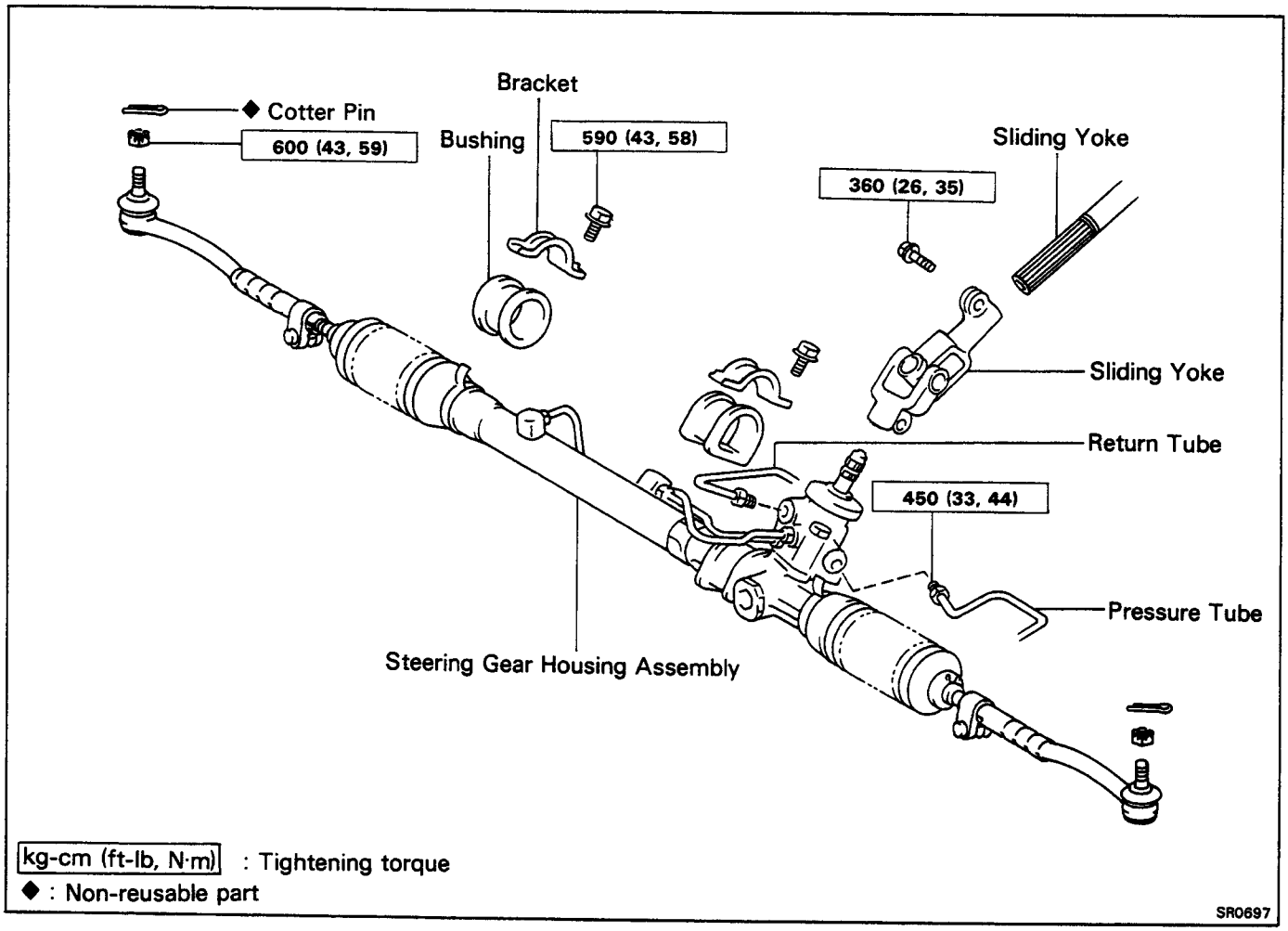
9. **BLEED POWER STEERING (See page SR-26)**

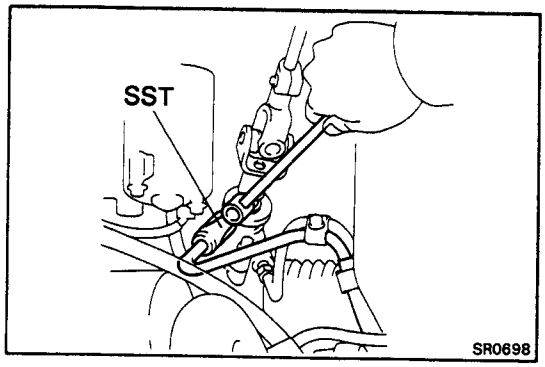
10. **CHECK FOR FLUID LEAKS**

11. **INSTALL ENGINE FRONT UNDER COVER**

Steering Gear Housing

REMOVAL OF STEERING GEAR HOUSING

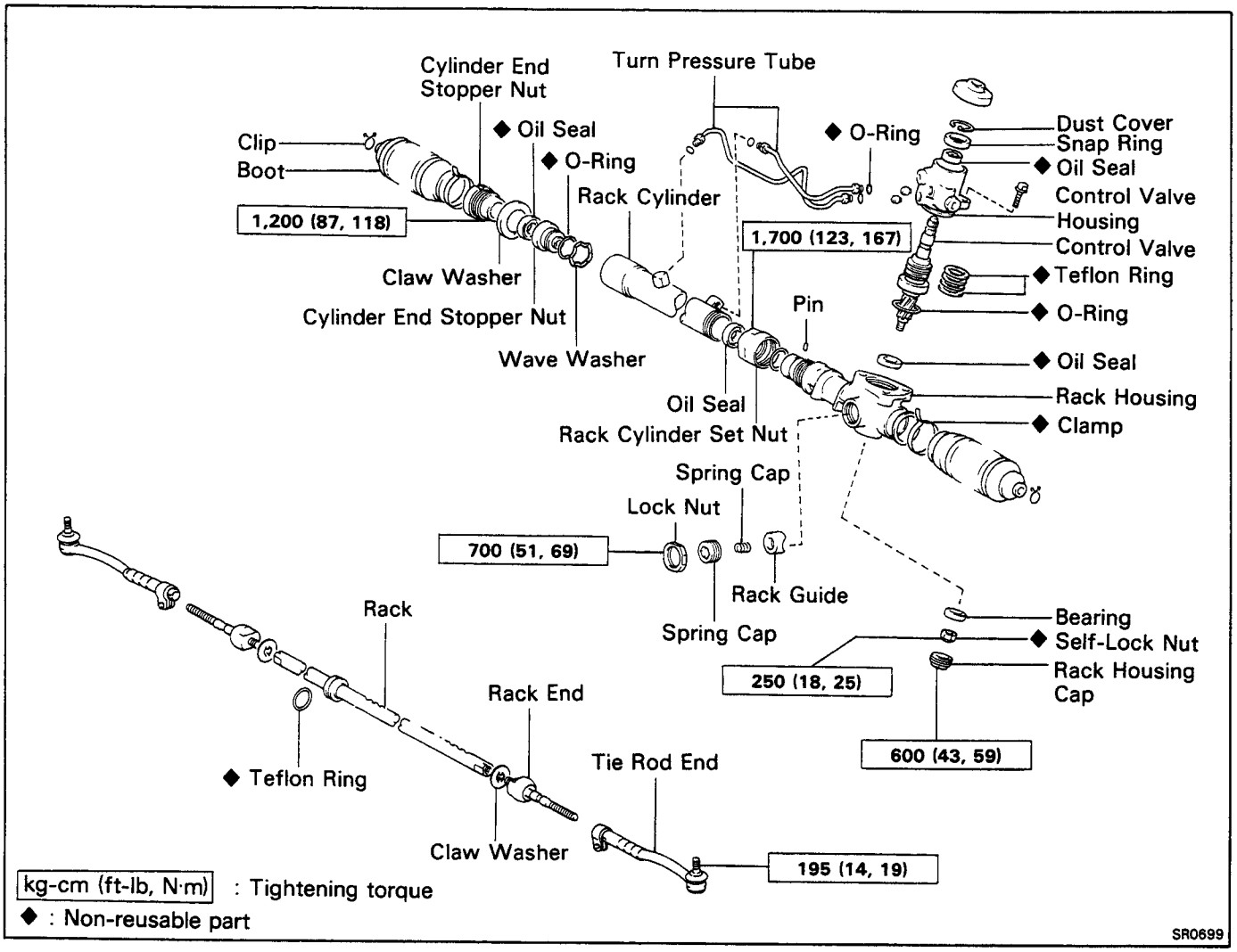


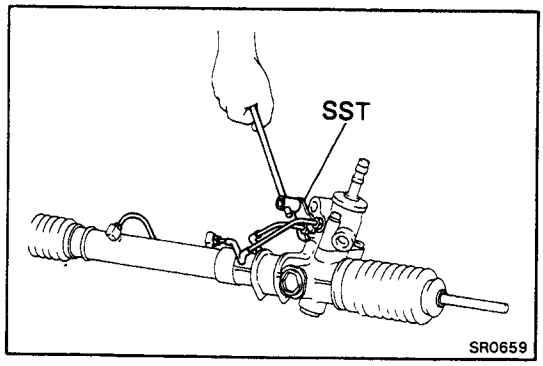


1. **DISCONNECT RETURN TUBE AND PRESSURE HOSE**
   (a) Using SST, disconnect the tube and hose.
   SST 09631-22020
   (b) Remove the union seats.

2. **REMOVE GEAR HOUSING ASSEMBLY**
   (See page SR-14)

COMPONENTS



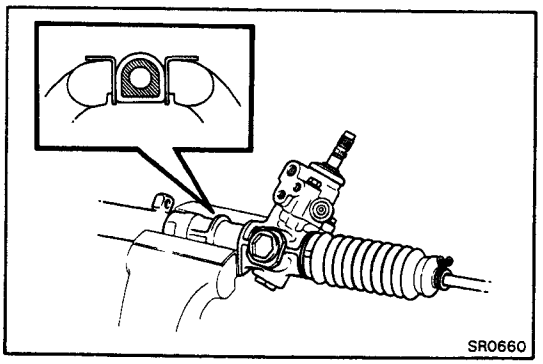


DISASSEMBLY OF STEERING GEAR HOUSING

1. REMOVE TURN PRESSURE TUBES

Using SST, remove the pressure tubes.

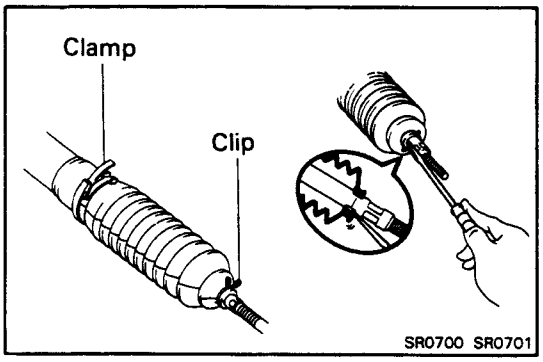
SST 09631-22020



2. MOUNT GEAR HOUSING IN VISE

NOTE:

- The rack housing is made of aluminum so always use a clasp on the vise and clamp onto the area shown.
- If clamping onto the center tube, wrap a piece of cloth around the tube and do not tighten to the point where the tube bends.

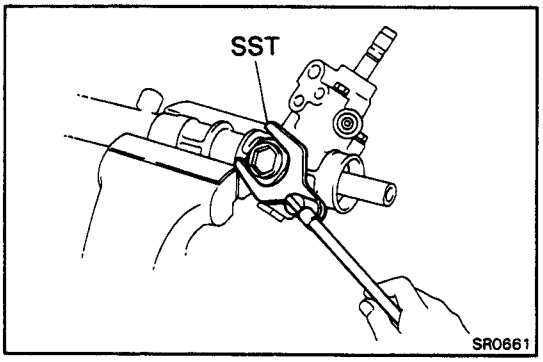


3. **REMOVE TIE ROD ENDS**
(See step 2 on page SR-16)

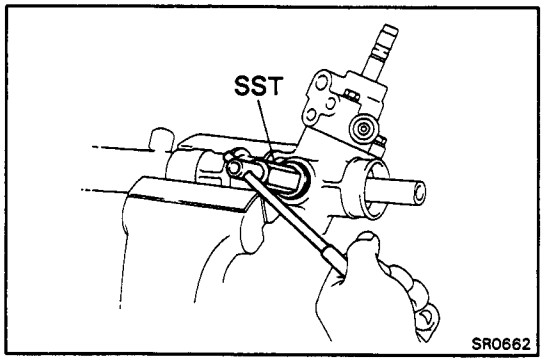
4. **REMOVE RACK BOOTS**
   (a) Using a screwdriver, loosen the staked parts of the clamp and remove the clamp.
   (b) Remove the clip.
   (c) Remove the rack boot.

5. **REMOVE RACK ENDS (See step 4 on page SR-16)**

6. **REMOVE DUST COVER**



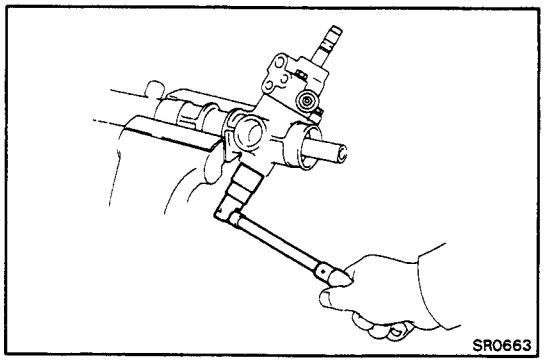
7. **REMOVE LOCK NUT ON RACK GUIDE SPRING CAP**
Using SST, remove the lock nut.
SST 09612-24012



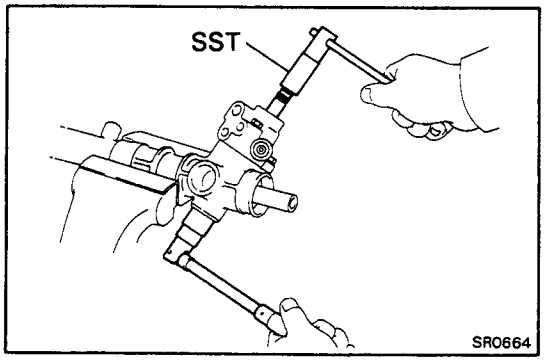
8. **REMOVE RACK GUIDE SPRING CAP**
Using SST, remove the spring cap.
SST 09612-24012

9. **REMOVE RACK GUIDE SPRING**

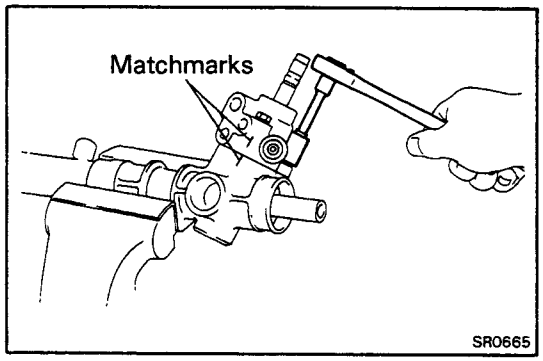
10. **REMOVE RACK GUIDE**



11. **REMOVE RACK HOUSING CAP**



12. **REMOVE SELF-LOCK NUT**
Using SST, remove the self-lock nut.
SST 09616-00010

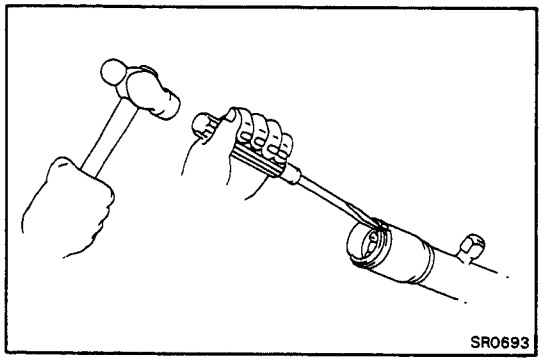


13. REMOVE CONTROL VALVE AND VALVE HOUSING

(a) Place matchmarks on the valve housing and rack housing.

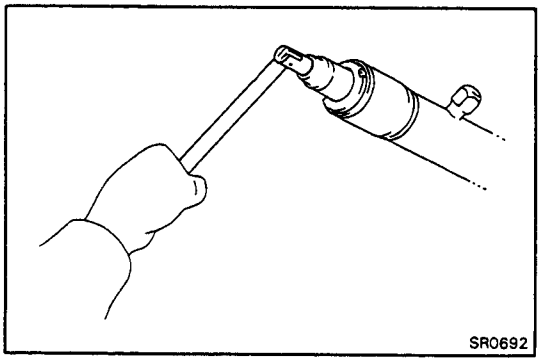
(b) Remove the three bolts.

(c) Pull out the valve and O-ring, together with the valve housing.



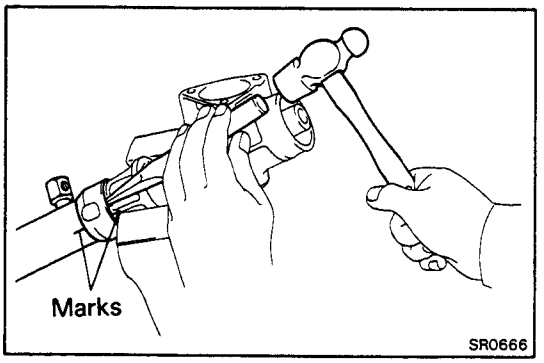
14. REMOVE CYLINDER END STOPPER NUT

(a) Using a hammer and chisel or screwdriver, loosen the staked part of the claw washer.



(b) Using SST, remove the stopper nut and claw washer.

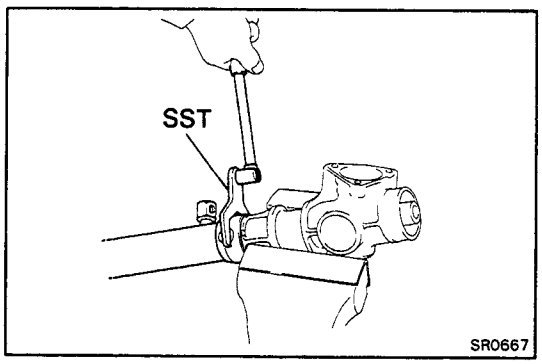
SST 09631-16010



15. SEPARATE RACK HOUSING AND CYLINDER

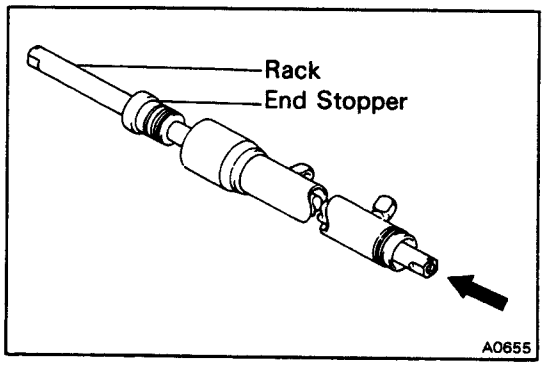
(a) Place matchmarks on the housing and tube.

(b) Using a hammer and chisel, loosen the staked end of the set nut.



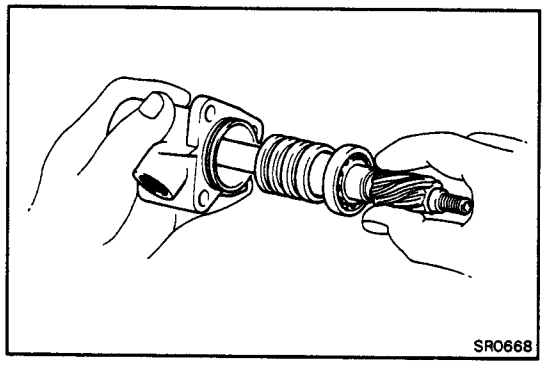
(c) Using SST, turn the set nut to separate the rack housing and cylinder.

SST 09617-16010



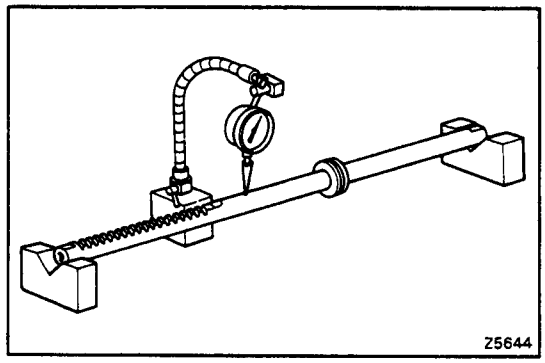
16. REMOVE RACK AND CYLINDER END STOPPER

Using a plastic-faced hammer, tap out the rack, end stopper.



17. SEPARATE CONTROL VALVE AND HOUSING

Pull the control valve out from the housing.



INSPECTION AND REPAIR OF STEERING GEAR HOUSING

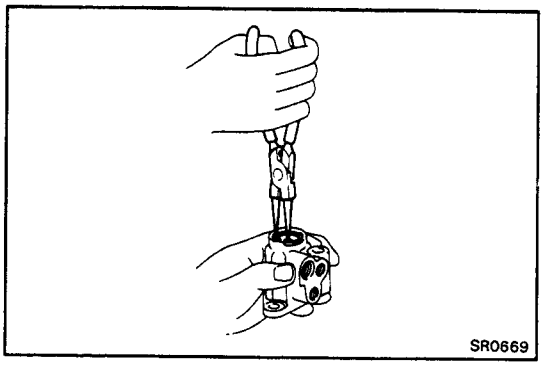
1. INSPECT RACK

(a) Place the rack on V-blocks.

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

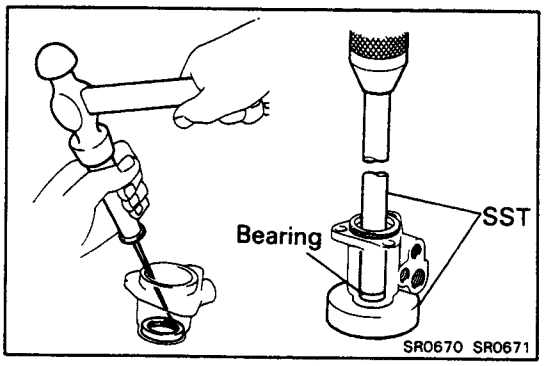
Maximum circle runout: 0.3 mm (0.012 in.)

If the circle runout is exceeds maximum, replace the rack.



2. IF NECESSARY, REPLACE CONTROL VALVE BEARING (AND OIL SEAL)

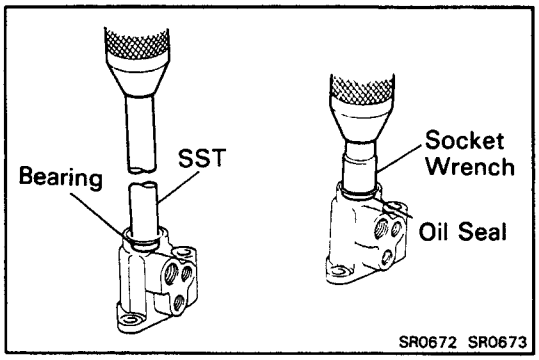
(a) Using snap ring pliers, remove the snap ring.



(b) Using a screwdriver, remove the oil seal.

(c) Using SST and a press, remove the bearing.

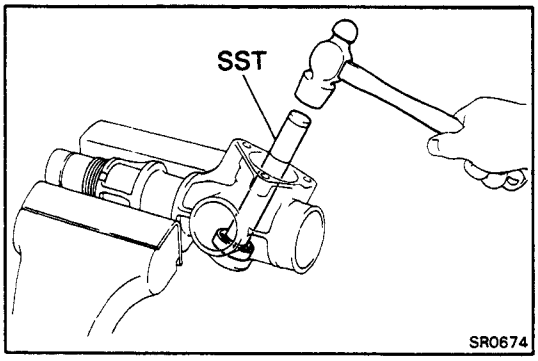
SST 09515-21010 and 09631-12020



(d) Using SST and a press, install a new bearing.
SST 09631-12020

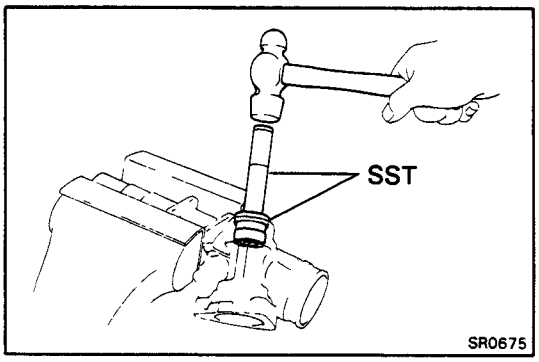
(e) Using a socket wrench and press, install a new oil seal.

(f) Using snap ring pliers, install the snap ring.

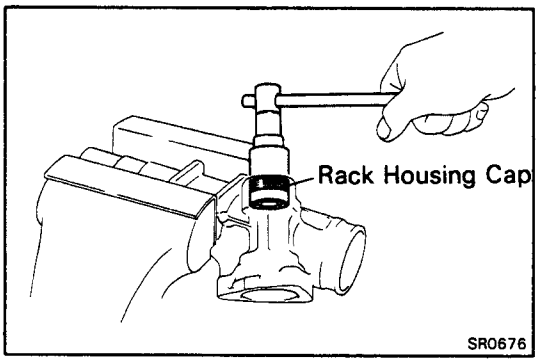


3. REPLACEMENT OF PINION BEARING

(a) Using SST and a hammer, remove the bearing.
SST 09620-30010

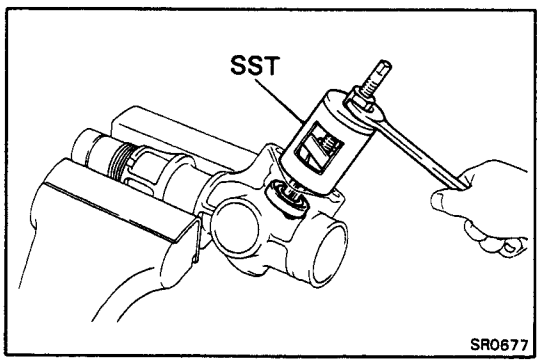


(b) Using SST and a hammer, install a new bearing.
SST 09620-30010



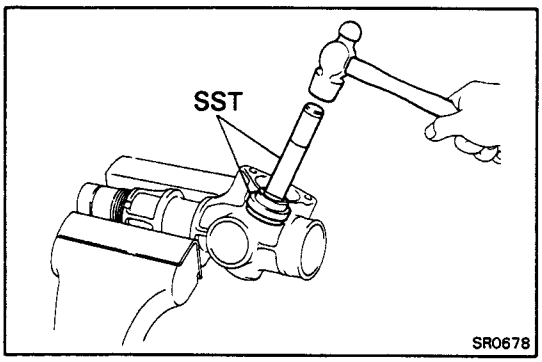
(c) Tighten the rack housing cap to snug down the bearing.

(d) Remove the rack housing cap.



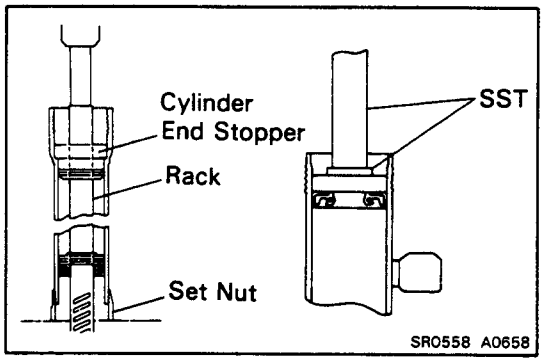
4. REPLACEMENT OF HOUSING OIL SEAL

(a) Using SST, remove the oil seal.
SST 09612-10092



(b) Using SST and a hammer, install a new oil seal.

SST 09620-30010



5. REPLACEMENT OF CYLINDER OIL SEAL

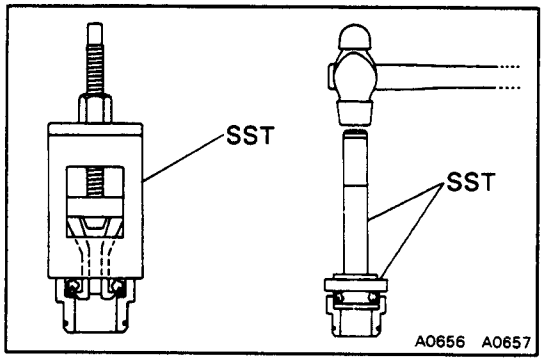
(a) Temporarily install the rack, cylinder end stopper and set nut to the cylinder.

(b) Using a press, remove the oil seal.

(c) Remove the rack, cylinder end stopper and set nut from the cylinder.

(d) Using SST and a hammer, install a new nut.

SST 09620-30010



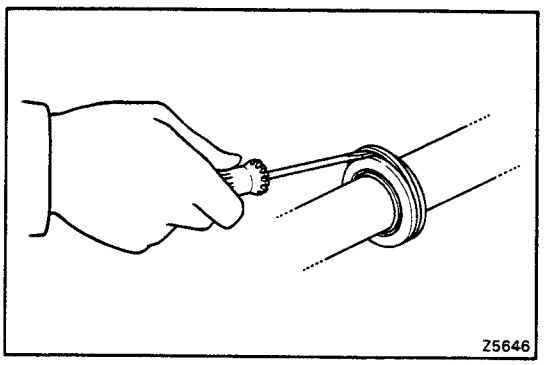
6. REPLACEMENT, REPLACE CYLINDER END STOPPER OIL SEAL

(a) Using SST, remove the oil seal.

SST 09612-10092

(b) Using SST and a hammer, install a new oil seal.

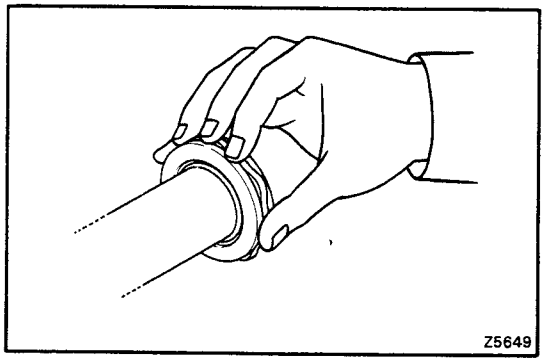
SST 09620-30010



7. REPLACEMENT OF TEFLON RINGS ON RACK AND CONTROL VALVE

(a) Using a small screwdriver, remove the teflon ring.

CAUTION: Do not damage the rack piston.



(b) Expand a new teflon ring with your fingers.

CAUTION: Do not expand the ring more than necessary.

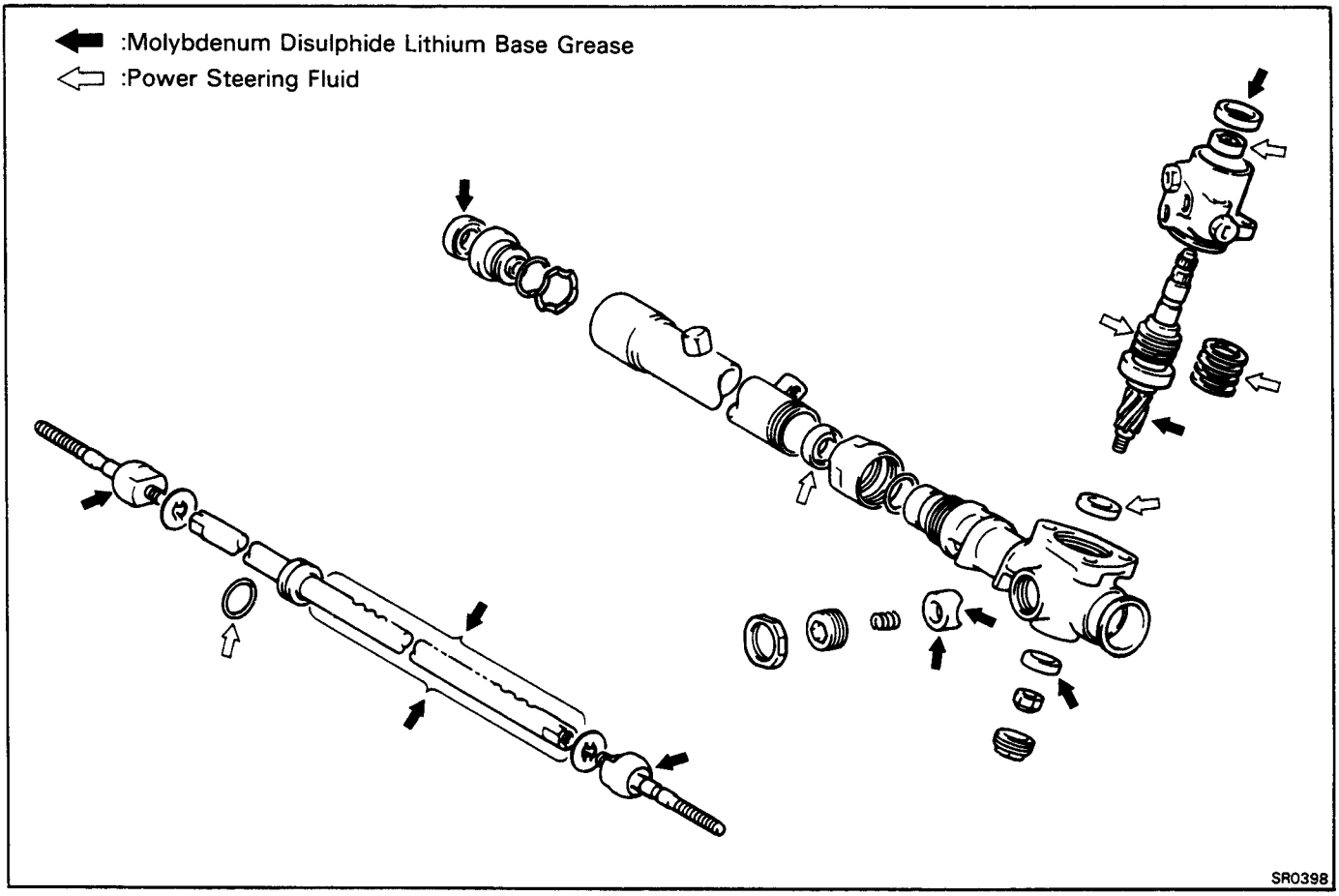
(c) Install the teflon ring.

(d) Snug down the teflon ring with your fingers so that it fits tightly in the groove.

ASSEMBLY OF STEERING GEAR HOUSING

(See page SR-37)

1. **COAT GREASE AND FLUID ON INDICATED BY ARROWS:**



2. **INSTALL RACK AND CYLINDER END STOPPER**

(a) Install SST to the rack.

SST 09631-16020

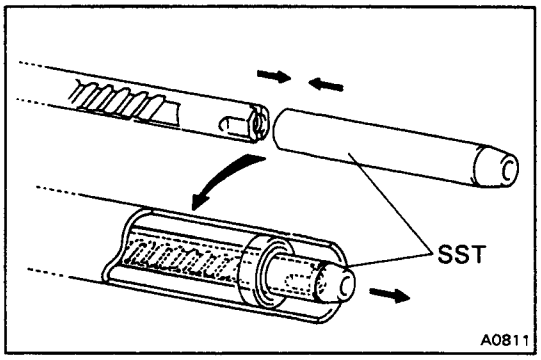
(b) Coat power steering fluid on the SST.

(c) Insert the rack into the cylinder.

(d) Remove SST.

(e) Install a new O-ring to the end stopper.

(f) Push the end stopper into the cylinder.



3. **ASSEMBLE RACK HOUSING AND CYLINDER**

(a) Mount the housing in a vise.

(b) Install the pin and new O-ring to the housing.

(c) Align the matchmarks on the housing and cylinder.

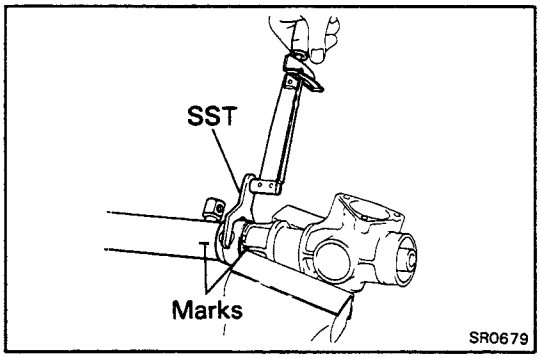
NOTE: If the matchmarks are not aligned, the housing pin and cylinder groove will not line up.

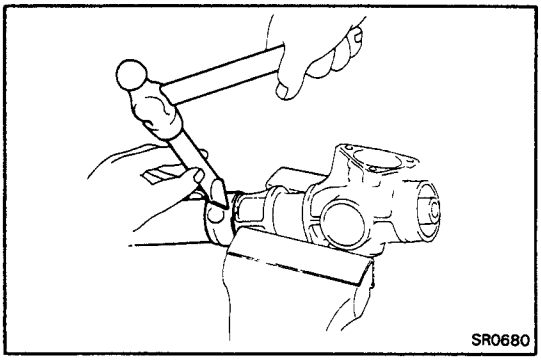
(d) Assemble the housing and cylinder with a new set nut.

(e) Using SST, torque the set nut.

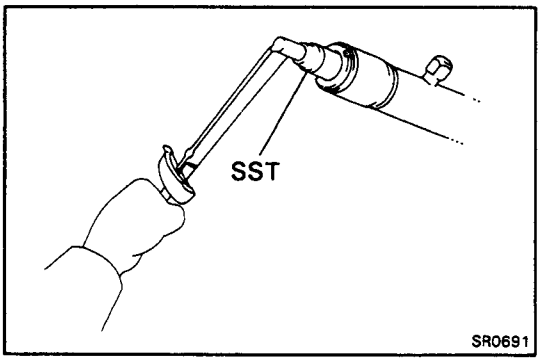
SST 09617-16010

Torque: 1,700 kg-cm (123 ft-lb, 167 N·m)





(f) Using a hammer and chisel, stake the nut.



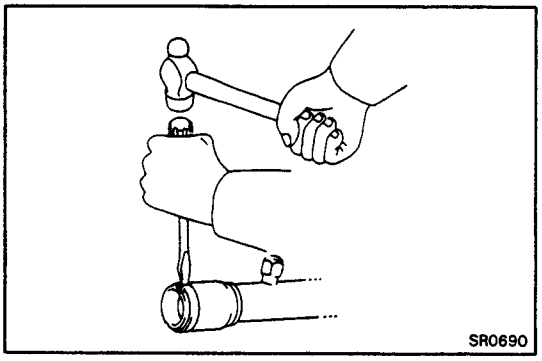
4. INSTALL CYLINDER END STOPPER NUT

(a) Install a new claw washer and the stopper nut.

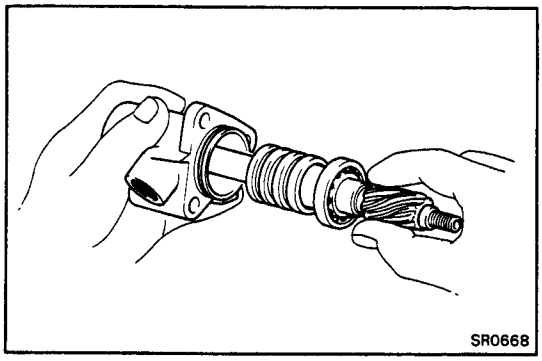
(b) Using SST, torque the stopper nut.

SST 09631-16010

Torque: 1,200 kg-cm (87 ft-lb, 118 N·m)

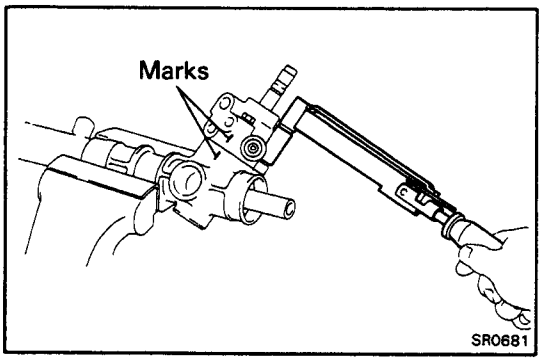


(c) Using a hammer and chisel or screwdriver, stake the claw washer.



5. ASSEMBLE CONTROL VALVE AND HOUSING

Insert the control valve into the housing.



6. INSTALL CONTROL VALVE ASSEMBLY

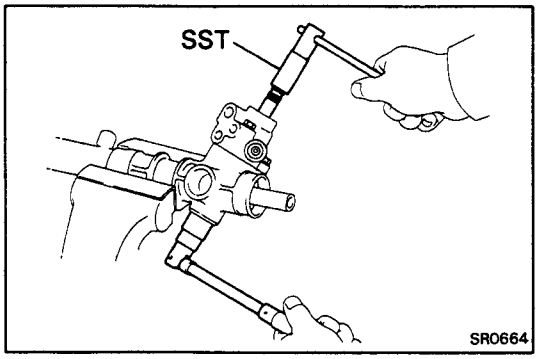
(a) Install a new O-ring to the valve.

(b) Align the matchmarks on the valve housing and rack housing.

(c) Install the valve with the three bolts.

(d) Torque the bolts.

Torque: 250 kg-cm (18 ft-lb, 25 N·m)

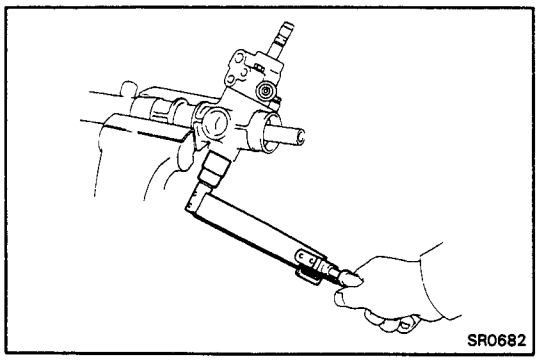


7. INSTALL SELF LOCK NUT

Using SST, install and torque a new lock nut.

SST 09616-00010

Torque: 250 kg-cm (18 ft-lb, 25 N·m)

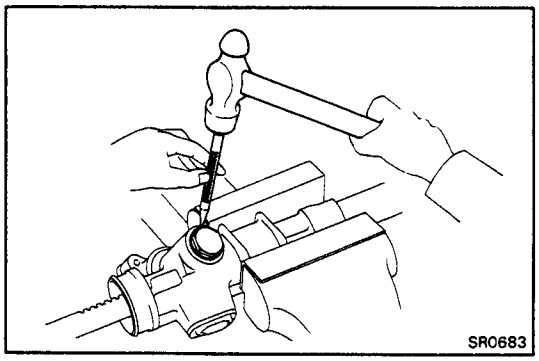


8. INSTALL NEW RACK HOUSING CAP

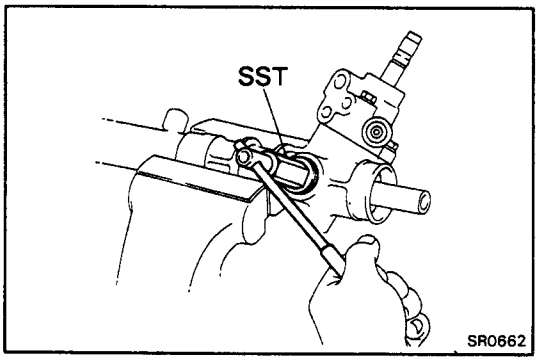
(a) Apply liquid sealer to the thread of the housing cap.

(b) Install and torque the housing cap.

Torque: 600 kg-cm (43 ft-lb, 59 N·m)



(c) Using a punch and hammer, stake the housing cap in two places.



9. INSTALL RACK GUIDE

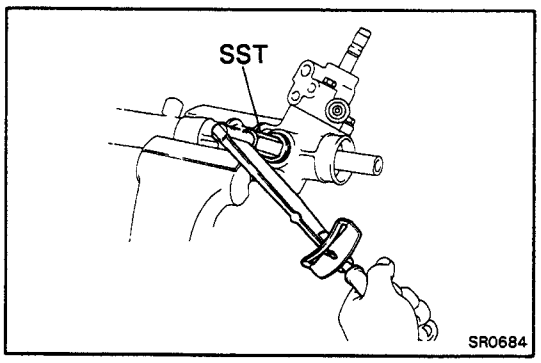
10. INSTALL RACK GUIDE SPRING

11. INSTALL RACK GUIDE SPRING CAP

(a) Apply liquid sealer to the threads of the spring cap.

(b) Using SST, temporarily install the spring cap.

SST 09612-24012

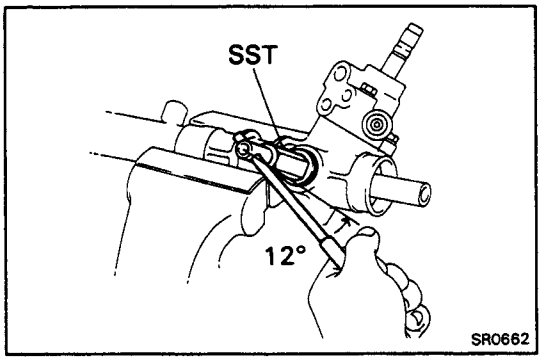


12. ADJUST TOTAL PRELOAD

(a) Using SST, torque the rack guide spring cap.

SST 09612-24012

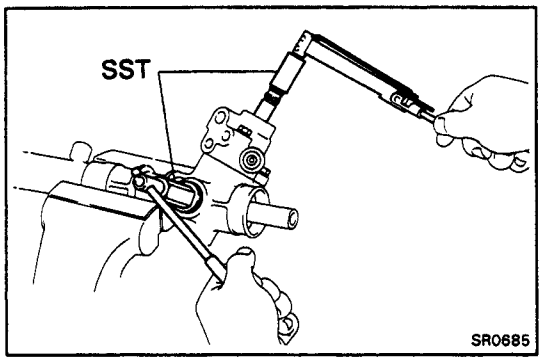
Torque: 250 kg-cm (18 ft-lb, 25 N·m)



(b) Return the rack guide spring cap 12°.

(c) Turn the control valve shaft right and left one or two times.

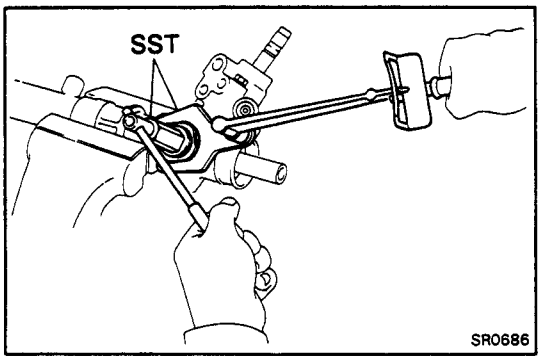
(d) Loosen the rack guide spring cap until there is no preload.



(e) Using SST, turn the rack guide spring cap until the preload is within specification.

SST 09616-00010 and 09612-24012

Preload (turning): 8 – 13 kg-cm (6.9 – 11.3 in.-lb, 0.8 – 1.3 N·m)



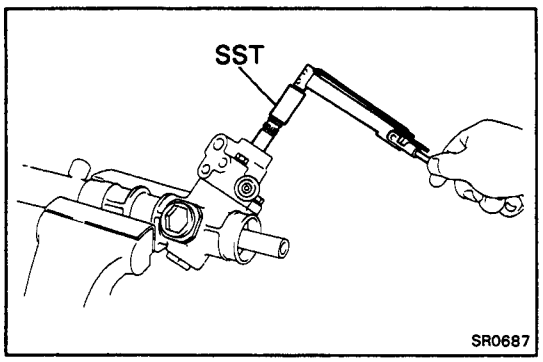
13. INSTALL RACK GUIDE SPRING CAP LOCK NUT

(a) Apply liquid sealer to the screw surface of the spring cap.

(b) Using SST, install and torque the lock nut.

SST 09612-24012

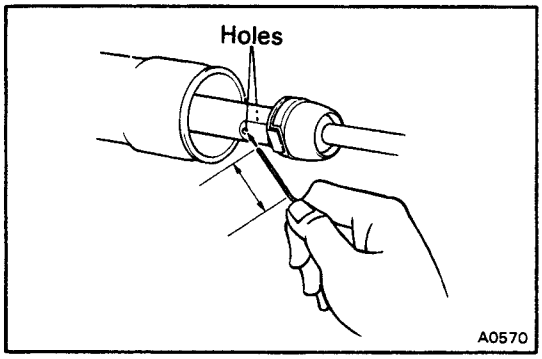
Torque: 650 kg-cm (47 ft-lb, 64 N·m)



(c) Recheck the total preload.

Preload (turning): 8 – 13 kg-cm (6.9 – 11.3 in.-lb, 0.8 – 1.3 N·m)

If the total preload is not within specification, readjust.



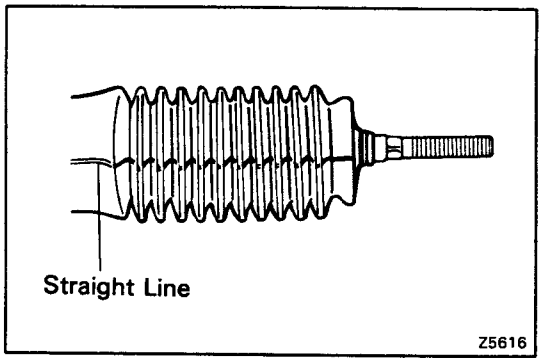
14. INSTALL RACK ENDS (See step 12 on page SR-21)

15. INSTALL DUST COVER

16. INSTALL RACK BOOTS

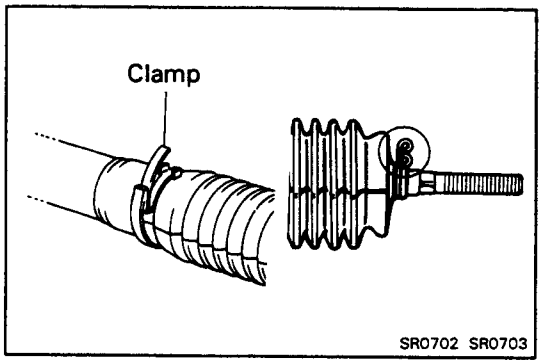
(a) Insure that the rack hole is not clogged with grease.

NOTE: If the rack hole is clogged, the pressure inside the boot will change after it is assembled and the handle turned.



(b) Install the boots.

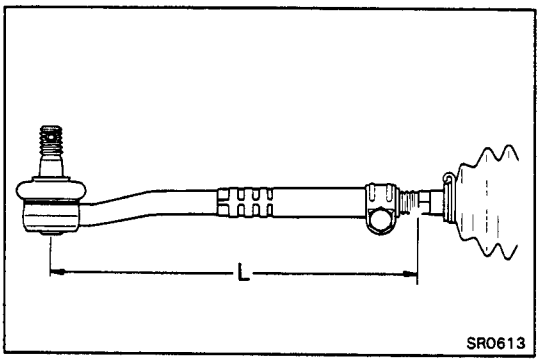
CAUTION:
- **Be careful not to damage the boots.**
- **Do not twist the boots.**



(c) Install the clamps.

(d) Using a screwdrivers, stake the parts of the clamp.

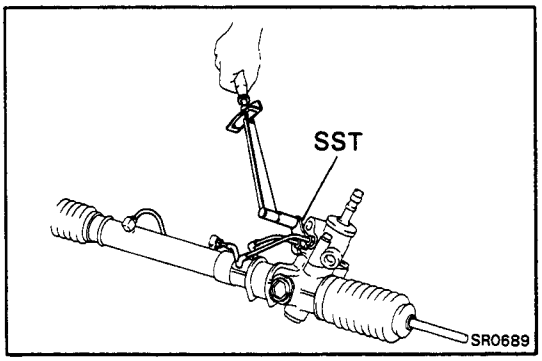
(e) Install the clips so that ends are facing outward.



17. INSTALL TIE ROD ENDS

Screw the tie rod end onto the rack end until the matchmarks are aligned.
Do not tighten the clamp bolt of the tie rod end yet.

NOTE: The length of Lin figure should be approximately 279 mm (10.98 in.).



18. INSTALL RIGHT AND LEFT TURN PRESSURE TUBES

(a) Install new O-rings to the pressure tubes.

(b) Using SST, install the pressure tubes and torque the union nuts.

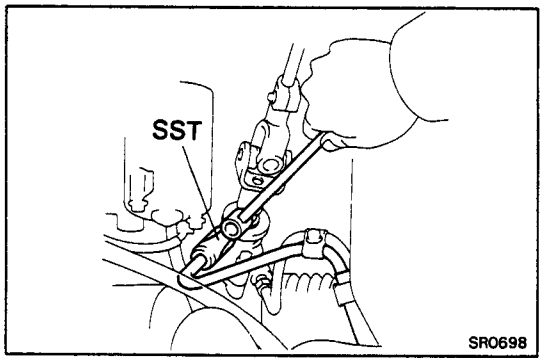
SST 09631-22020

Torque: 150 kg-cm (11 ft-lb, 15 N·m)

INSTALLATION OF STEERING GEAR HOUSING

(See page SR-31)

1. **INSTALL GEAR HOUSING ASSEMBLY**
(See step 1 to 3 on page SR-23)



2. **CONNECT RETURN TUBE AND PRESSURE HOSE**

Using SST, connect the tube and hose with the union seats and torque them.

SST 09631-22020

Torque: 450 kg-cm (33 ft-lb 44 N·m)

3. **FILL WITH POWER STEERING FLUID**
(See page SR-24)

4. **BLEED SYSTEM**

5. **CHECK FOR LEAKS**

6. **ADJUST TOE-IN** **(See page FA-3)**

7. **CHECK STEERING WHEEL CENTER POINT**

BODY ELECTRICAL SYSTEM

	Page
PRECAUTIONS	BE-2
LOCATION OF SWITCHES AND RELAYS	BE-5
IGNITION SWITCH	BE-9
LIGHTING	BE-10
WIPER AND WASHER	BE-15
INSTRUMENTS, GAUGES AND WARNING	BE-19
REAR WINDOW DEFOGGER	BE-31
HEATER	BE-34
SUN ROOF	BE-37
RADIO, STEREO TAPE PLAYER AND ANTENNA	BE-38
CLOCK	BE-45

PRECAUTIONS

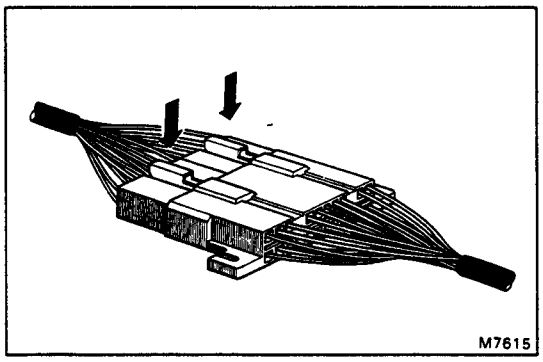
WIRING COLOR CODE

Wire colors are indicated by an alphabetical code.

The 1st letter indicates the basic wire color and the 2nd indicates the color of the stripe.

B = Black	BR = Brown
G = Green	GR = Grey
L = Light Blue	LG = Light Green
O = Orange	P = Pink
R = Red	V = Violet
W = White	Y = Yellow

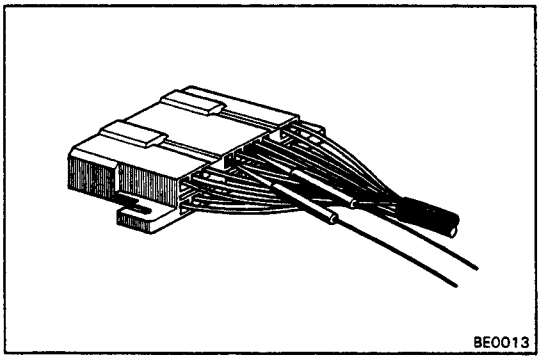
Example: R-G indicates a Red wire with a Green stripe.



BULKHEAD TYPE CONNECTOR HANDLING AND INSPECTION

DISCONNECT BULKHEAD TYPE CONNECTOR

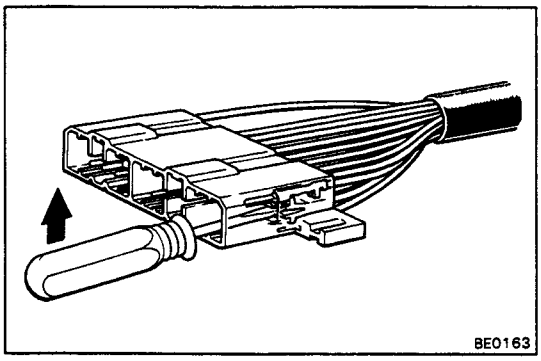
To remove the connector, push in the lock levers shown in the figure, and pull out.



INSPECT BULKHEAD TYPE CONNECTOR

When checking the continuity or voltage with a circuit tester, insertion of the test probe into the receptacle connector may open the fitting to the connector and result in poor contact.

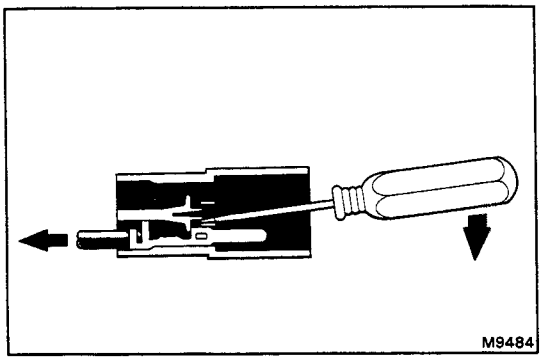
Therefore, ensure that the test probe is inserted only from the wire harness side as shown in the figure.



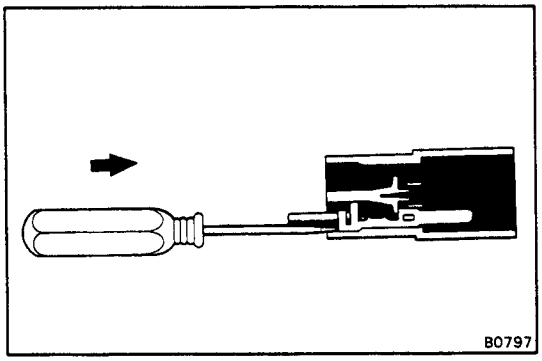
REPLACEMENT OF COMBINATION SWITCH

REMOVE TERMINALS FROM CONNECTOR

(a) From the open end, insert a miniature screwdriver between the locking lug and terminal.



(b) Pry up the locking lug with the screwdriver and pull the terminal out from the rear.



INSTALL TERMINALS TO CONNECTOR

(a) Push in the terminal until it is securely locked in the connector lug.

(b) Tug on the wire to confirm that it is securely locked.

INSPECTION OF CIRCUIT AND CONNECTOR

INSPECT CIRCUIT

When inspecting the circuit, refer to the diagram at the back of the manual.

INSPECT CONNECTOR

All connectors are shown from the component side. Therefore, when inspecting from the body side, the left and right terminal connections are in reverse.

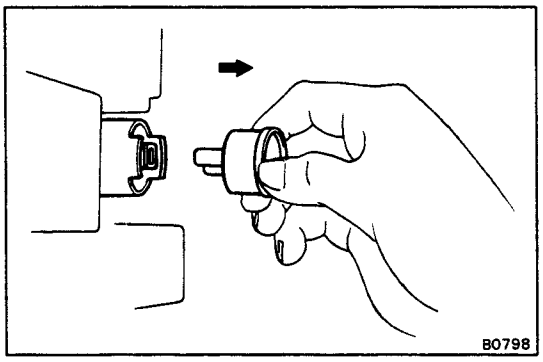
REPLACEMENT OF FUSES

Install new fuses with correct amperage ratings.

CAUTION:

1. **Turn off all electrical components and the ignition switch before replacing a fuse. Do not exceed the fuse amp rating.**
2. **Always use a fuse puller for removing and inserting a fuse. Remove and insert straight in and out without twisting. Twisting could force open the terminals too much, resulting in a bad connection.**

If a fuse continues to blow, the circuit is probably shorted. Have the system checked by a qualified technician.



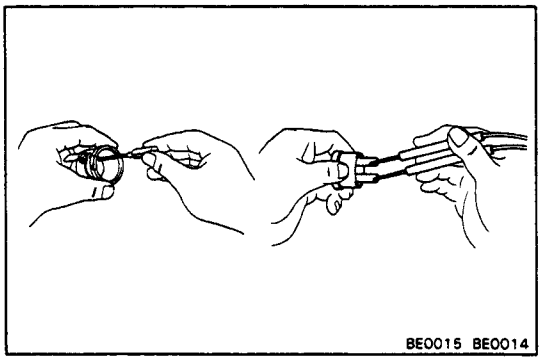
RESET OF CIRCUIT BREAKER

1. REMOVE CIRCUIT BREAKER

(a) Remove the kick panel.

(b) Remove the circuit breaker.

(c) Unlock the stopper and pull out the circuit breaker.

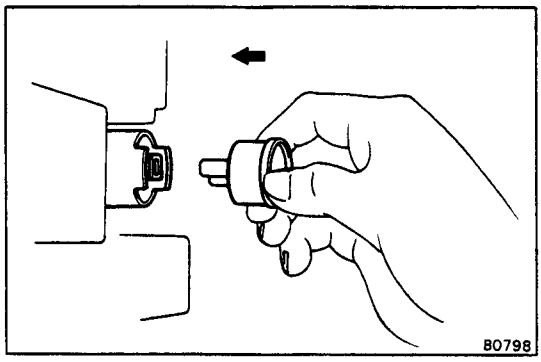


2. RESET CIRCUIT BREAKER

(a) Insert the needle into the reset hole and push it.

(b) Using an ohmmeter, check that there is continuity between both terminals of the circuit breaker.

If there is no continuity, replace the circuit breaker.



3. INSTALL CIRCUIT BREAKER

(a) Assemble the circuit breaker into the case.

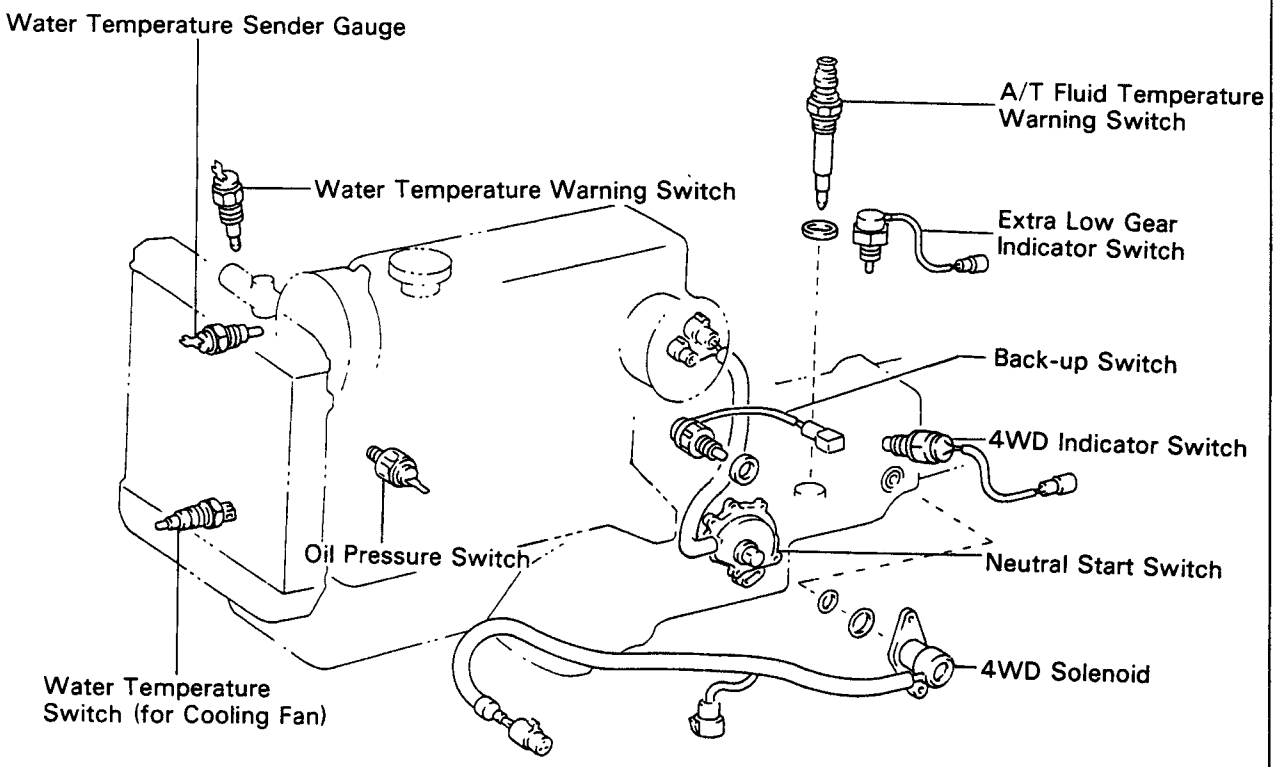
(b) Install the circuit breaker.

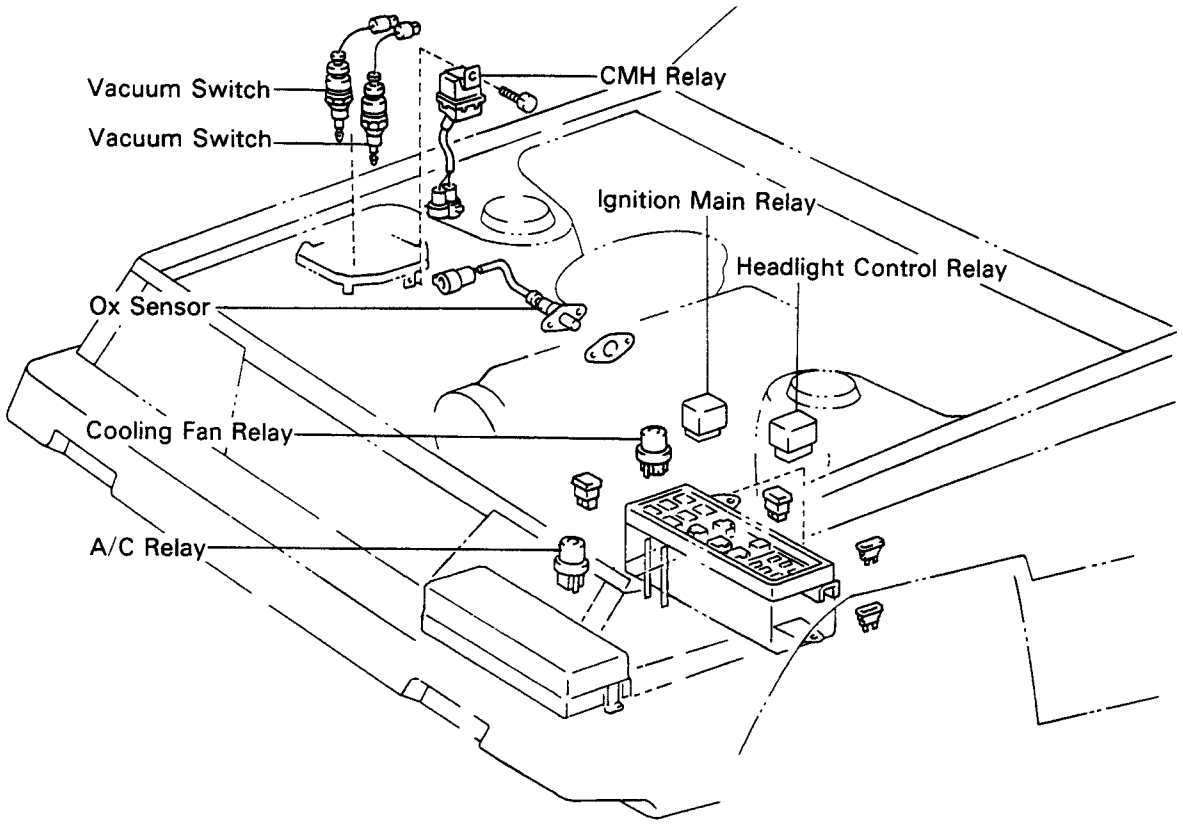
NOTE: If a circuit breaker continues to cut out, the circuit is probably shorted. Have the system checked by a qualified technician.

(c) Install the kick panel.

LOCATION OF SWITCHES AND RELAYS

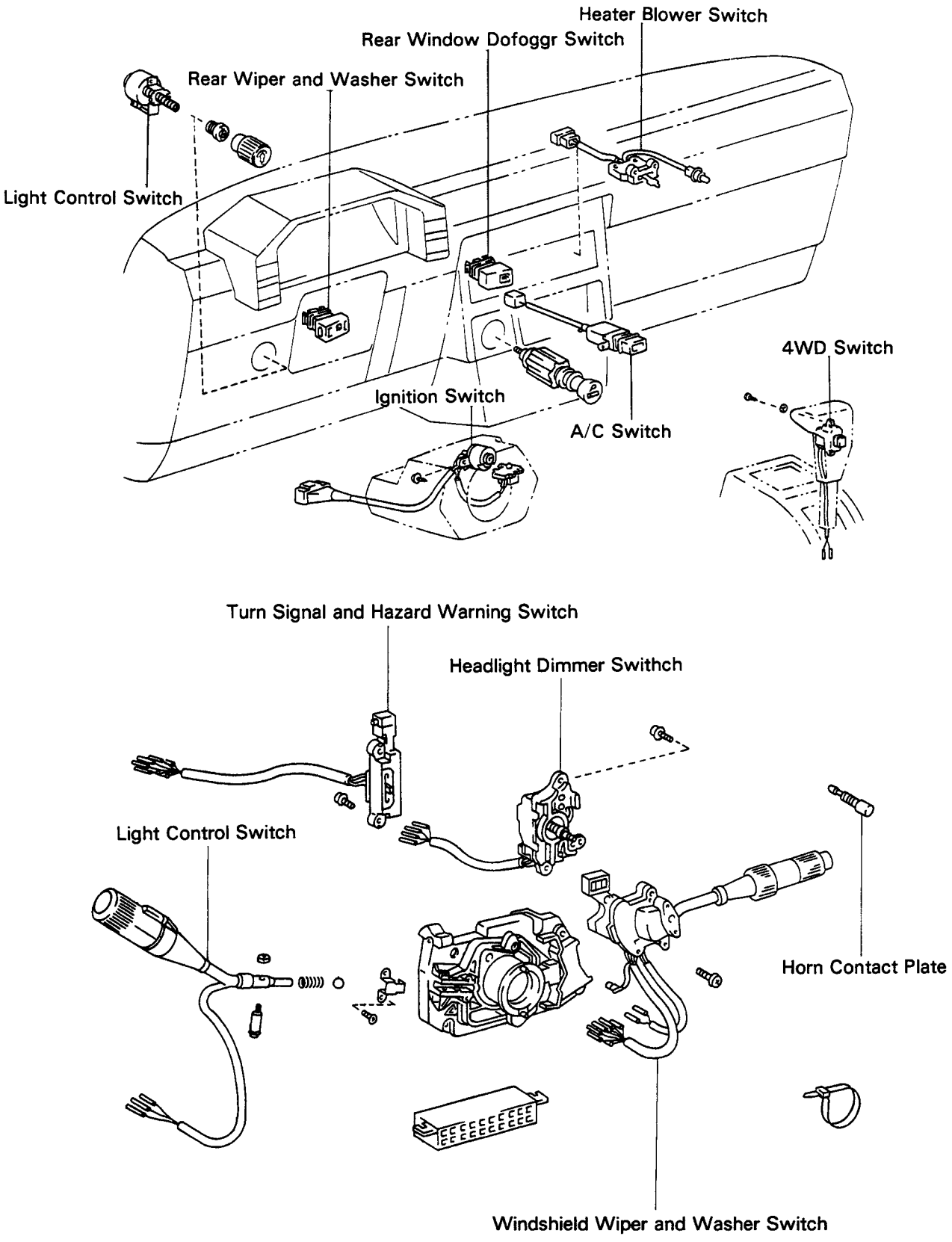
ENGINE COMPARTMENT SWITCHES AND RELAYS



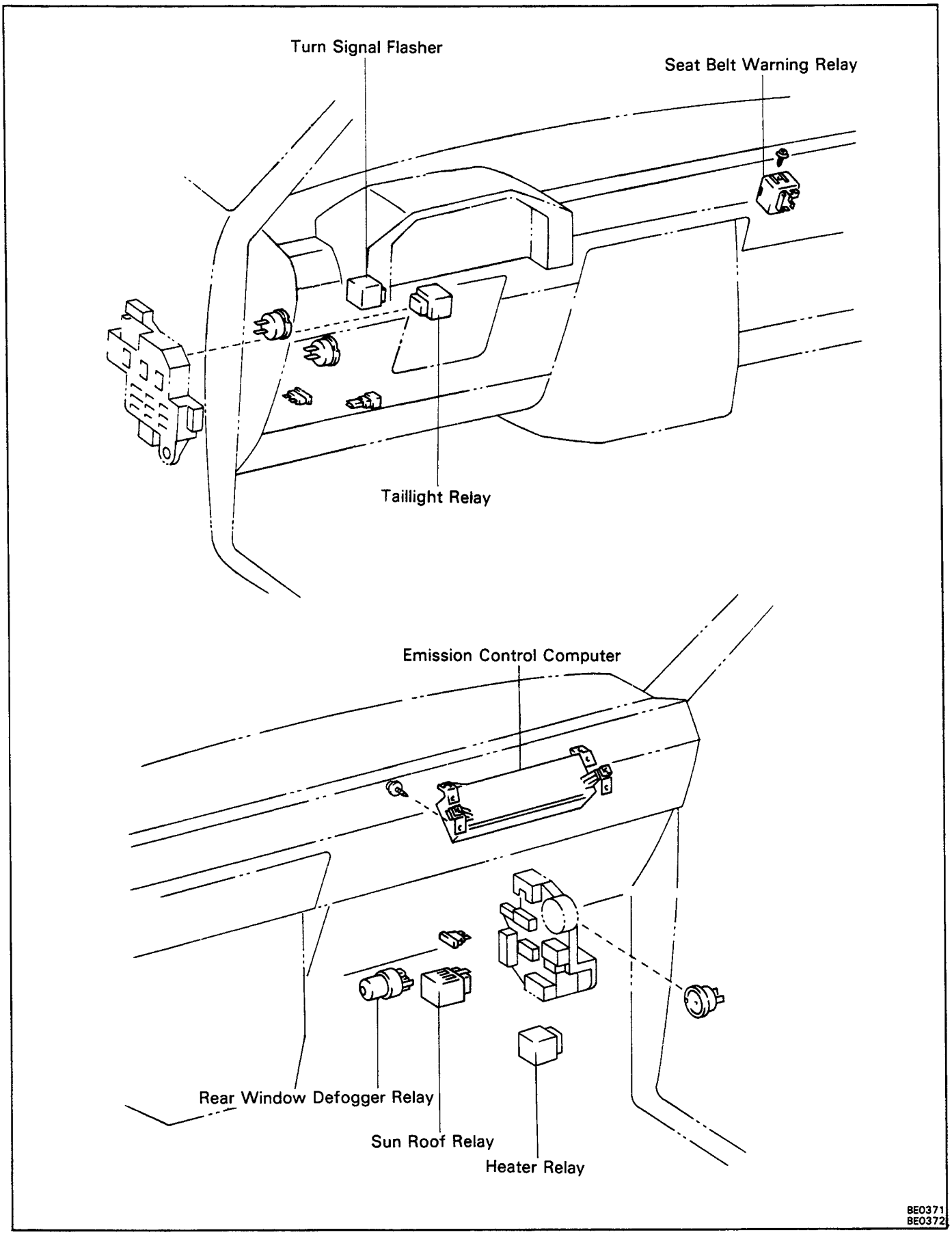


BE0367
BE0368

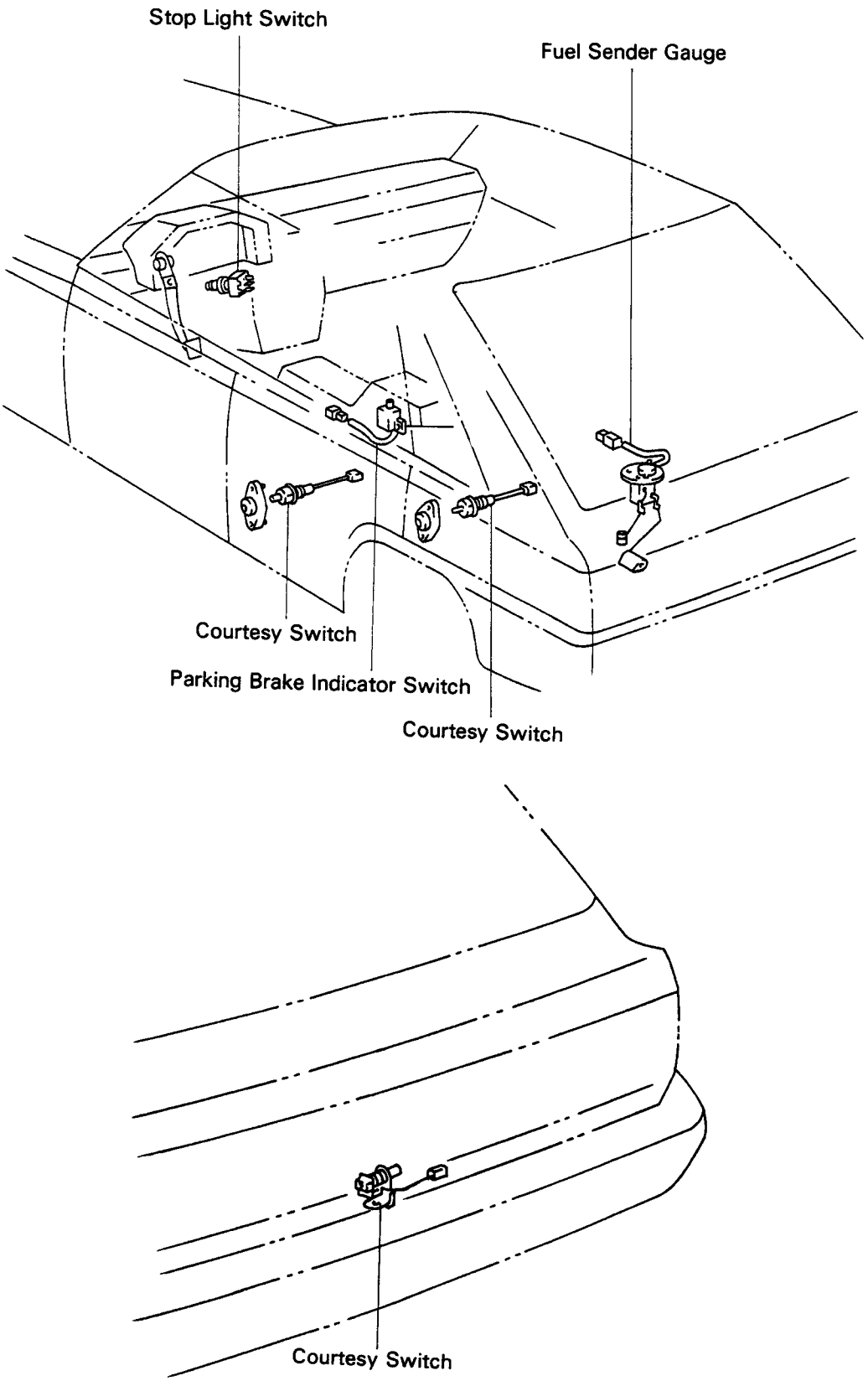
DASH AND STEERING COLUMN SWITCHES AND RELAYS



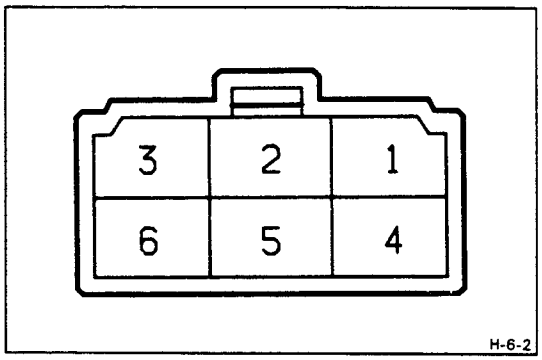
PASSENGER COMPARTMENT SWITCHES AND RELAYS



PASSENGER AND LUGGAGE COMPARTMENT SWITCHES AND RELAYS



BE0614
BE0374



IGNITION SWITCH

INSPECTION OF IGNITION SWITCH

INSPECT SWITCH CONTINUITY

Check the switch continuity between terminal.

Terminal (Wire color) / Switch position		1 AM (B-R)	3 ACC (L-R)	6 IG (B-Y)	4 ST (B-W)	2 B (G-W)	5 E (G-W)
LOCK							
ACC		○——	——○				
ON		○——	——○——	——○			
START		○——	——	——○——	——○		
Warning	NORMAL						
Warning	PUSH					○——	——○

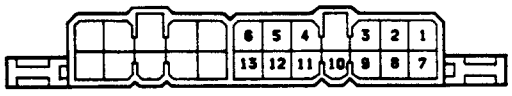
If continuity is not as specified, replace the switch.

LIGHTING

Troubleshooting

Problem	Possible cause	Remedy	Page
Only one light does not light	Light bulb burned out	Replace bulb	
	Socket, wire or ground faulty	Repair as necessary	
Headlights do not light	HEAD fuse blown	Replace fuse and check for short	BE-3
	Fusible link blown	Replace fusible link	
	Headlight control relay faulty	Check relay	BE-12
	Light control/dimmer switch faulty	Check switch	BE-11
	Wiring or ground faulty	Repair as necessary	
High beam headlights or headlight flasher do not operate	Light control/dimmer switch faulty	Check switch	BE-11
	Faulty wiring	Repair as necessary	
Tail, parking and license light do not light	TAIL fuse blown	Replace fuse and check for short	BE-3
	Fusible link blown	Replace fusible link	
	Taillight control relay faulty	Check relay	BE-12
	Light control switch faulty	Check switch	BE-11
	Wiring or ground faulty	Repair as necessary	
Stop lights do not light	STOP fuse blown	Replace fuse and check for short	
	Stop light switch faulty	Adjust or replace switch	
	Wiring or ground faulty	Repair as necessary	
Stop lights stay on	Stop light switch faulty	Adjust or replace switch	
Instrument lights do not light (taillights light)	Light control rheostat faulty	Check rheostat	BE-14
	Wiring or ground faulty	Repair as necessary	
Turn signal does not flash on one side	Turn signal switch faulty	Check switch	BE-13
	Wiring or ground faulty	Repair as necessary	
Turn signals do not operate	TURN fuse blown	Replace fuse and check for short	BE-3
	Turn signal flasher faulty	Check flasher	BE-14
	Turn signal/hazard warning switch faulty	Check switch	BE-13
	Wiring or ground faulty	Repair as necessary	
Hazard warning lights do not operate	HAZ-HORN fuse blown	Replace fuse and check for short	BE-3
	Turn signal flasher faulty	Check flasher	BE-14
	Turn signal/hazard warning switch faulty	Check switch	BE-13
	Wiring or ground faulty	Repair as necessary	

Light Control Switch and Headlight Dimmer Switch



BE0111

Light Control Switch and Headlight Dimmer Switch

INSPECTION OF LIGHT CONTROL SWITCH AND HEADLIGHT DIMMER SWITCH

INSPECT SWITCH CONTINUITY

Check the switch continuity between terminals.

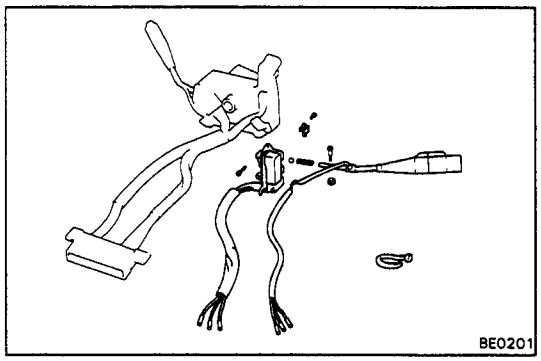
Light Control Switch

Switch position \ Terminal (Wire color)	10 or 11 T (W)	11 or 10 EL (W)	4 H (R)
OFF			
TAIL	○——	——○	
HEAD	○——	——○	——○

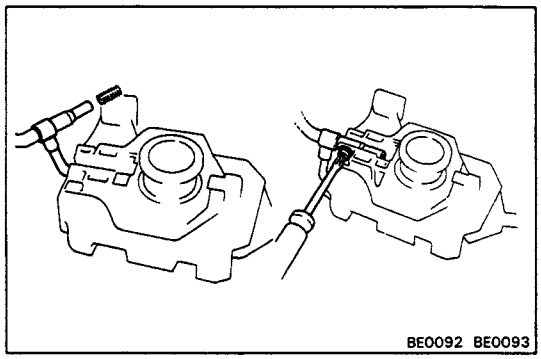
Headlight Dimmer Switch

Switch position \ Terminal (Wire color)	12 HR (R-W)	5 HU (R-Y)	6 HL (R-G)	13 ED (W-B)
FLASH	○——	——○		——○
LOW			○——	——○
HIGH		○——		——○

If continuity is not as specified, replace the switch.



BE0201



BE0092 BE0093

REPLACEMENT OF LIGHT CONTROL SWITCH AND HEADLIGHT DIMMER SWITCH

REPLACE LIGHT CONTROL SWITCH AND HEADLIGHT DIMMER SWITCH

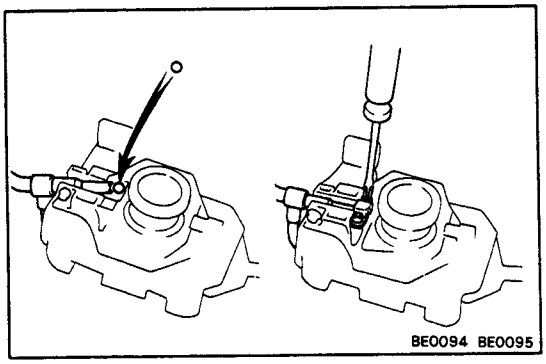
(a) Remove the terminals from the connector. (See page BE-2)

(b) Remove the light control switch.

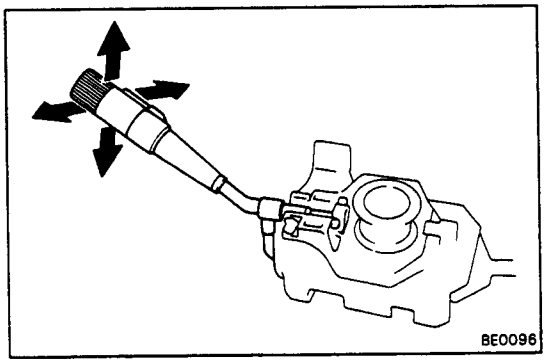
(c) Remove the headlight dimmer switch.

(d) Install headlight dimmer switch.

(e) Insert the spring into the lever and install the lever with the screw and nut.

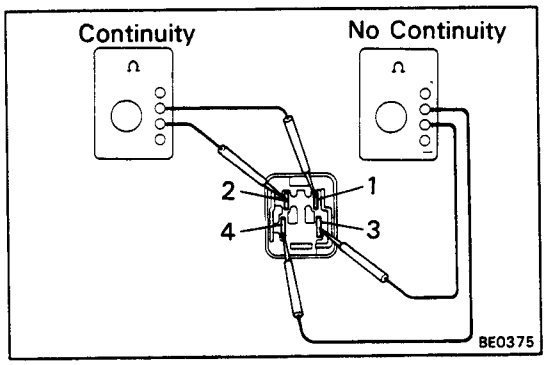


(f) Place the ball on the spring, position the lever at "HI" and install the plate.



(g) Insure that the switch operates smoothly.

(h) Install the terminals to the connector. (See pages BE-3 and 11)



Headlight Control Relay

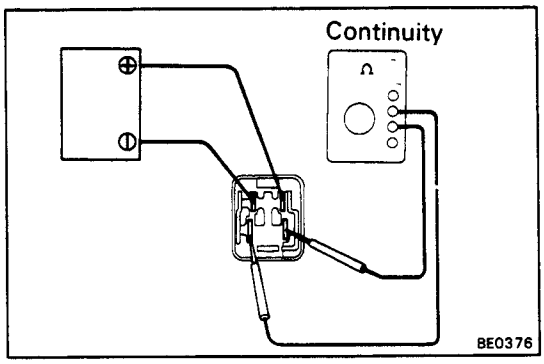
INSPECTION OF HEADLIGHT CONTROL RELAY

1. INSPECT RELAY CONTINUITY

(a) Check that there is continuity between terminals 1 and 2.

(b) Check that there is no continuity between terminals 3 and 4.

If continuity is not as specified, replace the relay.

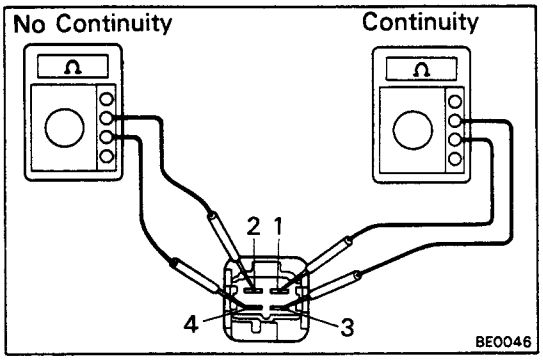


2. INSPECT RELAY OPERATION

(a) Apply battery voltage across terminals 1 and 2.

(b) Check that there is continuity between terminals 3 and 4.

If operation is not as specified, replace the relay.



Taillight Control Relay

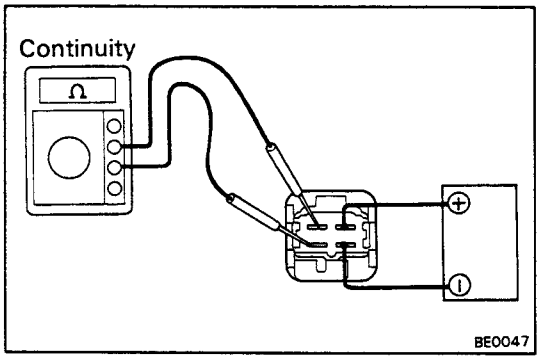
INSPECTION OF TAILLIGHT CONTROL RELAY

1. INSPECT RELAY CONTINUITY

(a) Check that there is continuity between terminals 1 and 3.

(b) Check that there is no continuity between terminals 2 and 4.

If continuity is not as specified, replace the relay.

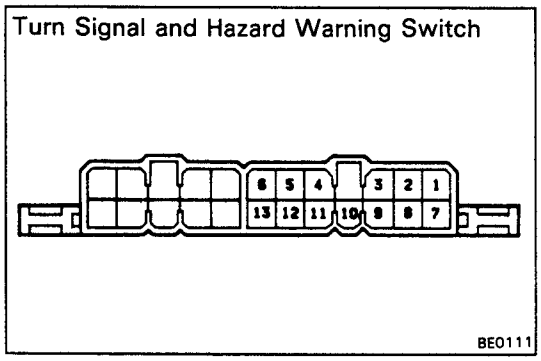


2. INSPECT RELAY OPERATION

(a) Apply battery voltage across terminals 1 and 3.

(b) Check that there is continuity between terminals 2 and 4.

If operation is not as specified, replace the relay.



Turn Signal and Hazard Warning Switch

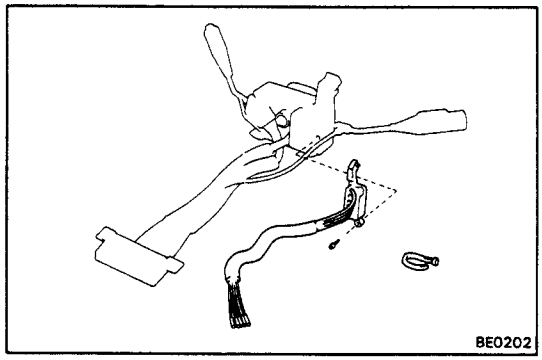
INSPECTION OF TURN SIGNAL AND HAZARD WARNING SWITCH

INSPECT SWITCH CONTINUITY

Check the switch continuity between terminals.

Switch position \ Terminal (Wire color)		2 B1 (G-L)	1 B2 (G-O)	7 F (G)	3 TB (G-W)	9 TL (G-B)	8 TR (G-Y)
TURN	RIGHT	○		○	○		○
	OFF	○		○			
	LEFT	○		○	○	○	
HAZARD	OFF	○		○			
	ON		○	○	○	○	○

If continuity is not as specified, replace the switch.



REPLACEMENT OF TURN SIGNAL AND HAZARD WARNING SWITCH

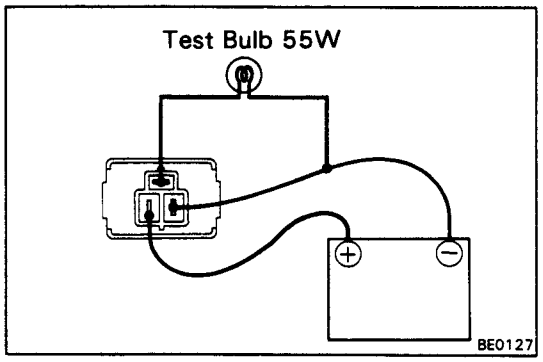
REPLACE TURN SIGNAL AND HAZARD WARNING SWITCH

(a) Remove the terminals from the connector. (See page BE-2)

(b) Remove the turn signal and hazard switch.

(c) Install the turn signal and hazard switch.

(d) Install the terminals to the connector. (See pages BE-3 and 10)



Turn Signal Flasher

INSPECTION OF TURN SIGNAL FLASHER

INSPECT RELAY OPERATION

(a) Connect the positive (+) lead from the battery to terminal 3. Connect the negative (−) lead to terminal 2.

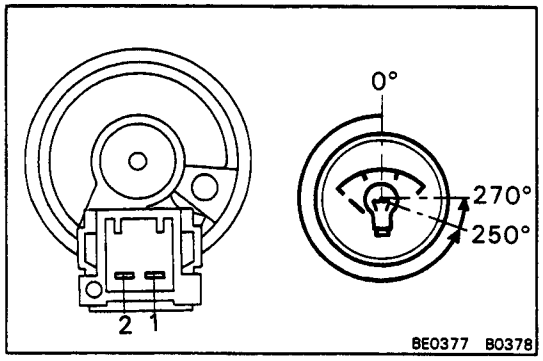
(b) Connect a 55W bulb between terminals 1 and 2. Then check that the bulb turns on and off.

NOTE: The turn signal lights should flash 70 to 100 times per minute.

If one of the front or rear turn signal lights has an open circuit, the number of flashes would be more than 120 per minute.

If one of the side turn signal lights has an open circuit, the number of flashes would increase by about 10 per minute.

If operation is not as specified, replace the flasher.



Light Control Rheostat

INSPECTION OF LIGHT CONTROL RHEOSTAT

INSPECT RESISTANCE OF RHEOSTAT

Using an ohmmer, measure the resistance between terminals 1 and 2 at each position of the knob.

Knob position	Resistance (Ω)
0° (Maximum brightness)	0
250° (Minimum brightness)	Approx. 10
270° (OFF)	∞

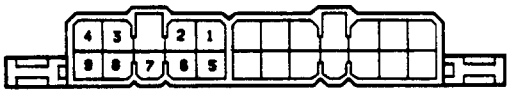
If resistance is not as specified, replace the rheostat.

WIPER AND WASHER

Troubleshooting

Problem	Possible cause	Remedy	Page	
			Windshield	Rear
Wipers do not operte or return to off position	Wiper fuse blown	Replace fuse and check for shorts	BE-3	BE-3
	Wiper motor faulty	Check motor	BE-17	BE-18
	Wiper switch faulty	Check switch	BE-15	BE-18
	Wiper relay faulty	Check relay	BE-16	
	Wiring or ground faulty	Repair as necessary		
Wipers do not operate at INT position	Wiper relay faulty	Check relay	BE-16	
	Wiper switch faulty	Check switch	BE-15	BE-18
	Wiper motor faulty	Check motor	BE-17	BE-18
	Wiring or ground faulty	Repair as necessary		
Washer does not operate	Washer hose or nozzle clogged	Repair as necessary		
	Washer motor faulty	Replace motor		
	Wiper switch faulty	Check switch	BE-15	BE-18
	Wiring faulty	Repair as necessary		

Windshield Wiper and Washer Switch



BE0111

Windshield Wiper and Washer Switch

INSPECTION OF WINDSHIELD WIPER AND WASHER SWITCH

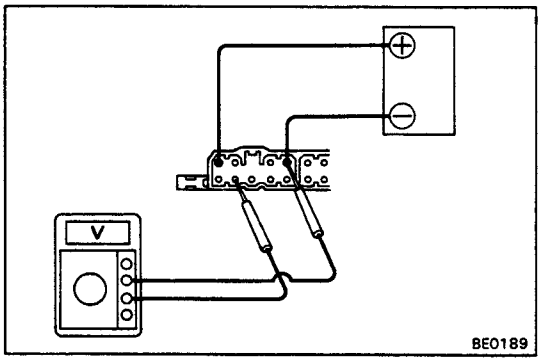
1. **INSPECT SWITCH CONTINUITY**

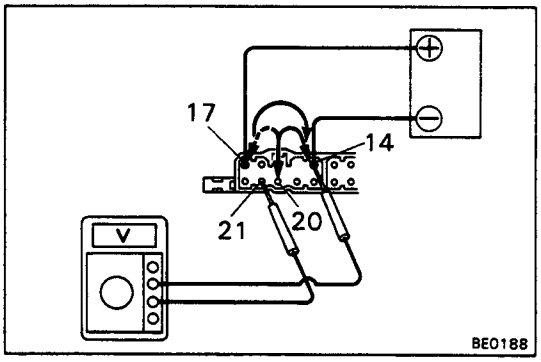
Check the switch continuity between terminal.

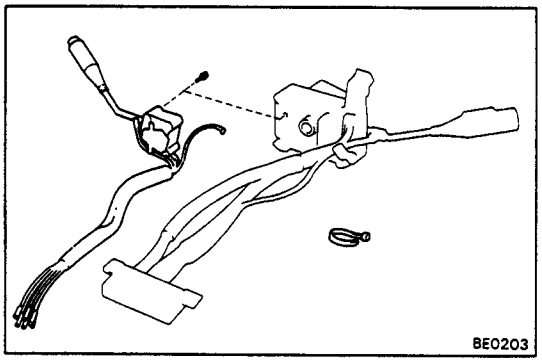
Terminal (Wire color) / Switch position	4 B (L-W)	7 S (L-R)	8 +1 (L-B)	9 +2 (L-O)	6 C (LG-R)	1 E (B)	2 W (L)
OFF		○—○					
MIST	○——	——○					
INT		○—○			○—○		
LOW		○—○					
HIGH	○——	——	——	——○			
WASHER						○—○	

MIST position: With MIST
INT position: With INT

If continuity is not as specified, replace the switch.







2. INSPECT SWITCH OPERATION (INT Type only)

(a) Turn the INT switch to minimum position.

(b) Connect the positive (+) lead from the battery to terminal 4 and connect the negative (−) lead from the battery to terminal 1.

(c) Connect the positive (+) lead from the voltmeter to terminal 8 and connect the negative (−) lead from the voltmeter to terminal 1. Turn the wiper switch to INT position and check that the meter needle indicates battery voltage.

(d) After first connecting the 7 probe to terminal 1, connect it to terminal 4. Then, immediately connect it to terminal 1 again, and check that the tester needle indicates 0 volts for 3 − 5 seconds before returning to its original position.

If operation is not as specified, replace the switch.

REPLACEMENT OF WINDSHIELD WIPER AND WASHER SWITCH

REPLACE WINDSHIELD WIPER AND WASHER SWITCH

(a) Remove the terminals from the connector. (See page BE-2)

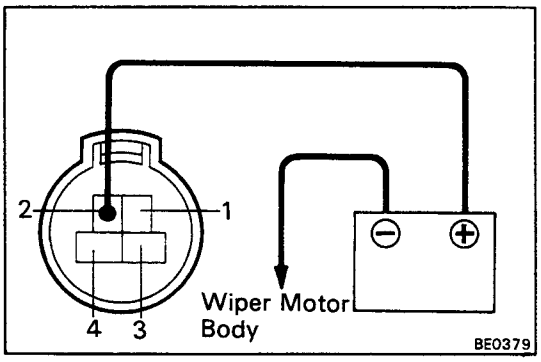
(b) Remove the terminal from the horn contact plate.

(c) Remove the windshield wiper and washer switch.

(d) Install the windshield wiper and washer switch.

(e) Install the terminal to the horn contact plate.

(f) Install the terminals to the connector. (See pages BE-3 and 15)



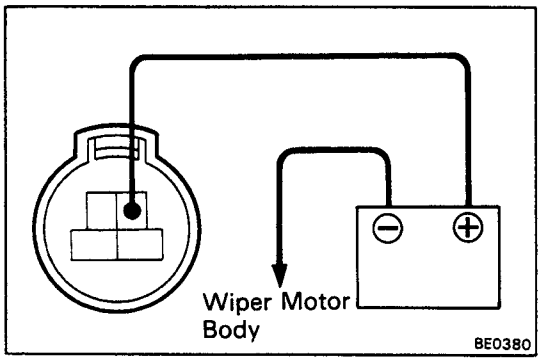
Windshield Wiper Motor

INSPECTION OF WINDSHIELD WIPER MOTOR

1. INSPECT THAT MOTOR TURNS AT LOW SPEED

(a) Connect the positive (+) lead from the battery to terminal 2. Connect the negative (−) lead to the motor body.

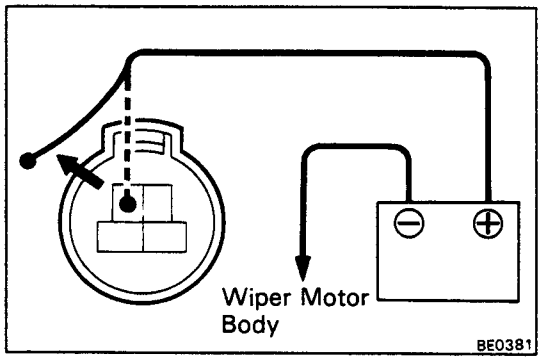
(b) Check that the motor turns at low speed.



2. INSPECT THAT MOTOR TURNS AT HIGH SPEED

(a) Connect the positive (+) lead from the battery to terminal 1. Connect the negative (−) lead to the motor body.

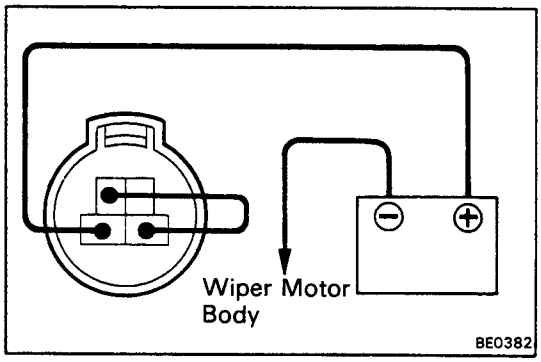
(b) Check that the motor turns at hight speed.



3. INSPECT THAT MOTOR STOPS RUNNING AT STOP POSITION

(a) Connect the positive (+) lead from the battery to terminal 2. Connect the negative (−) lead to the motor body. Turn the motor at low speed.

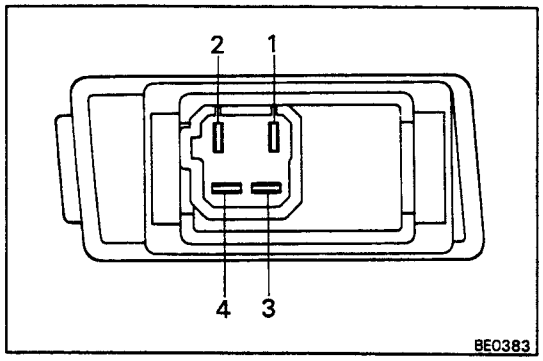
(b) Stop motor operation anywhere except stop position by disconnecting terminal 2.



(c) Connect terminals 2 and 3.

(d) Connect the positive (+) lead from the battery to terminal 4.

(e) Check that the motor stops running at stop position after the motor operates again.



Rear Wiper and Washer Switch

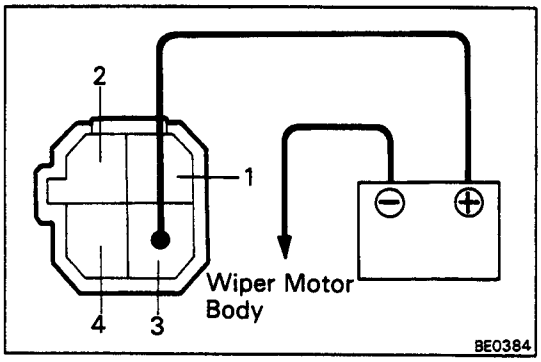
INSPECTION OF REAR WIPER AND WASHER SWITCH

INSPECT SWITCH CONTINUITY

Check the switch continuity between the terminals.

Switch position \ Terminal	4 S	1 +1	2 B	3 W
OFF	○——	——○		
MIST		○——	——○	
ON		○——	——○	
WASHER			○——	——○

If continuity is not as specified, replace the switch.



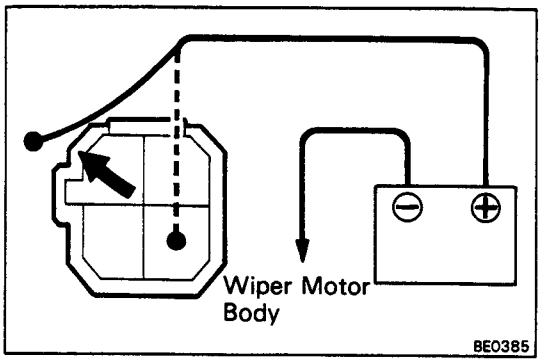
Rear Wiper Motor

INSPECTION OF REAR WIPER MOTOR

1. INSPECT THAT MOTOR TURNS

(a) Connect the positive (+) lead from the battery to terminal 3. Connect the negative (−) lead to the motor body.

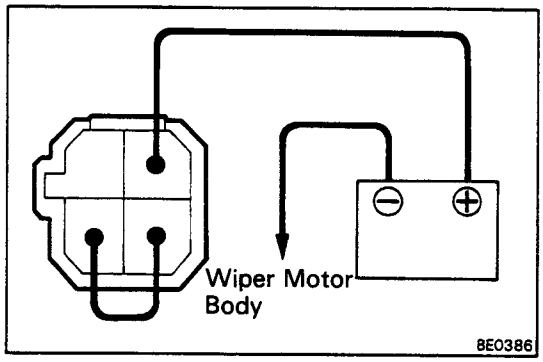
(b) Check that the motor turns.



2. INSPECT THAT MOTOR STOPS RUNNING AT STOP POSITION

(a) Connect the positive (+) lead from the battery to terminal 3. Connect the negative (−) lead to the motor body. Turn the motor.

(b) Stop motor operation anywhere except stop position by disconnecting terminal 3.



(c) Connect terminals 3 and 4.

(d) Connect the positive (+) lead from the battery to terminal 1.

(e) Check that the motor stops running at stop position after the motor operates again.

INSTRUMENTS, GAUGES AND WARNING

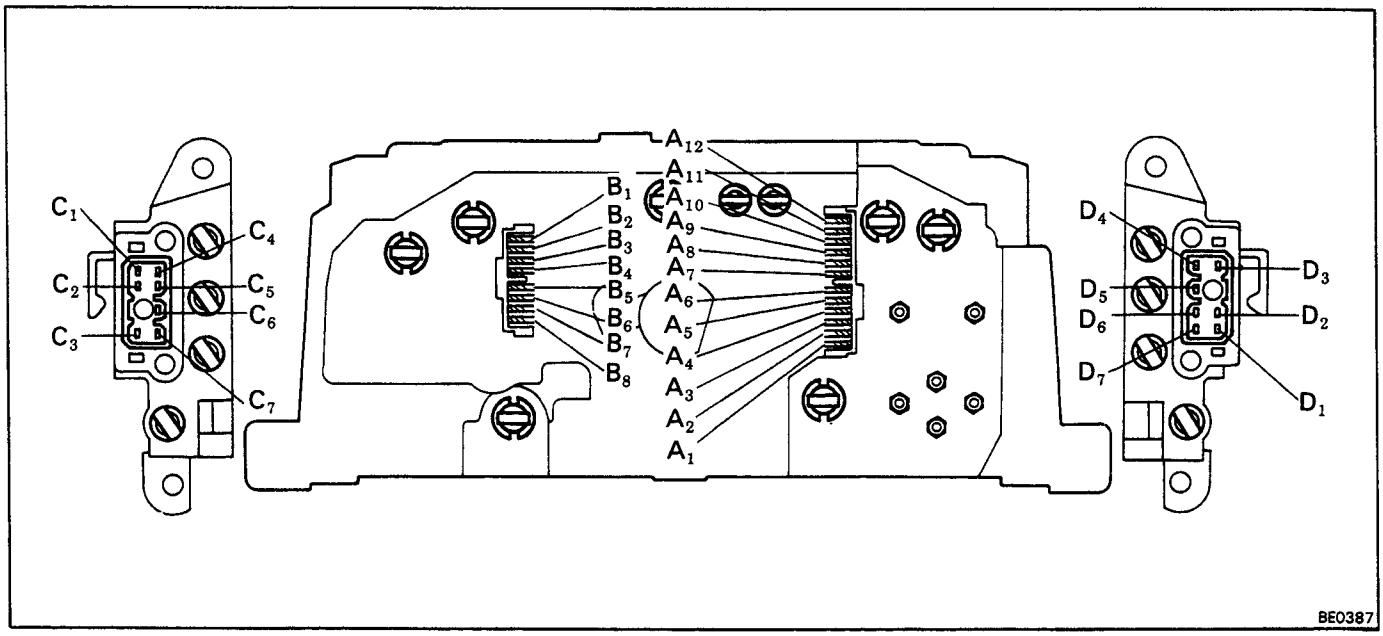
Troubleshooting

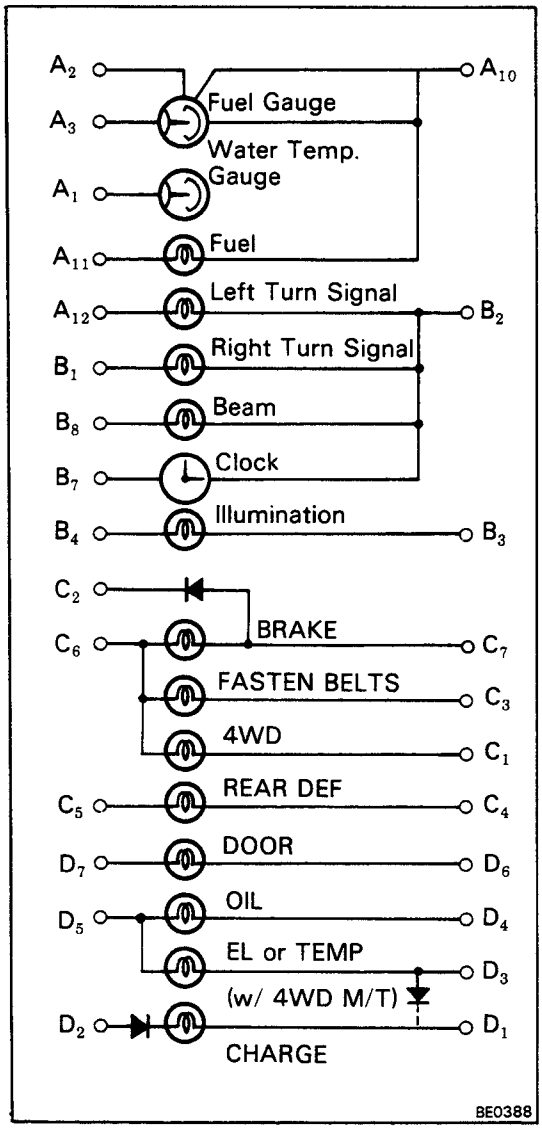
Problem	Possible cause	Remedy	Page
Tachometer does not work	"GAUGE" fuse blown	Replace fuse and check for short	BE-3
	Tachometer faulty	Check tachometer	BE-24
	Wiring faulty	Repair as necessary	
Fuel gauge does not work	"GAUGE" fuse blown	Replace fuse and check for short	BE-3
	Fuel receiver gauge faulty	Check receiver gauge	BE-25
	Sender gauge faulty	Check sender gauge	BE-26
	Wiring or ground faulty	Repair as necessary	
Fuel level warning light does not work	"GAUGE" fuse blown	Replace fuse and check for short	BE-3
	Bulb burned out	Replace bulb	
	Fuel level warning switch faulty	Check switch	BE-26
	Wiring or ground faulty	Repair as necessary	
Water temperature gauge does not work	"GAUGE" fuse blown	Replace fuse and check for short	BE-3
	Water temperature receiver gauge faulty	Check receiver gauge	BE-27
	Water temperature sender gauge faulty	Check sender gauge	BE-27
	Wiring or ground faulty	Repair as necessary	
Oil pressure warning light does not work	"GAUGE" fuse blown	Replace fuse and check for short	BE-3
	Bulb burned out	Replace bulb	
	Oil pressure switch faulty	Check switch	BE-28
	Wiring or ground faulty	Repair as necessary	
Brake fluid level ("BRAKE") warning light dose not work	"GAUGE" fuse blown	Replace fuse and check for short	BE-3
	Bulb burned out	Replace bulb	
	Brake fluid level warning switch faulty	Check switch	BE-28
	Wiring or ground faulty	Repair as necessary	
Parking brake ("BRAKE") Indicator light does not work	"GAUGES" fuse blown	Replace fuse and check for short	BE-3
	Bulb burned out	Replace bulb	
	Parking brake indicator switch faulty	Check switch	BE-28
	Wiring or ground faulty	Repair as necessary	
Four-wheel drive ("4WD") indicator light does not work	"GAUGE" fuse blown	Replace fuse and check for short	BE-3
	Bulb burned out	Replace bulb	
	Four-wheel drive indicator switch faulty (w/ M/T)	Check indicator switch	BE-29
	Four-wheel drive main switch faulty (w/ A/T)	Check main switch	BE-29
	Wiring or ground faulty	Repair as necessary	
Extra low gear ("EL") indicator light does not work	"GAUGE" fuse blown	Replace fuse and check for short	BE-3
	Bulb burned out	Replace bulb	
	Extra low gear indicator switch faulty	Check switch	BE-30
	Wiring or ground faulty	Repair as necessary	

Troubleshooting (Cont'd)

Problem	Possible cause	Remedy	Page
Automatic transmission fluid temperature ("TEMP") warning light does not work	"GAUGE" fuse blown	Replace fuse and check for short	BE-3
	Bulb burned out	Replace bulb	
	Automatic transmission fluid temperature warning switch faulty	Check switch	EB-30
	Wiring or ground faulty	Repair as necessary	
Overheat ("TEMP") warning light does not work	"GAUGE" fuse blown	Replace fuse and check for short	BE-3
	Bulb burned out	Replace bulb	
	Water temperature warning switch faulty	Check switch	BE-30
	Wiring or ground faulty	Repair as necessary	

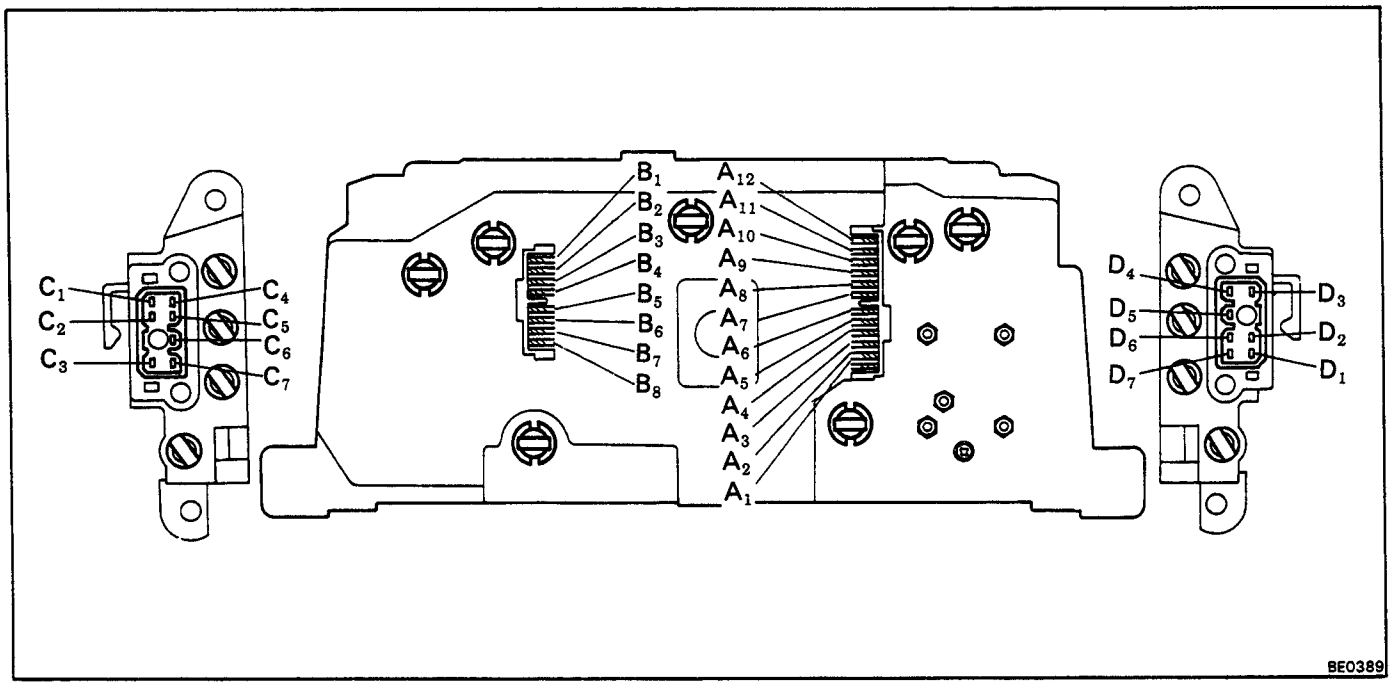
Combination Meter and Gauge w/o Tachometer (YAZAKI Type)

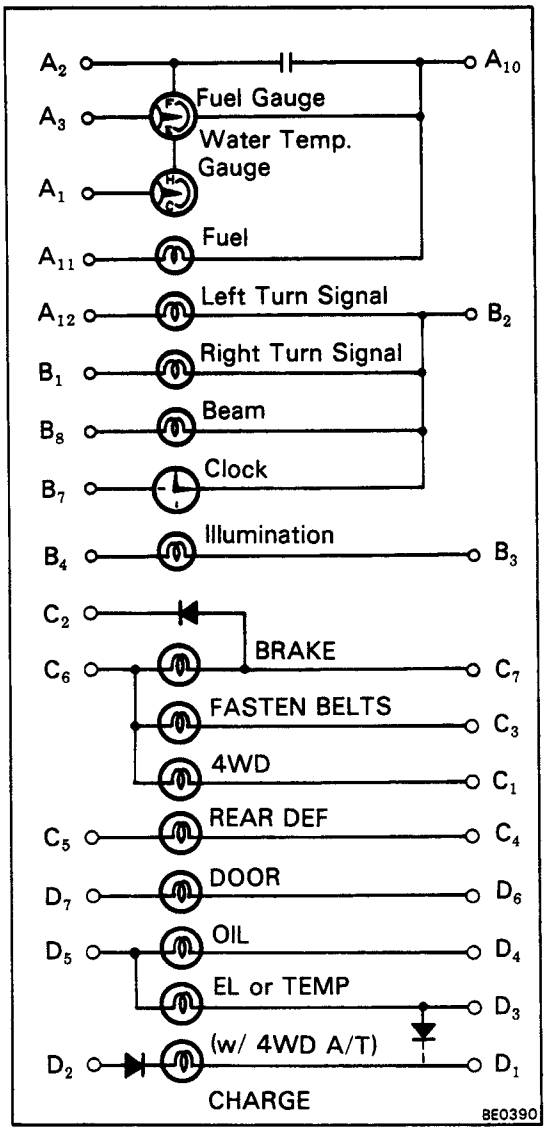




No.	Wiring connector side
A_1	Water Temperature Sender Gauge
A_2	Gauge Ground
A_3	Fuel Sender Gauge
A_{10}	GAUGES Fuse
A_{11}	Fuel Level Warning Switch
A_{12}	Turn Signal Switch Terminal TL
B_1	Turn Signal Switch Terminal TR
B_2	Ground
B_3	Rheostat
B_4	TAIL Fuse
B_7	DOME Fuse
B_8	Dimmer Switch Terminal HL
C_1	4WD Indicator Switch (w/ M/T) 4WD Switch (w/ A/T)
C_2	CHARGE Fuse
C_3	Seat Belt Warning Relay
C_4	Rear Window Defogger Switch
C_5	Ground
C_6	GAUGES Fuse
C_7	Brake Fluid Level Warning Switch Parking Brake Indicator Switch
D_1	CHARGE Fuse
D_2	IGN Fuse
D_3	A/T Fluid Temperature Warning Switch (w/ 4WD A/T) Water Temperature Warning Switch (w/ 4WD A/T) Extra Low Gear Indicator Switch (w/ 4WD M/T)
D_4	Oil Pressure Switch
D_5	GAUGE Fuse
D_6	Door Courtesy Switch
D_7	DOME Fuse

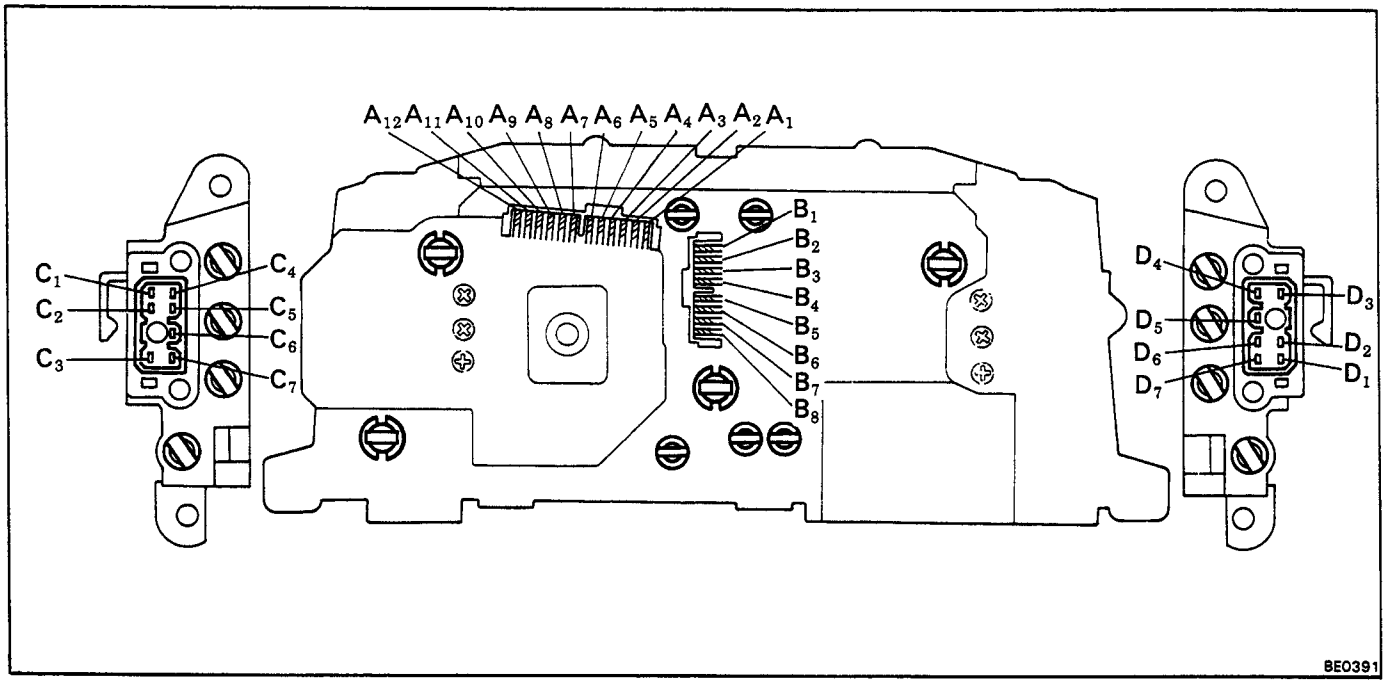
w/o Tachometer (YAZAKI Type)

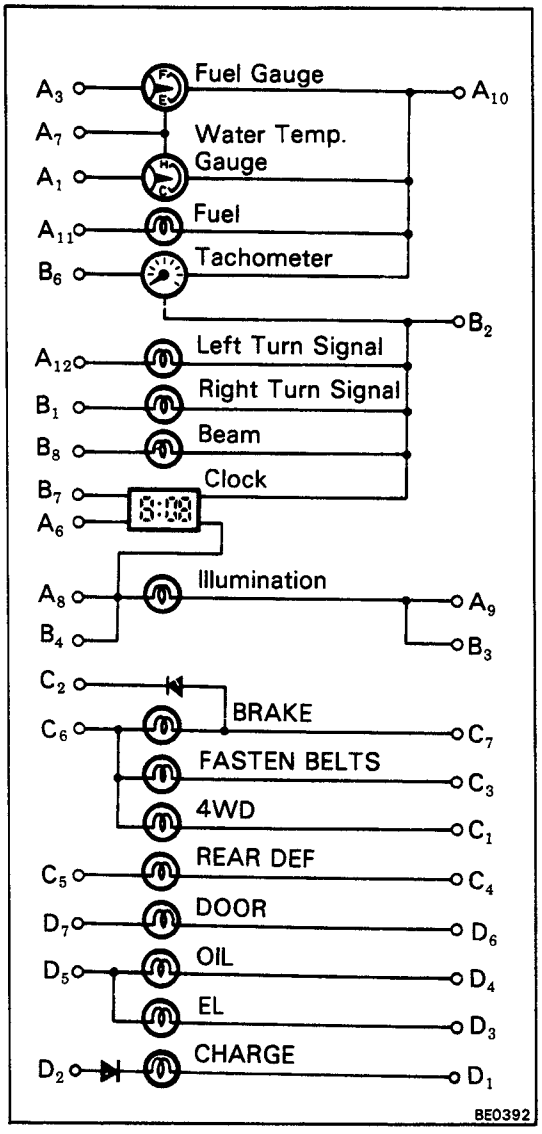




No.	Wiring connector side
A_1	Water Temperature Sender Gauge
A_2	Gauge Ground
A_3	Fuel Sender Gauge
A_{10}	GAUGES Fuse
A_{11}	Fuel Level Warning Switch
A_{12}	Turn Signal Switch Terminal TL
B_1	Turn Signal Switch Terminal TR
B_2	Ground
B_3	Rheostat
B_4	TAIL Fuse
B_7	DOME Fuse
B_8	Dimmer Switch Terminal HL
C_1	4WD Indicator Switch (w/ M/T) 4WD Switch (w/ A/T)
C_2	CHARGE Fuse
C_3	Seat Belt Warning Relay
C_4	Rear Window Defogger Switch
C_5	Ground
C_6	GAUGES Fuse
C_7	Brake Fluid Level Warning Switch Parking Brake Indicator Switch
D_1	CHARGE Fuse
D_2	IGN Fuse
D_3	A/T Fluid Temperature Warning Switch (w/ 4WD A/T) Water Temperature Warning Switch (w/ 4WD A/T) Extra Low Gear Indicator Switch (w/ 4WD M/T)
D_4	Oil Pressure Switch
D_5	GAUGE Fuse
D_6	Door Courtesy Switch
D_7	DOME Fuse

w/ Tachometer





No.	Wiring connector side
A_1	Water Temperature Sender Gauge
A_3	Fuel Sender Gauge
A_6	CIG Fuse
A_7	Gauge Ground
A_8	TAIL Fuse
A_9	Rheostat
A_{10}	GAUGES Fuse
A_{11}	Fuel Level Warning Switch
A_{12}	Turn Signal Switch Terminal TL
B_1	Turn Signal Switch Terminal TR
B_2	Ground
B_3	Rheostat
B_4	TAIL Fuse
B_5	Blank
B_6	IIA
B_7	DOME Fuse
B_8	Dimmer Switch Terminal HL
C_1	4WD Indicator Switch
C_2	CHARGE Fuse
C_3	Seat Belt Warning Relay
C_4	Rear Window Defogger Switch
C_5	Ground
C_6	GAUGES Fuse
C_7	Brake Fluid Level Warning Switch Parking Brake Indicator Switch
D_1	CHARGE Fuse
D_2	IGN Fuse
D_3	Extra Low Gear Indicator Switch (w/ 4WD M/T)
D_4	Oil Pressure Switch
D_5	GAUGE Fuse
D_6	Door Courtesy Switch
D_7	DOME Fuse

Speedometer

ON-VEHICLE INSPECTION OF SPEEDOMETER

(a) Using a speedometer tester, inspect the speedometer for allowable indication error and check the operation of the odometer.

NOTE: Tire wear and tire over or under inflation will increase the indication error.

Standard indication (km/h)	Allowable range (km/h)
20	18 – 23
40	40 – 44
60	60 – 64.5
80	80 – 85
100	100 – 105
120	120 – 125.5
140	140 – 146
160	160 – 167

Standard indication (mph)	Allowable range (mph)
20	20 – 23
40	40 – 43.5
60	60 – 64
80	80 – 84.5
100	100 – 105

If the error is excessive, replace the speedometer.

(b) Check the speedometer for pointer vibration and abnormal noises.

NOTE: Pointer vibration can be caused by a loose speedometer cable.

Tachometer

ON-VEHICLE INSPECTION OF TACHOMETER

(a) Connect a tune-up test tachometer, and start the engine.

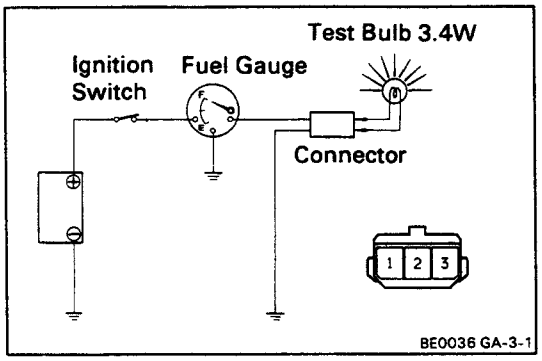
CAUTION:

- **Reversing the connection of the tachometer will damage the transistors and diodes inside.**
- **When removing or installing the tachometer, be careful not to drop it, or subject it to heavy shocks.**

(b) Compare the tester and tachometer indications.

rpm / Temp. and volts	1,000	3,000	5,000
25°C DC13V	$^{+\ 20}_{-120}$	±200	±200

If the error is excessive, replace the tachometer.



Fuel Gauge

INSPECTION OF FUEL GAUGE

1. INSPECT RECEIVER GAUGE OPERATION

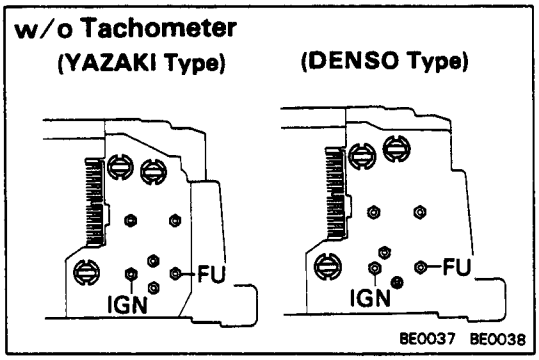
(a) Disconnect the connector from the fuel sender gauge.

(b) (w/ Tachometer)
Turn the ignition switch ON. Check that the receiver gauge needle moves to the empty position.

(c) Connect a 3.4W bulb between terminals 1 and 3 of the wiring connector. Check that the bulb lights and the receiver gauge needle operates.

NOTE: Because of the silicon oil in the gauge, it will take about 90 seconds for the needle to stabilize.

If operation is not as specified, inspect the receiver gauge.

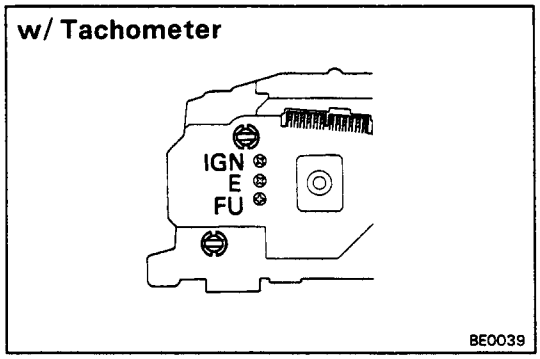


2. INSPECT RECEIVER GAUGE CONTINUITY

w/o Tachometer

Check that there is continuity between terminals IGN and FU.

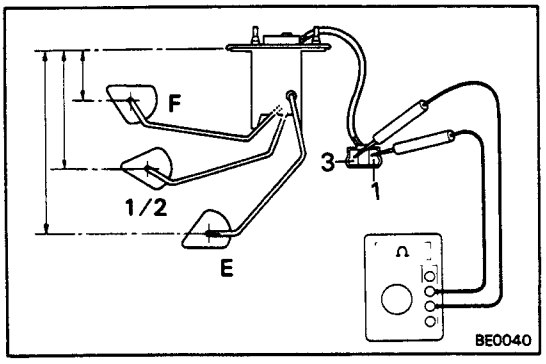
If there is no continuity, replace the receiver gauge.



w/ Tachometer

Check that there is continuity between terminals IGN and FU, between terminals FU and E and between terminals IGN and E.

If there is no continuity, replace the receiver gauge.



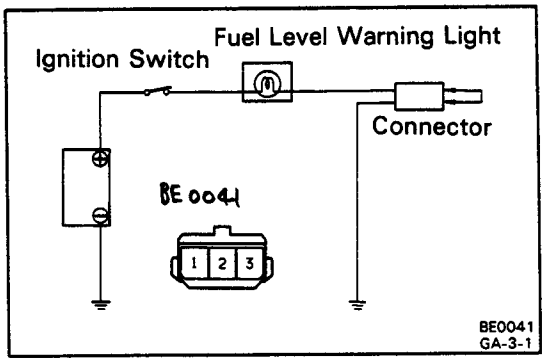
3. INSPECT SENDER GAUGE RESISTANCE

(a) Check that resistance changes as the float is moved from the top to the bottom position.

(b) Measure the resistance between terminals 1 and 3 for each float position.

Float position		mm (in.)	Resistance (Ω)
F	Sedan Wagon(2WD)	26 – 32 (1.02 – 1.26)	3±2.1
	Wagon(4WD)	72 – 80 (2.83 – 3.15)	
½	Sedan Wagon(2WD)	80 (3.15)	32.5±4.8
	Wagon(4WD)	149 – 157 (5.87 – 6.18)	
E	Sedan Wagon(2WD)	133 – 139 (5.24 – 5.47)	110±7.7
	Wagon(4WD)	211 – 219 (8.31 – 8.62)	

If resistance is not as specified, replace the gauge.



Fuel Level Warning

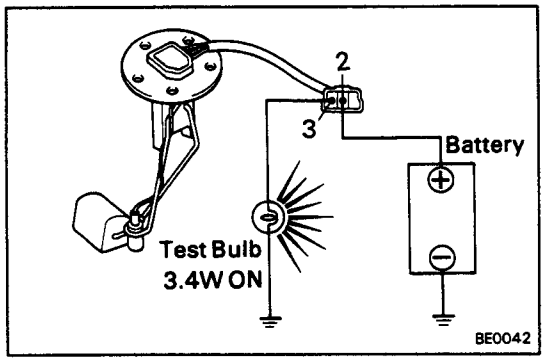
INSPECTION OF FUEL LEVEL WARNING

1. INSPECT WARNING LIGHT OPERATION

(a) Disconnect the connector from the warning switch. Connect terminals 2 and 3 of the wiring connector.

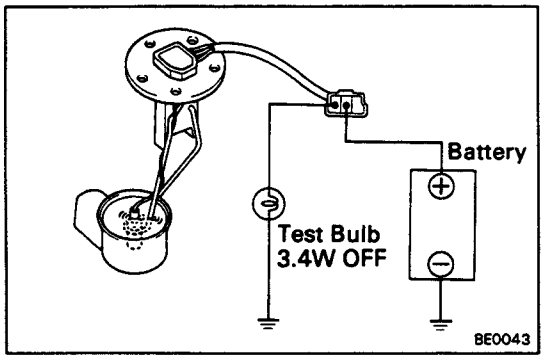
(b) Turn the ignition switch ON. Check that the warning light lights.

If operation is not as specified, inspect the bulb.



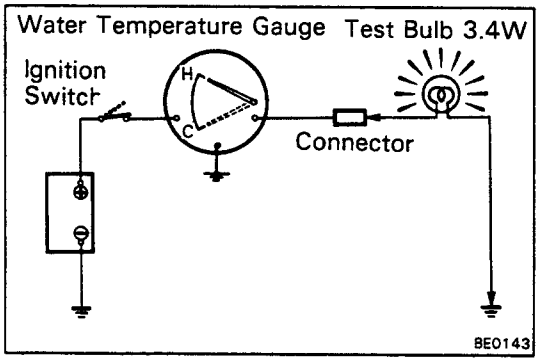
2. INSPECT LEVEL WARNING SWITCH OPERATION

(a) Apply battery voltage between terminals 2 and 3 through a 12V 3.4W bulb. Check that the bulb lights.



(b) Submerge the switch in gasoline or water. Check that the bulb goes out.

If operation is not as specified, replace the sender gauge.



Water Temperature Gauge

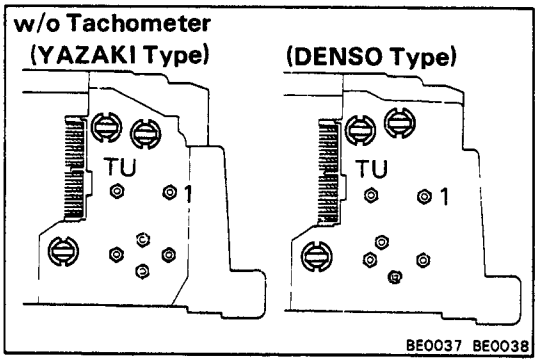
INSPECTION OF WATER TEMPERATURE GAUGE

1. INSPECT RECEIVER GAUGE OPERATION

(a) Disconnect the connector from the sender gauge. Ground the terminal of the wiring connector through a 12V, 3.4W bulb as shown.

(b) Turn the ignition switch ON. Check that the bulb lights and the receiver gauge needle operates.

If operation is not as specified, inspect the receiver gauge.

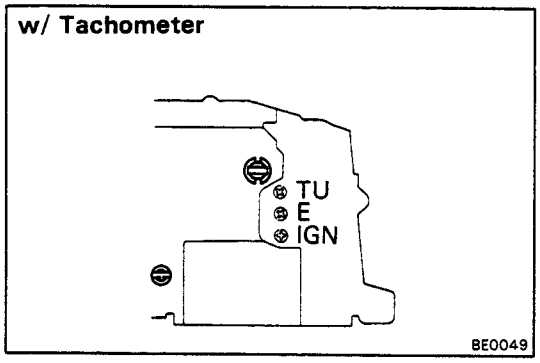


2. INSPECT RECEIVER GAUGE CONTINUITY

w/o Tachometer

Check that there is continuity between terminals TU and 1.

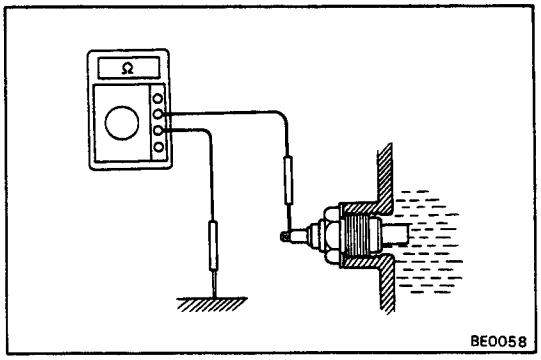
If there is no continuity, replace the receiver gauge.



w/ Tachometer

Check that there is continuity between terminals IGN and TU, between terminals TU and E and between terminals IGN and E.

If there is no continuity, replace the receiver gauge.

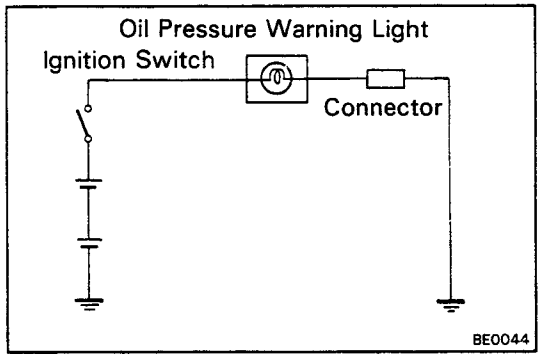


3. INSPECT SENDER GAUGE RESISTANCE

Using an ohmmeter, measure the resistance between the terminal and ground for the corresponding water temperature sender gauge.

Water temperature °C (°F)	Resistance (Ω)
50 (122)	226.0 $^{+33.6}_{-36.6}$
115 (239)	26.4 $^{+1.71}_{-2.21}$

If resistance is not as specified, replace the sender gauge.



Oil Pressure Warning ("OIL")

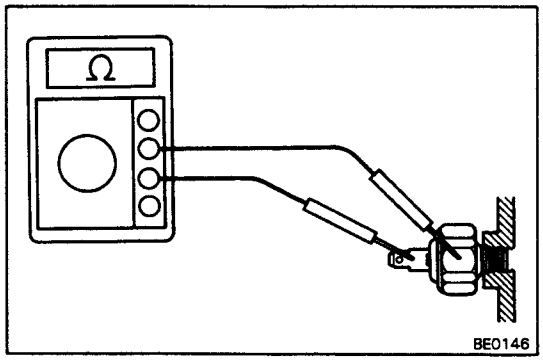
INSPECTION OF OIL PRESSURE WARNING

1. INSPECT WARNING LIGHT OPERATION

(a) Disconnect the connector from the pressure switch. Ground the terminal of the wiring connector.

(b) Turn the ignition switch ON. Check that the warning light lights.

If operation is not as specified, inspect the bulb.



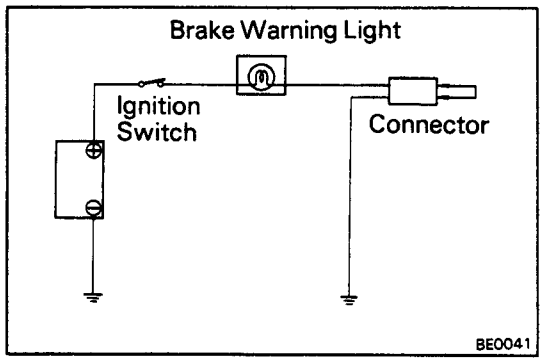
2. **INSPECT PRESSURE SWITCH OPERATION**

(a) Check that there is continuity between the terminal and ground when the switch is ON with the engine stopped.

(b) Check that there is no continuity between the terminal and ground when the switch is OFF with the engine running.

NOTE: After the engine has started, oil pressure should be over 0.3 kg/cm² (4.3 psi, 29 kPa).

If operation is not as specified, replace the switch.



Brake Fluid Level Warning ("BRAKE")

INSPECTION OF BRAKE FLUID LEVEL WARNING

1. **INSPECT WARNING LIGHT OPERATION**

(a) Disconnect the connector from the warning switch. Connect the terminals of the wiring connector.

(b) Turn the ignition switch ON. Check that the warning light lights.

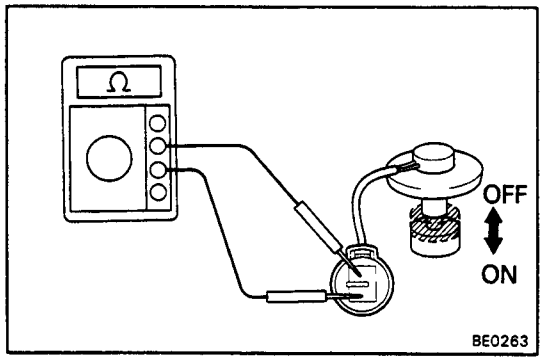
If operation is not as specified, inspect the bulb.

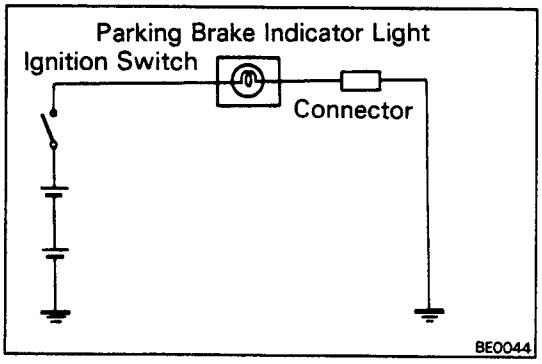
2. **INSPECT WARNING SWITCH OPERATION**

(a) Check that there is no continuity between terminals when the warning switch is OFF (float up).

(b) Check that there is continuity between terminals when the warning switch is ON (float down).

If operation is not as specified, replace the warning switch.





Parking Brake Indicator ("BRAKE")

INSPECTION OF PARKING BRAKE INDICATOR

1. **INSPECT INDICATOR LIGHT OPERATION**

(a) Disconnect the connector from the indicator switch. Connect the terminals of the wiring connector.

(b) Turn the ignition switch ON. Check that the indicator light lights.

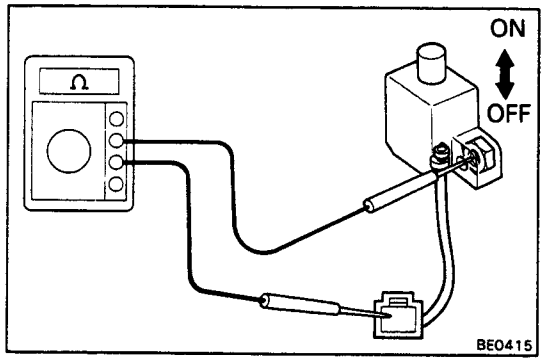
If operation is not as specified, inspect the bulb.

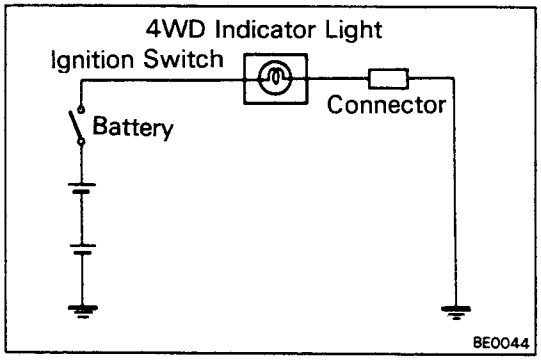
2. **INSPECT INDICATOR SWITCH OPERATION**

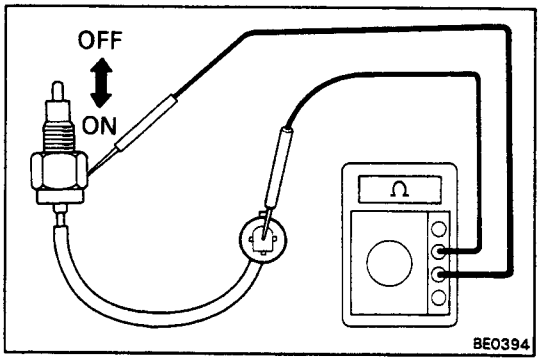
(a) Check that there is continuity between the terminal and body when the indicator switch is ON.

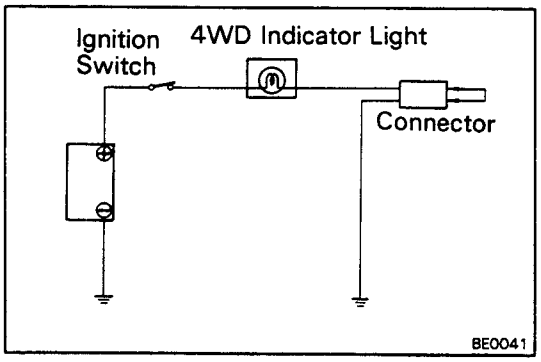
(b) Check that there is no continuity between the terminal and body when the indicator switch is OFF.

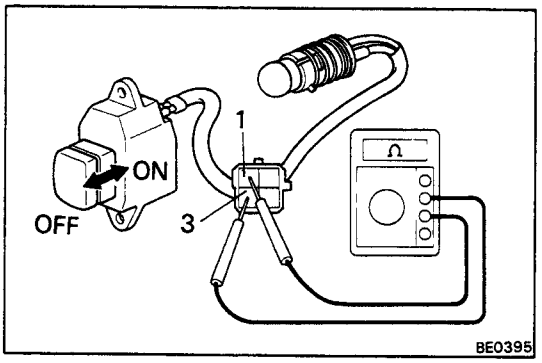
If operation is not as specified, replace the indicator switch.

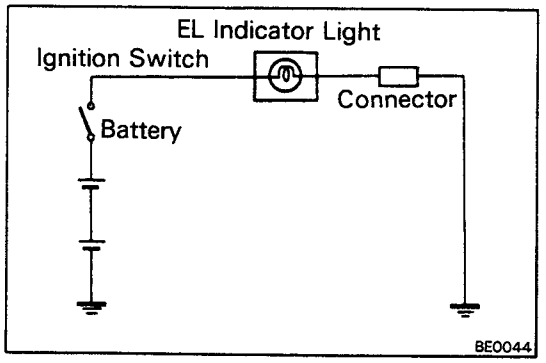












Four-Wheel Drive Indicator ("4WD")

INSPECTION OF FOUR-WHEEL INDICATOR

w/ M/T

1. INSPECT INDICATOR LIGHT OPERATION

(a) Disconnect the connector from the indicator switch. Ground the terminal of the wiring connector.

(b) Turn the ignition switch ON. Check that the indicator light lights.

If operation is not as specified, inspect the bulb.

2. INSPECT INDICATOR SWITCH OPERATION

(a) Check that there is no continuity between the terminal and body when the switch is OFF.

(b) Check that there is continuity between the terminal and body when the switch is ON.

If operation is not as specified, replace the indicator switch.

w/ A/T

1. INSPECT INDICATOR LIGHT OPERATION

(a) Disconnect the connector from the indicator switch. Ground the terminal of the wiring connector.

(b) Turn the ignition switch or starter switch ON. Check that the warning light lights.

If operation is not as specified, inspect the bulb.

2. INSPECT MAIN SWITCH OPERATION

(a) Check that there is no continuity between the terminals 1 and 3 when the switch is OFF.

(b) Check that there is continuity between terminals 1 and 3 when the switch is ON.

If operation is not as specified, replace the main switch.

Extra Low Gear Indicator ("EL")

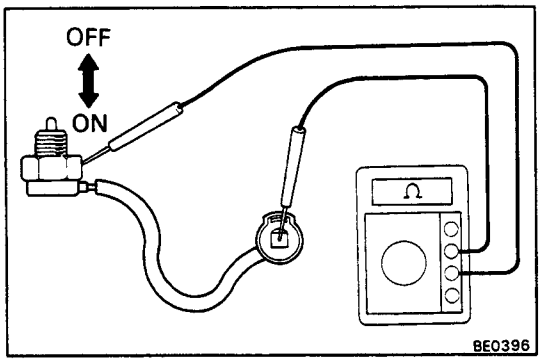
INSPECTION OF EXTRA LOW INDICATOR

1. INSPECT WARNING LIGHT OPERATION

(a) Disconnect the connector from the indicator switch. Ground the terminal of the wiring connector.

(b) Turn the ignition switch ON. Check that the warning light lights.

If operation is not as specified, inspect the bulb.

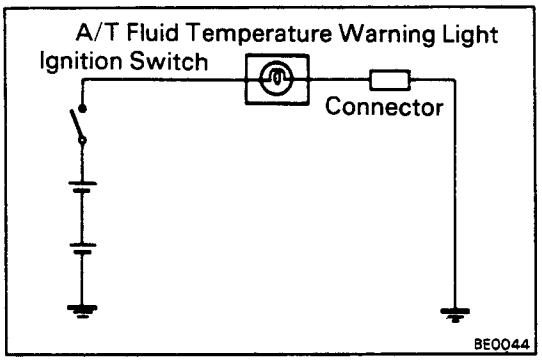


2. INSPECT INDICATOR SWITCH OPERATION

(a) Check that there is no continuity between terminals when the warning switch is OFF.

(b) Check that there is continuity between terminals when the warning switch is ON.

If operation is not as specified, replace the indicator switch.



Automatic Transmission Fluid Temperature Warning ("TEMP")

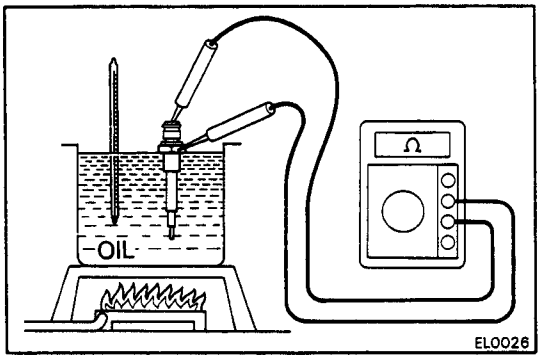
INSPECTION OF AUTOMATIC TRANSMISSION FLUID TEMPERATURE WARNING

1. INSPECT WARNING LIGHT OPERATION

(a) Disconnect the connector from the warning switch. Ground the terminal.

(b) Turn the ignition switch ON. Check that the warning light lights.

If operation is not as specified, inspect the bulb.

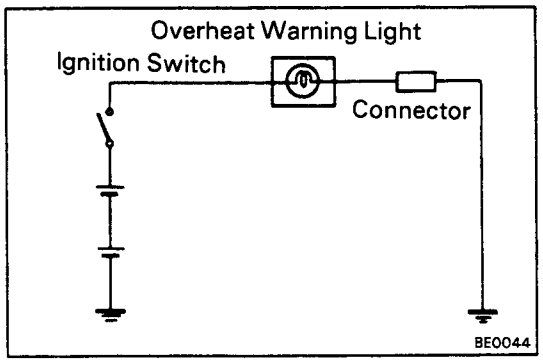


2. INSPECT WARNING SWITCH OPERATION

(a) Check that there is no continuity between the terminal and body when the oil temperature is below 125°C (257°F).

(b) Check that there is continuity between the terminal and body when the oil temperature is above 132°C (270°F).

If operation is not as specified, replace the warning switch.



Overheat Warning ("TEMP") (w/ A/T only)

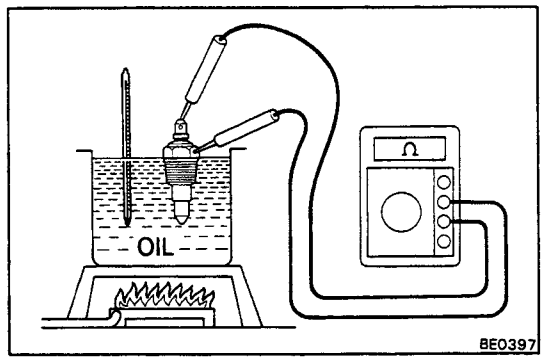
INSPECTION OF OVERHEAT WARNING

1. INSPECT WARNING LIGHT OPERATION

(a) Disconnect the connector from the warning switch. Ground the terminal of the wiring connector.

(b) Turn the ignition switch ON. Check that the warning light lights.

If operation is not as specified, inspect the bulb.



2. INSPECT WARNING SWITCH OPERATION

(a) Check that there is no continuity between terminal and body when the oil temperature is below 103°C (217°F).

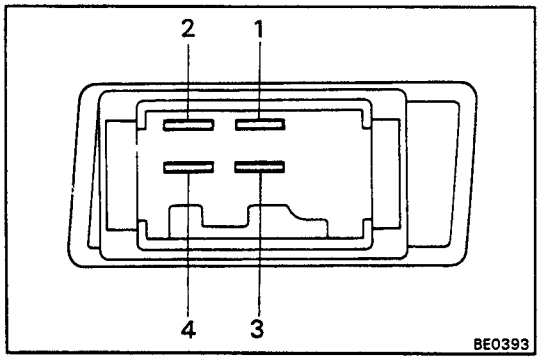
(b) Check that there is continuity between terminal and body when the oil temperature is above 110°C (230°F).

If operation is not as specified, replace the warning switch.

REAR WINDOW DEFOGGER

Troubleshooting

Problem	Possible cause	Remedy	Page
Rear window defogger does not work	Circuit breaker OFF	Reset breaker and check for short	BE-4
	Defogger relay faulty	Check relay	BE-31
	Defogger switch faulty	Check switch	BE-31
	Defogger wire broken	Check wires	BE-32
	Wiring and ground faulty	Repair as necessary	



Rear Window Defogger Switch

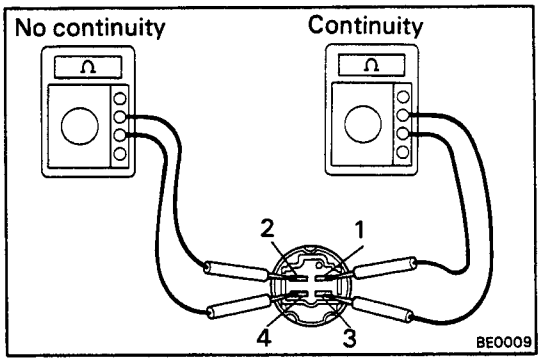
INSPECTION OF REAR WINDOW DEFOGGER SWITCH

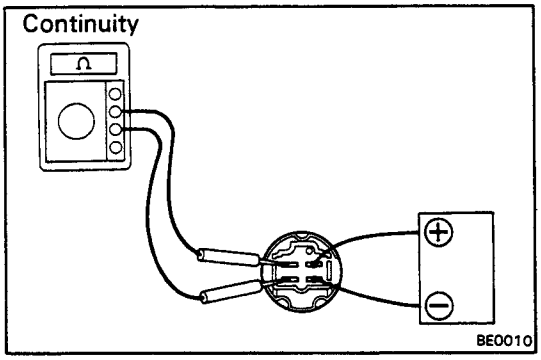
INSPECT SWITCH CONTINUITY

Check the switch continuity between terminals.

Switch Position \ Terminal	4	2	Illumination 1	Illumination 3
OFF			○	○
ON	○	○	○	○

If continuity is not as specified, replace the switch.





Rear Window Defogger Relay

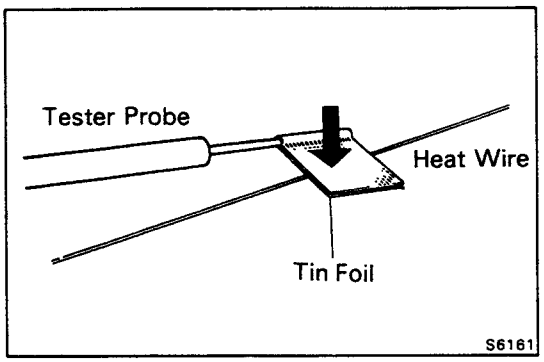
INSPECTION OF REAR WINDOW DEFOGGER RELAY

1. **INSPECT RELAY CONTINUITY**
   (a) Check that there is continuity between terminals 1 and 3.
   (b) Check that there is no continuity between terminals 2 and 4.

   If continuity is not as specified, replace the relay.

2. **INSPECT RELAY OPERATION**
   (a) Apply battery voltage across terminals 1 and 3.
   (b) Check that there is continuity between terminals 2 and 4.

   If operation is not as specified, replace the relay.



Rear Window Defogger Wires

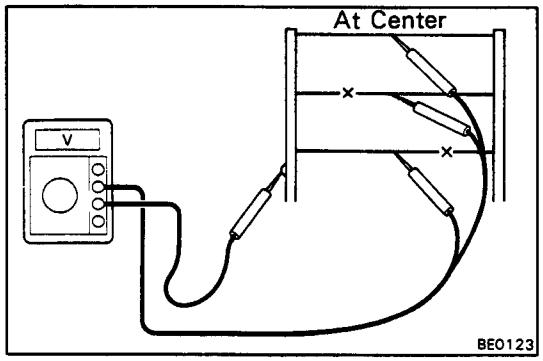
CAUTION:

- **When cleaning the glass, use a soft, dry cloth, and wipe the glass in the direction of the wire. Take care not to damage the wires.**
- **Do not use detergents or glass cleaners with abrasive ingredients.**
- **When measuring voltage, wind a piece of tin foil around the tip of the negative probe and press the foil against the wire with your finger as shown.**

INSPECTION OF REAR WINDOW DEFOGGER WIRES

1. INSPECT FOR WIRE BREAKAGE

(a) Switch ON the defogger.

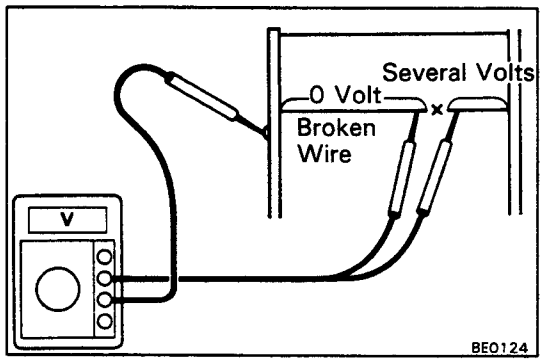


(b) Measure the voltage at the center of each heat wire.

Voltage	Criteria
Approx. 5 V	Okay (No break in wire)
Approx. 10 V or 0 V	Broken wire

NOTE: If there are 10 V, the wire is broken between the center of the wire and the positive (+) end.

If there is no voltage, the wire is broken between the center of the wire and ground.



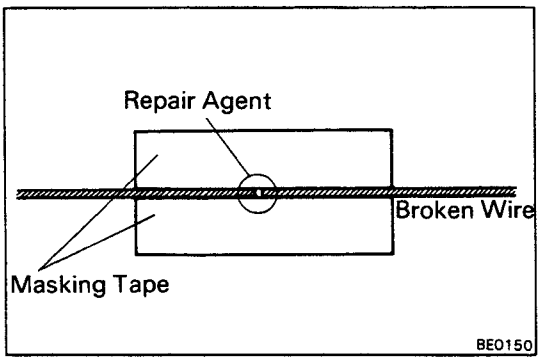
2. INSPECT FOR WIRE BREAKAGE POINT

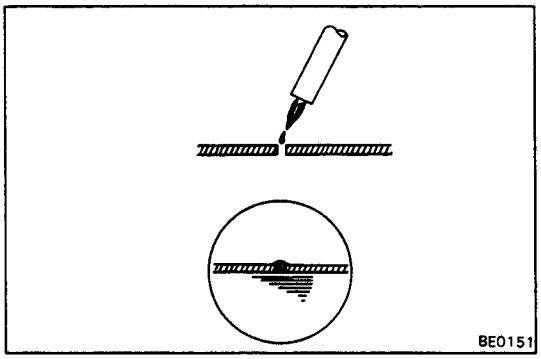
(a) Place the voltmeter positive (+) lead against the defogger positive (+) terminal.

(b) Place the voltmeter negative (−) lead with the foil strip against the heat wire at the positive (+) terminal end and slide it toward the negative (−) terminal end.

(c) The point where the voltmeter deflects from zero to several volts is the place where the heat wire is broken.

NOTE: If the heat wire is not broken, the voltmeter will indicate 0V at the positive (+) end of the heat wire but gradually increase to 12V as the meter probe is moved to the other end.





REPAIR OF REAR WINDOW DEFOGGER WIRES

1. **CLEAN BROKEN WIRE TIPS WITH WHITE GASOLINE**

2. **PLACE MASKING TAPE ALONG BOTH SIDES OF WIRE TO BE REPAIRED**

   (a) Thoroughly mix the repair agent (Dupont paste No. 4817).

   (b) Using a fine tip brush, apply a small amount to the wire.

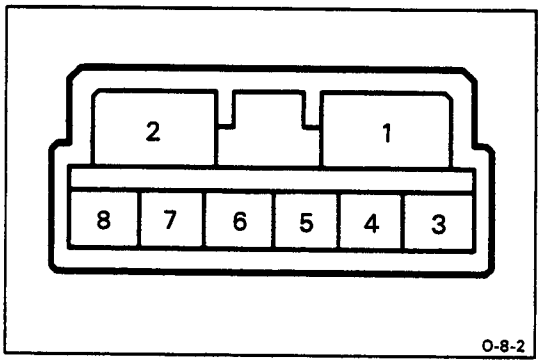
   (c) After a couple of minutes, remove the masking tape.

   (d) Allow to stand at least 24 hours.

HEATER

Troubleshooting

Problem	Possible cause	Remedy	Page
Blower does not work when fan switch is on	HEATER fuse blown	Replace fuse and check for short	BE-3
	Heater relay faulty	Check relay	BE-35
	Heater blower switch faulty	Check switch	BE-34
	Heater blower resistor faulty	Check resistor	BE-35
	Heater blower motor faulty	Replace motor	
	Wiring or ground faulty	Repair as necessary	
Incorrect temperature output	Control cables broken or binding	Check cables	BE-36
	Heater hoses leaking or clogged	Replace hose	
	Water valve faulty	Replace valve	
	Air dampers broken	Repair dampers	
	Air ducts clogged	Repair ducts	
	Heater radiator leaking or clogged	Replace radiator	
	Heater control unit faulty	Repair control unit	



Heater Blower Switch

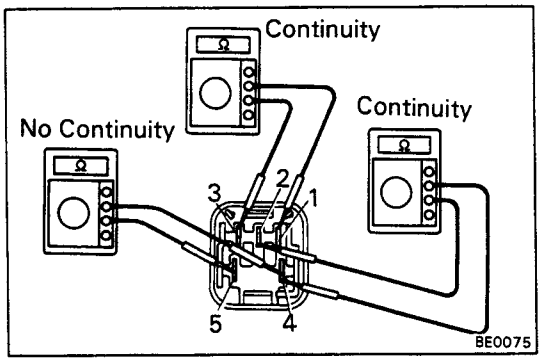
INSPECTION OF HEATER BLOWER SWITCH

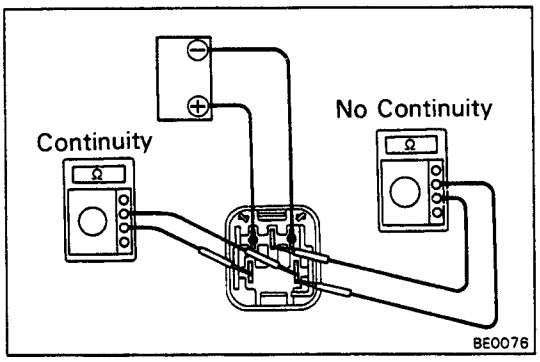
INSPECT SWITCH CONTINUITY

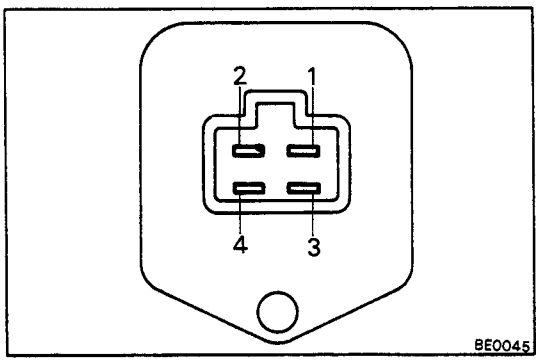
Check the switch continuity between terminals.

Switch position \ Terminal (Wire color)	2 (W-B)	3 (P-Y)	4 (L-Y)	5 (L-O)	1 (L-B)	Illumination 6 (G-R)	Illumination 7 (W-B)
OFF	○					○—○	
▮	○—○					○—○	
▮	○—○—○					○—○	
▮	○—○			○		○—○	
HI	○—○				○	○—○	

If continuity is not as specified, replace the switch.







Heater Relay

INSPECTION OF HEATER RELAY

1. INSPECT RELAY CONTINUITY

(a) Check that there is continuity between terminals 1 and 3.

(b) Check that there is continuity between terminals 2 and 4.

(c) Check that there is no continuity between terminals 4 and 5.

If continuity is not as specified, replace the relay.

2. INSPECT RELAY OPERATION

(a) Apply battery voltage across terminals 1 and 3.

(b) Check that there is no continuity between terminals 2 and 4.

(c) Check that there is continuity between terminals 4 and 5.

If operation is not as specified, replace the relay.

Heater Blower Resistor

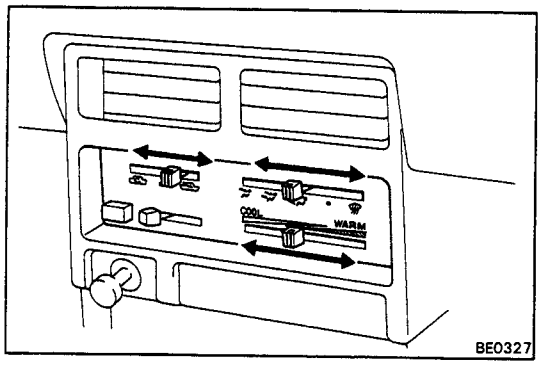
INSPECTION OF HEATER BLOWER RESISTOR

INSPECT RESISTOR RESISTANCE

Using an ohmmeter, measure the resistance between terminals.

Between terminals	Resistance (Ω)
2 – 4	Approx. 0.4
1 – 4	Approx. 1.3
1 – 3	Approx. 3.0

If resistance is not as specified, replace the resistor.

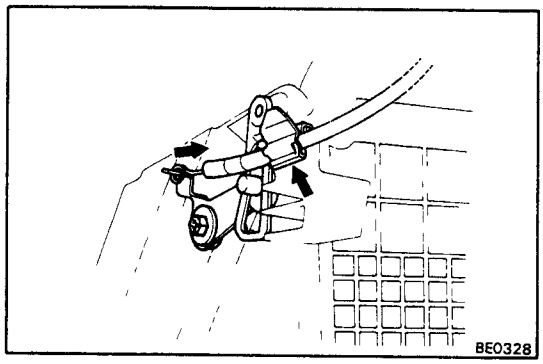


Heater Control

INSPECTION OF FRONT HEATER CONTROL

INSPECT HEATER CONTROL OPERATION

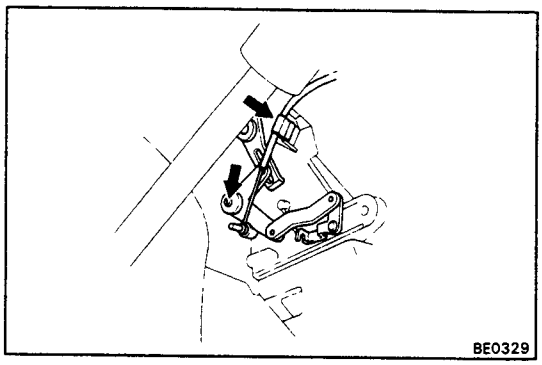
Move the control levers right and left, and check for stiffness and binding.



ADJUSTMENT OF FRONT HEATER CONTROL

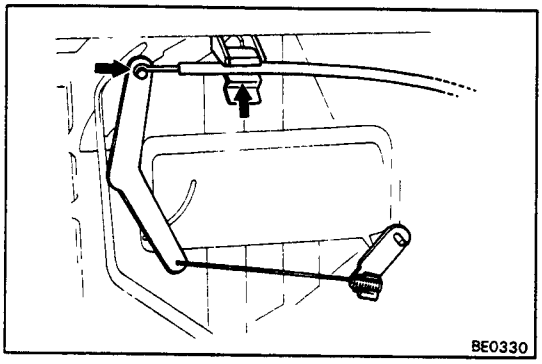
1. ADJUST AIR INLET DAMPER

Set the air damper and control lever at fresh.



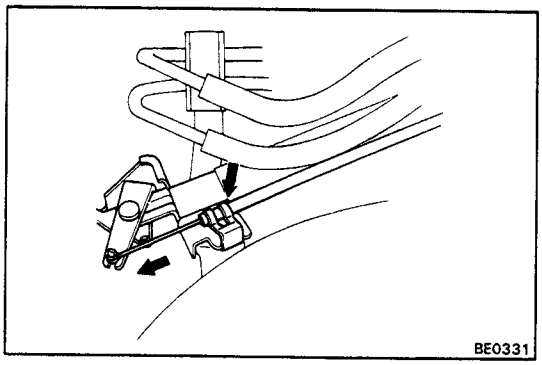
2. ADJUST MODE SELECTOR DAMPER

Set the mode selector and control lever at face.



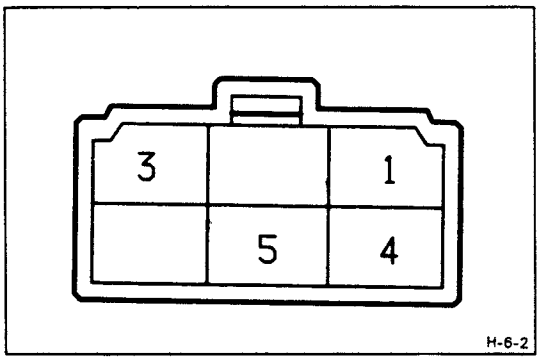
3. ADJUST AIR MIX DAMPER

Set the air mix damper and control lever at "COOL".



4. ADJUST WATER VALVE

Set the water valve and control lever at "COOL".



SUN ROOF

Sun Roof Switch

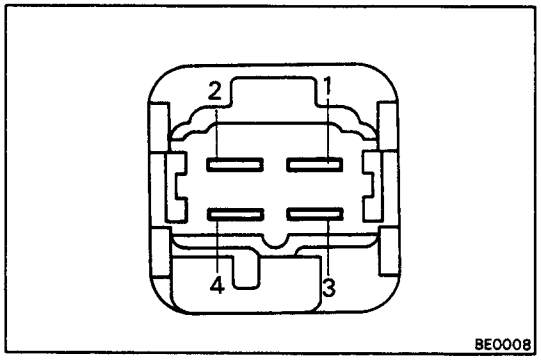
INSPECTION OF SUN ROOF SWITCH

INSPECT SWITCH CONTINUITY

Check the switch continuity between terminals.

Switch position \ Terminal (Wire color)	3 (R-W)	1 (W-B)	4 (G-Y)	5 (G-W)
OPEN	○——	——○	○——	——○
OFF		○——	——○——	——○
CLOSE	○——		——○	
		○——		——○

If continuity is not as specified, replace the switch.

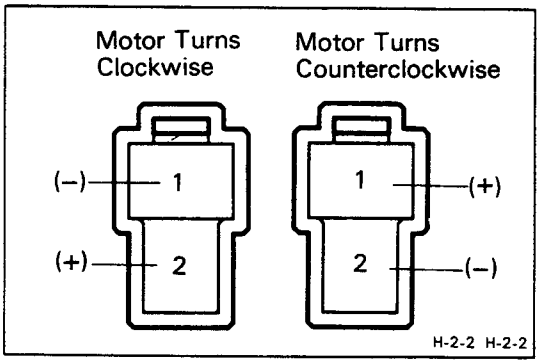


Sun Roof Relay

INSPECTION OF SUN ROOF RELAY

INSPECT RELAY CONTINUITY AND OPERATION

(See Taillight Control Relay on page BE-12)



Sun Roof Motor

INSPECTION OF SUN ROOF MOTOR

INSPECT MOTOR OPERATION

(a) Connect the positive (+) lead from the battery to terminal 2 (red wire) and the negative (−) lead to terminal 1 (green wire), and check that the motor turns clockwise.

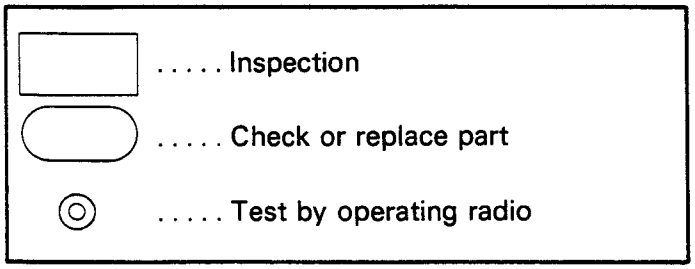
(b) Connect the positive (+) lead from the battery to terminal 1 (green wire) and the negative (−) lead to terminal 2 (red wire), and check that the motor turns counterclockwise.

If operation is not as specified, replace the motor.

RADIO, STEREO TAPE PLAYER AND ANTENNA

Troubleshooting

DESCRIPTION OF SYMBOLS



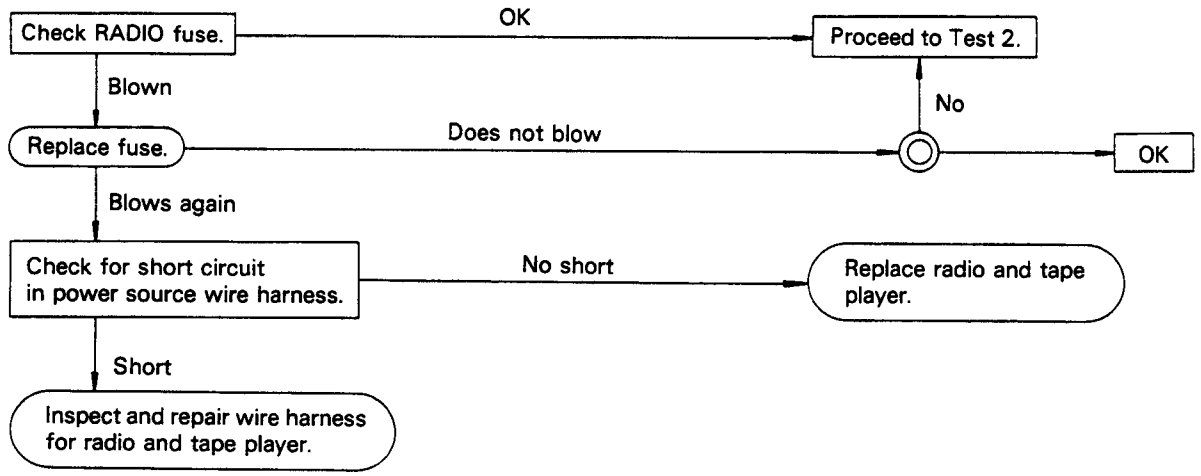
1. DEAD RADIO AND TAPE PLAYER

(a) No power to radio or tape player, or power without sound.

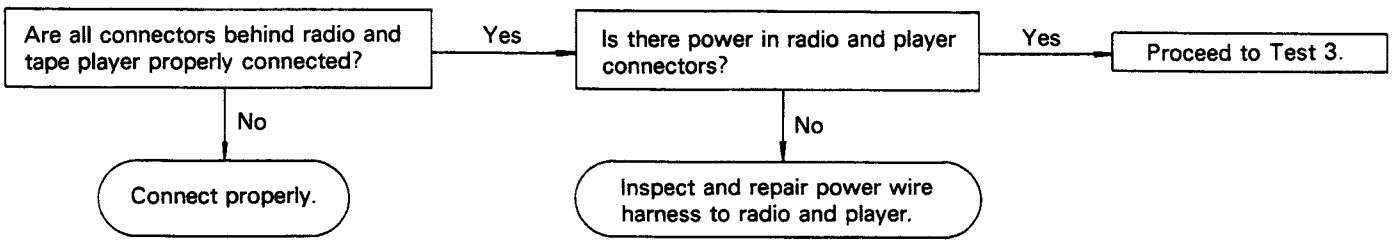
Possible causes:

- Blown RADIO fuse
- Short circuit or broken wire in wire harness of power source
- Loose connectors behind radio and tape player
- Loose speaker connector
- Defective speaker
- Broken wire in speaker wire harness
- Improperly installed radio or tape player
- Defective radio or tape player

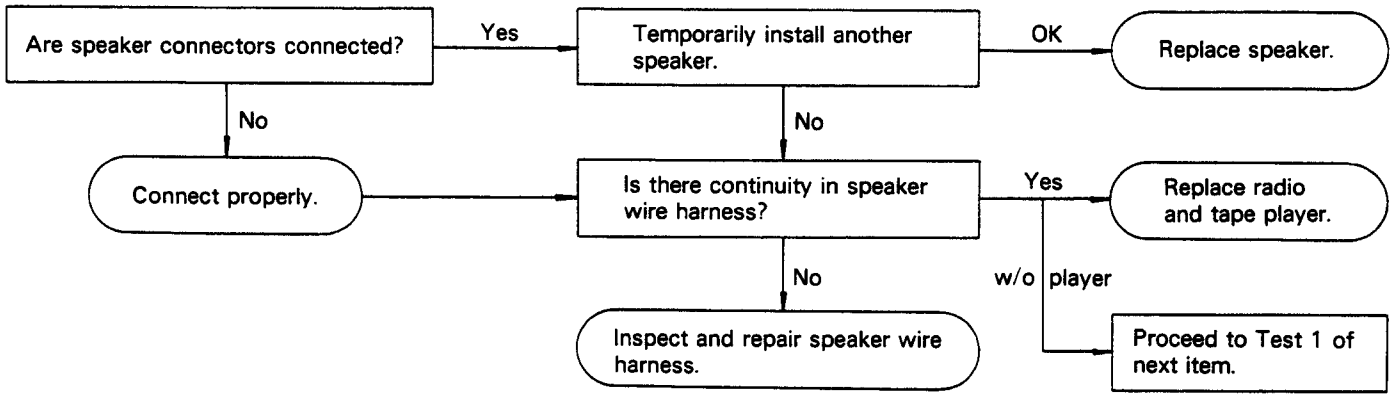
TEST 1



TEST 2


Are all connectors behind radio and tape player properly connected?
Yes
Is there power in radio and player connectors?
Yes
Proceed to Test 3.
No
Connect properly.
No
Inspect and repair power wire harness to radio and player.

TEST 3

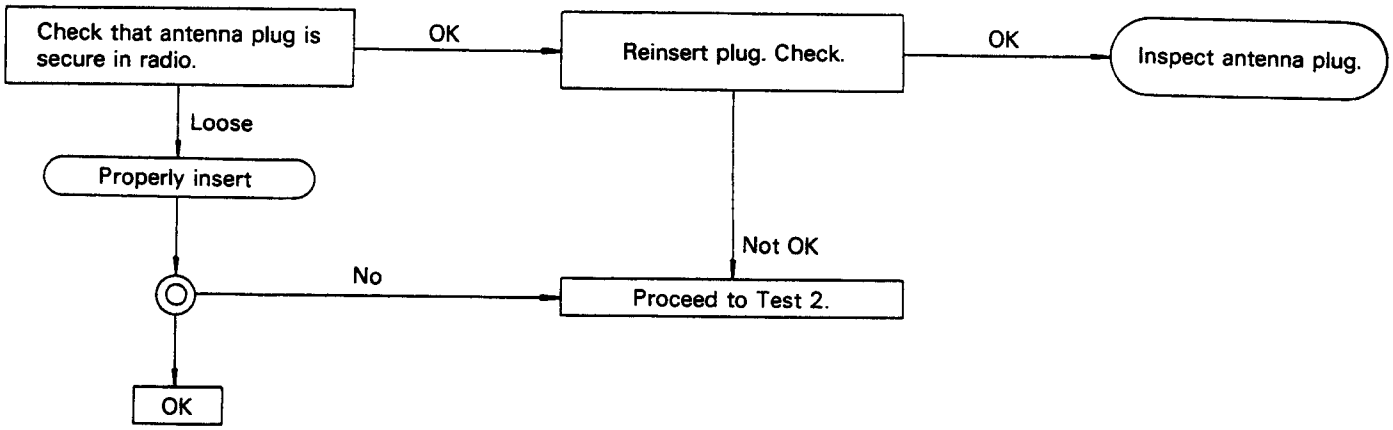

Are speaker connectors connected?
Yes
Temporarily install another speaker.
OK
Replace speaker.
No
No
Connect properly.
Is there continuity in speaker wire harness?
Yes
Replace radio and tape player.
No
w/o player
Inspect and repair speaker wire harness.
Proceed to Test 1 of next item.

(b) Tape player okay but no sound from AM and FM or either one.

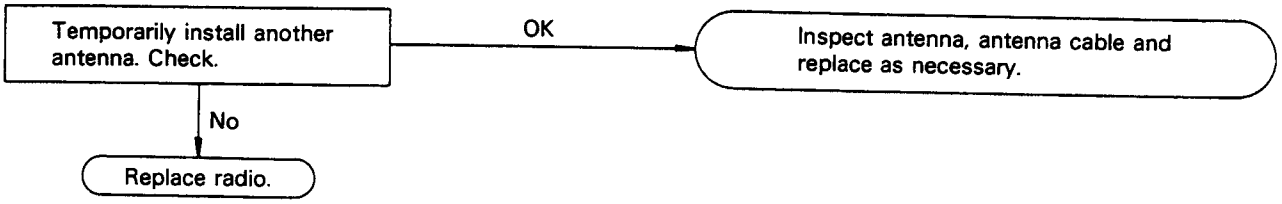
Possible causes:

- Antenna disconnected
- Antenna plug not properly connected
- Defective antenna
- Defective antenna cable
- Defective radio or tape player

TEST 1



TEST 2

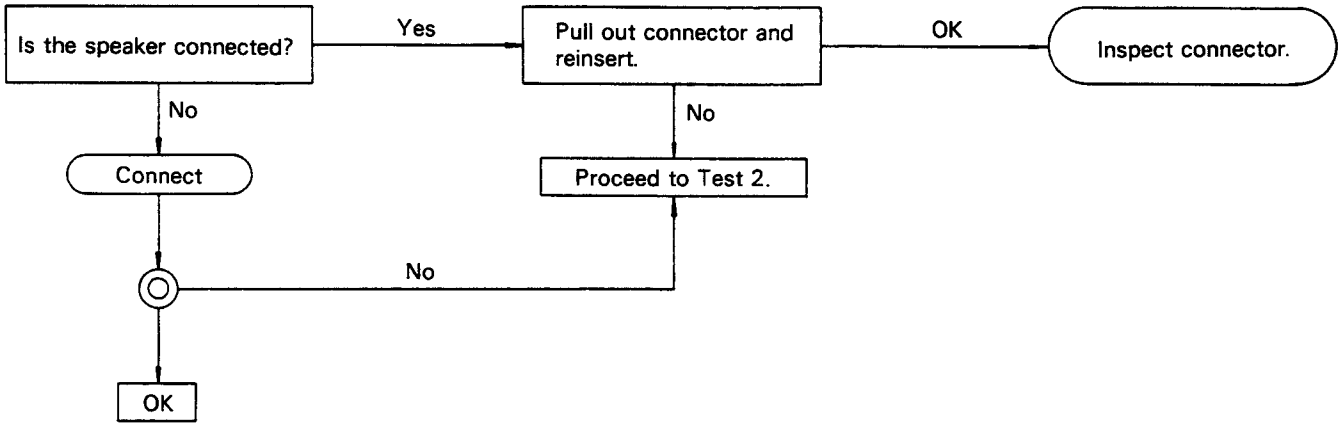


(c) No sound from one speaker.

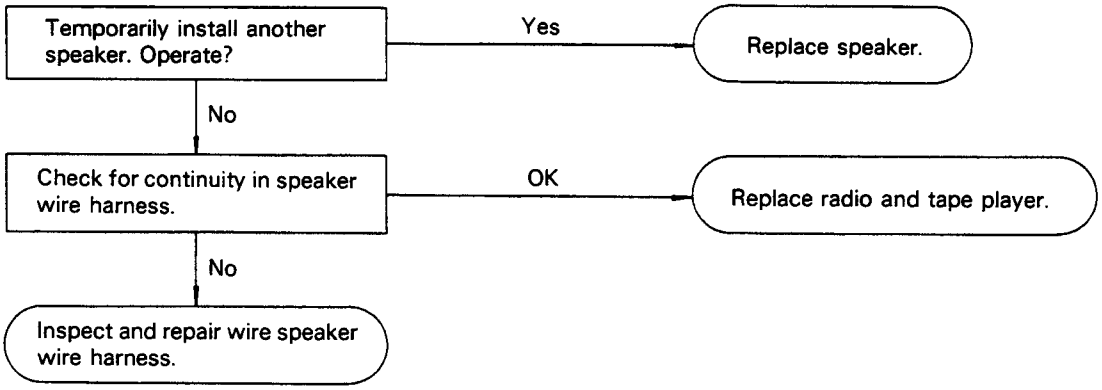
Possible causes:

- Loose speaker connector
- Broken wire in speaker wire harness
- Defective speaker
- Defective radio and tape player

TEST 1



TEST 2

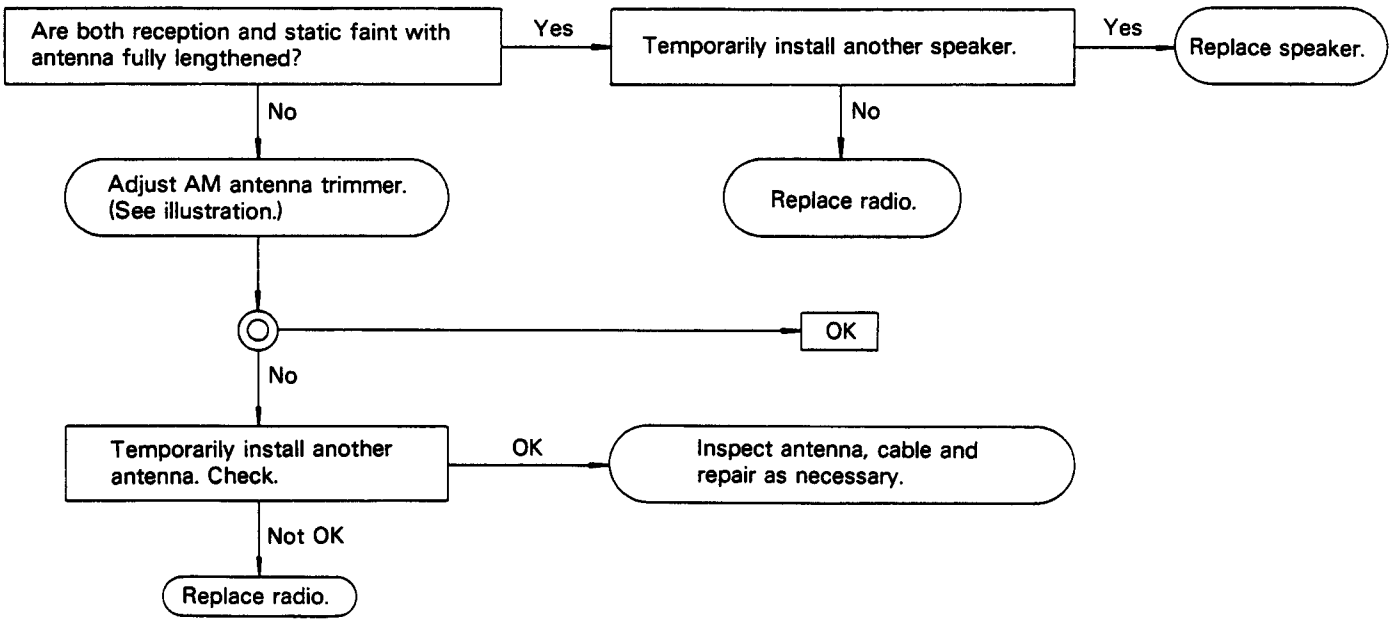


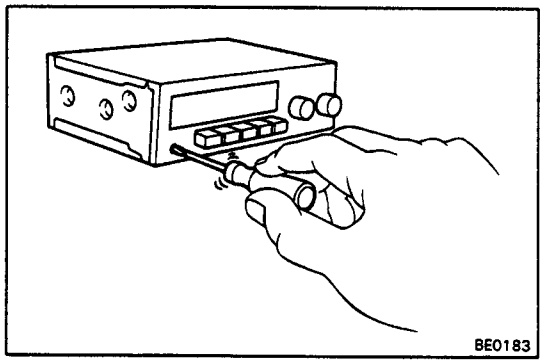
2. FAINT RECEPTION

Possible causes:

- Maladjusted antenna trimmer
- Defective antenna or cable
- Defective speaker
- Defective radio

TEST





NOTE: Adjustment of antenna trimmer.

(1) Fully lengthen the antenna.

(2) With volume at maximum, turn the dial to around 1400 kHz where there is no reception.

(3) Adjust the trimmer to loudest static.

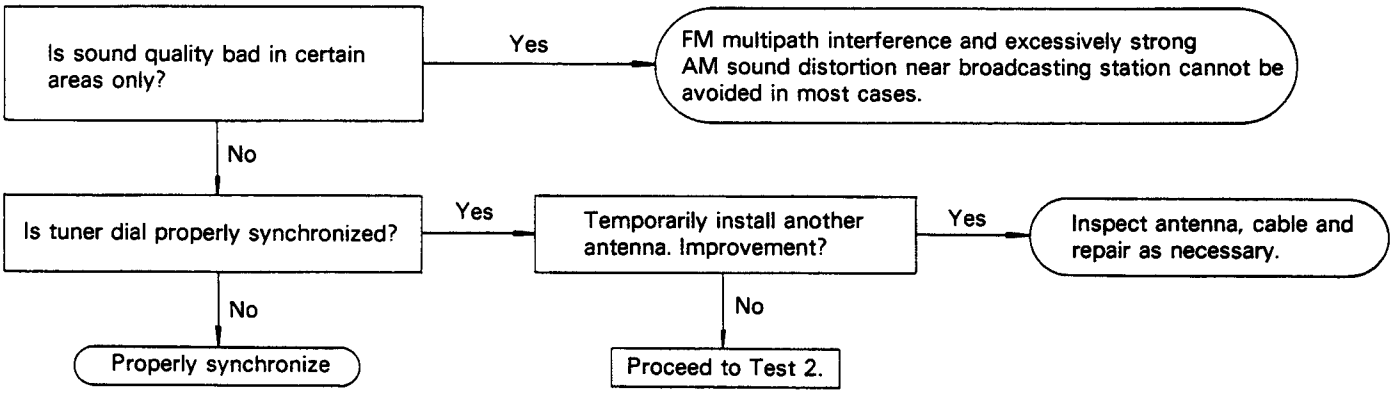
3. BAD SOUND QUALITY

(a) Sound quality bad when radio played.

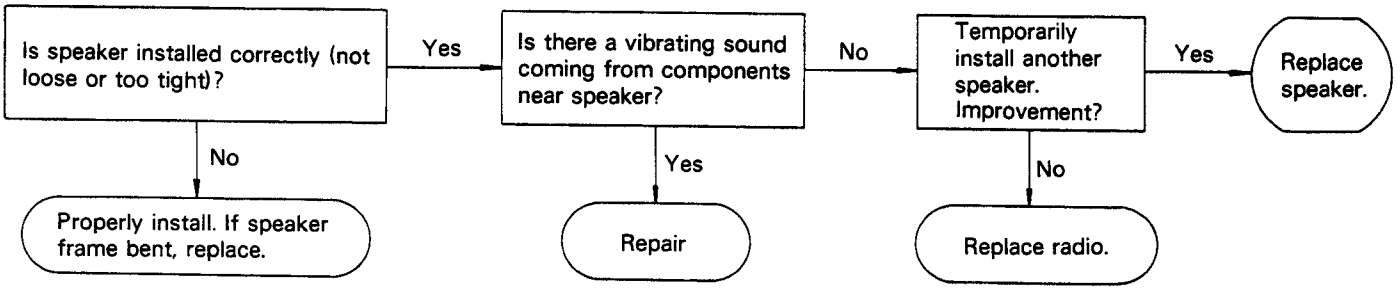
Possible causes:

- Multipath interference or excessive interception
- Tuner dial not synchronized with station
- Defective antenna or cable
- Speaker improperly installed
- Vibration sound from components near speaker
- Defective speaker
- Defective radio

TEST 1



TEST 2



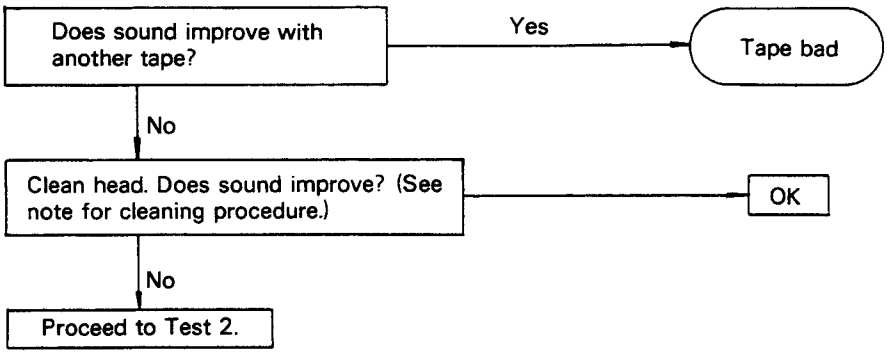
NOTE: FM distortion tends to increase sharply if tuner is not synchronized.

(b) Sound quality bad when tape player played.

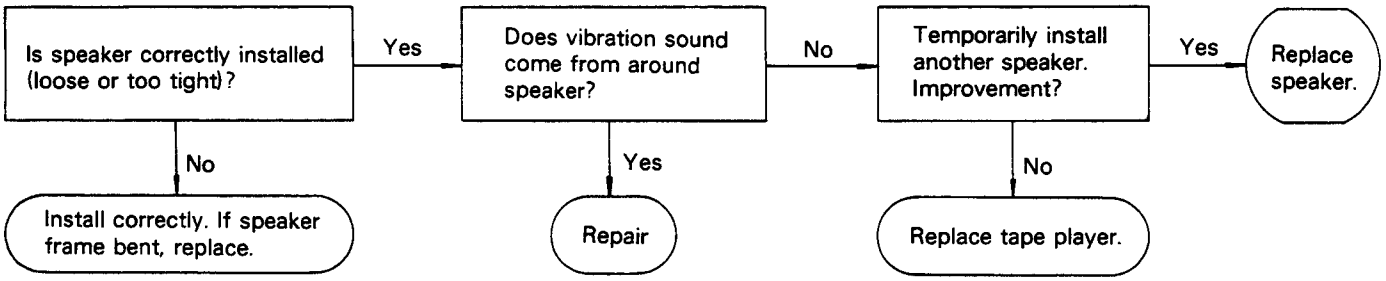
Possible causes:

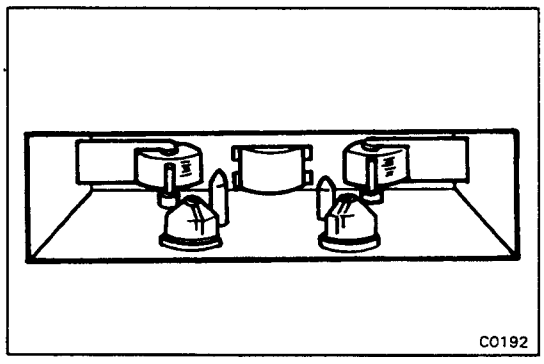
- Bad tape
- Dirty head
- Incorrectly installed speaker
- Vibration noise from around speaker
- Defective speaker
- Defective tape player

TEST 1



TEST 2





NOTE: Head cleaning procedure.

(1) Raise the cassette door with finger. Next using a pencil or like object, push in the guide as shown.

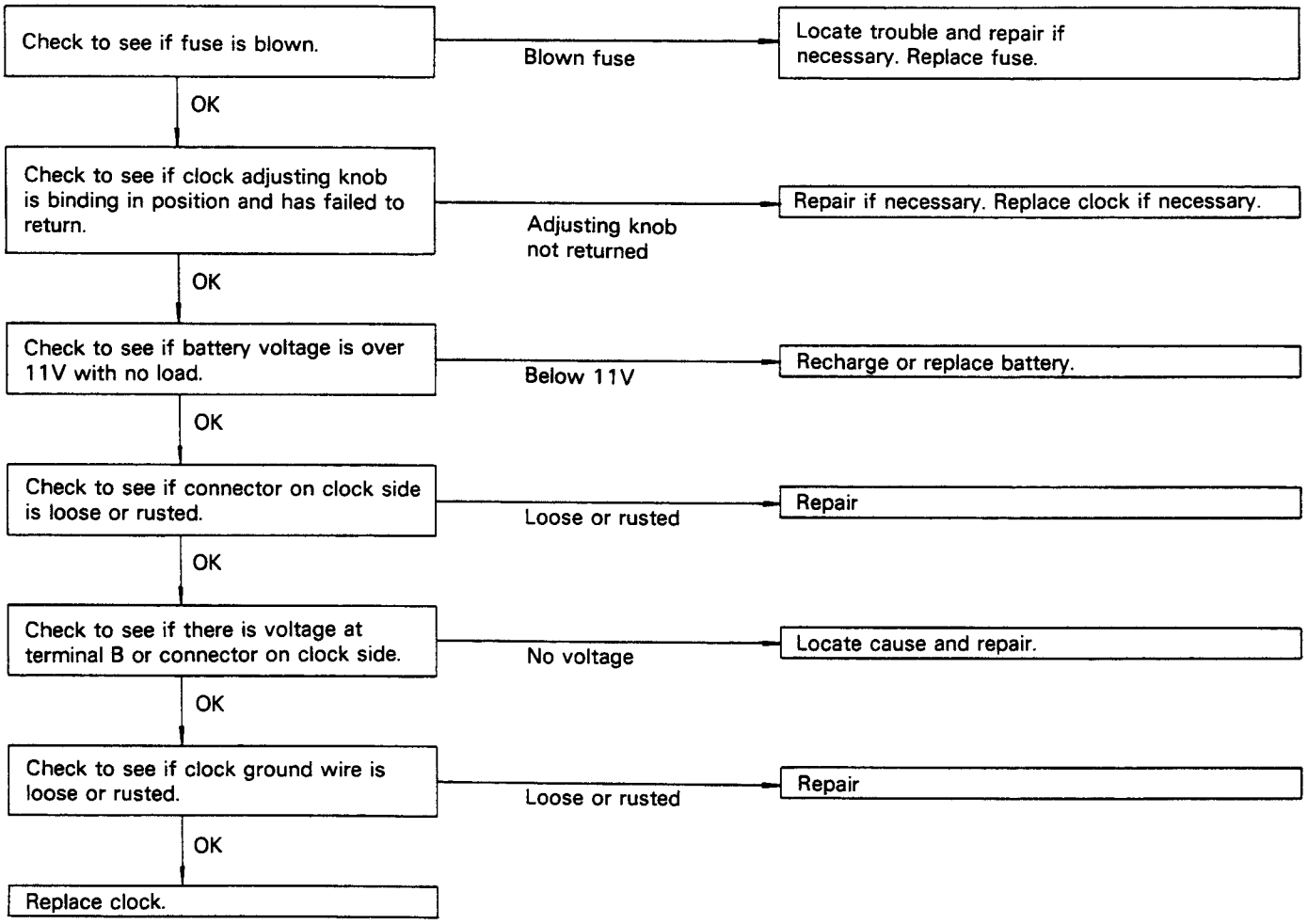
(2) Using a cleaning pen or cotton applicator soaked in alcohol, clean the head surface, pinch rollers and capstans.

(3) Push in the eject button.

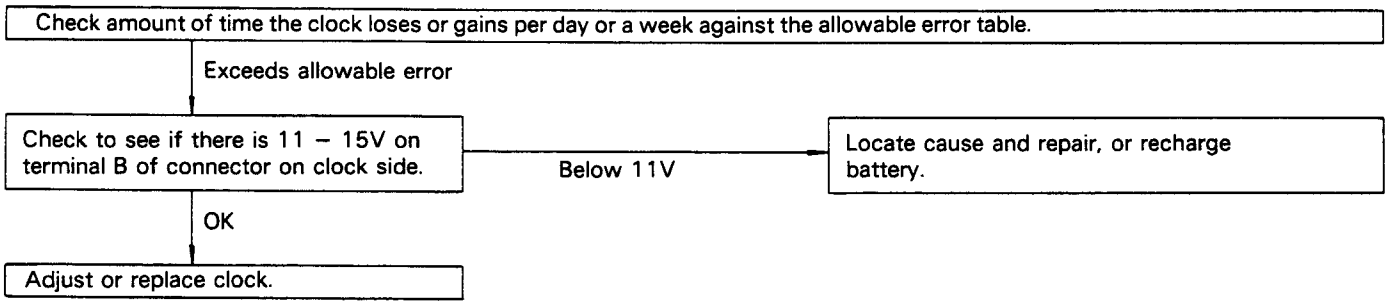
CLOCK

Troubleshooting

CLOCK WILL NOT OPERATE



CLOCK LOSES OR GAINS TIME



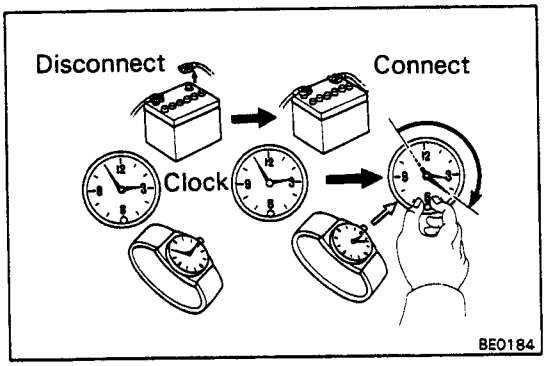
1. **INSPECT ALLOWABLE ERROR OF CLOCK**

Check the allowable error of the clock.

Allowable error (per day): ±1.5 seconds

2. **ADJUSTMENT OF CLOCK**

Adjustment of the quartz clock requires a precise digital counter. Adjustment must be made in a shop specified by the manufacturer.



3. **STARTING OF CLOCK**

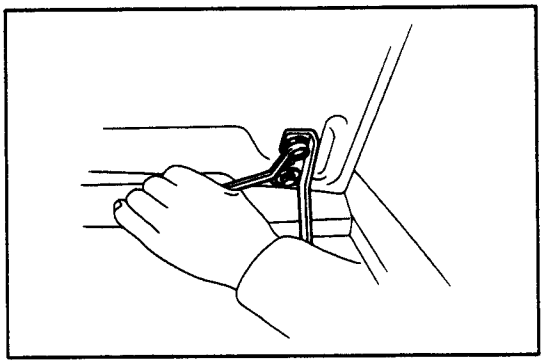
(a) Connect the battery terminal.

(b) Check the clock to see that it is running, and then set it to the correct time.

NOTE: Whenever the battery terminal is disconnected, make sure to set the clock to the correct time after reconnecting it.

BODY

	Page
HOOD	BO-2
FRONT DOOR	BO-3
REAR DOOR	BO-12
BACK DOOR	BO-20
MOULDING	BO-21
Windshield Outside Moulding	BO-21
Roof Drip and Belt Moulding	BO-25
Side Body Moulding	BO-28
WINDSHIELD	BO-37
QUARTER WINDOW GLASS	BO-44
3-Door Sedan Fixed Type	BO-44
3-Door Sedan Swing Type	BO-47
5-Door Sedan	BO-49
Wagon FWD	BO-51
Wagon 4WD	BO-53
BACK DOOR GLASS	BO-55
Sedan	BO-55
Wagon	BO-59
SUN ROOF	BO-61
SAFETY PAD	BO-67
SEAT	BO-72
SEAT BELT	BO-74
BODY DIMENSIONS	BO-76

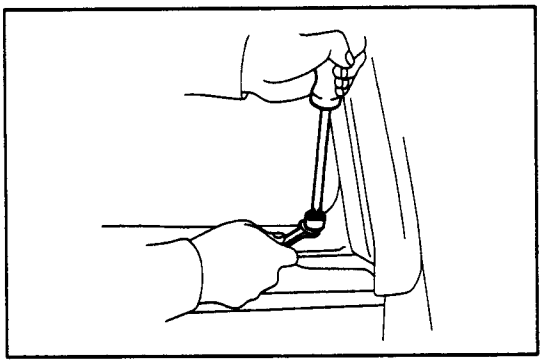


HOOD

ADJUSTMENT OF HOOD

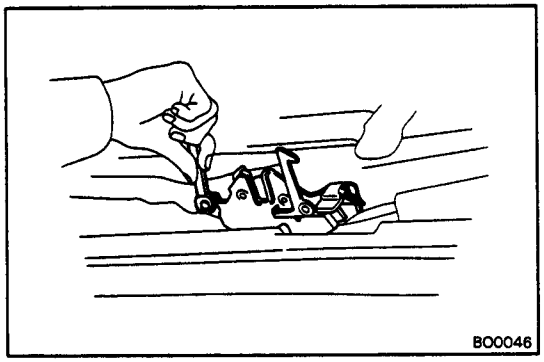
1. ADJUST HOOD IN FORWARD/REARWARD AND LEFT/RIGHT DIRECTIONS

Loosen the hood side hinge bolts to adjust.



2. ADJUST FRONT EDGE OF HOOD IN VERTICAL DIRECTION

Turn the cushions to adjust.

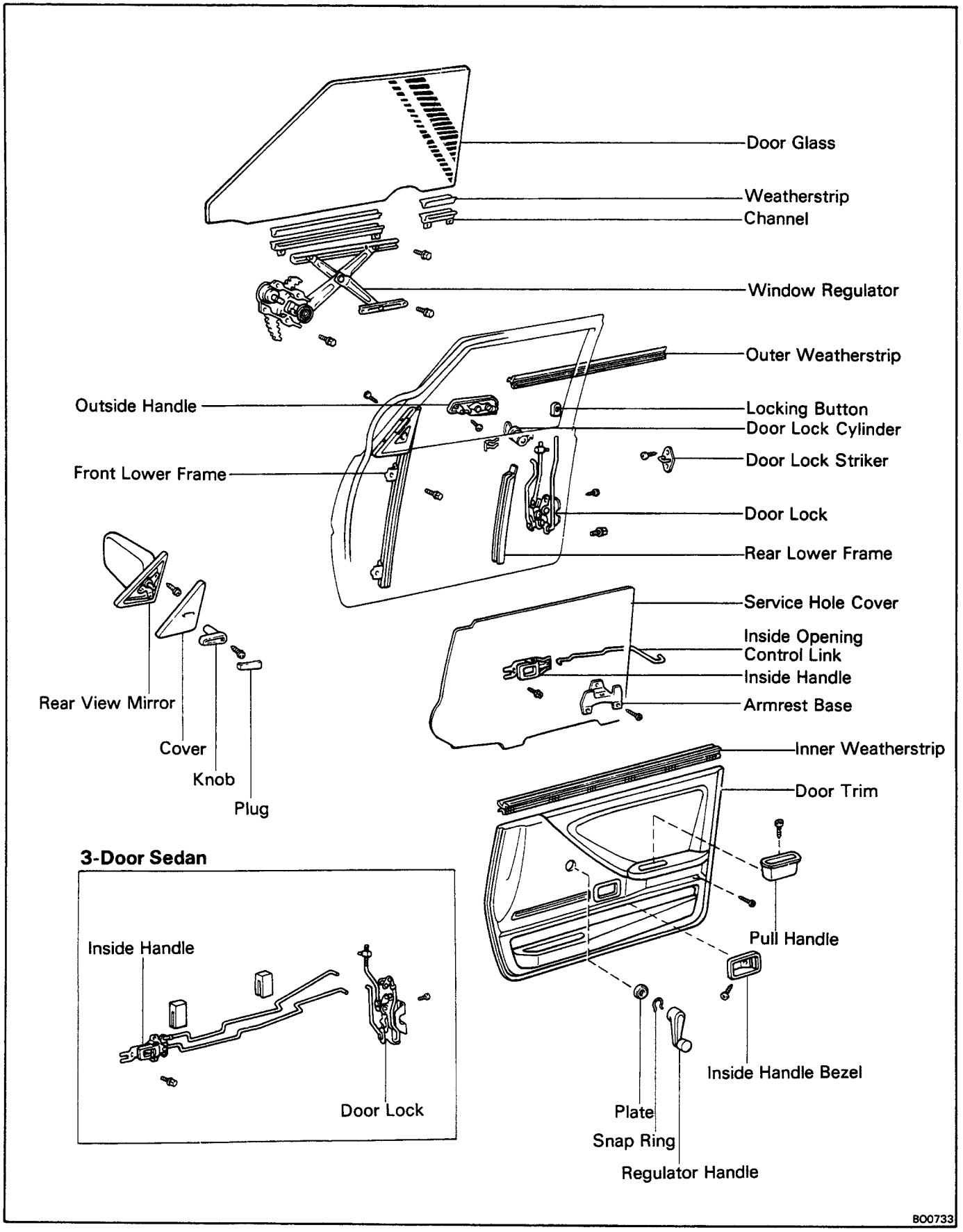


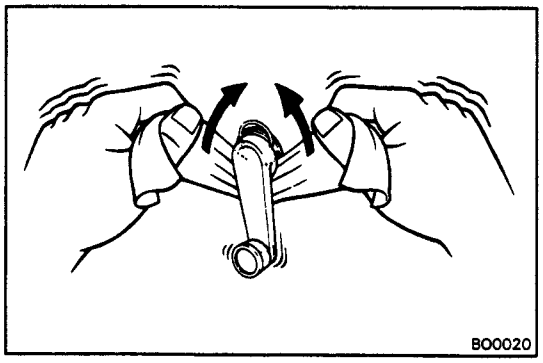
3. ADJUST HOOD LOCK

Loosen the mounting bolts to adjust.

FRONT DOOR

COMPONENTS





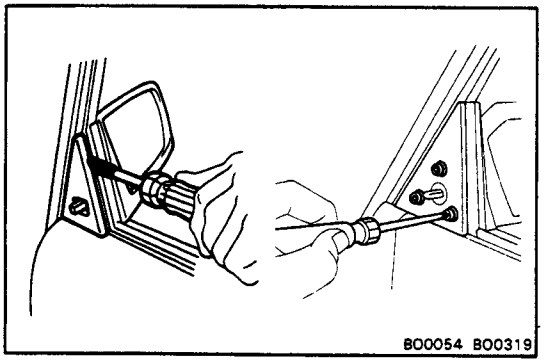
DISASSEMBLY OF FRONT DOOR

(See page BO-3)

1. **REMOVE DOOR INSIDE HANDLE BEZEL AND PULL OFF HANDLE**

2. **REMOVE WINDOW REGULATOR HANDLE**

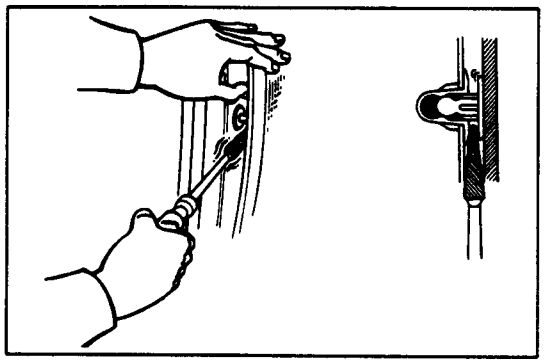
   Pull off the snap ring with a cloth, and remove the regulator handle



3. **REMOVE REAR VIEW MIRROR**
   (a) Remove the plug.
   (b) Remove the screw and knob.
   (c) Pry loose the retainer and remove the cover.
   (d) Remove the three screws and the mirror.

4. **REMOVE INNER WEATHERSTRIP**

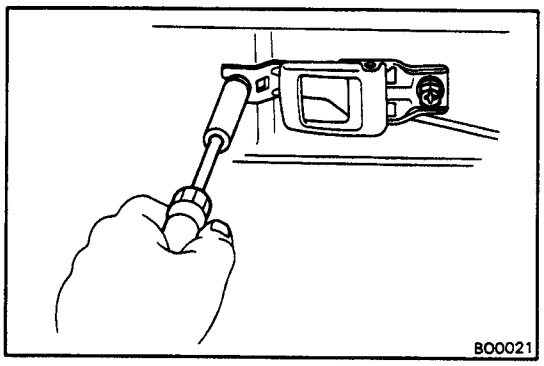
   Pull out the weatherstrip.



5. **REMOVE DOOR TRIM**
   (a) Remove the screw.
   (b) Pry loose the retainers with a screwdriver and remove the trim.

   NOTE: Tape the screwdriver tip before use.

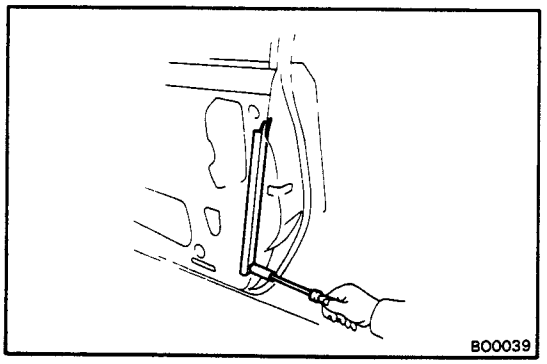
6. **REMOVE ARMREST BASE**



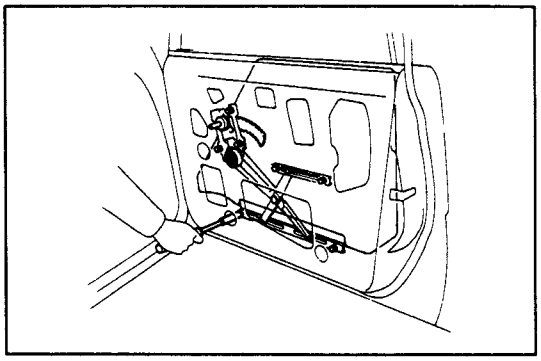
7. **(5-DOOR SEDAN AND WAGON) REMOVE DOOR INSIDE HANDLE**
   (a) Remove the two screws.
   (b) Disconnect the control link from the handle and remove the handle.

8. **REMOVE SERVICE HOLE COVER**

9. **(5-DOOR SEDAN AND WAGON) REMOVE DOOR INSIDE OPENING CONTROL LINK FROM DOOR LOCK**

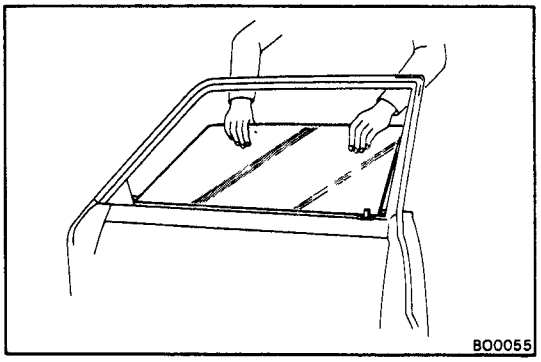


10. **REMOVE REAR LOWER FRAME**
    (a) Remove the mount bolt.
    (b) Remove the frame from the glass run.

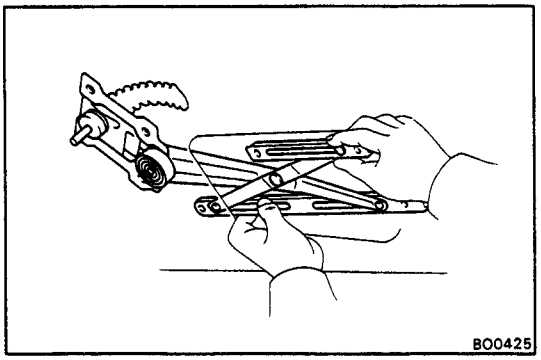


11. REMOVE DOOR GLASS

(a) Remove the two glass channel mount bolts.



(b) Remove the door glass by pulling it upward.

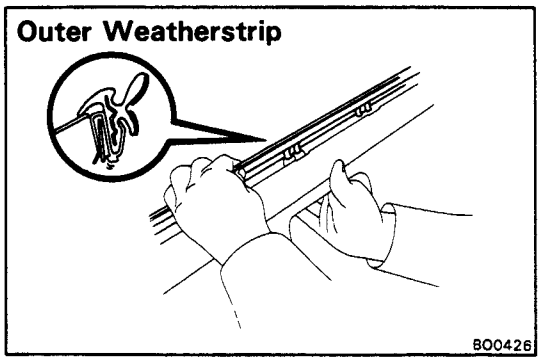


12. REMOVE WINDOW REGULATOR

(a) Remove the three regulator mount bolts.

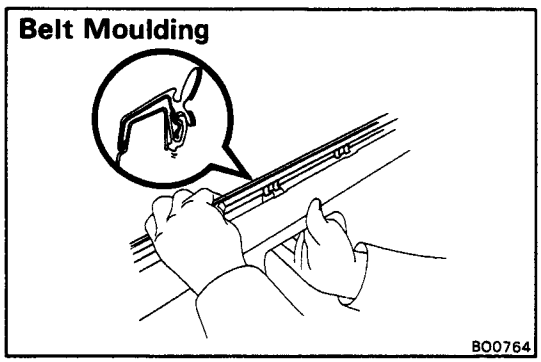
(b) Remove the two equalizer arm bracket mount bolts.

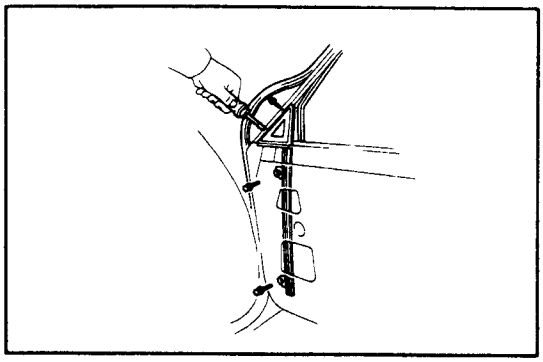
(c) Remove the regulator through the service hole.



13. REMOVE OUTER WEATHERSTRIP OR BELT MOULDING

Pry loose the clips from the edge of the panel and remove the weatherstrip or moulding.



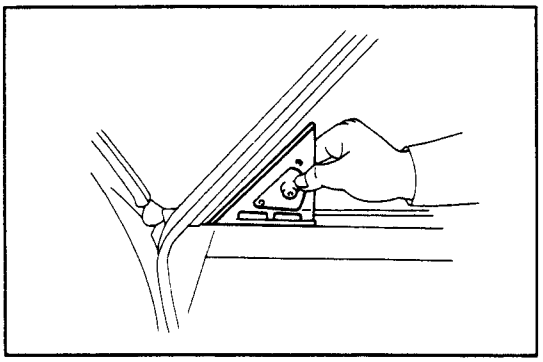


14. REMOVE FRONT LOWER FRAME

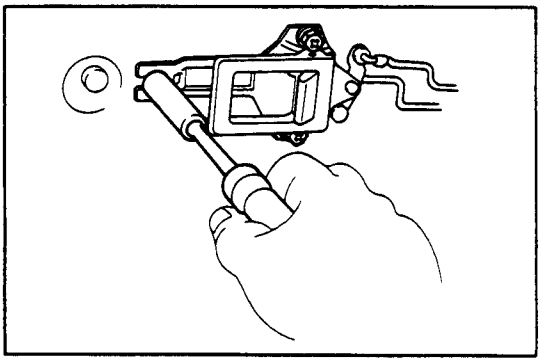
(a) Pull out the glass run from the frame.

(b) Remove the two screws under the weatherstrip.

(c) Remove the two bolts from the panel.



(d) Pull out the frame.



15. DISCONNECT FOLLOWING LINKAGES:

(a) Door inside opening control link (3-door sedan)

(b) Door inside locking control link

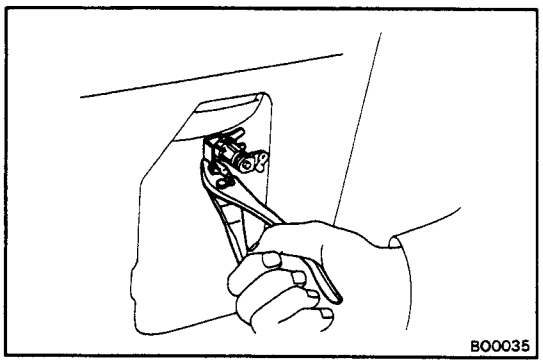
(c) Door outside opening control link

(d) Door outside locking control link

**16. (3-DOOR SEDAN)
REMOVE DOOR INSIDE HANDLE**

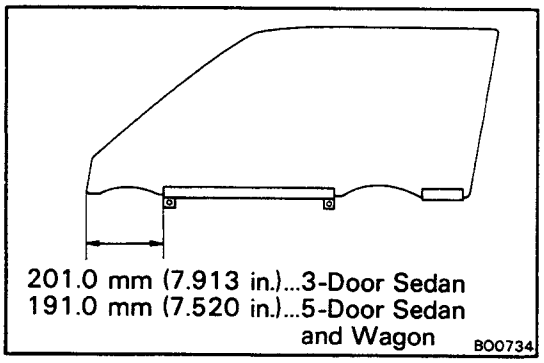
17. REMOVE DOOR OUTSIDE HANDLE

18. REMOVE DOOR LOCK CYLINDER



19. REMOVE DOOR LOCK

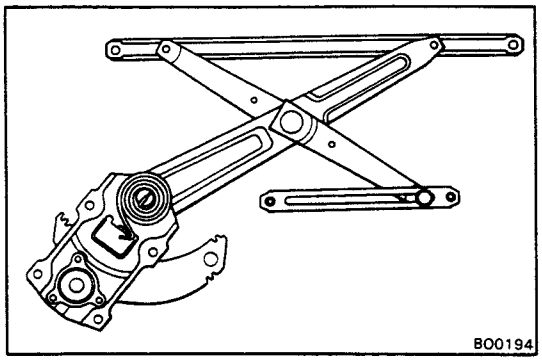
REPLACEMENT OF GLASS



1. REMOVE GLASS CHANNELS WITH SCREWDRIVER OR SUCH

2. APPLY SOAPY WATER TO INSIDE OF WEATHERSTRIPS

3. TAP ON CHANNELS WITH PLASTIC-FACED HAMMER

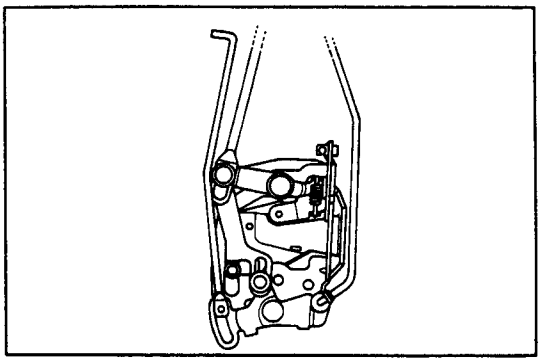


ASSEMBLY OF FRONT DOOR

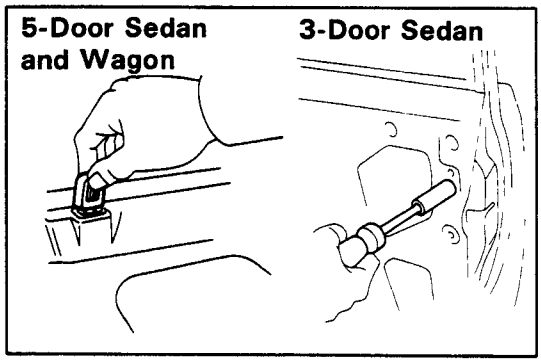
(See page BO-3)

1. APPLY MP GREASE TO PARTS BEFORE INSTALLING

(a) Apply MP grease to the sliding surface, spring and gears of the window regulator.



(b) Apply MP grease to the sliding surface of the door lock.



2. INSTALL DOOR LOCK

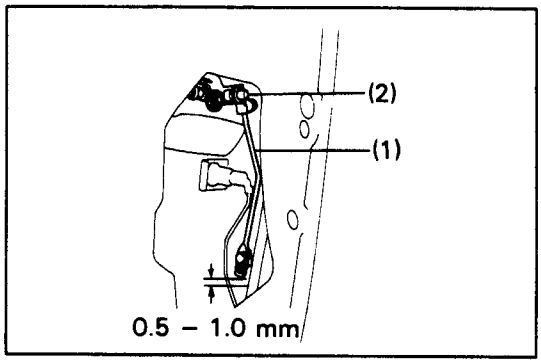
(a) Place the door lock in the door and install the locking button to the door lock (5-door sedan and wagon).

(b) Install the door lock with the three screws.

(c) Install the adjusting bolt of the control link (3-door sedan).

3. INSTALL DOOR LOCK CYLINDER

Install the lock cylinder with retainer and connect the control link.



4. INSTALL DOOR OUTSIDE HANDLE

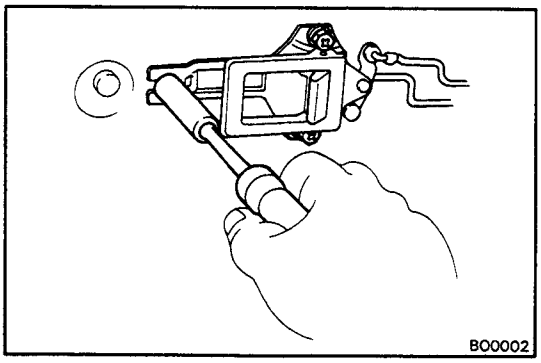
Install the handle with the two bolts and connect the control link.

5. ADJUST DOOR OUTSIDE HANDLE

(a) Pull the control link adjuster's pin from the hole.

(b) With the control link (1) at rest position, turn the adjuster (2) so that the pin is 0.5 – 1.0 mm (0.020 – 0.039 in.) below the hole.

(c) Raise the control link and insert the pin in the hole.



6. (3-DOOR SEDAN) INSTALL DOOR INSIDE HANDLE

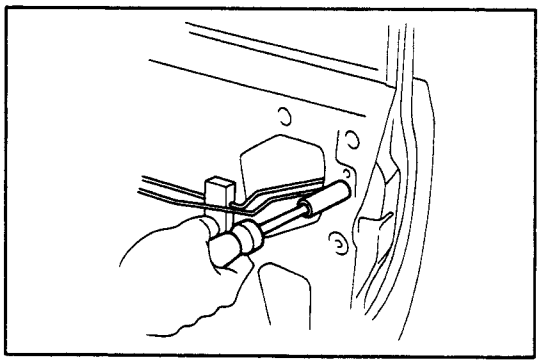
(a) Connect the control links.

(b) Install the handle with the three screws.

7. (3-DOOR SEDAN) ADJUST DOOR INSIDE HANDLE

(a) Loosen the three screws.

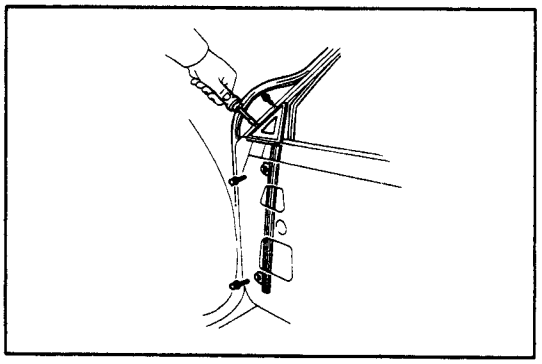
(b) Push the door handle forward until strong resistance is felt. Move the handle back 0.5 – 1.0 mm (0.020 – 0.039 in.) and tighten the screws.



8. (3-DOOR SEDAN)
ADJUST DOOR INSIDE LOCK

(a) Loosen the adjusting bolt.

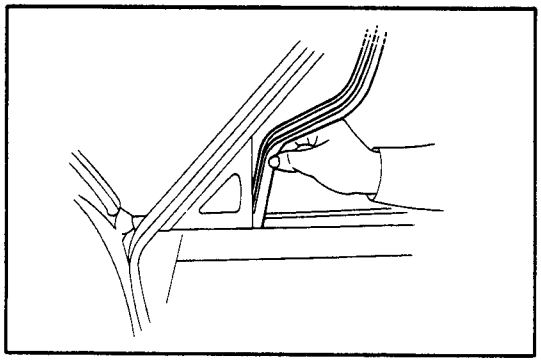
(b) Push the door lock adjusting bolt up until you feel stromg resistance. Move the bolt down 0.5 – 1.0 mm (0.020 – 0.039 in.) and tighten it.



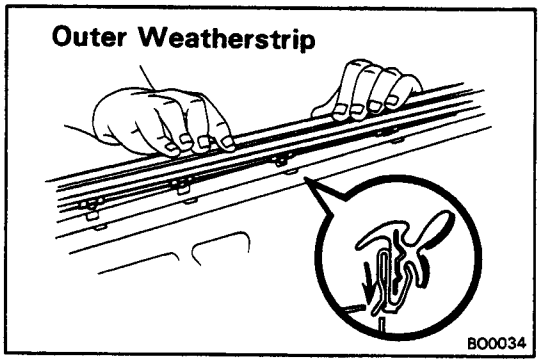
9. INSTALL FRONT LOWER FRAME

(a) Place the frame in the door cavity.

(b) Install the two screws and two bolts.



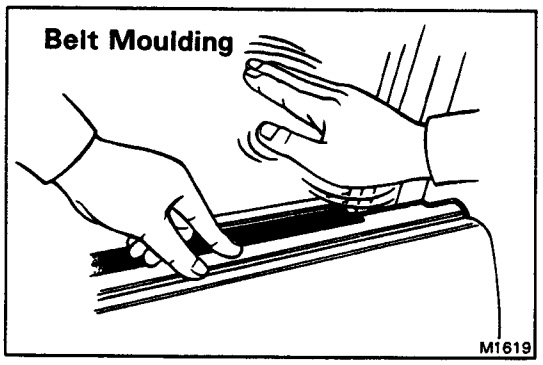
(c) Attach the glass run into the frame.



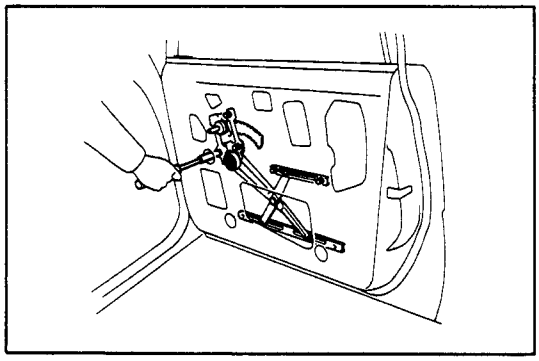
10. INSTALL OUTER WEATHERSTRIP OR BELT MOULDING

Outer Weatherstrip

Insert the claw of the clips into the upper panel hole and push the weatherstrip onto the panel.

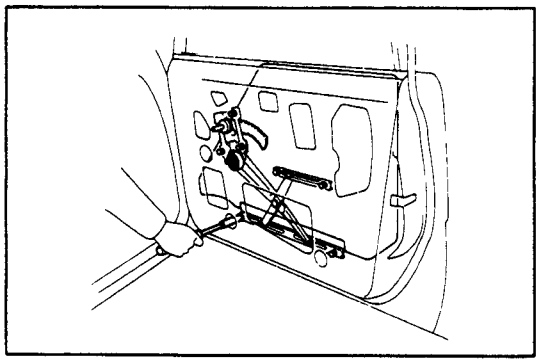


Belt Moulding (See page BO-26)



11. INSTALL WINDOW REGULATOR

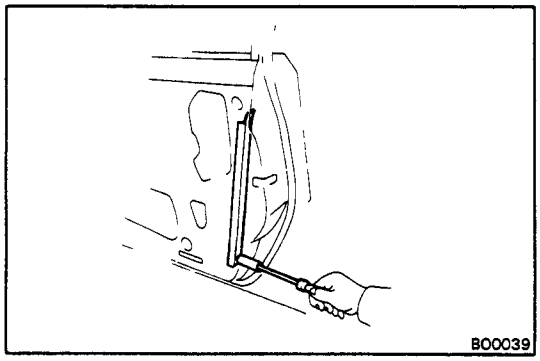
Place the regulator through the service hole and install the five mounting bolts.



12. INSTALL DOOR GLASS

(a) Place the glass in the door cavity.

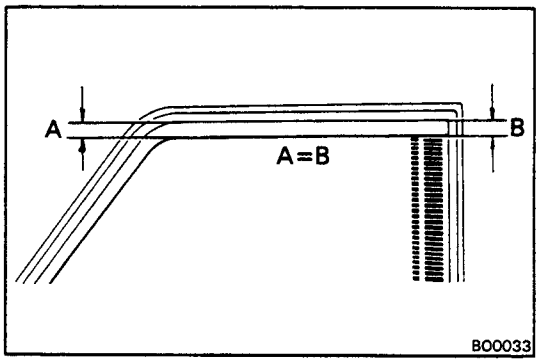
(b) Install the glass to the regulator with the two mount bolts.



13. INSTALL REAR LOWER FRAME

(a) Attach the glass run into the frame.

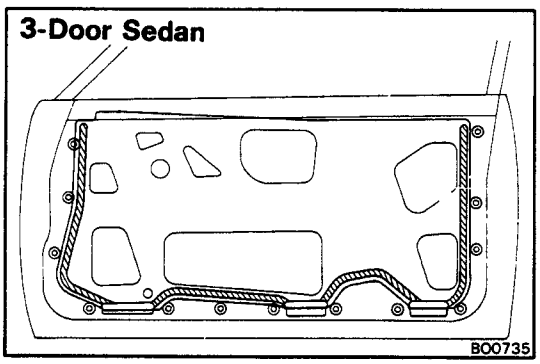
(b) Install the frame with the bolt.



14. ADJUST DOOR GLASS

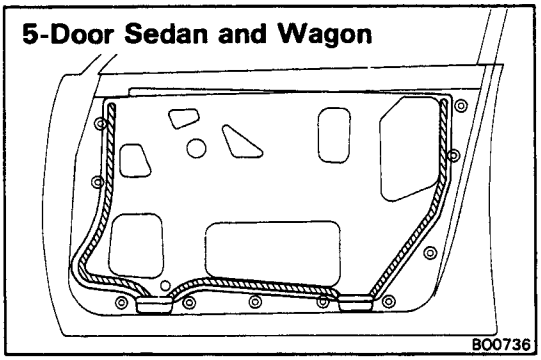
Adjust the equalizer arm up or down and tighten it where dimensions A and B, as shown, are equal.

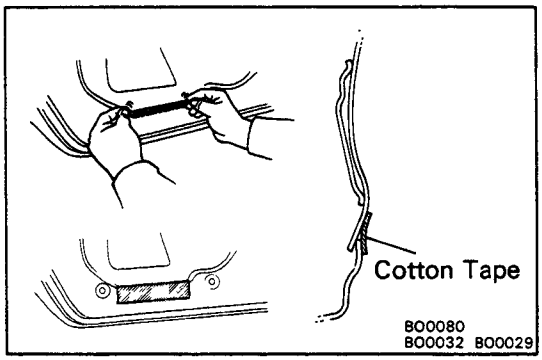
15. (5-DOOR SEDAN AND WAGON) INSTALL DOOR INSIDE OPENING CONTROL LINK TO DOOR LOCK



16. INSTALL SERVICE HOLE COVER

(a) Seal the service hole cover with adhesive.

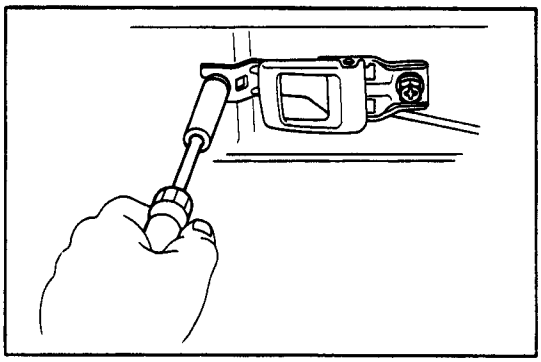




(b) Insert the lower edge of the service hole cover into the panel slit.

(c) Seal the panel slit with cotton tape.

NOTE: Do not block the trim clip seating with the tape.



17. (5-DOOR SEDAN AND WAGON) INSTALL DOOR INSIDE HANDLE

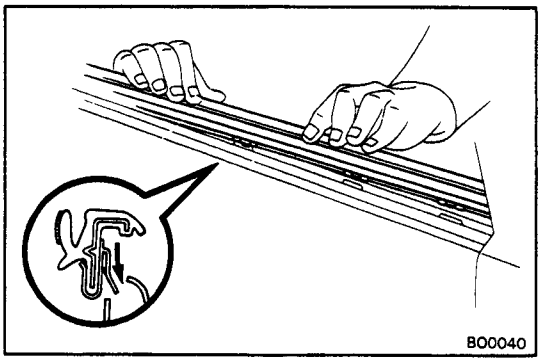
(a) Connect the control link.

(b) Install the handle with the two screws.

18. (5-DOOR SEDAN AND WAGON) ADJUST DOOR INSIDE HANDLE
(See step 7 on page BO-7)

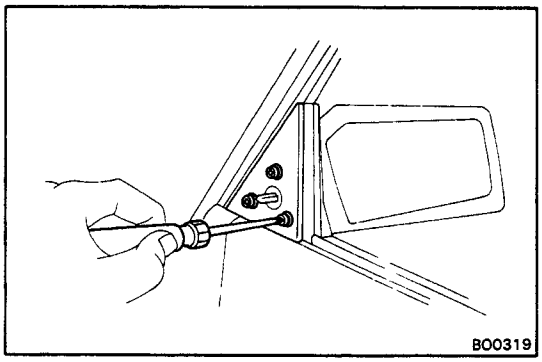
19. INSTALL ARMREST BASE

20. INSTALL DOOR TRIM



21. INSTALL INNER WEATHERSTRIP

Insert the claw of the clips into the upper panel hole and push the weatherstrip onto the panel.



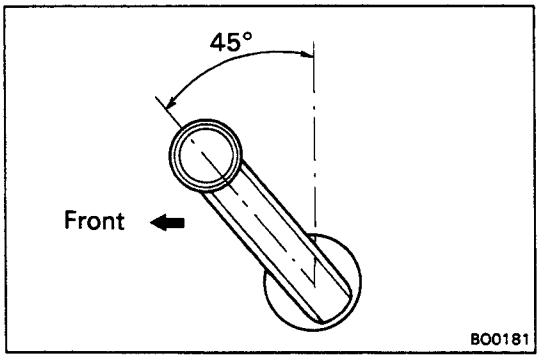
22. INSTALL REAR VIEW MIRROR

(a) Install the mirror with the three screws.

(b) Push on the cover.

(c) Install the knob with the screw.

(d) Install the plug.



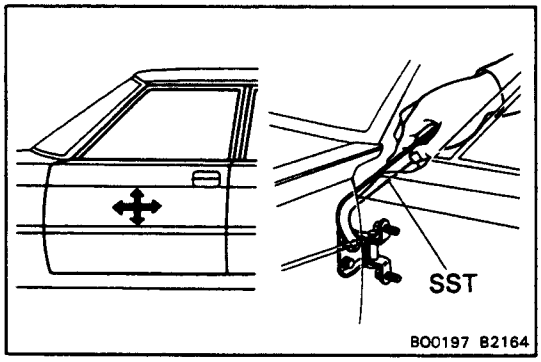
23. INSTALL WINDOW REGULATOR HANDLE

(a) Install the snap ring to the regulator handle.

(b) With the door window fully closed, install the regulator handle as shown.

24. INSTALL DOOR INSIDE HANDLE BEZEL AND PULL OFF HANDLE

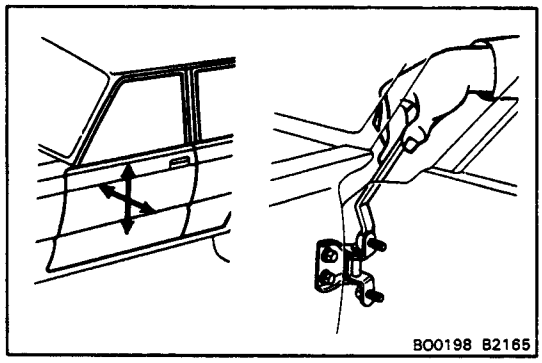
ADJUSTMENT OF FRONT DOOR



1. ADJUST DOOR IN FORWARD/REARWARD AND VERTICAL DIRECTIONS

Using SST, loosen the body side hinge bolts to adjust.

SST 09812-00010

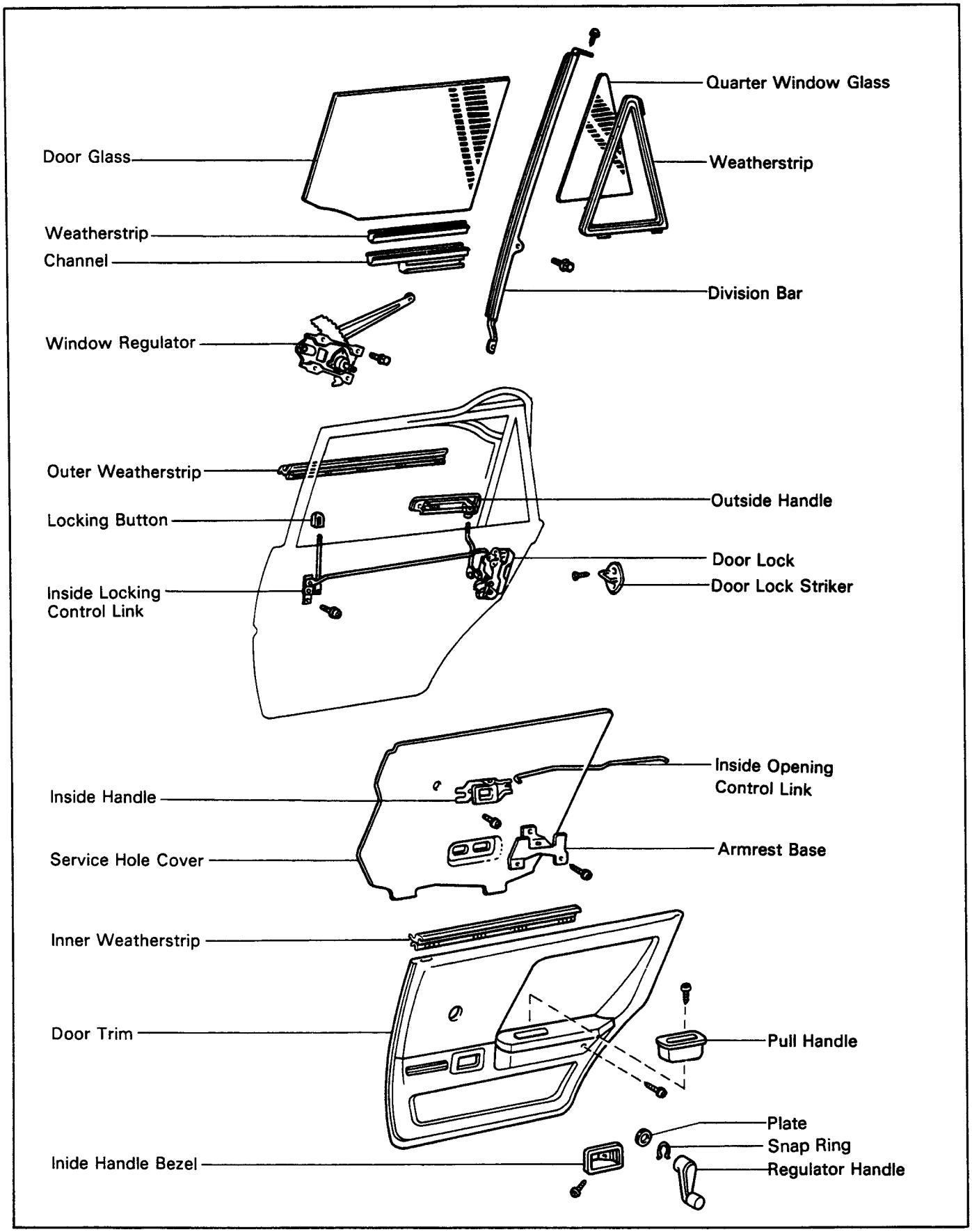


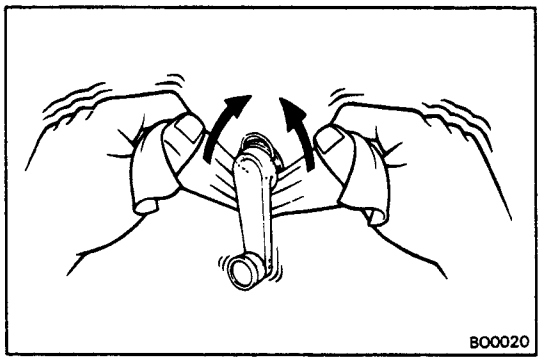
2. ADJUST DOOR IN LEFT/RIGHT AND VERTICAL DIRECTIONS

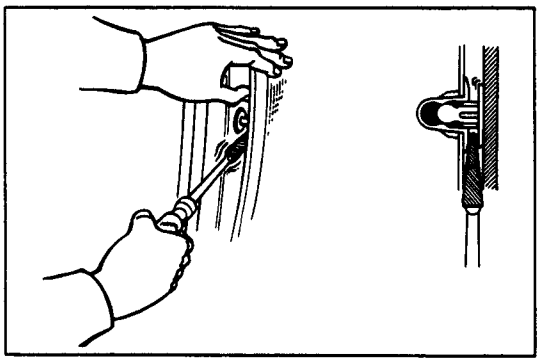
Loosen the door side hinge bolts to adjust.

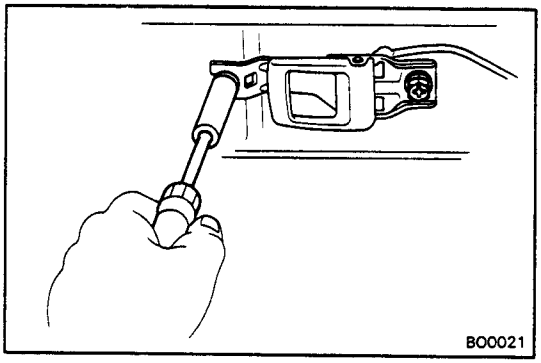
REAR DOOR

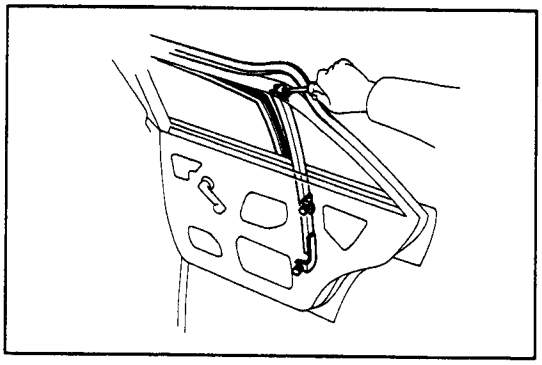
COMPONENTS

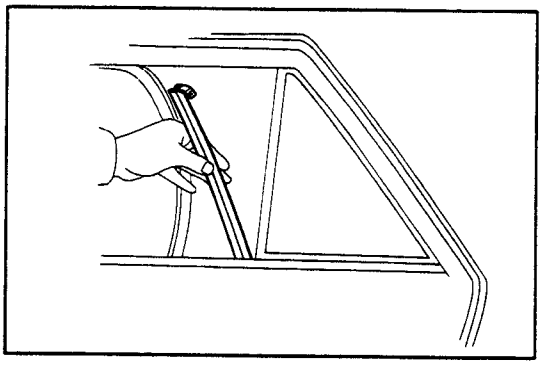












DISASSEMBLY OF REAR DOOR

(See page BO-12)

1. **REMOVE DOOR INSIDE HANDLE BEZEL AND PULL HANDLE**

2. **REMOVE WINDOW REGULATOR HANDLE**

   Pull off the snap ring with a piece of cloth, and remove the regulator handle snap ring and plate.

3. **REMOVE INNER WEATHERSTRIP**

   Pull out the weatherstrip.

4. **REMOVE DOOR TRIM**

   (a) Remove the screw.

   (b) Pry loose the retainers with a screwdriver and remove the trim.

   NOTE: Tape the screwdriver tip before use.

5. **REMOVE ARMREST BASE**

6. **REMOVE DOOR INSIDE HANDLE**

   (a) Remove the two screws.

   (b) Disconnect the handle from the control link and remove the handle.

7. **REMOVE SERVICE HOLE COVER**

8. **REMOVE DOOR INSIDE OPENING CONTROL LINK FROM DOOR LOCK**

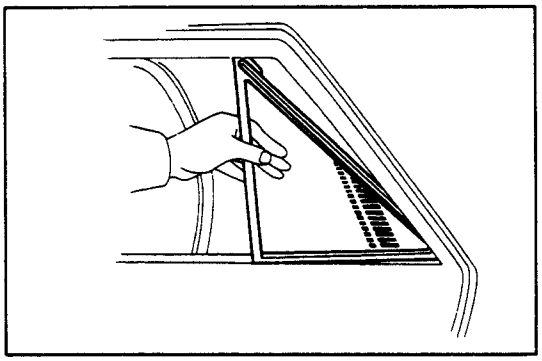
9. **REMOVE DIVISION BAR**

   (a) Remove the screw under the weatherstrip.

   (b) Remove the two bolts from the panel.

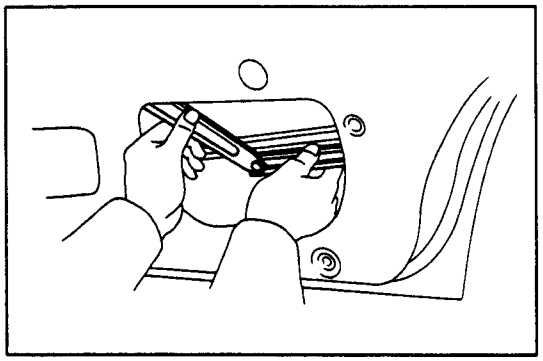
   (c) Pull the glass run out from the division bar.

   (d) Pull out the division bar.



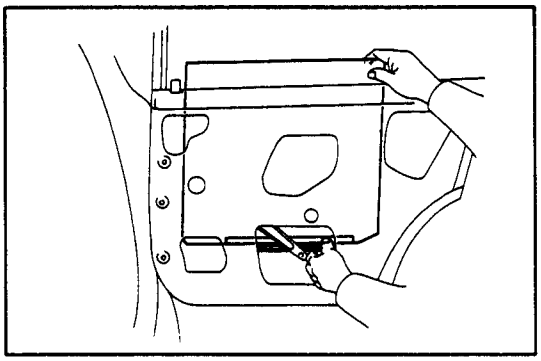
10. REMOVE QUARTER WINDOW GLASS WITH WEATHERSTRIP

Remove the quarter window glass together with the weatherstrip by pulling it forward.

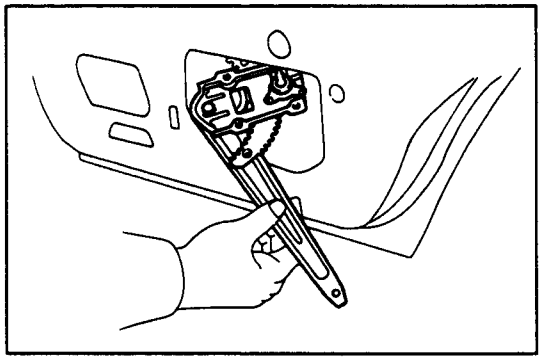


11. REMOVE DOOR GLASS

(a) Remove the door glass from the regulator roller.



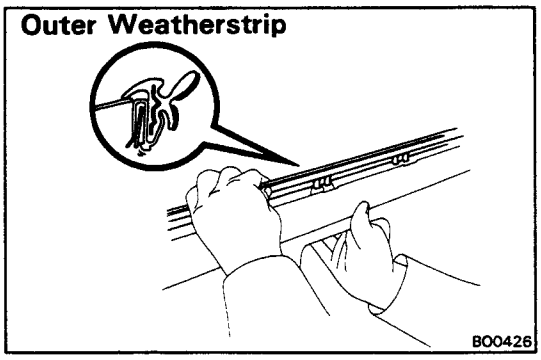
(b) Remove the door glass by pulling it upward.



12. REMOVE REGULATOR

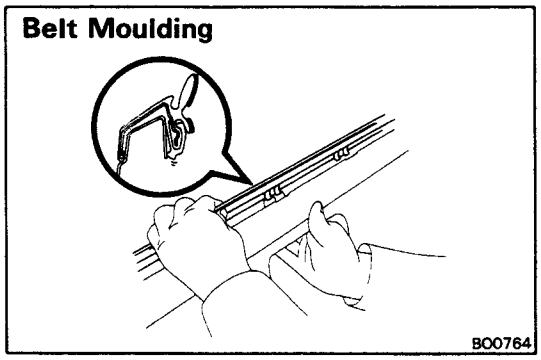
(a) Remove the three regulator mount bolts.

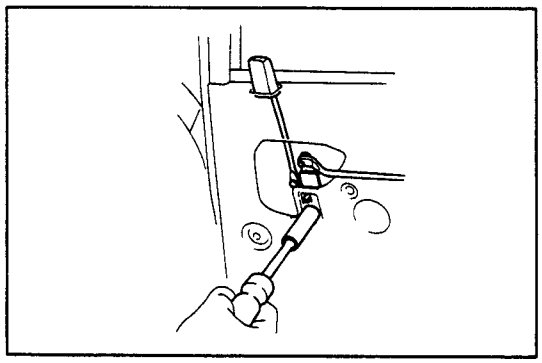
(b) Remove the regulator through the service hole.



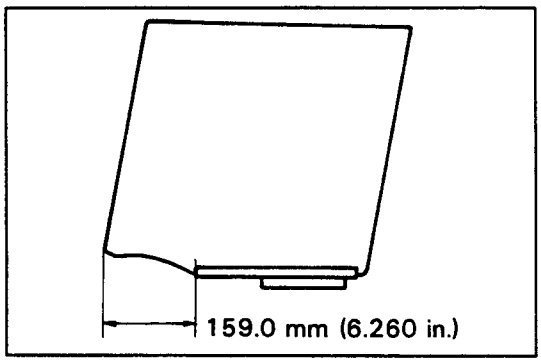
13. REMOVE OUTER WEATHERSTRIP OR BELT MOULDING

Pry loose the clips from the edge of the panel and remove the weatherstrip or moulding.



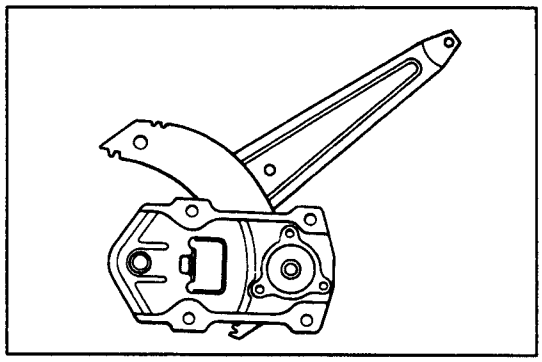


14. **DISCONNECT FOLLOWING LINKAGES:**
    (a) Door inside locking control link
    (b) Door outside opening control link
15. **REMOVE DOOR INSIDE LOCKING CONTROL LINK AND BUTTON**
16. **REMOVE DOOR LOCK**
17. **REMOVE DOOR OUTSIDE HANDLE**



REPLACEMENT OF GLASS

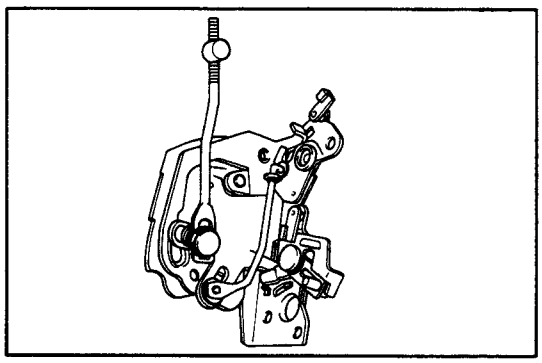
1. **REMOVE GLASS CHANNEL WITH SCREWDRIVER**
2. **APPLY SOAPY WATER TO INSIDE OF WEATHER STRIP**
3. **INSTALL CHANNEL BY TAPPING IT WITH PLASTIC-FACED HAMMER**



ASSEMBLY OF REAR DOOR

(See page BO-12)

1. **BEFORE INSTALLING PARTS, APPLY THEM WITH MP GREASE**
    (a) Apply the sliding surface, spring and gears of the window regulator with MP grease.

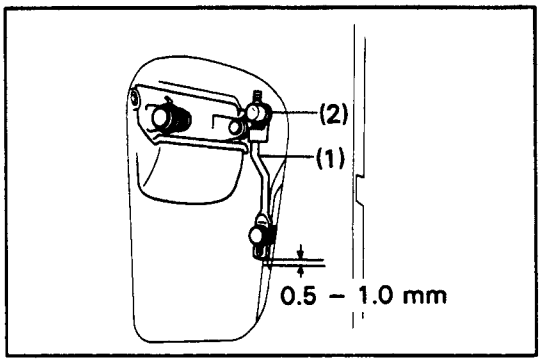


    (b) Apply the sliding surface of the door lock with MP grease.

2. INSTALL OUTSIDE HANDLE

3. INSTALL DOOR LOCK

Install the door lock with the three screws and connect the outside opening control link.

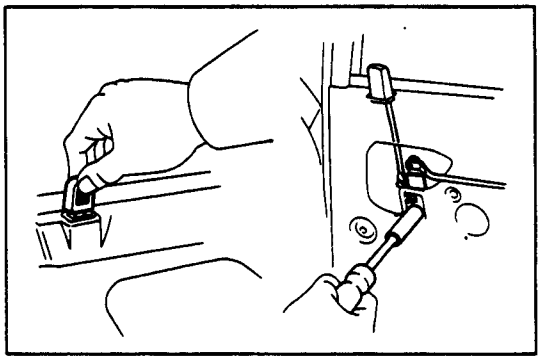


4. ADJUST DOOR OUTSIDE HANDLE

(a) Pull the control link adjuster pin from the hole.

(b) With the control link (1) at rest position, turn the adjuster (2) so that the pin is 0.5 – 1.0 mm (0.020 – 0.039 in.) below the hole.

(c) Raise the control link and insert the pin in the hole.

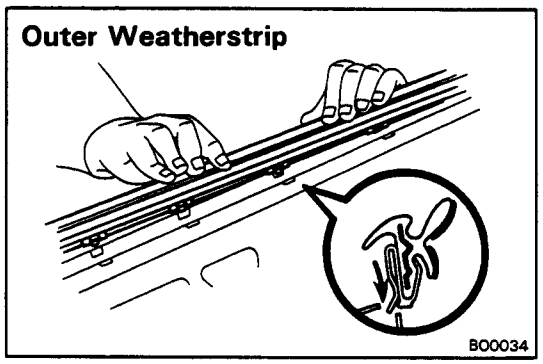


5. INSTALL DOOR INSIDE LOCKING CONTROL LINK AND BUTTON

(a) Place the control link in the door and install the locking button to the control link.

(b) Install the control link setting bolt.

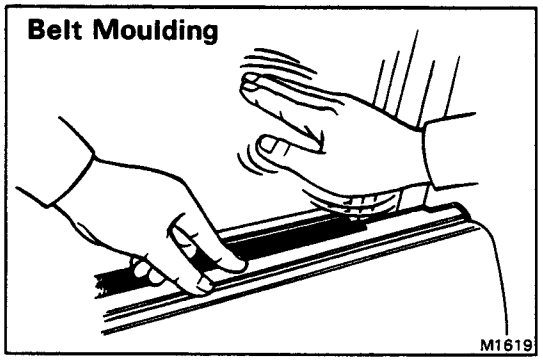
(c) Connect the control link to the door lock.



6. INSTALL OUTER WEATHERSTRIP OR BELT MOULDING

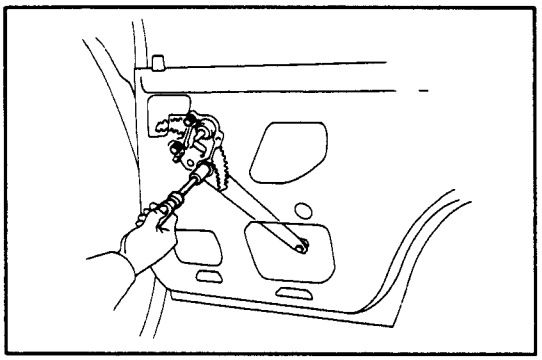
Outer Weatherstrip

Insert the claw of the clips into the upper panel hole and push the weatherstrip onto the panel.



Belt Moulding

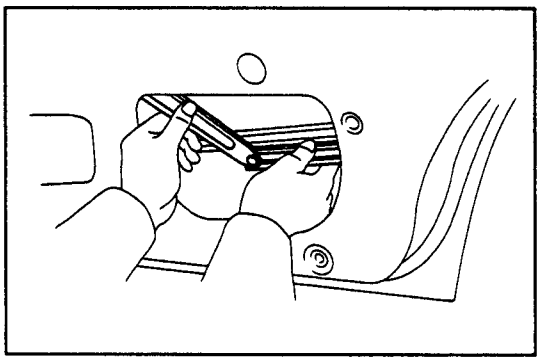
Tap the moulding onto the upper panel.



7. INSTALL REGULATOR

(a) Place the regulator through the service hole.

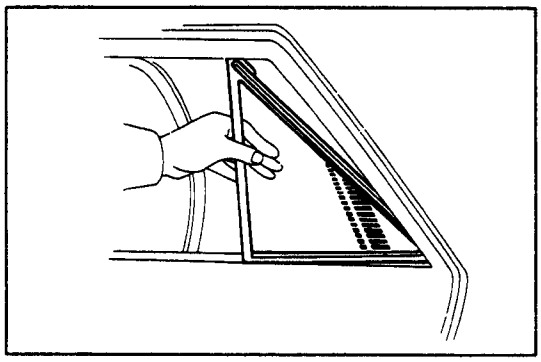
(b) Install the three regulator mount bolts.



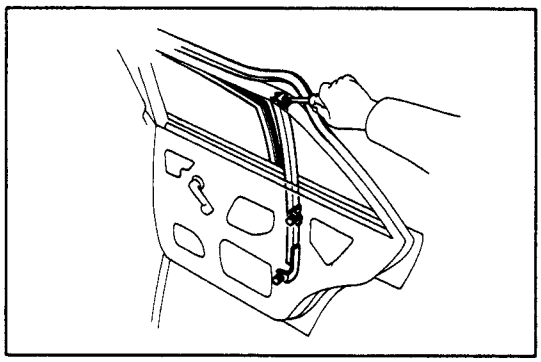
8. PLACE DOOR GLASS IN DOOR

(a) Insert the door glass in the door cavity.

(b) Install the regulator roller into the door grass rail.



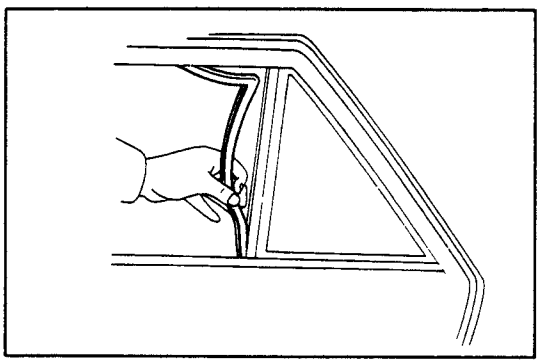
9. INSTALL QUARTER GLASS



10. INSTALL DIVISION BAR

(a) Place the division bar in the door.

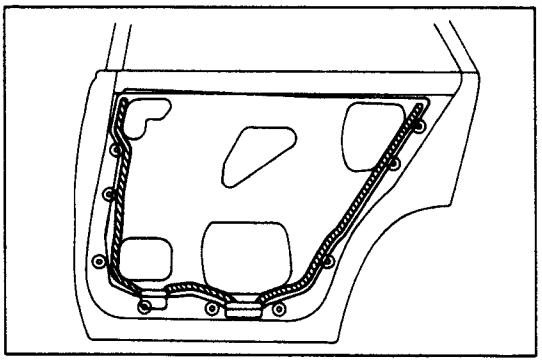
(b) Install the screw and two bolts.



(c) Install the glass run into the division bar.

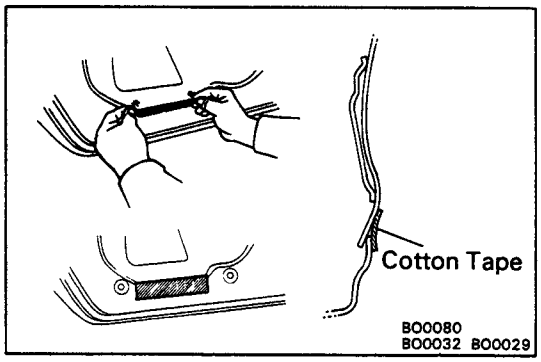
NOTE: Apply soapy water to the glass run.

11. CONNECT DOOR INSIDE OPENING CONTROL LINK TO DOOR LOCK



12. INSTALL SERVICE HOLE COVER

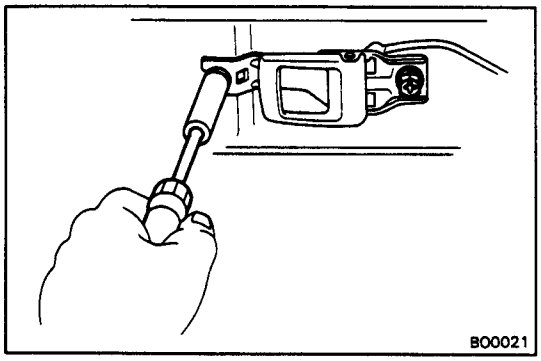
(a) Seal the service hole cover with adhesive.



(b) Insert the lower edge of the service hole cover into the panel slit.

(c) Seal the panel slit with cotton tape.

NOTE: Do not block the trim clip seating with the tape.



13. INSTALL DOOR INSIDE HANDLE

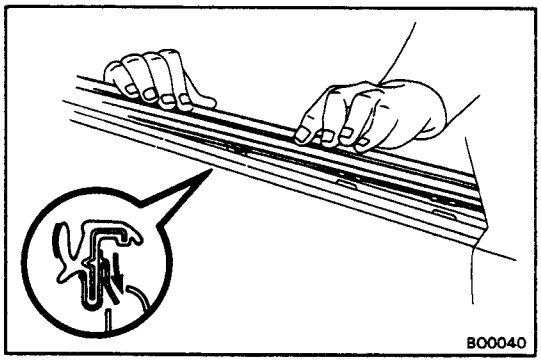
(a) Connect the handle to the control link.

(b) Install the handle with the two screws.

14. ADJUST DOOR INSIDE HANDLE

(a) Loosen the screws.

(b) Push the door handle forward until strong resistance is felt. Move the handle back 0.5 – 1.0 mm (0.020 – 0.039 in.) and tighten the mount screws.

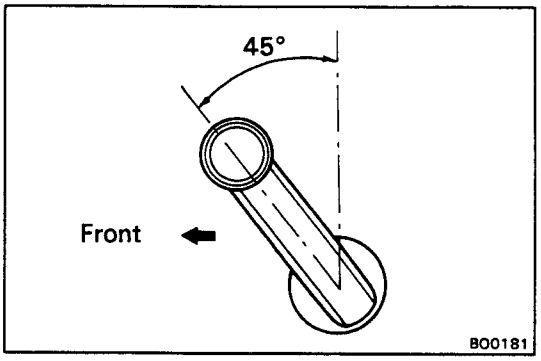


15. INSTALL ARMREST BASE

16. INSTALL DOOR TRIM

17. INSTALL INNER WEATHERSTRIP

Insert the claw of the clips into the upper panel hole and push the weatherstrip onto the panel.

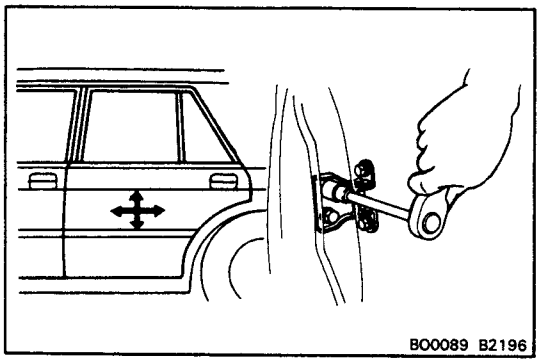


18. INSTALL WINDOW REGULATOR HANDLE

(a) Install the snap ring to the regulator handle.

(b) With the door window fulley closed, the requlator handle as shown.

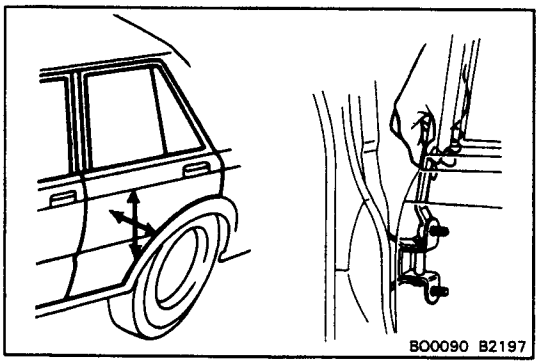
19. INSTALL DOOR INSIDE HANDLE BEZEL AND PULL HANDLE



ADJUSTMENT OF REAR DOOR

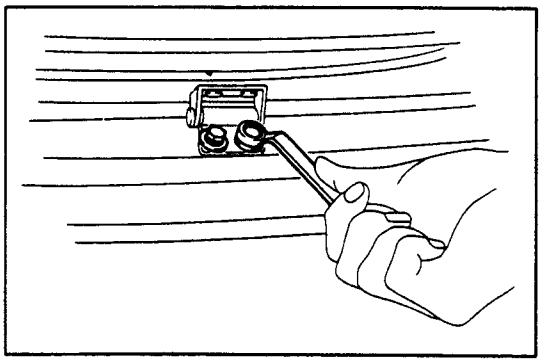
1. ADJUST DOOR IN FORWARD/REARWARD AND VERTICAL DIRECTIONS

Loosen the body side hinge bolts to adjust.



2. ADJUST DOOR IN LEFT/RIGHT AND VERTICAL DIRECTIONS

Loosen the door side hinge bolts to adjust.

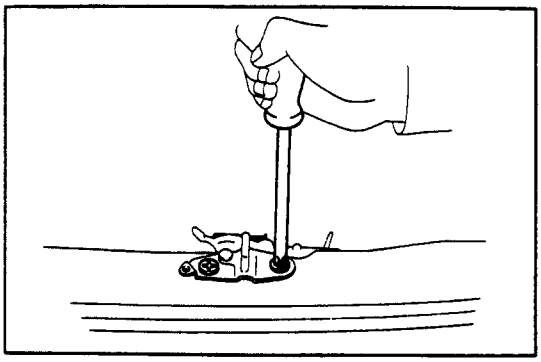


BACK DOOR

ADJUSTMENT OF BACK DOOR

1. **ADJUST DOOR IN FORWARD/REARWARD AND LEFT/RIGHT DIRECTIONS**

   Loosen the hinge bolts to adjust.



2. **(SEDAN)**
   ADJUST DOOR LOCK STRIKER

   Loosen the mount.

Damper Stay

CAUTION:

(a) Do not disassemble the damper because the cylinder is filled with gas.

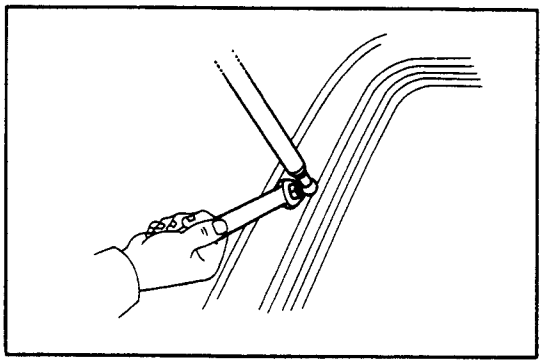
(b) If the damper is being replaced, drill a 2.0 – 3.0 mm (0.079 – 0.118 in.) hole in the bottom of the old damper cylinder to completely release the high-pressure gas.

(c) When drilling, chips may fly out so work carefully.

(d) The gas is coloress, odorless and not poisonous.

(e) When working, handle the damper carefully. Never score or scratch the exposed part of the piston rod, and never allow paint or oil to get on it.

(f) Do not turn the piston rod and cylinder with the damper fully extended.



REMOVAL OF DAMPER STAY

1. **DISCONNECT DAMPER STAY FROM BACK DOOR**
2. **REMOVE DAMPER STAY FROM BODY**

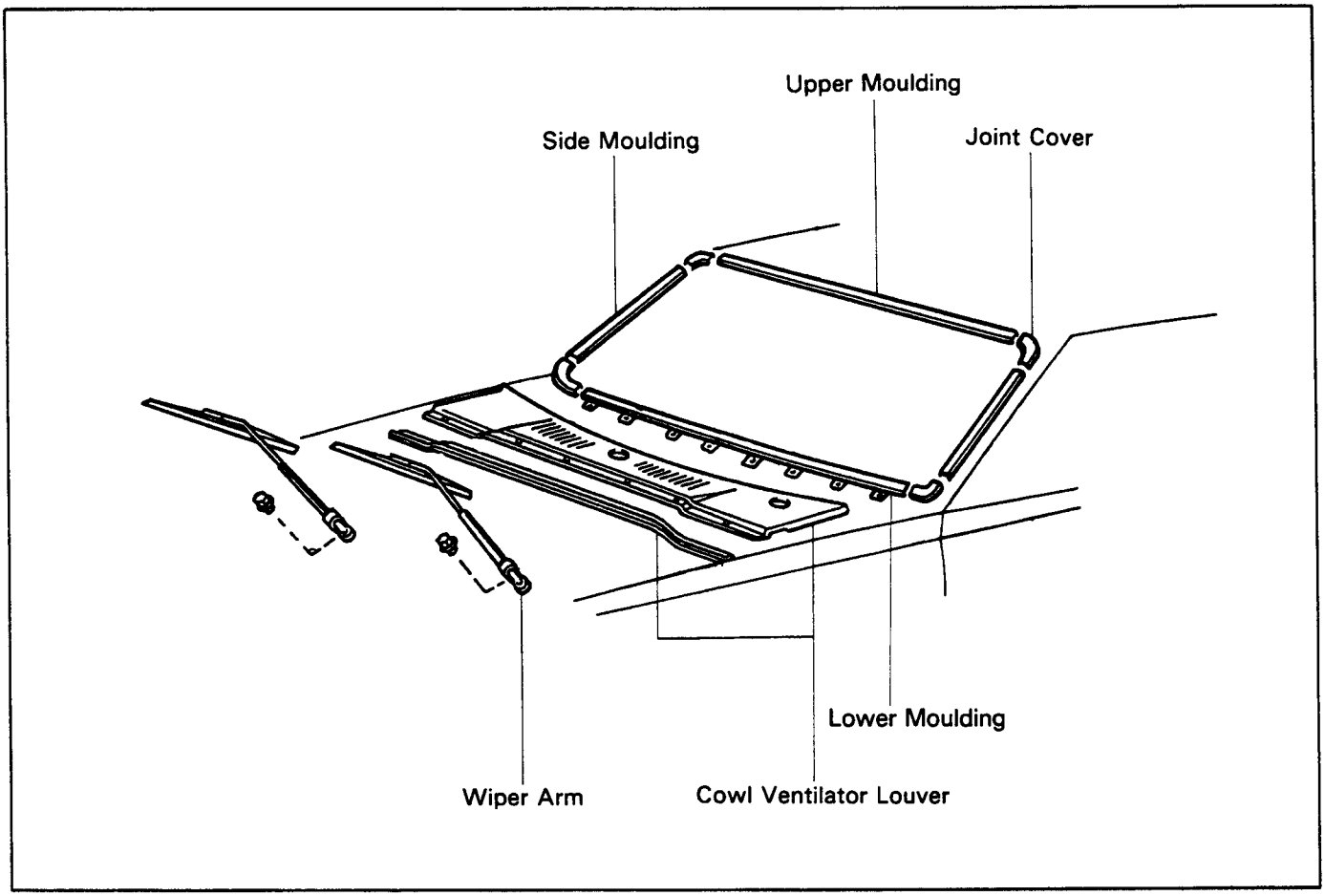
INSTALLATION OF DAMPER STAY

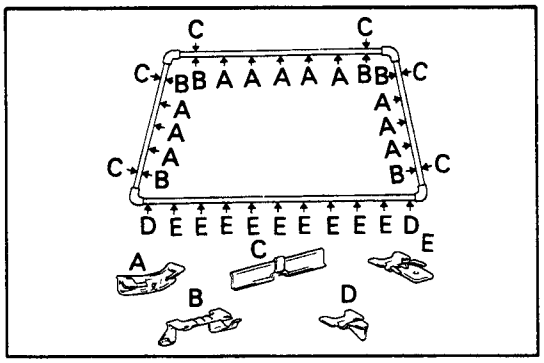
1. **INSTALL DAMPER STAY TO BACK DOOR**
2. **CONNECT DAMPER STAY TO BODY**

MOULDING

Windshield Outside Moulding

COMPONENTS



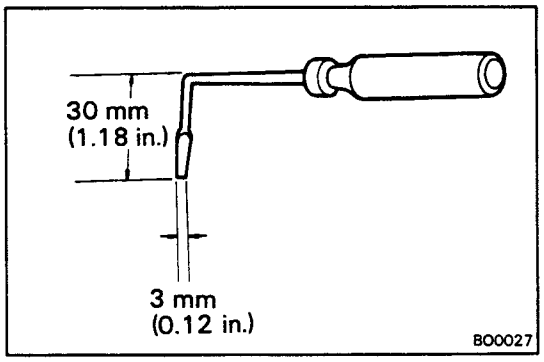


REMOVAL OF OUTSIDE MOULDING

There are five types of clips for moulding installation.

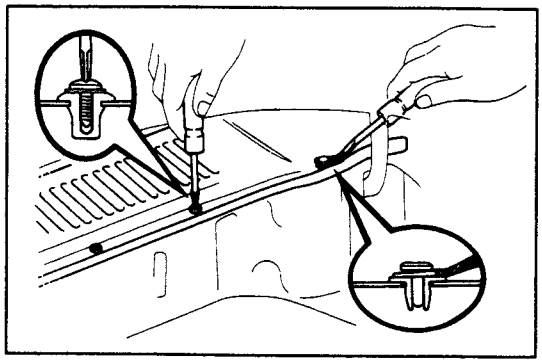
Locations of these (A,B,D and E) clips and fasteners (C) are as shown in the figure.

Carefully apply adhesive tape to protect the body.



1. **PREPARE A SMALL SCREWDRIVER**

   Use a screwdriver which is bent at a right angle.

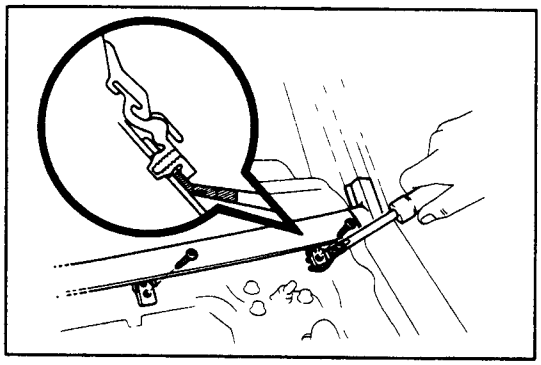


2. REMOVE WIPER ARM

3. REMOVE COWL VENTILATOR LOUVER

(a) Remove the four screws.

(b) Pry out the two clips with a clip remover and remove the louver.

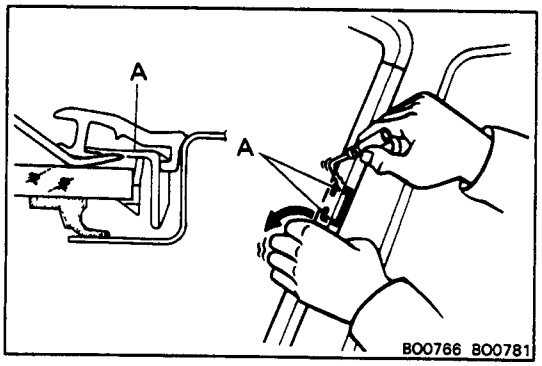


4. REMOVE LOWER MOULDING

(a) Remove the screws.

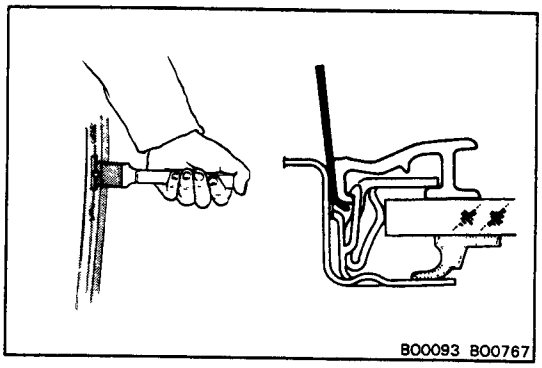
(b) Pry loose the clips with a clip remover and remove the moulding.

5. REMOVE LOWER JOINT COVER



6. REMOVE SIDE MOULDING

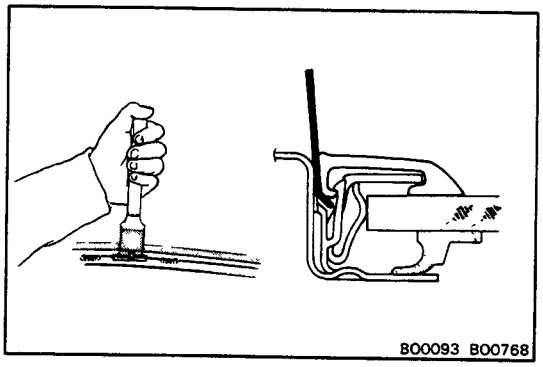
(a) Insert the tip of the screwdriver between the moulding and clip, and twist it to pry loose the clips (A) on the window side.



(b) Pry loose the fasteners and clips with a scraper and remove the moulding.

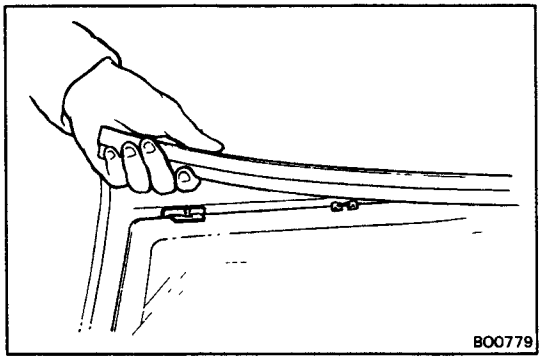
7. REMOVE UPPER JOINT COVER

Remove the joint cover from the upper moulding.



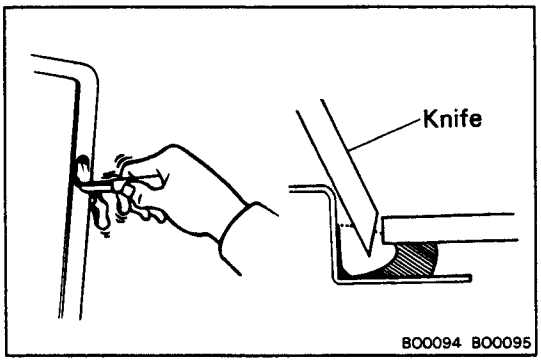
8. REMOVE UPPER MOULDING

(a) Pry loose the fasteners and clips with a scraper.



(b) Slide the moulding out.

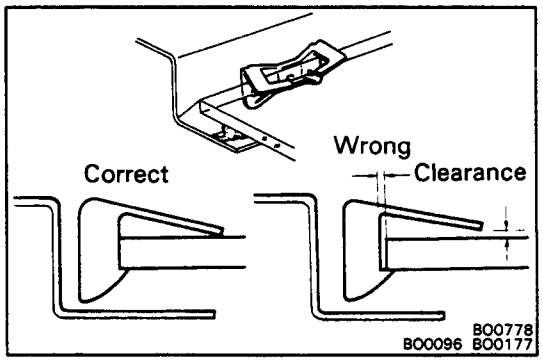
CAUTION: Be careful not to bend the moulding.



REPLACEMENT OF FASTENER AND CLIP

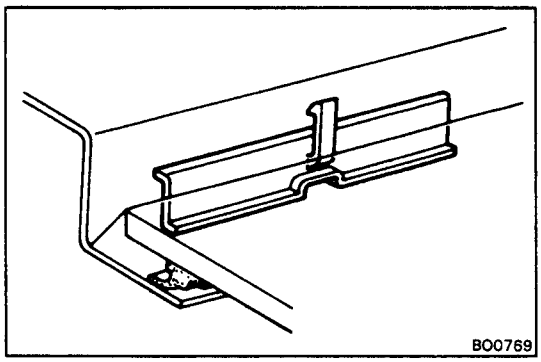
If any fastener or clip is damaged, replace it.

1. **REMOVE DAMAGED CLIP**
2. **CUT OLD ADHESIVE OFF AROUND CLIP INSTALLATION AREA**
   (a) Grind a notch into the clip so it latches onto the glass edge.

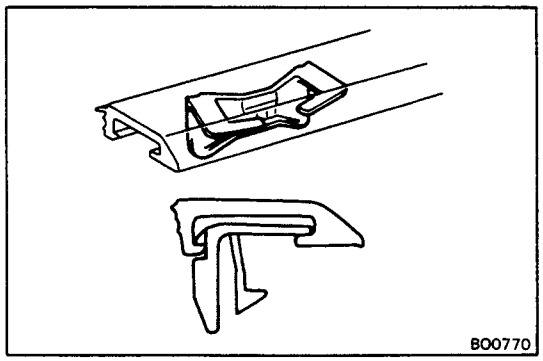


(b) Temporarily install the clip and check that it is firmly attached to the glass.

If the clip is loose, replace it.



3. **REMOVE ANY DAMAGED FASTENER**
4. **CUT OLD ADHESIVE OFF AROUND FASTENER INSTALLATION AREA**
5. **INSTALL FASTENER ONTO BODY WITH DOUBLE STICK TAPE**

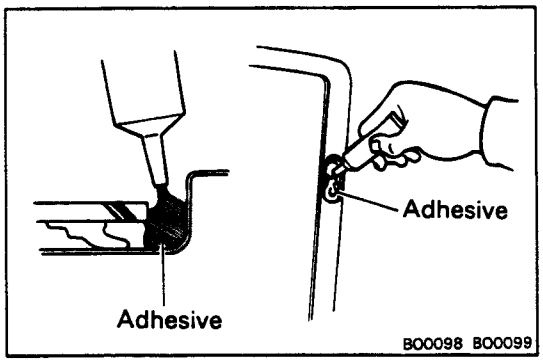


INSTALLATION OF OUTSIDE MOULDING

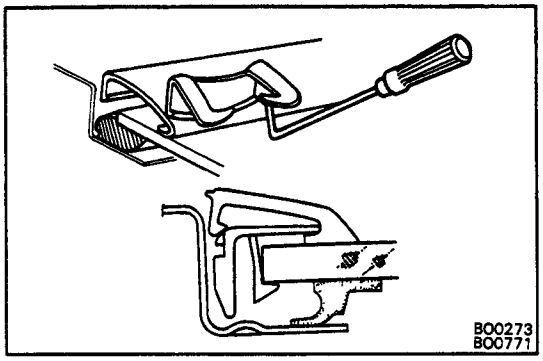
(See page BO-21)

1. **INSTALL NEW CLIP INTO MOULDING**

   Install the moulding to the body so that the clips and fasteners are not in a position where they will contact each other.



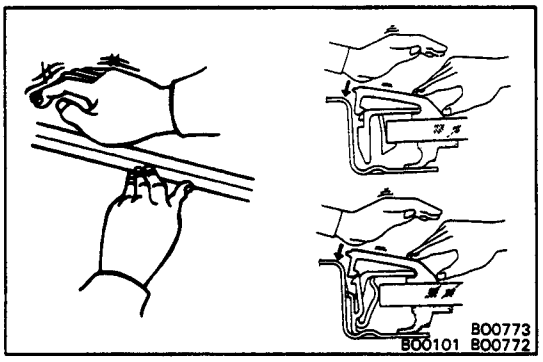
2. APPLY ADHESIVE AT CLIP INSTALLATION AREA



3. INSTALL UPPER MOULDING

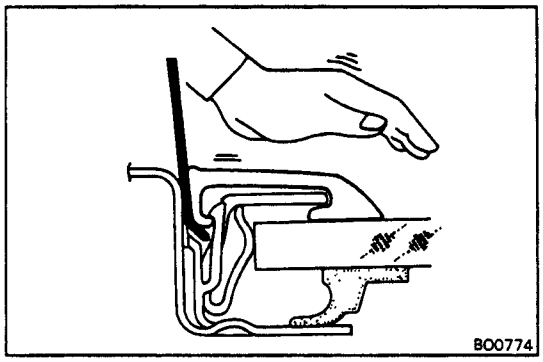
(a) Place the moulding onto the body.

(b) Pry up the clips on the body side and install them to the moulding.



(c) Tap the moulding with your hand to fasten the clips at the glass edge.

At the same time, tap on the fasteners by hand.



(d) If the moulding is not at the same level as the body, insert a scraper between them and tap on the moulding while pushing on the fastener.

4. INSTALL UPPER JOINT COVER

Install the joint cover to the upper moulding.

5. INSTALL SIDE MOULDING IN SAME MANNER AS FOR UPPER MOULDING

6. INSTALL LOWER JOINT COVER

Install the joint cover to the upper moulding.

7. INSTALL LOWER MOULDING

(a) Place the moulding onto the body.

(b) Push the clips into the body.

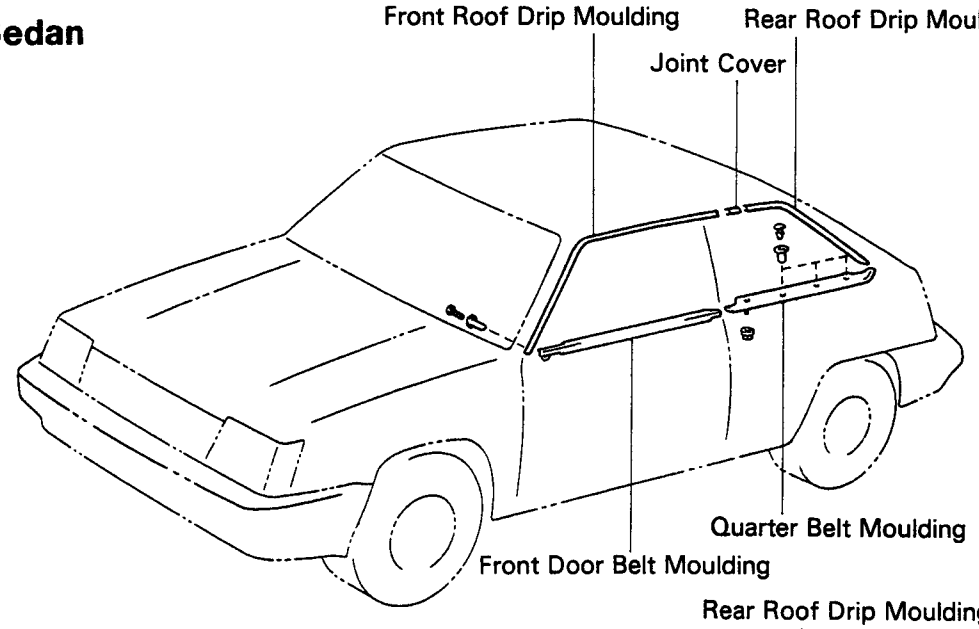
(c) Install the screws.

8. INSTALL COWL VENTILATOR LOUVER AND WIPER ARM

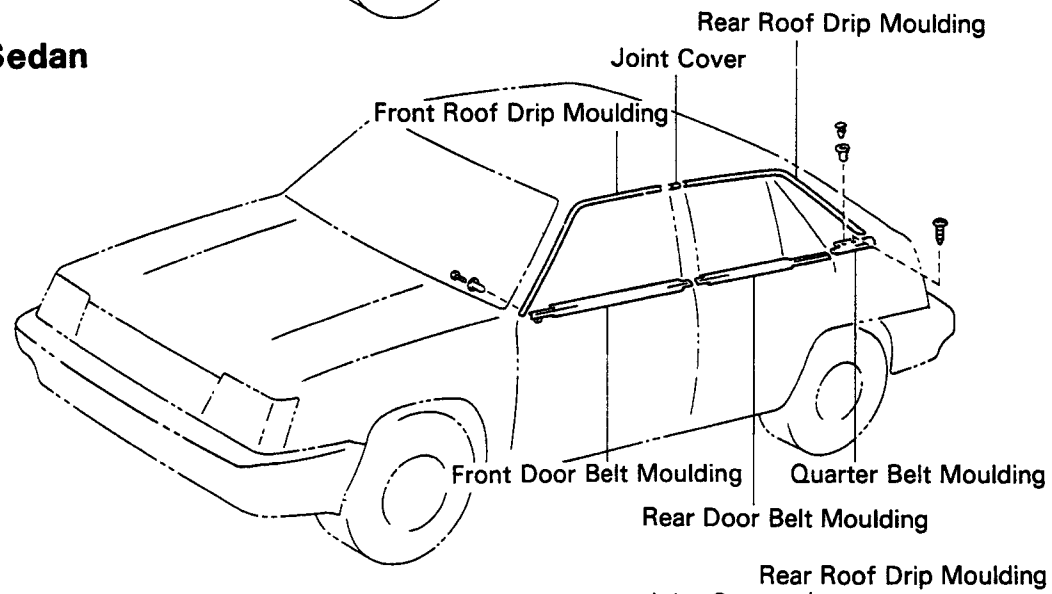
Roof Drip and Belt Moulding

COMPONENTS

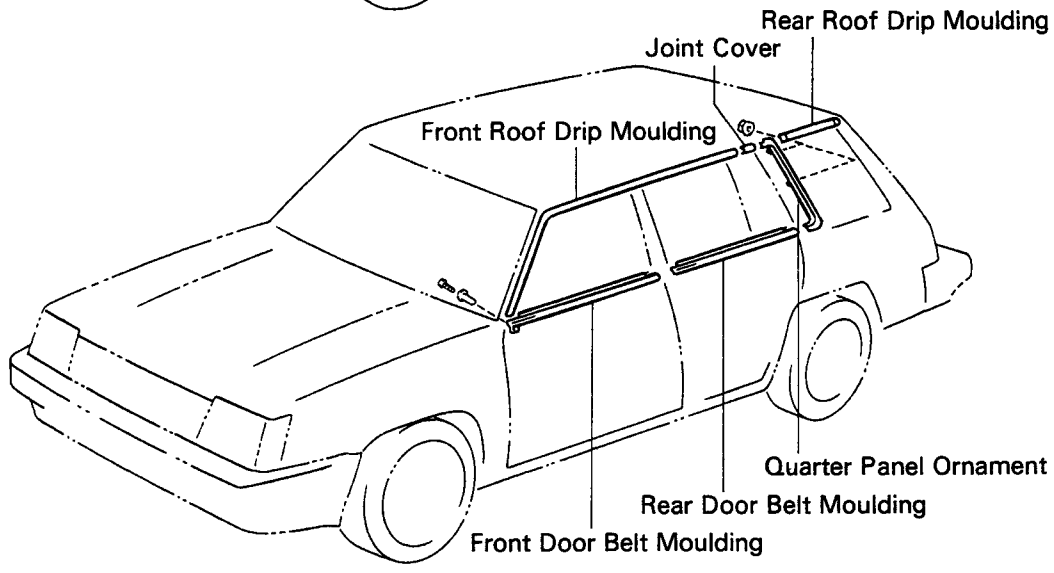
3-Door Sedan



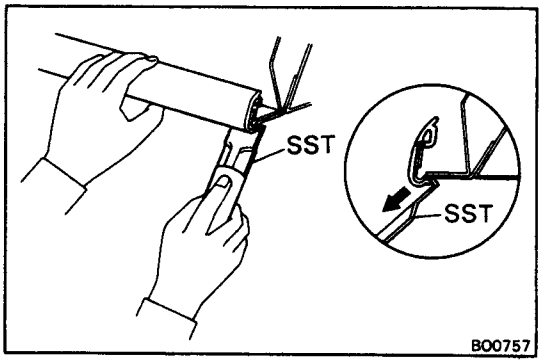
5-Door Sedan



Wagon



B00784



REMOVAL OF ROOF DRIP MOULDING

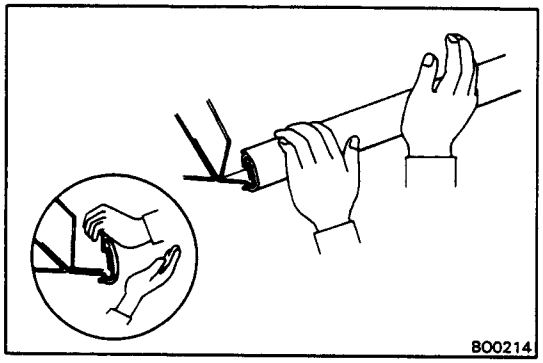
REMOVE ROOF DRIP MOULDING

(a) Using SST, pull off the joint cover.

(b) Using SST, pull off the roof drip moulding from both ends.

SST 09806-30010

NOTE: Remove the moulding corners last.

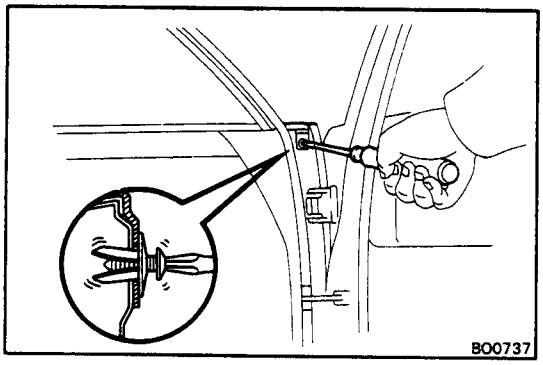


INSTALLATION OF ROOF DRIP MOULDING

INSTALL ROOF DRIP MOULDING

(a) Attach the upper edge of the moulding to the body flange. Tap on the moulding by hand.

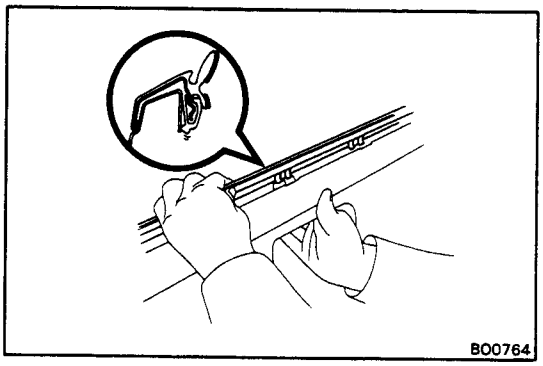
(b) Install the joint cover.



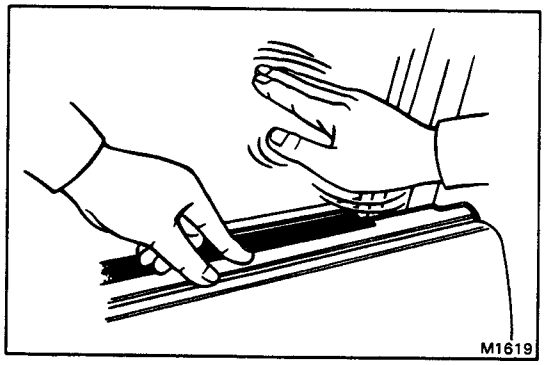
REMOVAL OF DOOR BELT MOULDING

1. **REMOVE DOOR GLASS**
   Front Door (See page BO-4)
   Rear Door (See page BO-13)

2. **REMOVE DOOR BELT MOULDING**
   (a) Using a screwdriver, remove one clip (front door).



(b) Pry loose the clips from the edge of the panel and remove the moulding.



INSTALLATION OF DOOR BELT MOULDING

1. **INSTALL DOOR BELT MOULDING**
   (a) Tap the moulding onto the clips by hand.
   (b) Install the clip (front door).

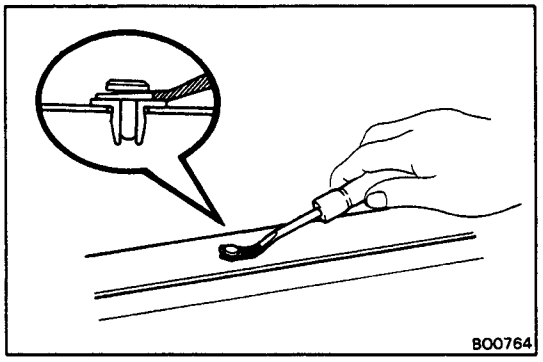
2. **INSTALL DOOR GLASS**
   Front Door (See page BO-9)
   Rear Door (See page BO-17)

REMOVAL OF QUARTER BELT MOULDING

1.-1 (3-DOOR SEDAN FIXED TYPE, 5-DOOR SEDAN)
REMOVE QUARTER WINDOW GLASS
3-Door (See page BO-45)
5-Door (See page BO-49)

1.-2 (3-DOOR SEDAN SWING TYPE)
REMOVE WEATHERSTRIP (See page BO-47)

2. (3-DOOR SEDAN)
REMOVE QUARTER TRIM
(See page BO-45)


BO0764

3. REMOVE QUARTER BELT MOULDING
   (a) Remove the screw (5-door sedan).
   (b) Remove the two nuts (3-door sedan).
   (c) Pry loose the clip with a scraper and remove the moulding.

INSTALLATION OF QUARTER BELT MOULDING

1. INSTALL QUARTER BELT MOULDING

2. (3-DOOR SEDAN)
INSTALL QUARTER TRIM

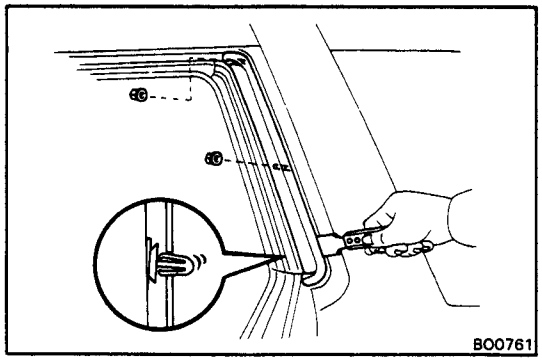
3.-1 (3-DOOR SEDAN FIXED TYPE, 5-DOOR SEDAN)
INSTALL QUARTER WINDOW GLASS
3-Door (See page BO-46)
5-Door (See page BO-50)

3.-2 (3-DOOR SEDAN SWING TYPE)
INSTALL WEATHERSTRIP (See page BO-48)

REMOVAL OF QUARTER PANEL ORNAMENT

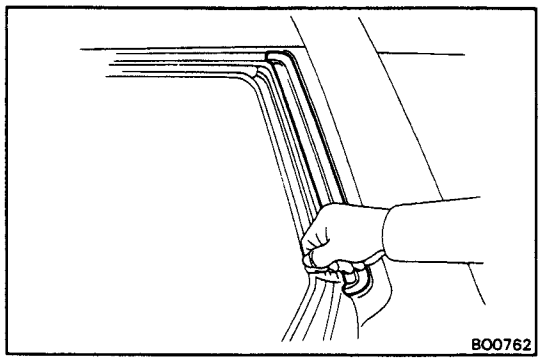
1. REMOVE ROOF SIDE INNER GARNISH
(See page BO-51)

2. REMOVE JOINT COVER


BO0761

3. REMOVE QUARTER PANEL ORNAMENT
   (a) Remove the two nuts.
   (b) Pry loose the retainer with a scraper and remove the panel ornament.

INSTALLATION OF QUARTER PANEL ORNAMENT


BO0762

1. INSTALL QUARTER PANEL ORNAMENT
   (a) Tap the panel ornament onto the clip by hand.
   (b) Install the two nuts.

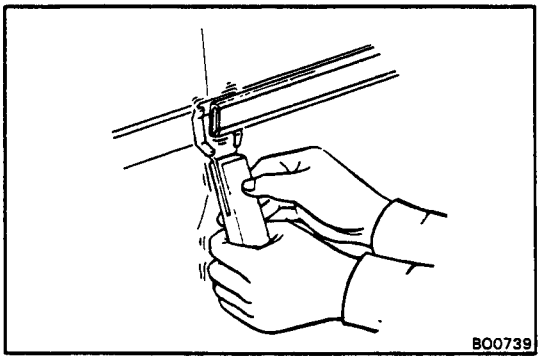
2. INSTALL JOINT COVER

3. INSTALL ROOF SIDE INNER GARNISH

Side Body Moulding Narrow Type

TOOLS AND SUPPLIES

Part No.	Part Name	Quantity
08850-00051	Adhesive (Super special) 20g (0.71 oz.)	1
	Unleaded gasoline (for cleaning body) Alcohol (for removing body oil stains) Heat lamp	

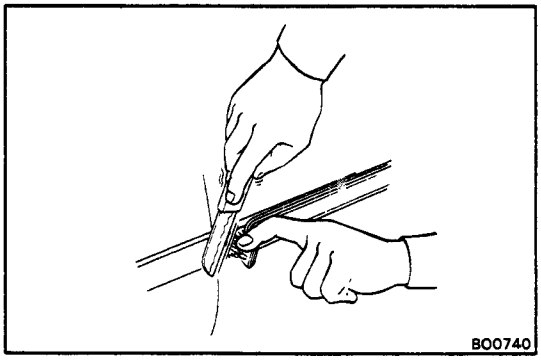


REMOVAL OF SIDE BODY MOULDING

1. REMOVE ENDS OF MOULDING

Using a scraper, pry the moulding loose about 30 mm (1.18 in.) from the ends.

NOTE: Apply tape to the scraper blade to prevent scratching the vehicle body.



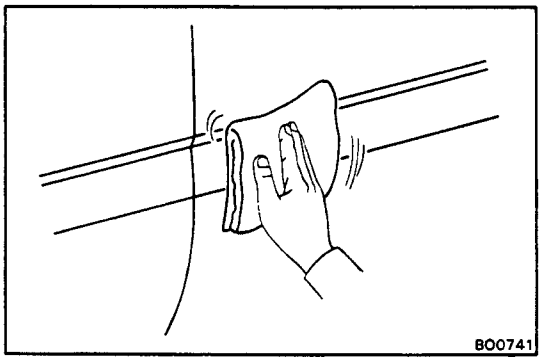
2. REMOVE MOULDING AND ADHESIVE

(a) Pull off the mouldings by cutting the adhesive with a knife.

(b) Scrape off adhesive from the body with a cutter or sandpaper.

CAUTION:

- **Remember that 30 — 80 mm (1.18 — 3.15 in.) of the ends of the moulding are glued tightly with a strong adhesive.**
- **Do not reuse mouldings.**

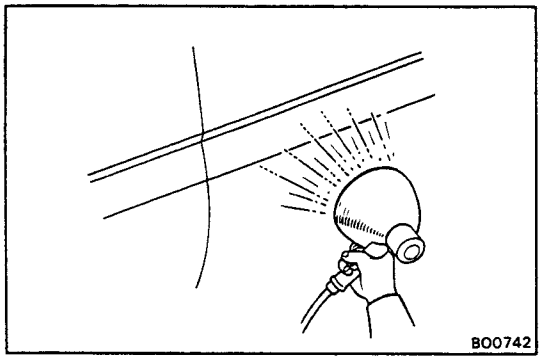


INSTALLATION OF NEW SIDE BODY MOULDING

1. CLEAN MOULDING MOUNTING SURFACES

(a) Wipe off the remaining adhesive with unleaded gasoline.

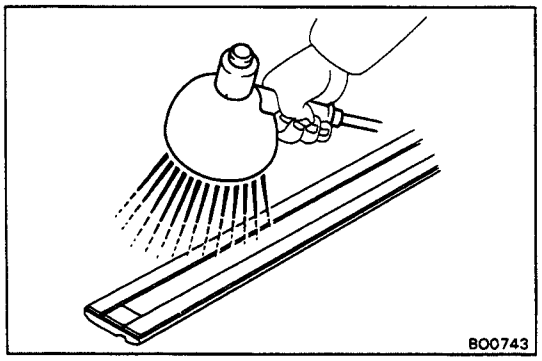
(b) Wipe off the unleaded gasoline with an alcohol-saturated rag.



2. HEAT BODY MOUNTING SURFACE

Using a heat lamp, heat the body mounting surfaces to 40 – 60°C (104 – 140°F).

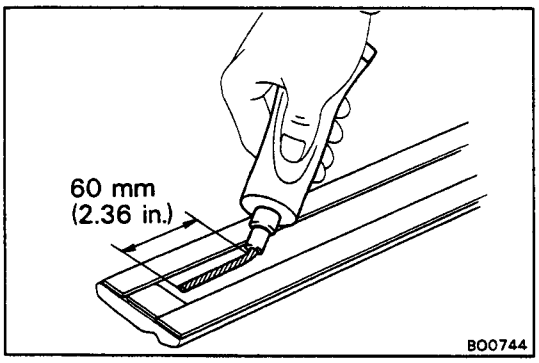
CAUTION: When the moulding is installed, the temperature of the mounting surface should be 20°C (68°F) or higher.



3. HEAT MOULDING

Using a heat lamp, heat the moulding to 20 – 30°C (68 – 86°F).

CAUTION: Do not heat the moulding excessively. The temperature should not be higher than 30°C (86°F).



4. APPLY ADHESIVE TO MOULDING

Apply adhesive to both of punched out ends of the double-stick tape.

CAUTION: Install the moulding within 7 minutes after applying the adhesive.

5. LIFT MOULDING RELEASE SHEET FROM FACE OF MOULDING

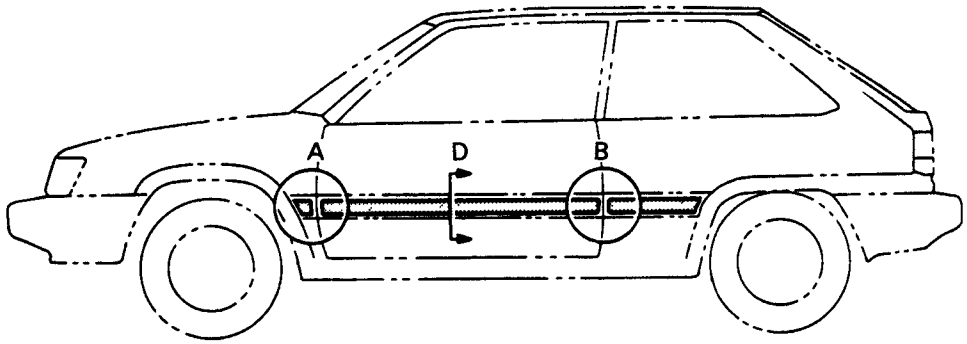
CAUTION:

- **When the moulding release sheet is removed, be sure that no dirt or dust can get onto the uncovered area.**
- **Do not depress adhesive coated parts excessively, just hold these parts down with your thumb.**
- **Be sure that body and moulding are heated to the proper temperature.**

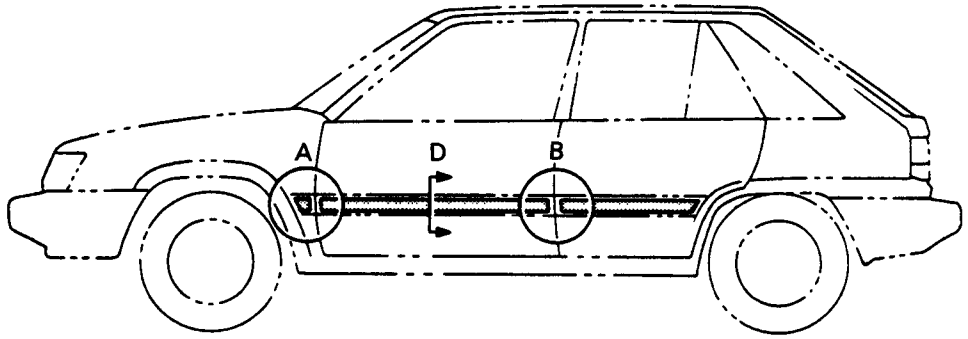
6. INSTALL MOULDING ALONG BODY PRESS LINE

Attach the moulding along the body press line, leaving the spaces shown in the illustration.

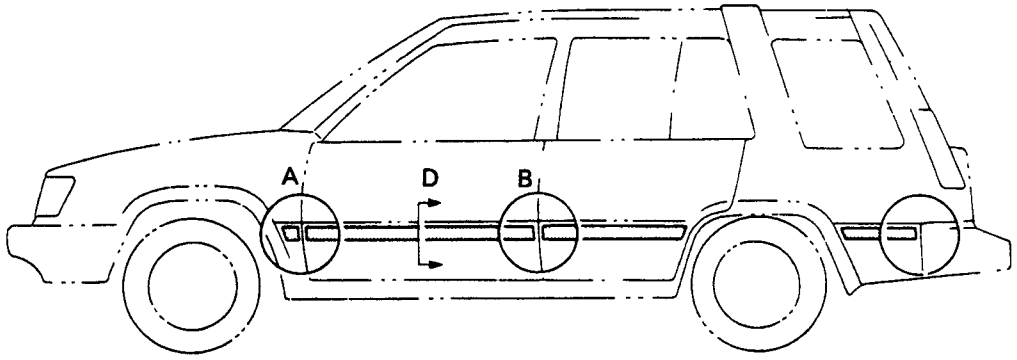
3-Door Sedan

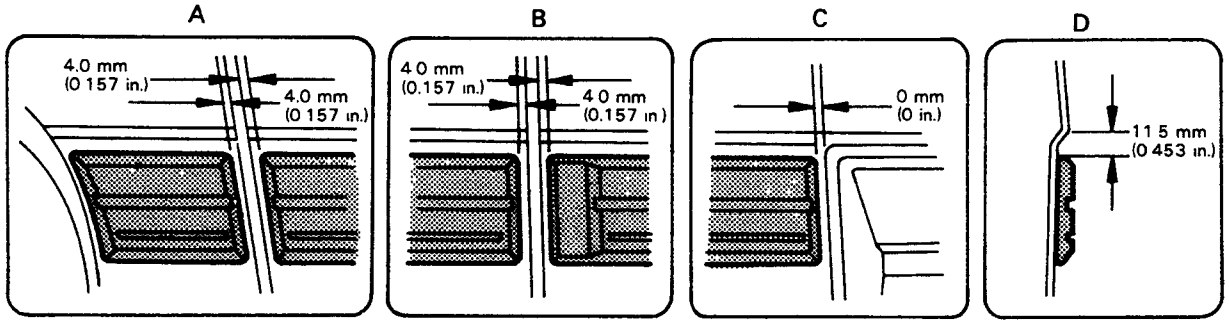


5-Door Sedan

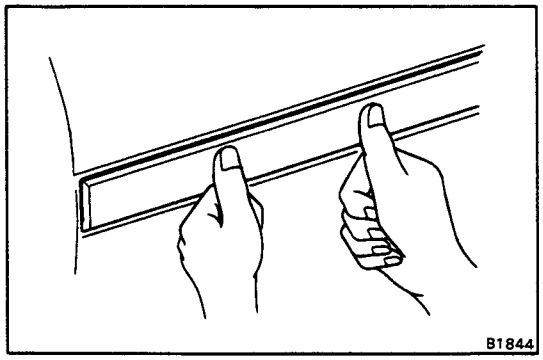


Wagon





B00745
B00806



CAUTION:

- **Scrape off any excess adhesive with a plastic spatula and clean the surface with a dry rag.**
- **After installation, do not wash the vehicle for 24 hours.**

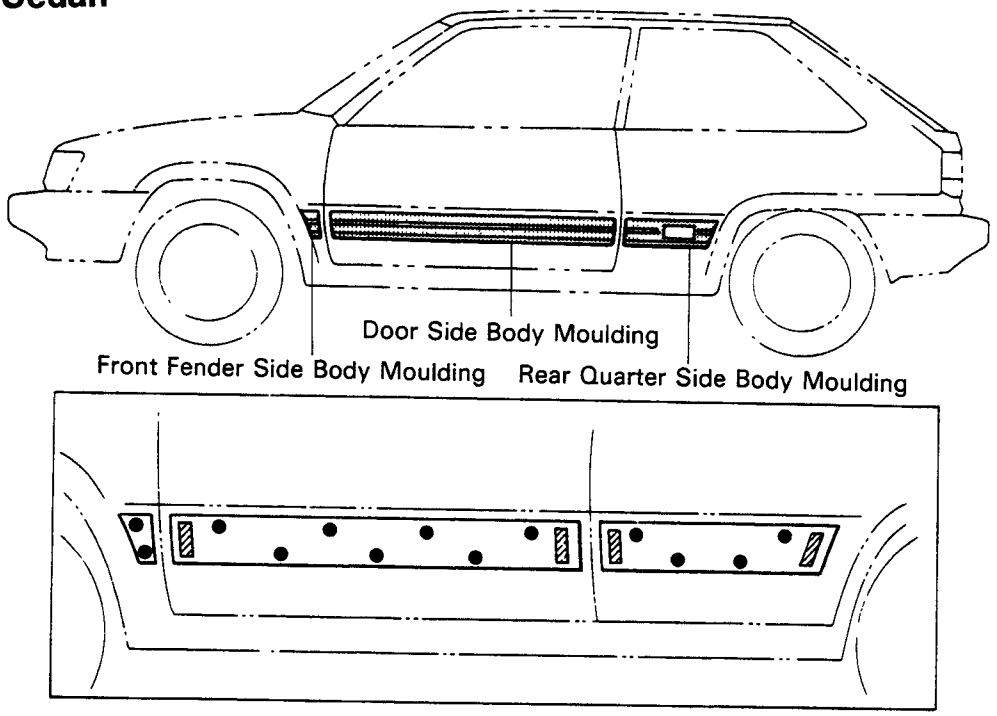
Precautions for storing moulding material:

- **Store in cool place, and avoid direct sunlight, high temperature and dust.**
- **The moulding is of polyvinyl chloride, so do not allow it to come in contact with thinner or other solvent, open flame, or boiling water.**
- **The storage time for the moulding, adhesive and Primer T is limited to about 9 months.**

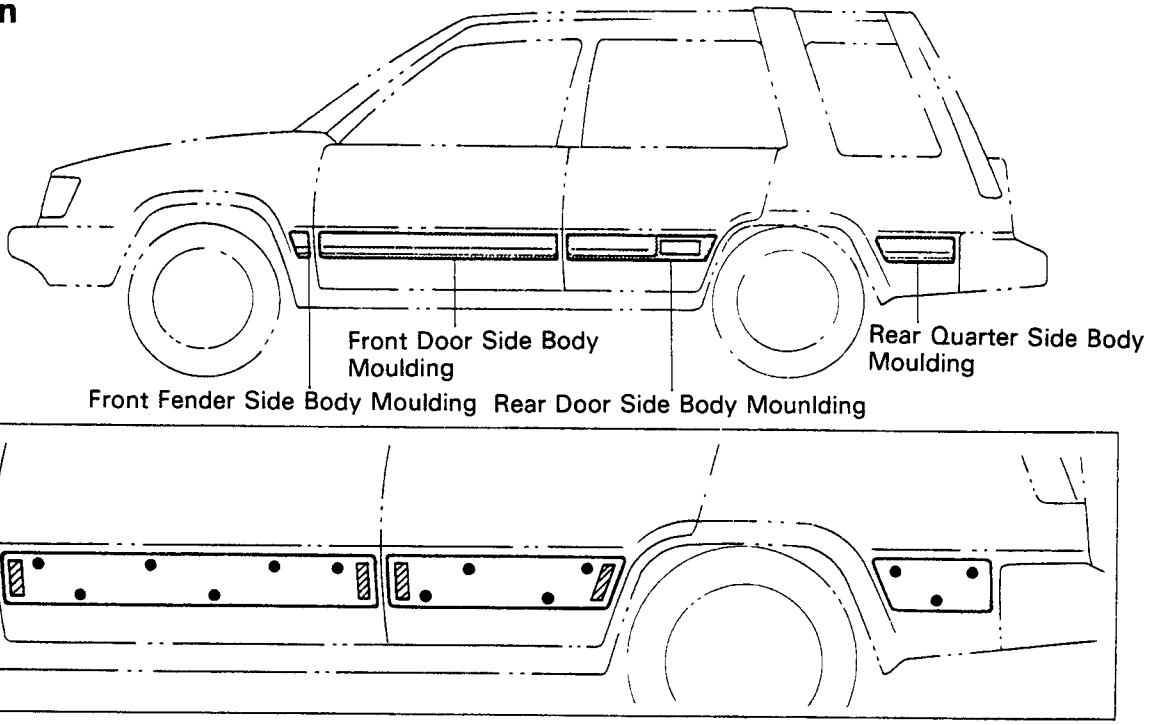
Wide Type

COMPONENTS

3-Door Sedan



Wagon

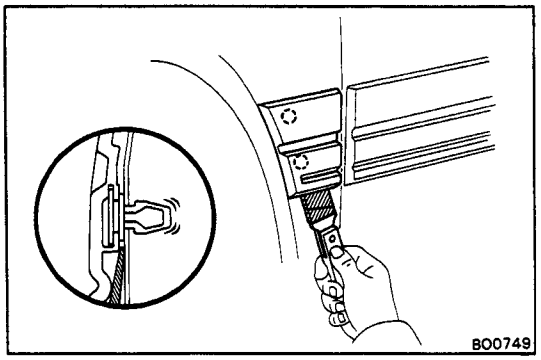


▨ Adhesive
• Clip

BO0747
BO0748

TOOLS AND SUPPLIES

Part No.	Part Name	Quantity
08850-00051	Adhesive (Super special) 20g (0.71 oz.)	1
———	Unleaded gasoline (for cleaning body) Alcohol (for removing body oil stains) Heat lamp	

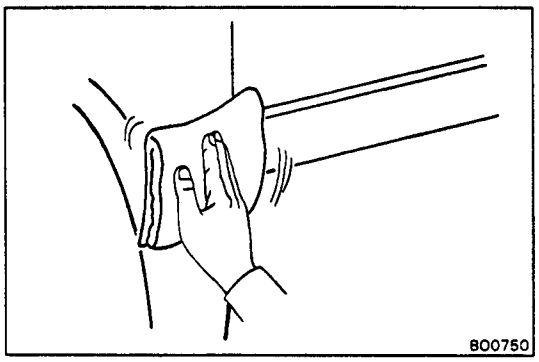


REMOVAL OF FRONT FENDER SIDE BODY MOULDING

REMOVE MOULDING

Using a scraper, pry loose the clips and remove the moulding.

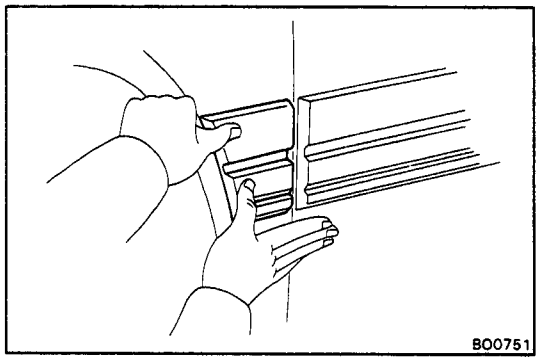
NOTE: Apply tape to the scraper blade to prevent scratching the vehicle body.



INSTALLATION OF FRONT FENDER SIDE BODY MOULDING

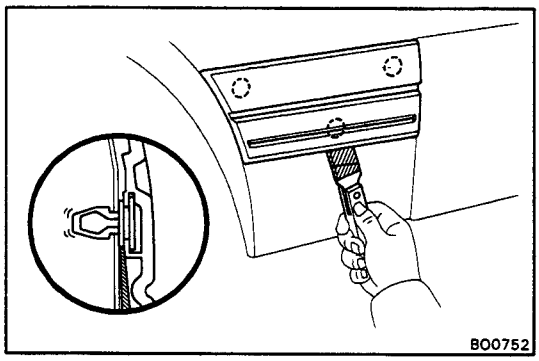
1. CLEAN MOULDING MOUNTING SURFACE

Wipe off with a towel.



2. INSTALL MOULDING

Install the clips to the moulding and push the moulding onto the panel by hand.



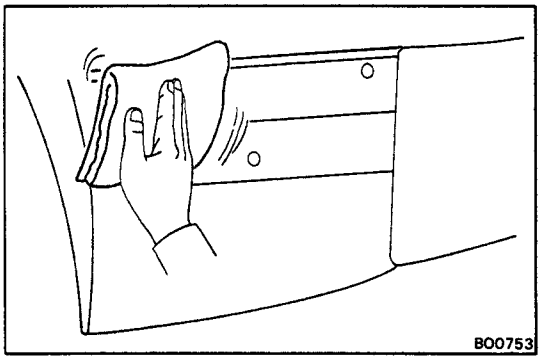
REMOVAL OF QUARTER SIDE BODY MOULDING (WAGON)

REMOVE MOULDING

(a) Remove the nut.

(b) Using a scraper, pry loose the clips and remove the moulding.

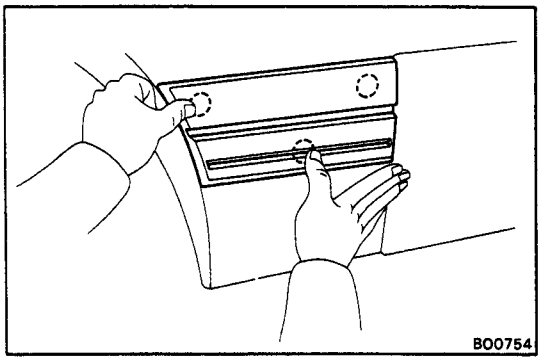
NOTE: Apply tape to the scraper blade to prevent scratching the vehicle body.



INSTALLATION OF QUARTER SIDE BODY MOULDING (WAGON)

1. CLEAN MOULDING MOUNTING SURFACE

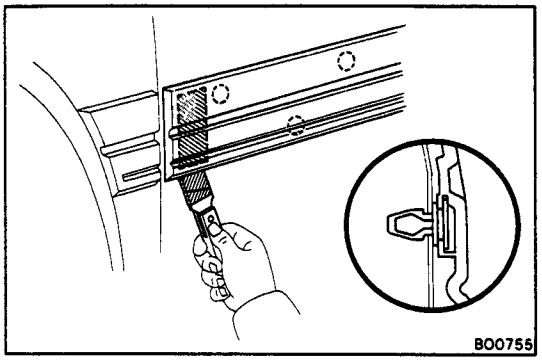
Wipe off the moulding with a towel.



2. INSTALL MOULDING

(a) Install the clips and bolt to the moulding and push the moulding onto the panel by hand.

(b) Install the nut.



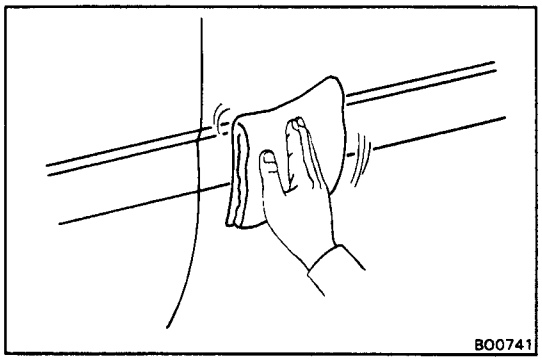
REMOVAL OF DOOR AND QUARTER (3-DOOR SEDAN) SIDE BODY MOULDING

REMOVE MOULDING

(a) Remove the nuts.

(b) Pry loose the adhesive and clips, and remove the moulding.

NOTE: Apply tape to the scraper blade to prevent scratching the vehicle body.



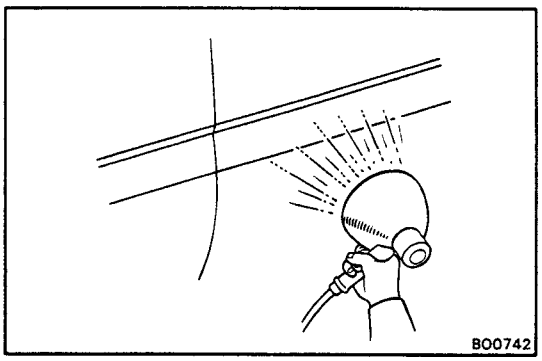
INSTALLATION OF DOOR AND QUARTER (3-DOOR SEDAN) SIDE BODY MOULDING

1. CLEAN MOULDING MOUNTING SURFACES

(a) Wipe off the remaining adhesive with unleaded gasoline.

(b) Wipe off the unleaded gasoline with an alcohol-saturated rag.

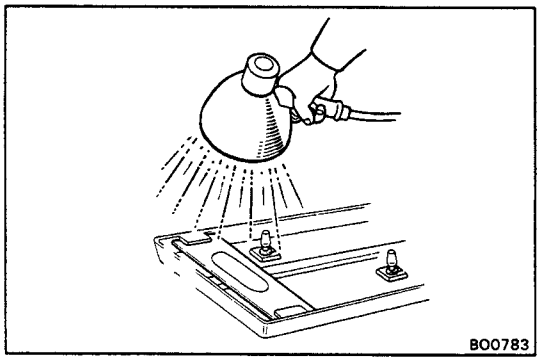
2. INSTALL CLIPS AND NEW RETAINERS MOULDING



3. HEAT BODY MOUNTING SURFACE

Using a heat lamp, heat the retainer surfaces to 40 – 60°C (104 – 140°F).

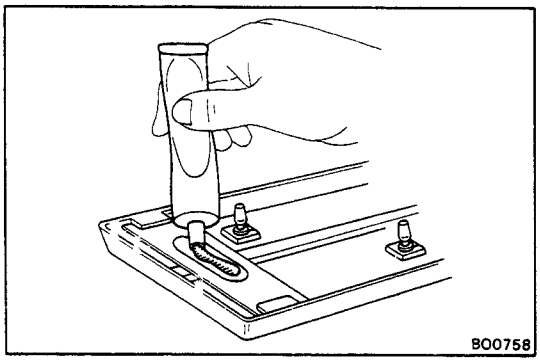
CAUTION: When the moulding is installed, the temperature of the mounting surface should be 20°C (68°F) or higher.



4. HEAT RETAINER

Using a heat lamp, heat the retainer to 20 – 30°C (104 – 140°F).

CAUTION: Do not heat the retainer excessively. The temperature should not be higher than 30°C (86°F).



5. APPLY ADHESIVE TO RETAINER

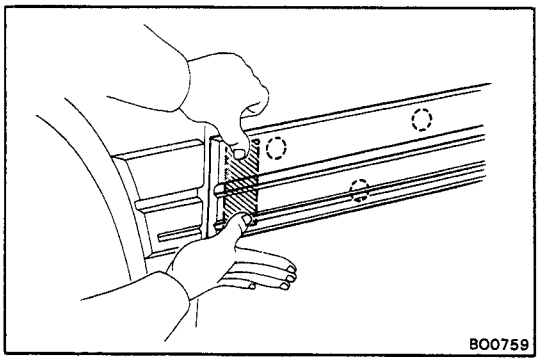
Apply adhesive to both of punched out ends of the double-stick tape.

CAUTION: Install the moulding within 7 minutes after applying the adhesive.

6. LIFT RETAINER RELEASE SHEET FROM FACE OF RETAINER

CAUTION:

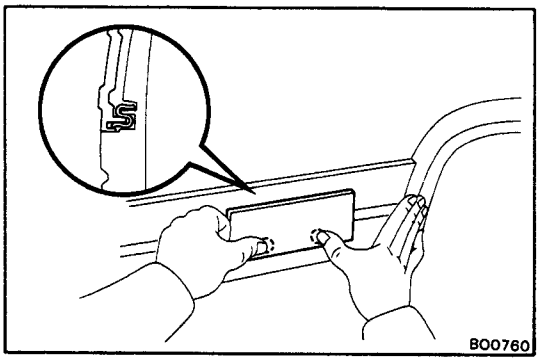
- **When the retainer release sheet is removed, be sure that no dirt or dust can get onto the uncovered area.**
- **Do not depress adhesive coated parts excessively, just hold these parts down with your thumb.**
- **Be sure that body and retainer are heated to the proper temperature.**



7. INSTALL MOULDING

(a) Push the moulding onto the panel by hand.

(b) Install the nuts.



8. INSTALL NAME PLATE

Install the clips to the plate and push the plate onto the panel by hand.

CAUTION: After installation do not wash the vehicle for 24 hours.

Precautions for storing retainer material:

- **Store in cool place and avoid direct sunlight, high temperature and dust.**
- **The storage time for the retainer, adhesive and Primer T is limited to about 9 months.**

WINDSHIELD

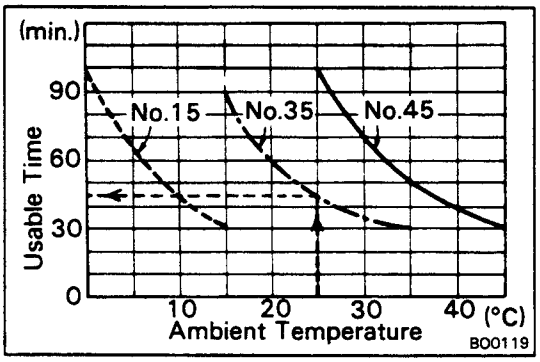
TOOLS AND SUPPLIES

Part Name and Part No.	Content of set	Quantity
Adhesive set 08850-00070 [0 – 15°C (32 – 59°F)] 08850-00080 [15 – 35°C (59 – 95°F)] 08850-00090 [35 – 45°C (95 – 113°F)]	Main agent 500 g (17.5 oz.) Hardening agent 75 g (2.63 oz.) Primer G [for glass] 20 g (0.70 oz.) Primer M [for body] 20 g (0.70 oz.) Sponge for applying primer Piano wire 0.6 mm dia. x 1 m (0.024 in. dia. x 39.37 in.) Cartridge	1 can 1 ea. 1 ea. 1 ea. 1 ea. 1 ea. 1 ea.
Dam kit 04562-30030	Dam Double-stick tape (for sticking on dam)	
	Sealant gun (for applying adhesive) Glass of steel sheet (for mixing adhesive) Putty spatula (for mixing adhesive and correcting adhered parts) Solvent (Alcohol, lead-free gasoline) (for cleaning adhering surfaces)	

Ambient temperature	Part No.	Part name
0 – 15°C (32 – 59°F)	08850-00070	Windshield glass adhesive set No. 15
15 – 35°C (59 – 95°F)	08850-00080	Windshield glass adhesive set No. 35
35 – 45°C (95 – 113°F)	08850-00090	Windshield glass adhesive set No. 45

1. CHOOSE SUITABLE ADHESIVE SET

Use a proper adhesive set depending upon the ambient temperature.

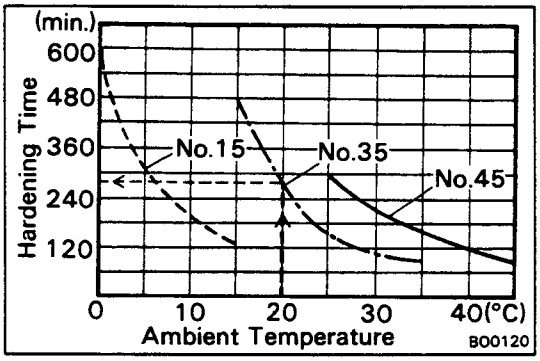


2. CHECK ADHESIVE USABLE TIME

After mixing the main agent and hardening agent, finish glass installation within the specified time as shown.

Example:

For glass installation in ambient temperature of 25°C (77°F), apply adhesive set No. 35 within 45 minutes.



3. CHECK ADHESIVE HARDENING TIME

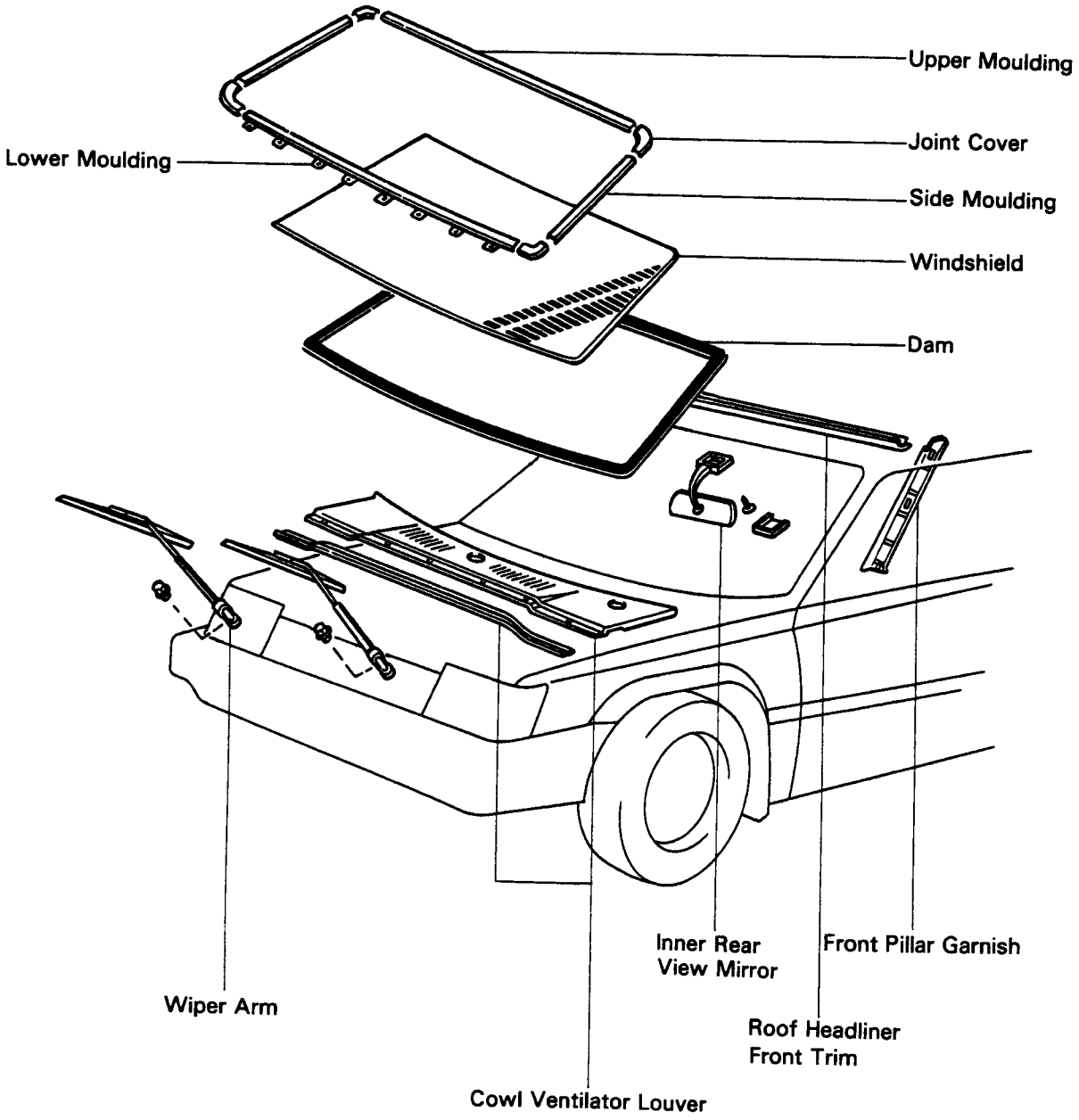
After main agent and hardening agent are applied, leak tests should be made only after the hardening time has elapsed.

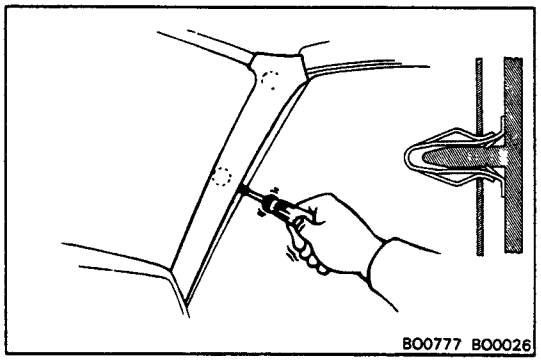
Example:

The hardening time for adhesive set No. 35 with ambient temperature of 25°C (77°F) is 2½ hours.

CAUTION: Do not drive the vehicle until at least double the hardening time has elapsed.

COMPONENTS


Upper Moulding
Joint Cover
Lower Moulding
Side Moulding
Windshield
Dam
Inner Rear View Mirror
Front Pillar Garnish
Wiper Arm
Roof Headliner Front Trim
Cowl Ventilator Louver

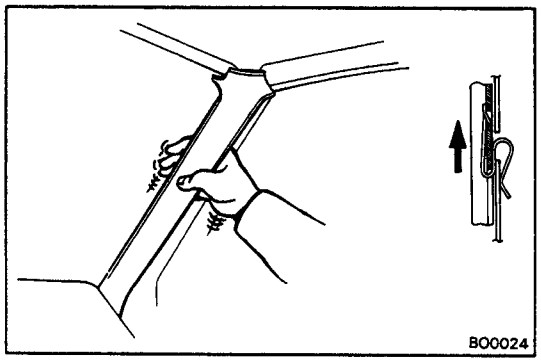


REMOVAL OF WINDSHIELD

(See page BO-38)

1. REMOVE FRONT PILLAR GARNISH

(a) Pry loose the clips with a screwdriver.



(b) Pull the garnish upward to remove.

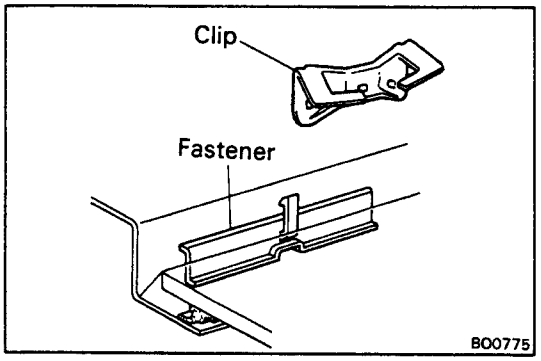
2. REMOVE FOLLOWING PARTS:

(a) Inner rear view mirror

(b) Roof headliner front trim

3. REMOVE WIPER ARM

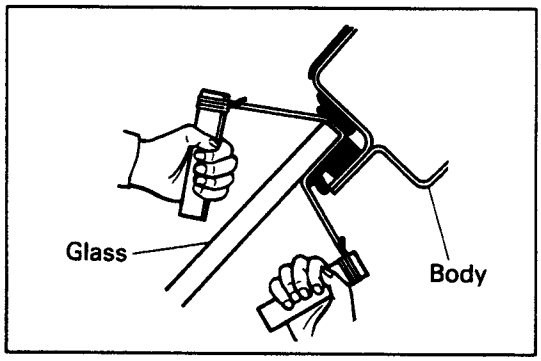
4. REMOVE COWL VENTILATOR LOUVER AND WINDSHIELD OUTSIDE MOULDING
(See page BO-22)



5. REMOVE CLIPS

Be careful not to damage the clips when removing them around the glass.

NOTE: Do not remove the fasteners except to replace those that are deformed.

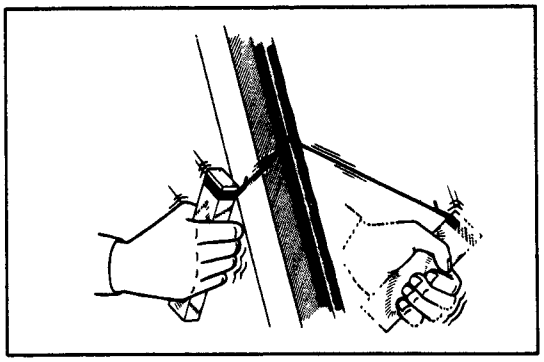


6. REMOVE WINDSHIELD GLASS

(a) Push piano wire through from the interior.

(b) Tie both wire ends to a wooden block or equivalent.

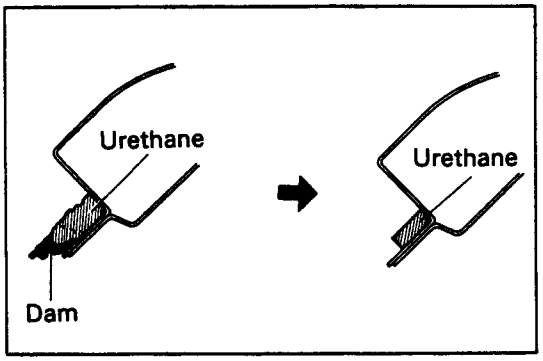
CAUTION: When separating, take care not to damage the paint or interior and exterior ornaments.



(c) Cut the adhesive by pulling piano wire around it.

(d) Remove the glass.

CAUTION: Cut off the glass, leaving as much of the urethane layer on the body as possible.

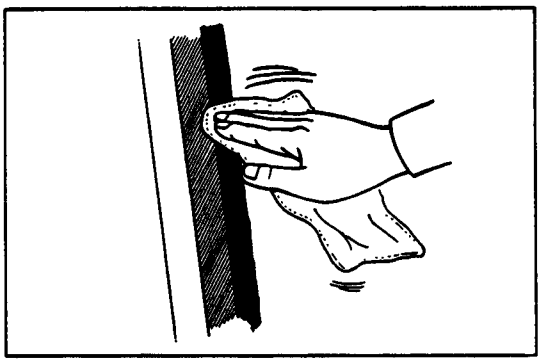


INSPECTION AND CLEANING

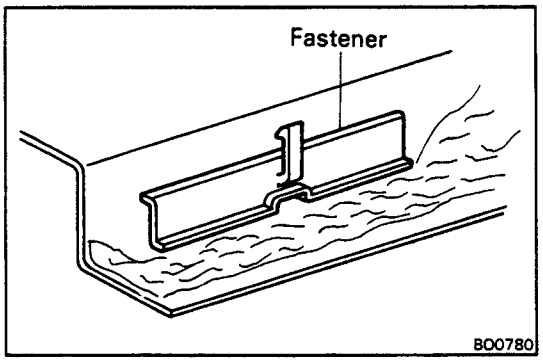
1. CLEAN CONTACT SURFACE OF BODY

(a) Remove any dam remaining on the body.

NOTE: Leave as much urethane layer on the body as possible.



(b) Clean the cutting surface of the urethane gum with a piece of cloth saturated in solvent (alcohol).

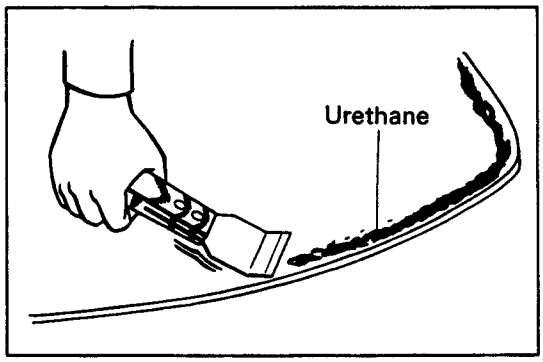


2. IF FASTENERS ARE DAMAGED

(a) Remove any damaged fasteners.

(b) Cut the old adhesive off around the fastener installation area.

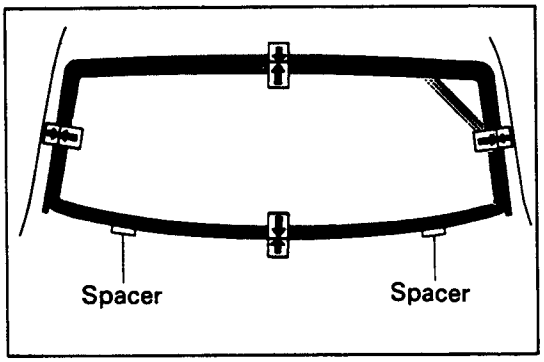
(c) Install a new fasterner.



3. CLEAN REMOVED GLASS BEFORE INSTALLATION

(a) Using a scraper, remove the urethane gum sticking to the glass.

(b) Clean the glass with alcohol.



4. POSITION GLASS

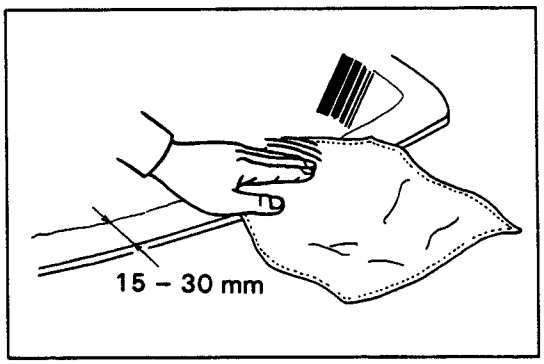
(a) Replace the rubber spacers, if broken.

(b) Place the glass in correct position onto the rubber spacers.

(c) Check that all contacting parts of the glass rim are perfectly even and do not make contact with the fasteners.

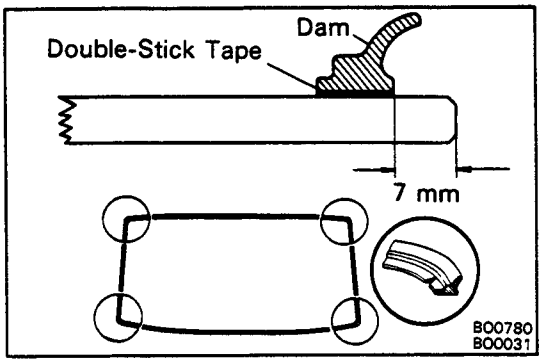
(d) Make reference marks between the glass and body.

(e) Remove the glass.



5. CLEAN CONTACT SURFACE OF GLASS

Using alcohol or similar solvent, clean the contact surface 15 – 30 mm (0.59 – 1.18 in.) wide on the entire glass rim.



INSTALLATION OF WINDSHIELD

(See page BO-38)

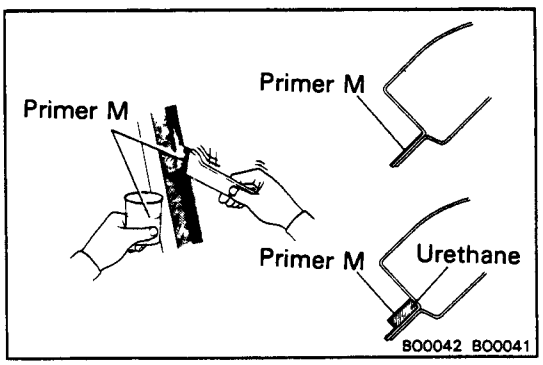
1. INSTALL DAM

(a) Apply double-stick tape at a point 7 mm (0.28 in.) from the glass rim.

(b) Place the dam on the two-sided tape.

NOTE: Cut a V-wedge into the corner folds of the dam.

CAUTION: Do not touch the glass face after cleaning it.

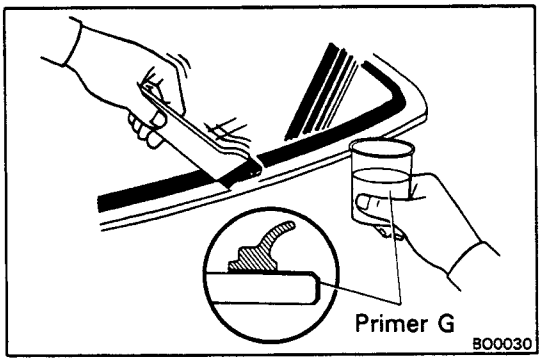


2. COAT CONTACT SURFACE OF BODY WITH PRIMER "M"

Using a brush, coat the contact surface on the body with Primer M.

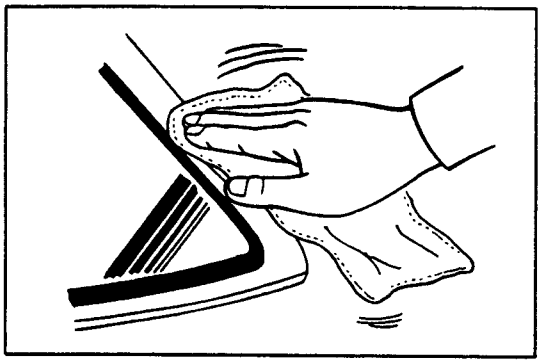
CAUTION:

- **Allow the primer coating dry for 10 minutes or more. Make sure that the installation of the glass is finished within 2 hours.**
- **Use care not to leave any part of the contact surface uncoated or excessively coated, as Primer M and G serve to boost the adhesive power of urethane to glass or body.**
- **Do not keep any of the opened Primer M and G for later use.**



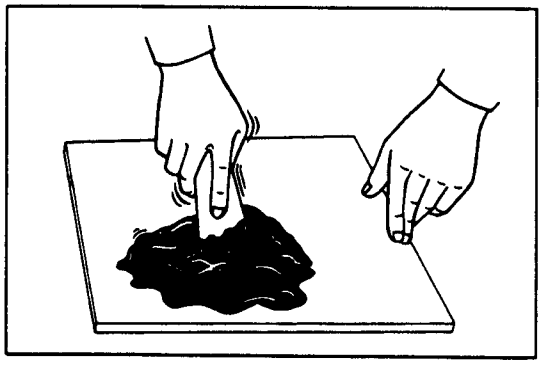
3. COAT CONTACT SURFACE OF GLASS WITH PRIMER "G"

(a) Using a brush or sponge, coat the edge of the glass and the contact surface with Primer G.



(b) Using a clean cloth, wipe off the primer before it dries.

CAUTION: Be sure that the installation of the glass is finished within 70 minutes.



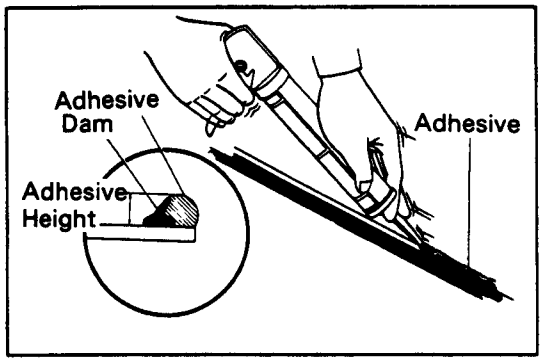
4. MIX ADHESIVE COATING

CAUTION:

- **Be sure that installation of the glass is finished within usable time. (See step 2 on page BO-37)**
- **The mixture should be made in 5 minutes or less.**

(a) Thoroughly clean the glass plate and putty spatula with solvent.

(b) Thoroughly mix 500g (17.5 oz) of the main agent and hardening 75g (2.63 oz) of the agent on glass plate or such with a putty spatula.



5. APPLY ADHESIVE

(a) Cut off the tip of the cartridge nozzle to make a hole 5 mm (0.20 in.) in diameter. Fill the cartridge with adhesive.

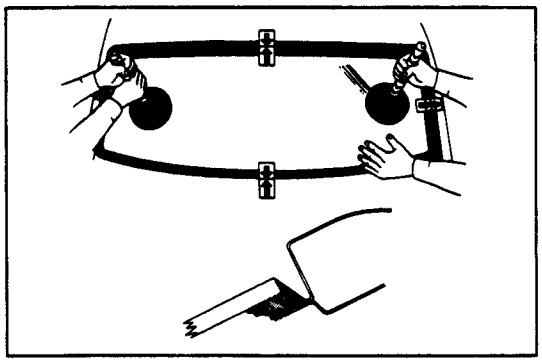
(b) Load the cartridge into the sealer gun.

(c) Coat the glass with adhesive on all contact surfaces along the ridge.

Adhesive height:

If adhesive is remaining on body
3.5 – 5.0 mm (0.138 – 0.197 in.)

If no adhesive is remaining on body
8.0 – 10.0 mm (0.315 – 0.394 in.)



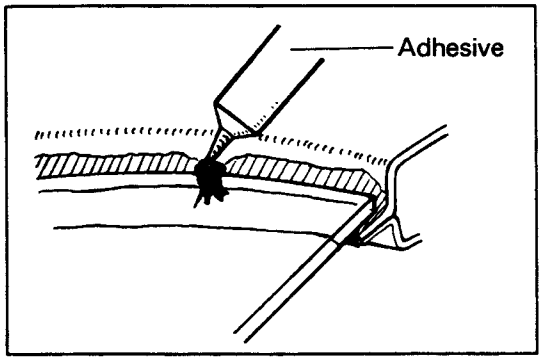
6. INSTALL GLASS

(a) Position the glass so that the reference marks are aligned, and press in gently along the rim.

(b) Using a spatula, apply adhesive on the glass rim.

(c) Use a spatula to remove any excess or protruding adhesive.

(d) Fasten glass securely until the adhesive sets.



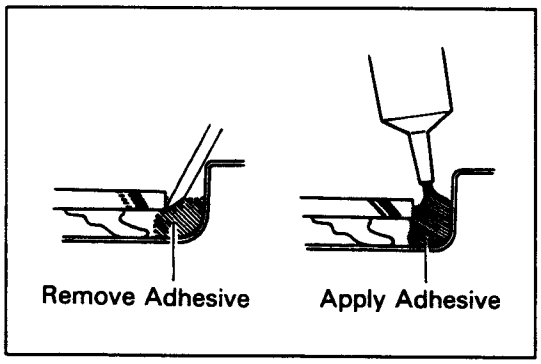
7. INSPECT FOR LEAKS AND REPAIR

(a) Perform a leak test after elapse of the hardening time.

(b) Seal any leak with adhesive or auto glass sealer.

Part No. 08705-00010

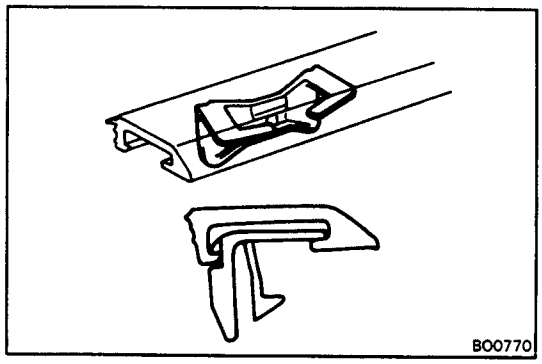
CAUTION: Wait at least twice the hardening time before driving the car.



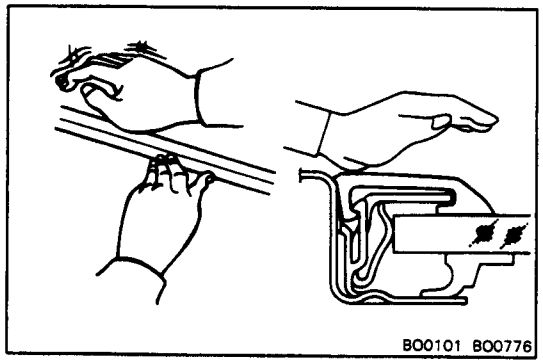
8. INSTALL OUTSIDE MOULDING

(a) Using a knife, remove the adhesive around the installation area of the clips.

(b) Apply adhesive to the installation area of the clips.



(c) Install the clips into the moulding.
When installing the moulding, be sure that the clips and fasteners on the body side do not make contact.



(d) Install the outside moulding.

- Fit on the upper moulding and tap the fasteners on by hand.
- Install the upper joint covers.
- Fit on the side moulding and tap the fasteners on by hand.
- Install the lower joint covers.
- Install the lower moulding.

9. INSTALL FOLLOWING PARTS:

(a) Cowl ventilator louver

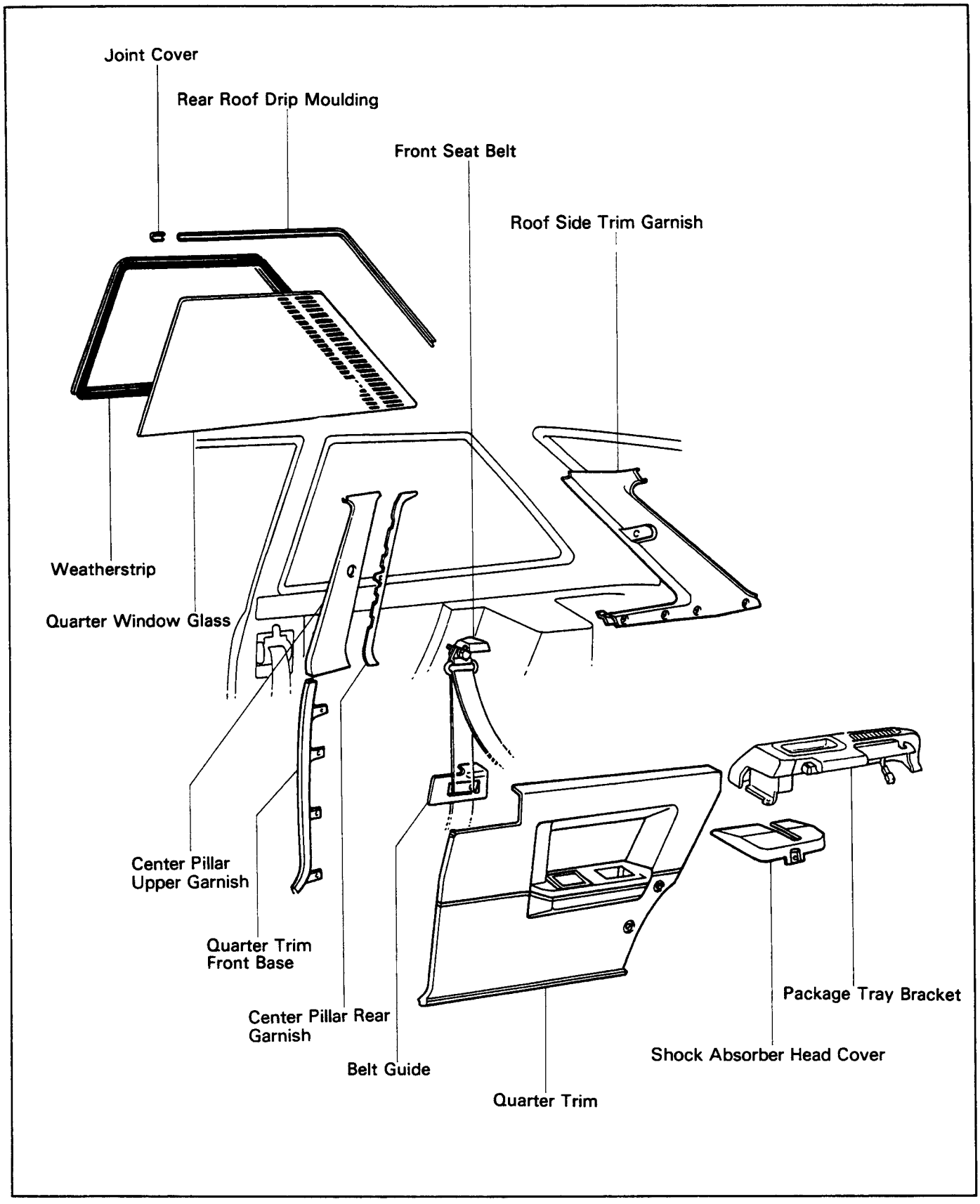
(b) Wiper arm

(c) Roof headliner front trim

(d) Inner rear view mirror

(e) Front pillar garnish

QUARTER WINDOW GLASS
3-Door Sedan Fixed Type
COMPONENTS

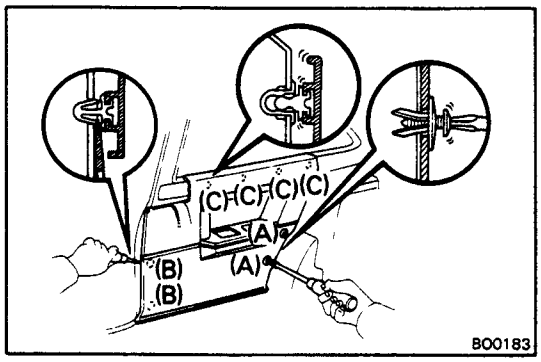


REMOVAL OF QUARTER WINDOW GLASS

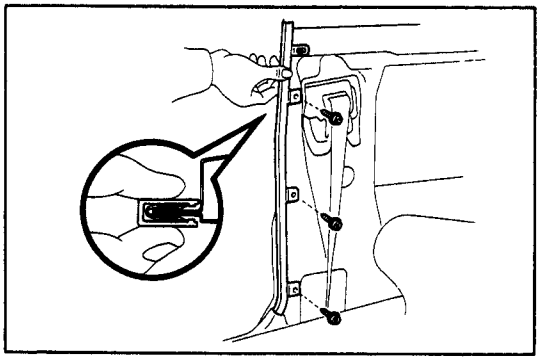
(See page BO-44)

1. REMOVE ROOF DRIP MOULDING AND JOINT COVER (See page BO-26)

2. REMOVE BELT GUIDE

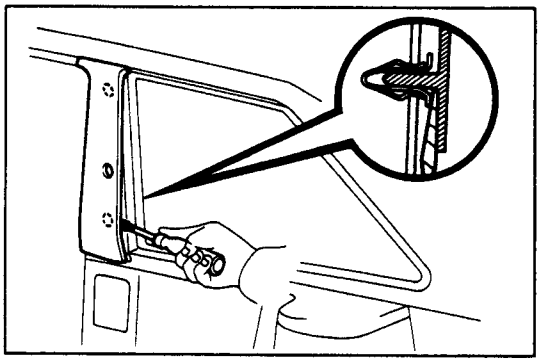


3. REMOVE QUARTER TRIM
   (a) Remove the two clips (A) with a screwdriver.
   (b) Pry loose the two clips (B) and four retainers (C) with a screwdriver and remove the trim.



4. REMOVE QUARTER TRIM FRONT BASE
   (a) Remove the three screws.
   (b) Pull loose the clip and remove the base.

5. REMOVE FRONT SEAT BELT SHOULDER ANCHOR

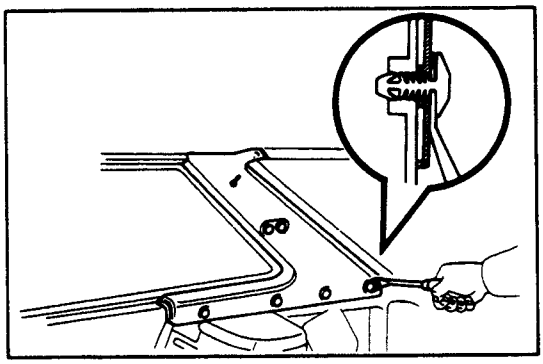


6. REMOVE CENTER PILLAR UPPER GARNISH
   Pry loose the two clips with a screwdriver and remove the garnish.

7. REMOVE CENTER PILLAR REAR GARNISH

8. REMOVE SHOCK ABSORBER HEAD COVER

9. REMOVE PACKAGE TRAY BRACKET

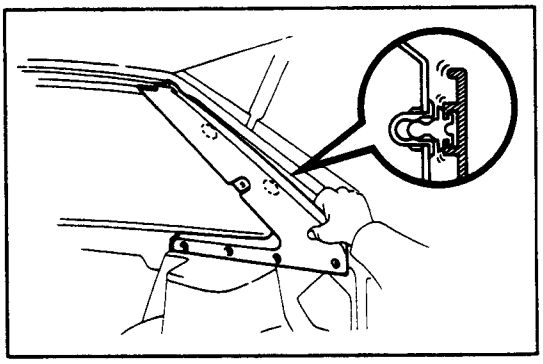


10. REMOVE ROOF SIDE TRIM GARNISH

(a) Remove the screw.

(b) (w/ Package Tray)
Pry out the three clips with a clip remover.

(c) (w/ Package Tray)
Pry out the six clips with a clip remover.



(d) Pull loose the two retainers and remove the garnish.

11. REMOVE QUARTER WINDOW GLASS
(See page BO-56)

INSTALLATION OF QUARTER WINDOW GLASS

(See page BO-44)

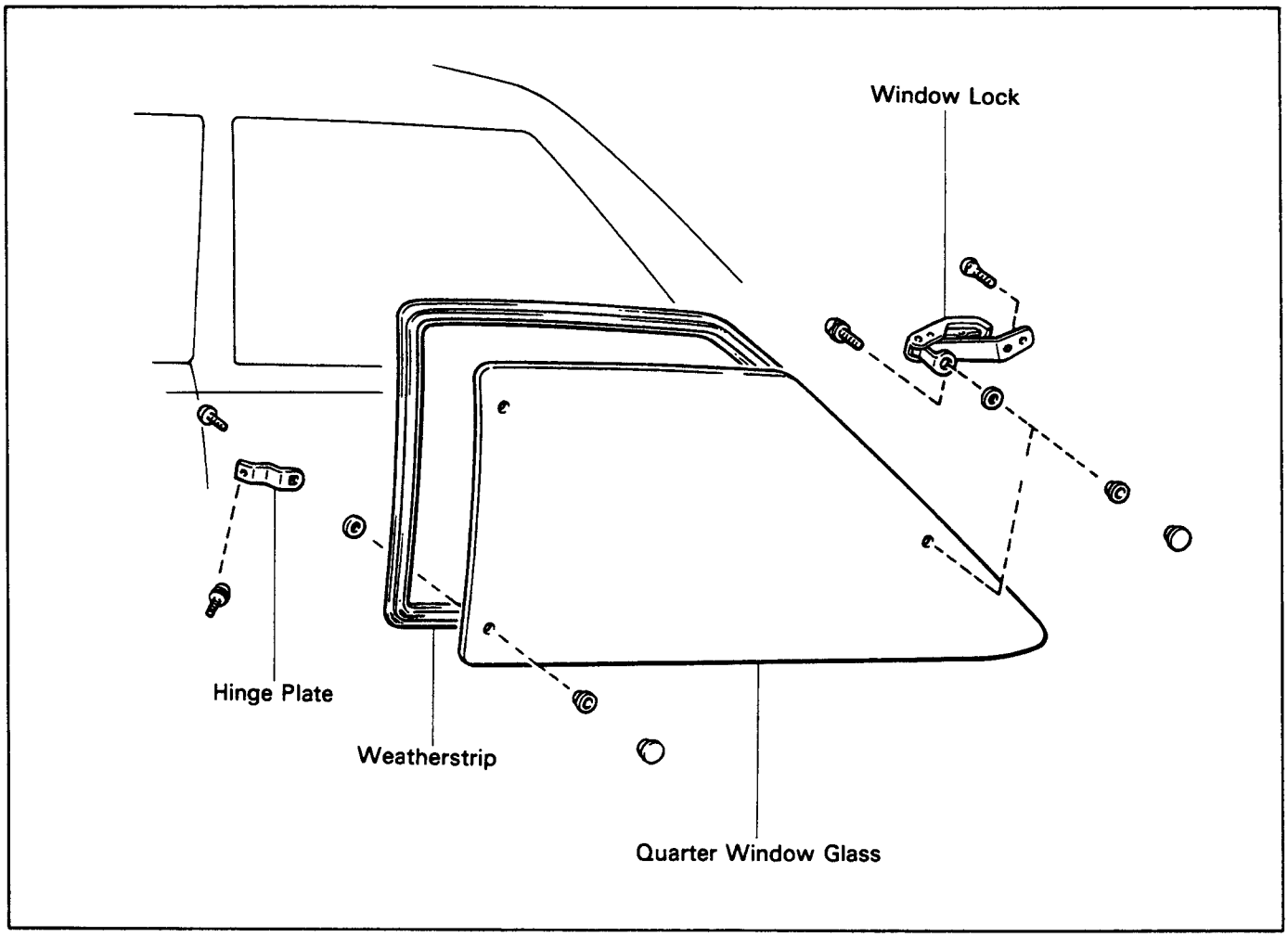
1. INSTALL QUARTER WINDOW GLASS
(See page BO-57)

2. INSTALL FOLLOWING PARTS:

(a) Roof side trim garnish
(b) Package tray bracket
(c) Shock absorber head cover
(d) Center pillar rear garnish
(e) Center pillar upper garnish
(f) Front seat belt shoulder anchor
(g) Quarter trim front base
(h) Quarter trim
(i) Belt guide
(j) Roof drip moulding and cover (See page BO-26)

3-Door Sedan Swing Type

COMPONENTS

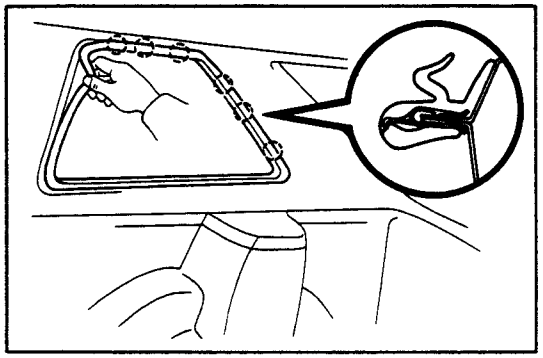


REMOVAL OF QUARTER WINDOW GLASS

1. REMOVE QUARTER WINDOW GLASS

(a) Remove the screws from the body side of the window lock and hinge plates.

(b) Disassemble the window glass, lock and hinge plates.



2. IF NECESSARY, REMOVE WEATHERSTRIP

Pull loose the six clips and remove the weatherstrip.

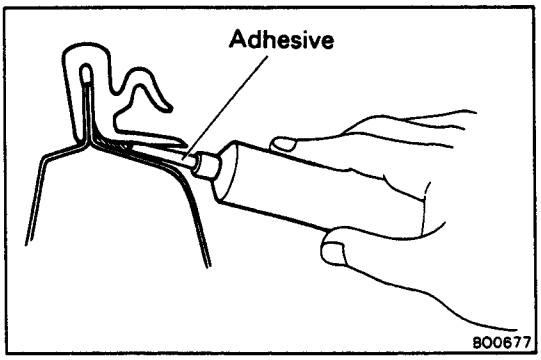
INSTALLATION OF QUARTER WINDOW GLASS

(See page BO-47)

1. **CLEAN BODY**

   Using alcohol, wipe off any adhesive left on the body.

2. **INSTALL WEATHERSTRIP**



3. **APPLY ADHESIVE**

   (a) Put masking tape around the weatherstrip to the protect the body.

   (b) Apply adhesive between the weatherstrip and body.

   Part No. 08704-00020

   NOTE: When adhesive is dry, remove the masking tape.

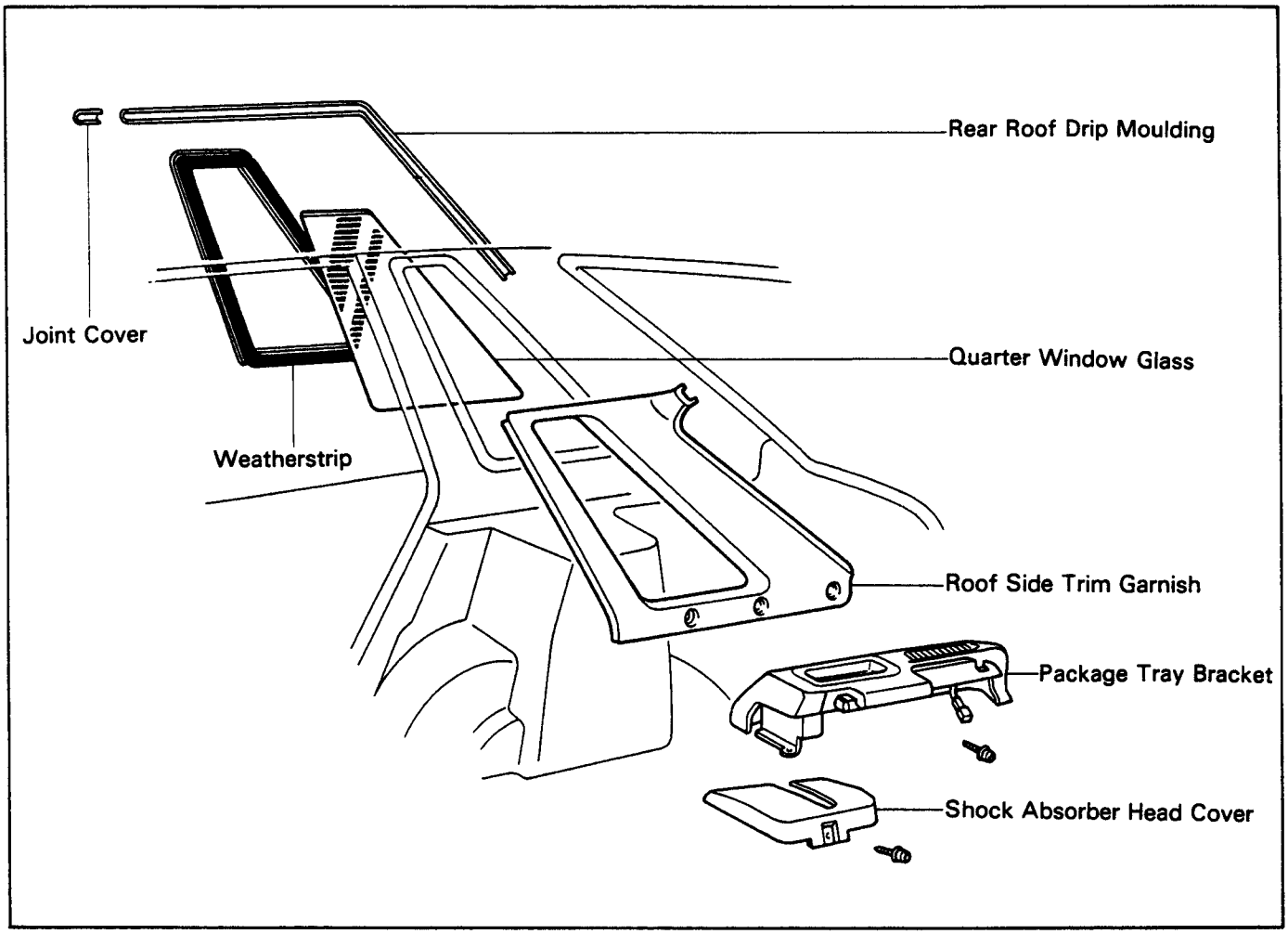
4. **INSTALL QUARTER WINDOW GLASS**

   (a) Assemble the window glass, lock and hinge plates.

   (b) Install the window glass with the screws.

5-Door Sedan

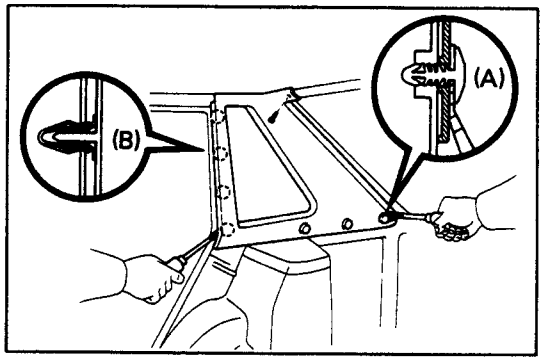
COMPONENTS



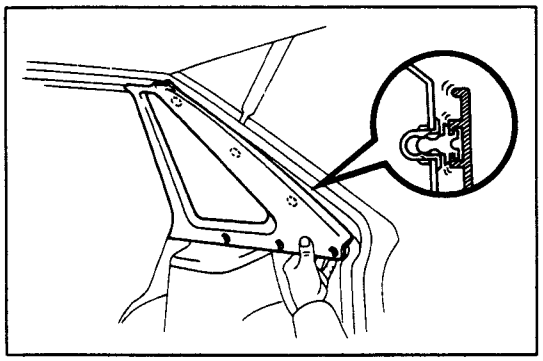
REMOVAL OF QUARTER WINDOW GLASS

1. **REMOVE ROOF DRIP MOULDING AND JOINT COVER (See page BO-26)**

2. **REMOVE PACKAGE TRAY BRACKET AND SHOCK ABSORBER HEAD COVER**



3. **REMOVE ROOF SIDE TRIM GARNISH**
   (a) Remove the screw.
   (b) (w/o Package Tray)
   Pry out the three clips (A) with a clip remover.
   (c) Pry loose the four clips (B) with a screwdriver.



(d) Pull loose the three retainers and remove the garnish.

4. **REMOVE QUARTER WINDOW GLASS**
(See page BO-56)

INSTALLATION OF QUARTER WINDOW GLASS

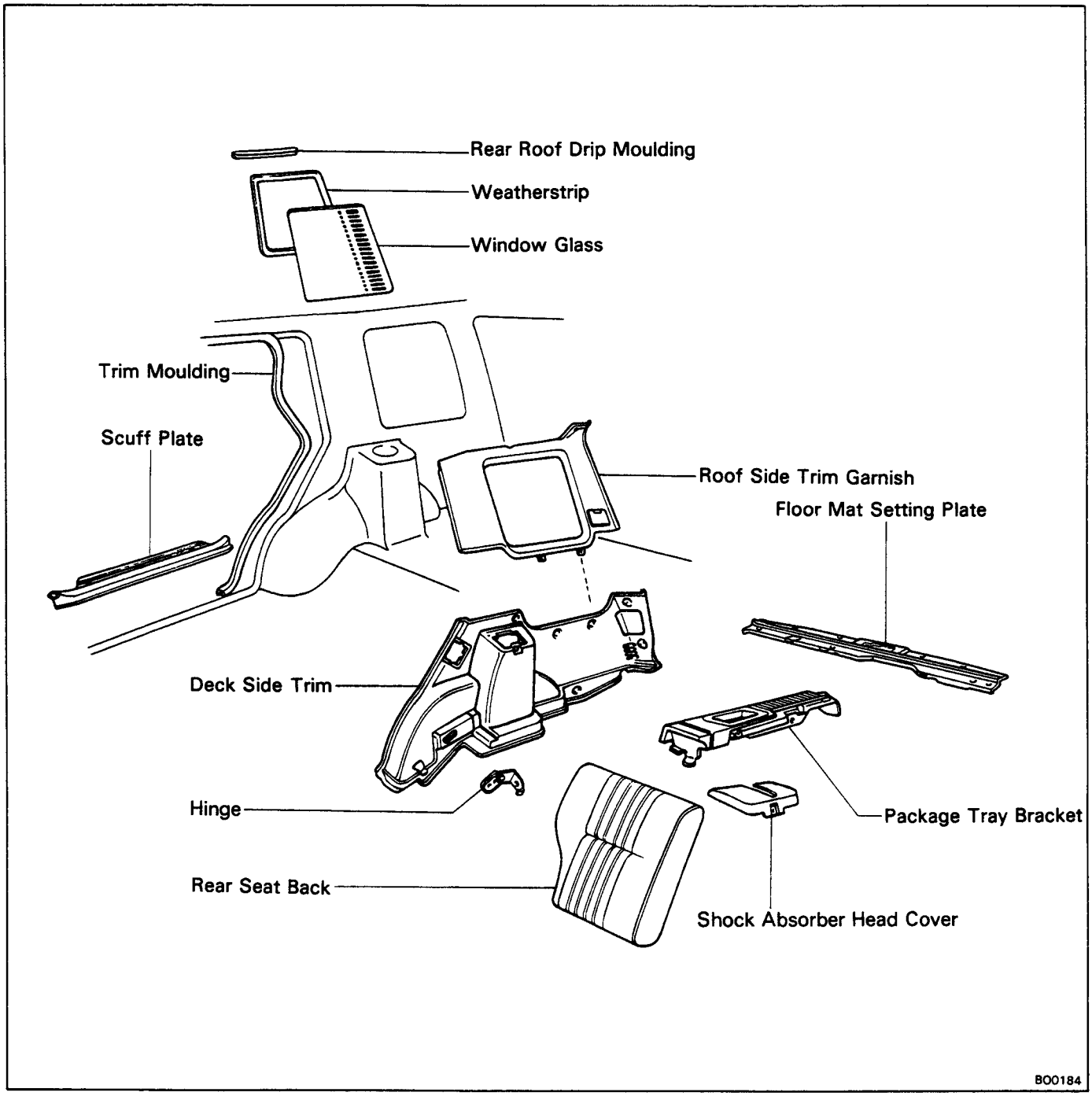
(See page BO-49)

1. **INSTALL QUARTER WINDOW GLASS**
(See page BO-57)

2. **INSTALL FOLLOWING PARTS:**
   (a) Roof side trim garnish
   (b) Package tray bracket
   (c) Shock absorber head cover
   (d) Roof drip moulding and joint cover
(See page BO-26)

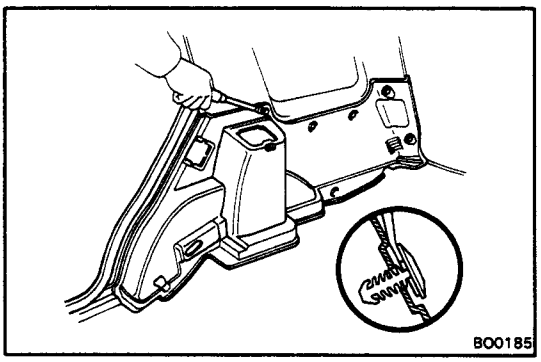
Wagon FWD

COMPONENTS



REMOVAL OF QUARTER WINDOW GLASS

1. **REMOVE FOLLOWING PARTS:**
   - (a) Rear seat back and hinge.
   - (b) Scuff plate
   - (c) Trim moulding (Partially)
   - (d) Rear floor mat setting plate
   - (e) Shock absorber head cover
   - (f) Package tray bracket
   - (g) Rear roof drip moulding

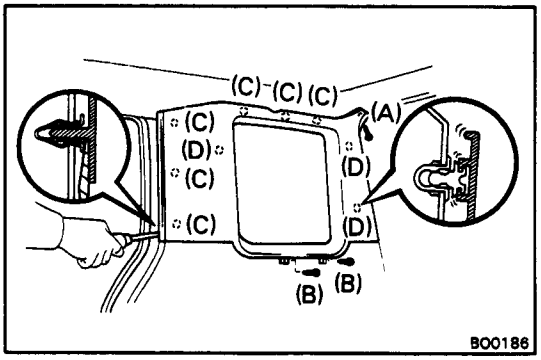


2. REMOVE DECK SIDE TRIM

(a) (w/ Package Tray)
Pry out the two clips with a clip remover.

(b) (w/o Package Tray)
Pry out the six clips with a clip remover.

(c) Remove the trim.



4. REMOVE ROOF SIDE TRIM GARNISH

(a) (w/ Package Tray)
Remove the screw (A).

(b) (w/o Package Tray)
Remove the three screw (A, B)

(c) Pry loose the six clips (C) and three retainers (D) with a screwdriver and remove the garnish.

5. REMOVE QUARTER WINDOW GLASS
(See page BO-56)

INSTALLATION OF QUARTER WINDOW GLASS

(See page BO-51)

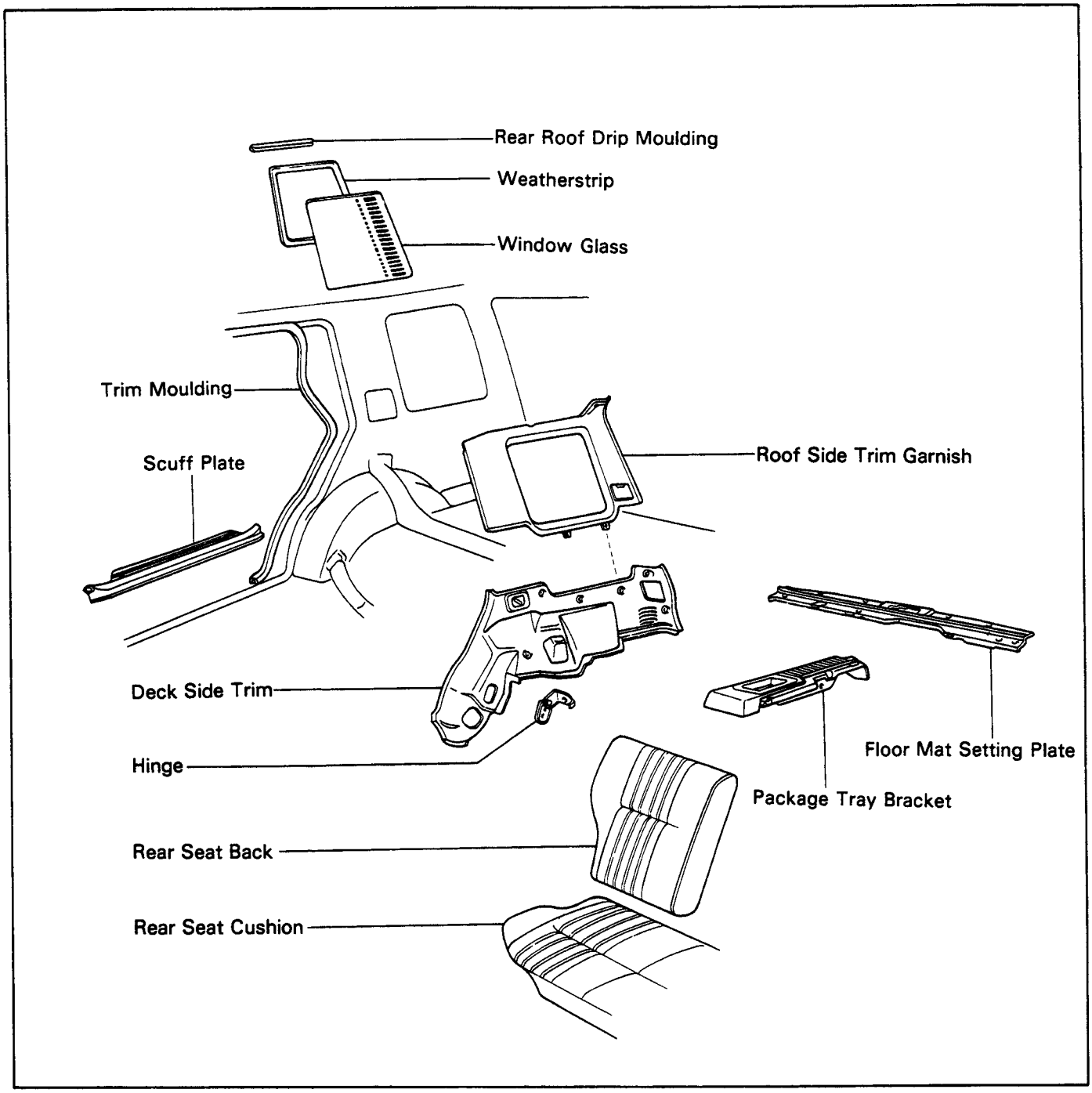
1. INSTALL QUARTER WINDOW GLASS
(See page BO-57)

2. INSTALL FOLLOWING PARTS:

(a) Roof side trim garnish
(b) Deck side trim
(c) Package tray bracket
(d) Shock absorber head cover
(e) Floor mat setting plate
(f) Trim moulding
(g) Scuff plate
(h) Rear seat back and hinge
(i) Rear roof drip moulding

Wagon 4WD

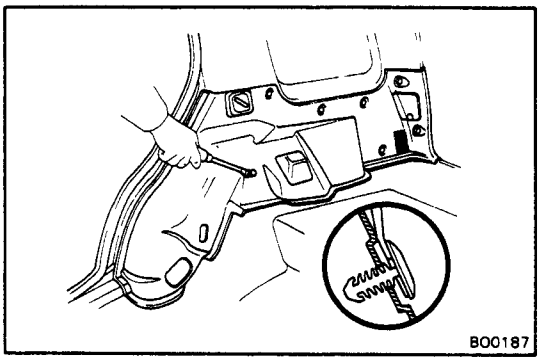
COMPONENTS



REMOVAL OF QUARTER WINDOW GLASS

1. **REMOVE REAR SEAT CUSHION (See page BO-73)**

2. **REMOVE FOLLOWING PARTS:**
   (a) Rear seat back and hinge
   (b) Scuff plate
   (c) Trim moulding (Partially)
   (d) Rear floor mat setting plate
   (e) Package tray bracket
   (f) Rear roof drip moulding



3. **REMOVE DECK SIDE TRIM**
   (a) (w/ Package Tray)
   Pry cut the two clips with a clip remover.
   (b) (w/o Package Tray)
   Pry out the six clips with a clip remover.
   (c) Remove the trim.

4. **REMOVE ROOF SIDE TRIM GARNISH**
(See step 4 on page BO-52)

5. **REMOVE QUARTER WINDOW GLASS**
(See page BO-56)

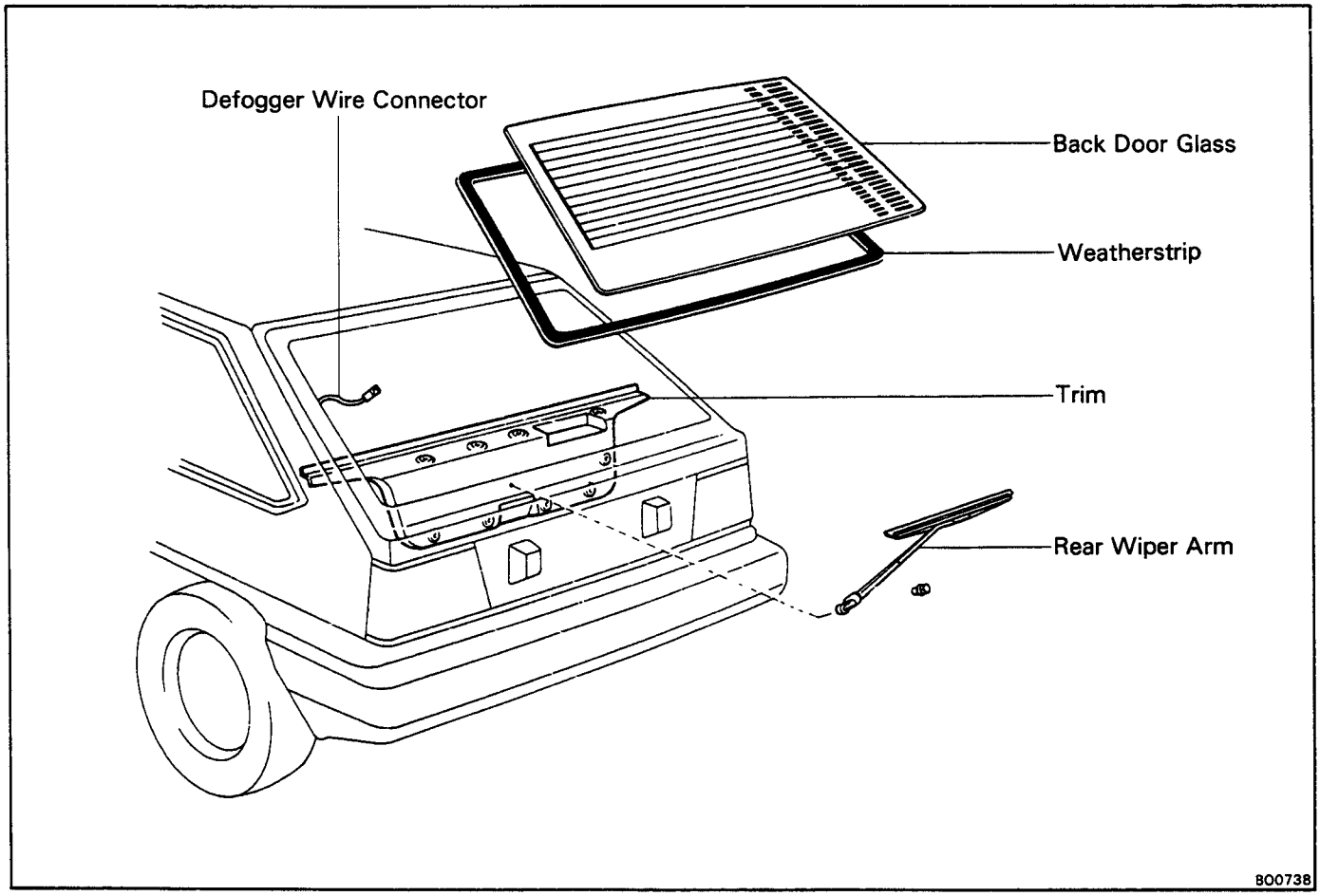
INSTALLATION OF QUARTER WINDOW GLASS

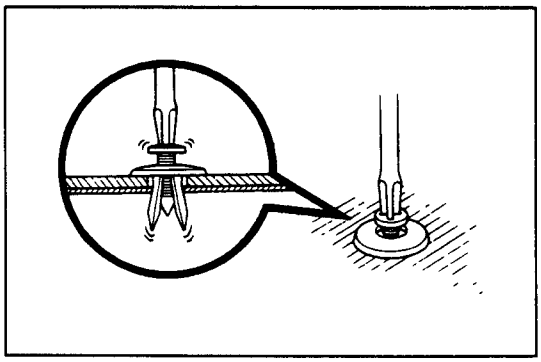
(See page BO-53)

1. **INSTALL QUARTER WINDOW GLASS**
(See page BO-57)

2. **INSTALL FOLLOWING PARTS:**
   (a) Roof side trim garnish
   (b) Deck side trim
   (c) Package tray bracket
   (d) Floor mat setting plate
   (e) Trim moulding
   (f) Scuff plate
   (g) Rear seat back and hinge
   (h) Rear seat cushion
   (i) Rear roof drip moulding

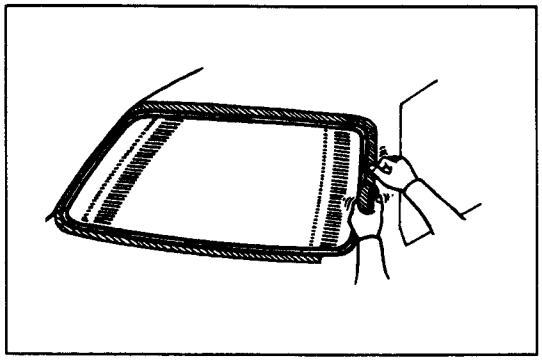
BACK DOOR GLASS
Sedan
COMPONENTS



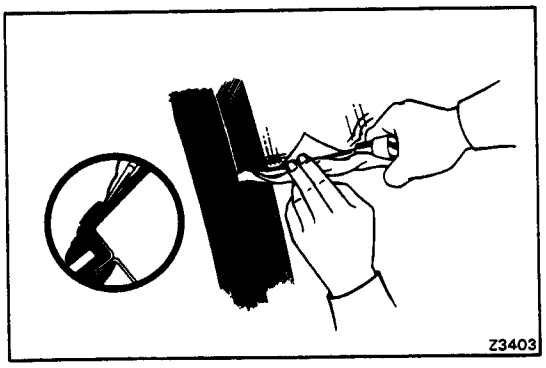


REMOVAL OF BACK DOOR GLASS

1. **REMOVE TRIM**
   Using a screwdriver, remove the clips.
2. **REMOVE REAR WIPER ARM**
3. **REMOVE DEFOGGER WIRE CONNECTOR**



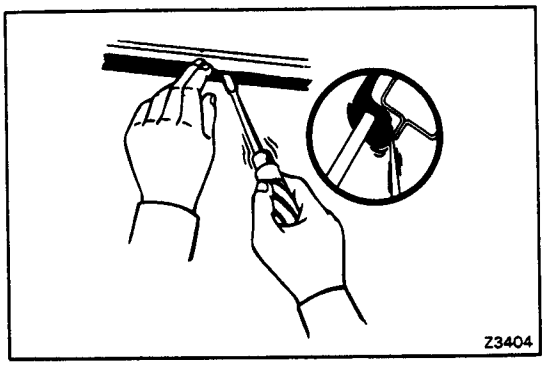
4. **APPLY ADHESIVE TAPE TO PROTECT BODY**



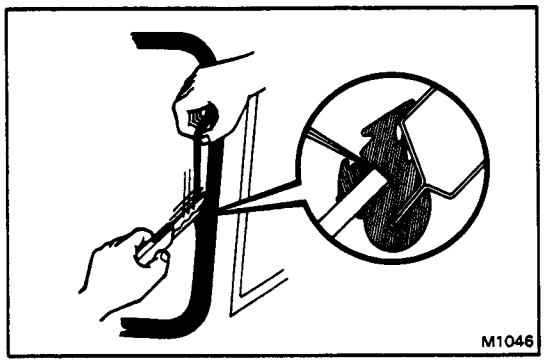
5. **REMOVE GLASS**

If Reusing Weatherstrip:

(a) Working from the outside vehicle with a screwdriver, loosen the weatherstrip lip from the body.



(b) Force the weatherstrip lip from the interior to the body flange outside. Pull the glass outwards and remove it with the weatherstrip.

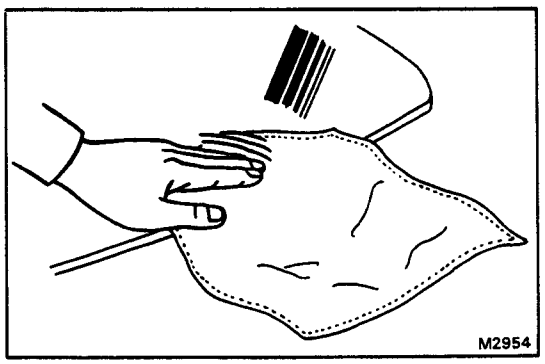


If not Reusing Weatherstrip:

(a) From the outside, cut off the weatherstrip lip with a knife.

(b) Push the glass outwards and remove the glass.

(c) Remove the weatherstrip from the body.

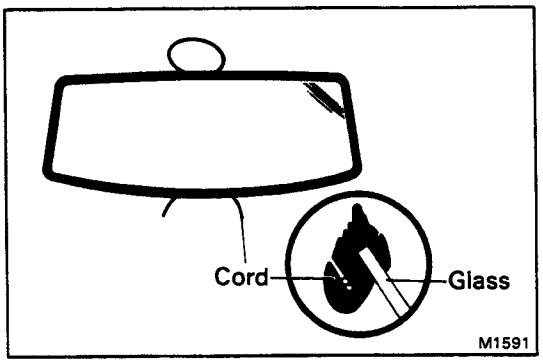


INSTALLATION OF BACK DOOR GLASS

(See page BO-55)

1. **CLEAN BODY AND GLASS**

Wipe off any adhesive left on the body or glass with alcohol.

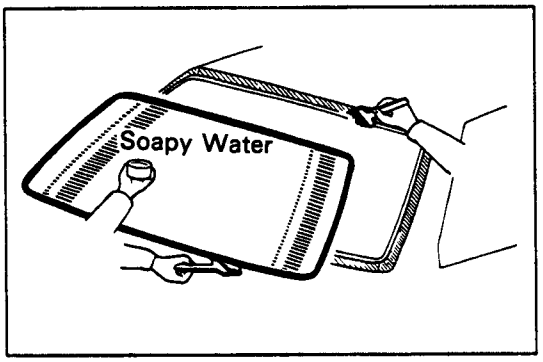


2. INSTALL WEATHERSTRIP ON GLASS

(a) Attach the weatherstrip to the glass.

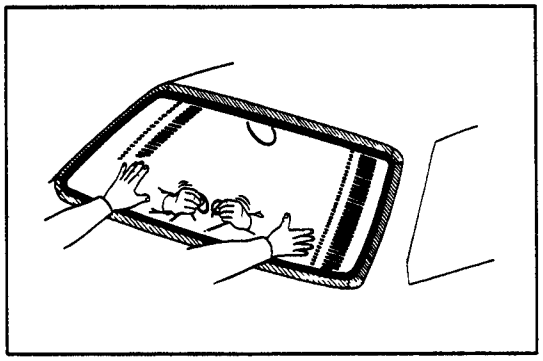
CAUTION: If the weatherstrip has hardened, it may develop water leaks. Use a new one if possible.

(b) Apply a working cord along the weatherstrip groove as shown.



3. INSTALL GLASS

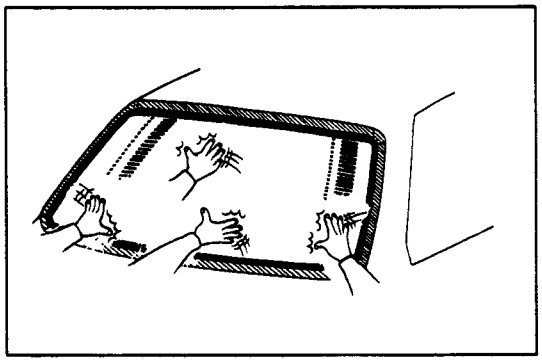
(a) Apply soapy water to the contact face of the weatherstrip lip and to the body flange.



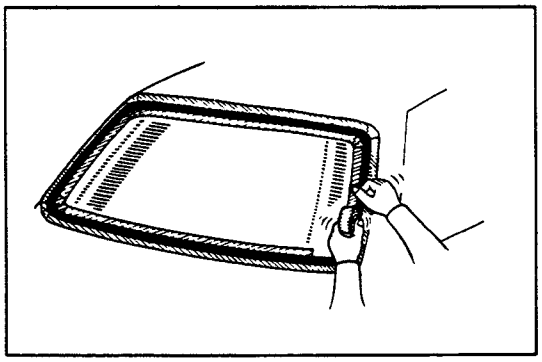
NOTE: Begin installation in the middle of the lower part of the glass.

(b) Hold the glass in position on the body.

(c) Install the glass by pulling the string from the interior, while pushing the outside of the weatherstrip with your open hand.

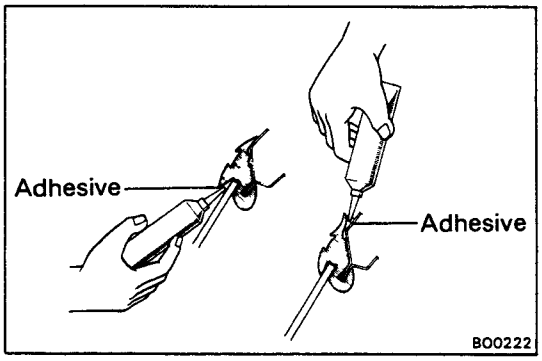


(d) To snug the glass in place, tap from the outside with your open hand.



4. APPLY ADHESIVE

(a) Put masking tape around the weatherstrip to protect the paint and glass.



(b) Apply adhesive between the weatherstrip and glass and between the weatherstrip and body.

Part No. 08704-00020

NOTE: When adhesive is dry, remove the masking tape.

5. INSTALL FOLLOWING PARTS:

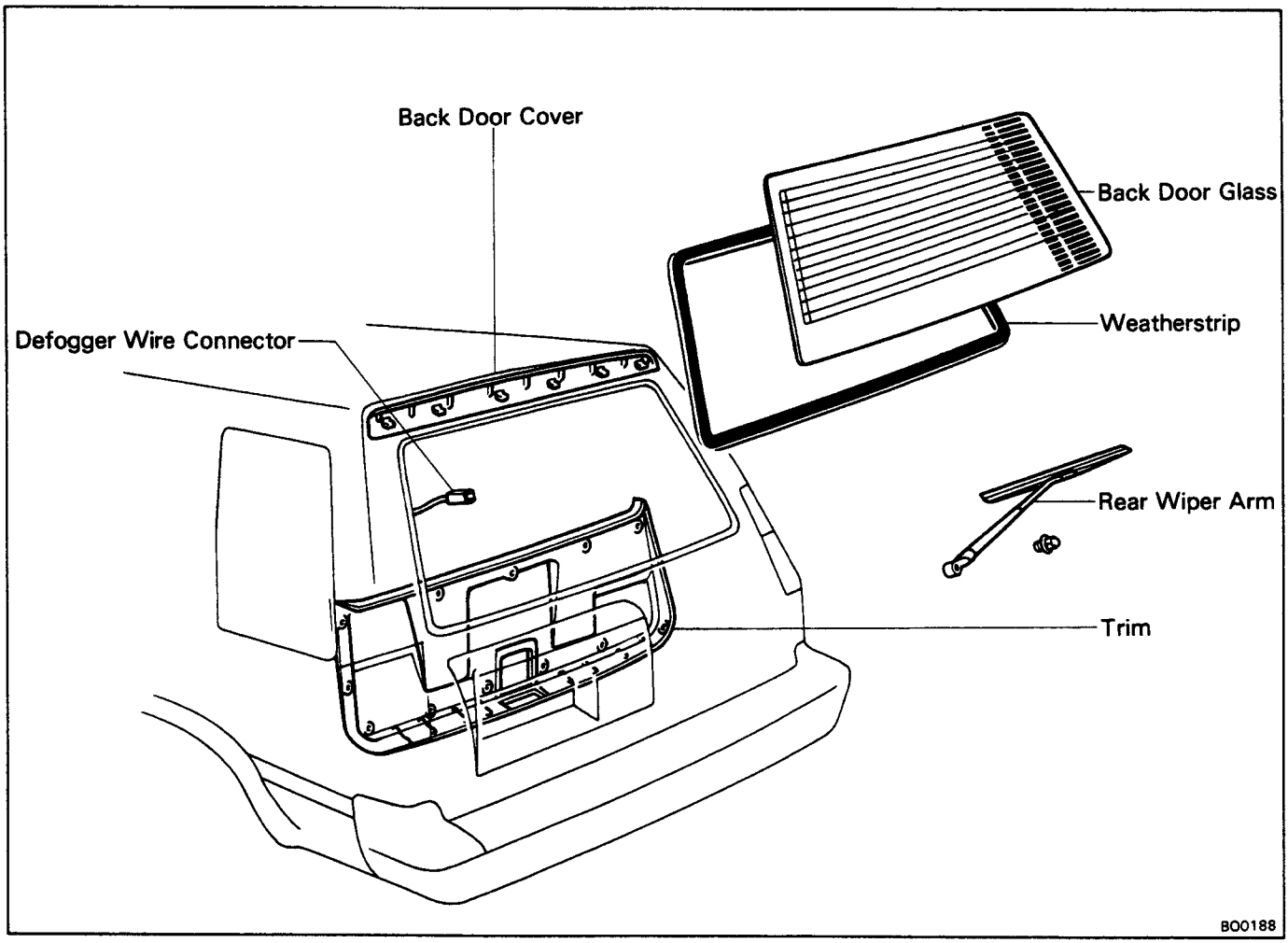
(a) Window defogger wire connector

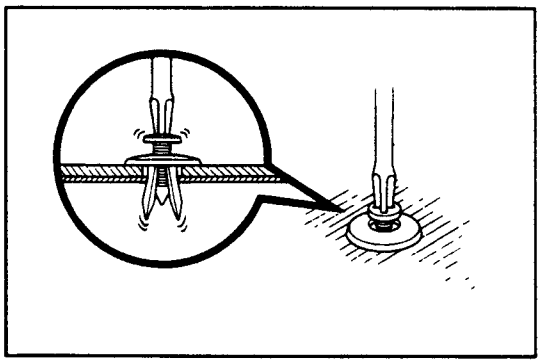
(b) Back door trim

(c) Rear wiper arm

Wagon

COMPONENTS

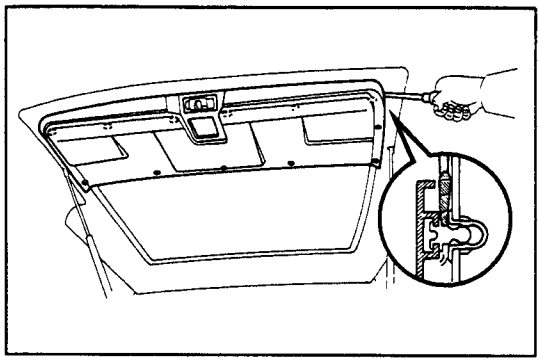




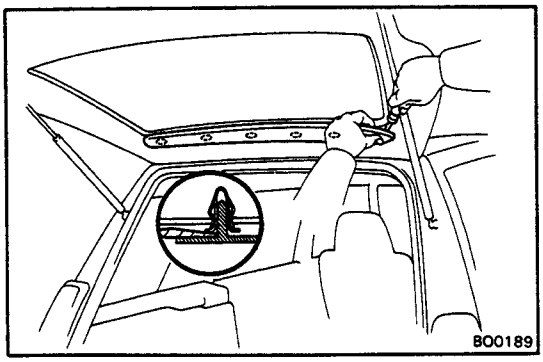
REMOVAL OF BACK DOOR GLASS

1. **REMOVE TRIM**

(a) Using a screwdriver, remove the seven clips.



(b) Pull loose the six retainers and remove the trim.



2. **REMOVE BACK DOOR COVER**

   Pry loose the six clips with a screwdriver and remove the door cover.

3. **REMOVE REAR WIPER ARM**

4. **DISCONNECT DEFOGGER WIRE CONNECTOR**

5. **REMOVE REAR WINDOW GLASS (See page BO-56)**

INSTALLATION OF BACK DOOR GLASS

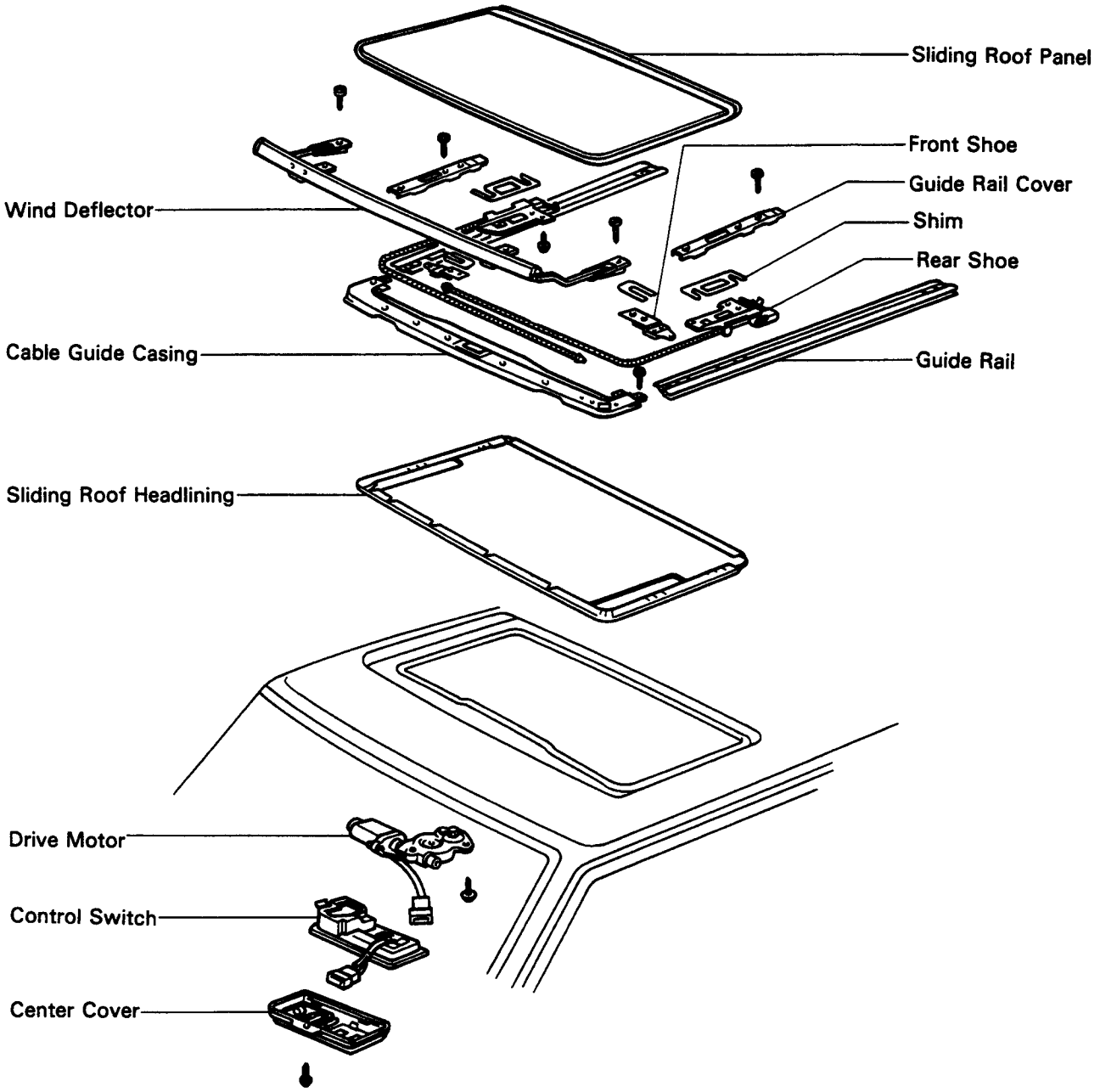
(See page BO-59)

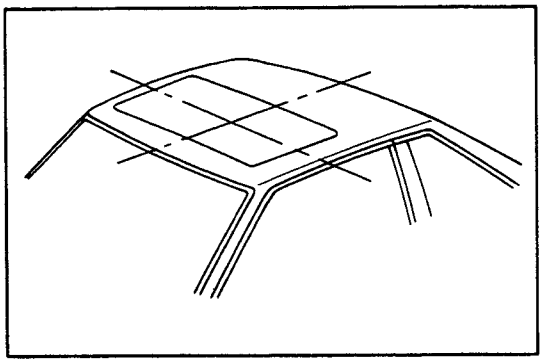
1. **INSTALL REAR WINDOW GLASS (See page BO-57)**

2. **INSTALL FOLLOWING PARTS:**
   (a) Window deffoger wire connector
   (b) Back door trim
   (c) Rear wiper arm
   (d) Back door cover

SUN ROOF

COMPONENTS





ON-VEHICLE INSPECTION

(a) Start the engine and check the operation time of the sun roof.

Operation time: Approx. 5 sec.

(b) Check for abnormal noise or binding during operation.

(c) With the sun roof fully closed, check for water leakage.

(d) Check for level difference between the sliding panel and roof panel.

Front side: 0 ± 1.5 mm (0 ± 0.059 in.)

Rear side: $0 \pm \frac{1.5}{2.0}$ mm ($0 \pm \frac{0.059}{0.079}$ in.)

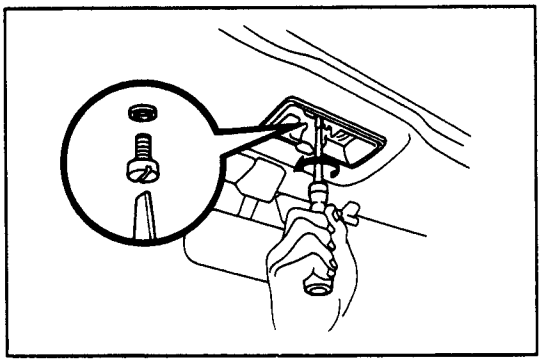
Left and right side: $0 \pm \frac{1.0}{2.0}$ mm ($0 \pm \frac{0.039}{0.079}$ in.)

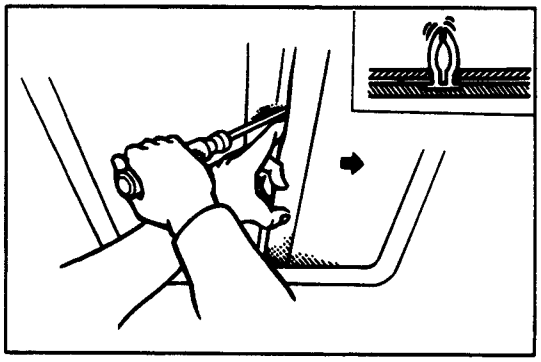
(e) If the sliding roof does not operate.

(1) Remove the center cover of the control switch.

(2) Remove the screw inside.

(3) Manually operate the sun roof by inserting a screwdriver into the hole and turning the drive shaft.

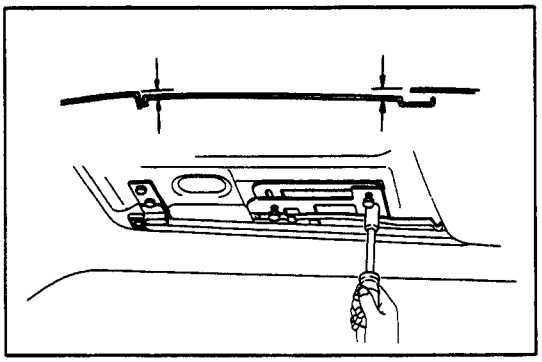




ADJUSTMENT OF SLIDING ROOF

(a) Before making adjustments, pull loose the clips and slide the headlining to the rear.

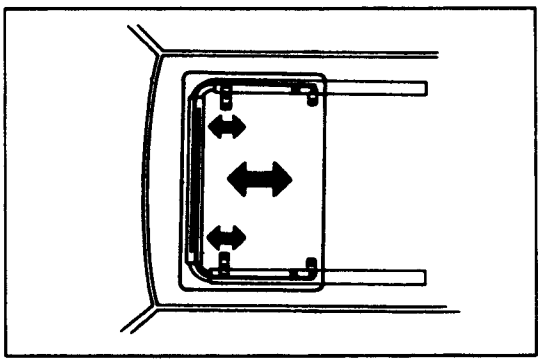
NOTE: When checking adjustment, reattach the headlining before sliding the roof.



(b) Vertical direction of sliding roof front end and rear end.

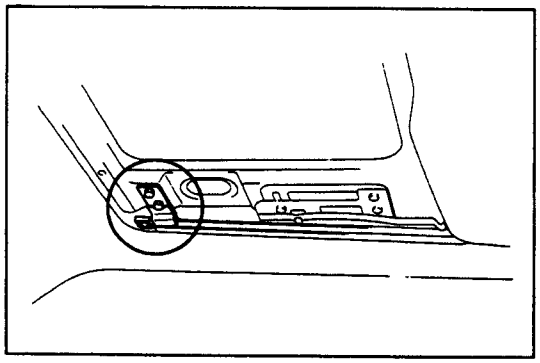
Adjust by increasing or decreasing the number of shims.

NOTE: If the front end is high, even without a shoe shim, check to see if the front shoes are in contact with the stoppers.

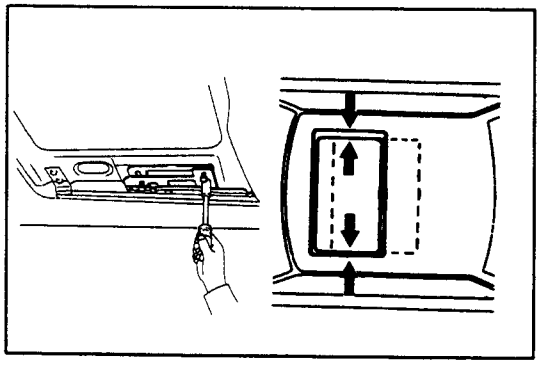


(c) Forward–rearward direction.

Adjust by moving the front shoe on both sides.

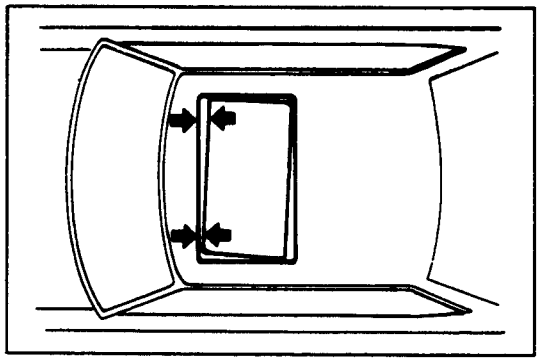


NOTE: When the sliding roof is fully closed, confirm that the front shoes is in contact with the stopper.



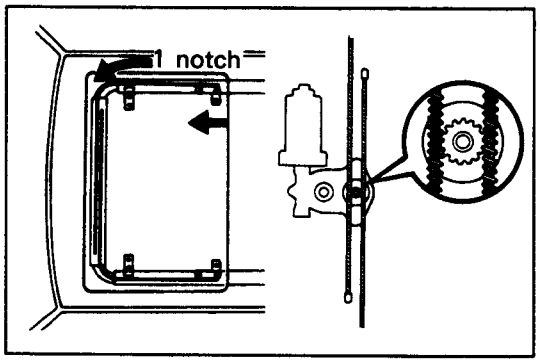
(d) Left–right direction.

Adjust by loosening the rear shoe bolts and sliding the roof forward and rearward.
It will adjust automatically.

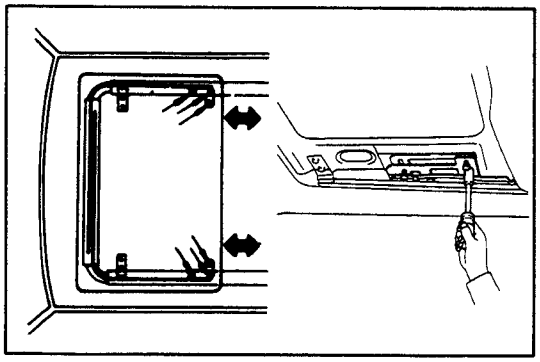


(e) In event sliding roof is tilted:

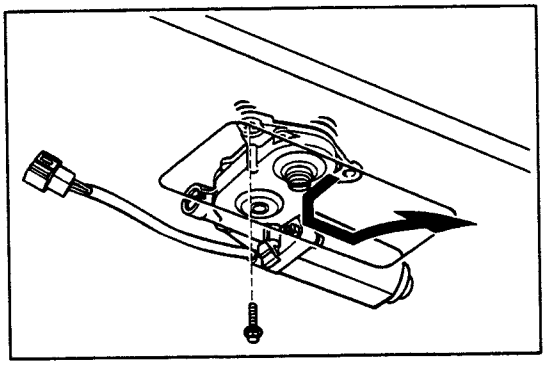
(Difference in left and right front clearance)



- If the difference is about 2 mm (0.08 in.).
  Remove the drive motor and shift the cable one notch on the side with the large clearance.
  Reinstall the motor.



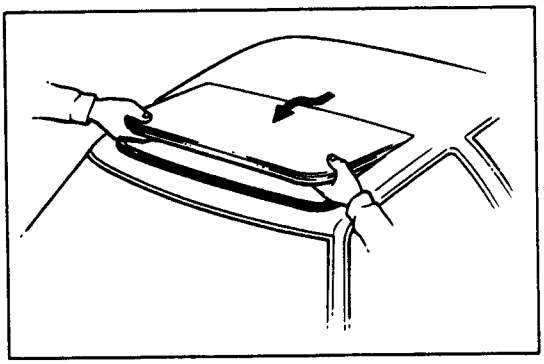
- If the difference is about 1 mm (0.04 in.).
  Loosen the rear shoe bolts and readjust the sliding roof to the proper position.



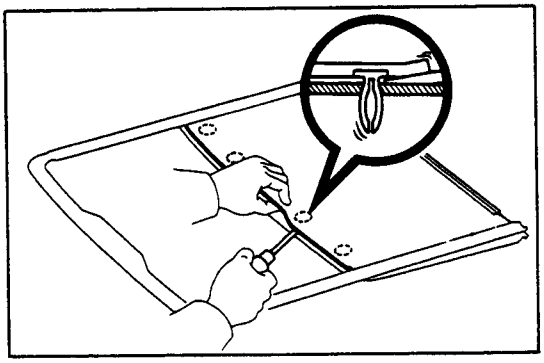
REMOVAL OF SUN ROOF

(See page BO-61)

1. REMOVE CONTROL SWITCH AND COVER
2. REMOVE DRIVE MOTOR THROUGH SERVICE HOLE
3. REMOVE WIND DEFLECTOR



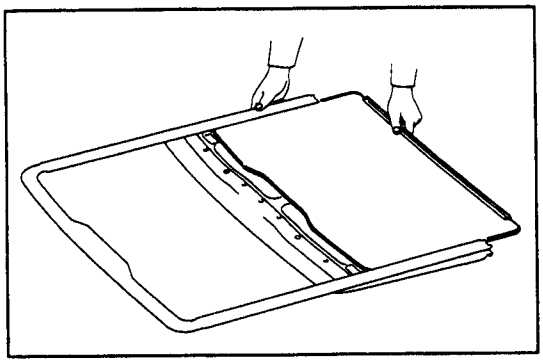
4. REMOVE GUIDE RAIL COVER
5. REMOVE SLIDING ROOF PANEL WITH GUIDE RAIL FROM ROOF
   (a) Apply adhesive tape to protect the body.
   (b) Remove the screws.
   (c) Pull the sliding roof panel with the guide rail upward and forward to remove it.



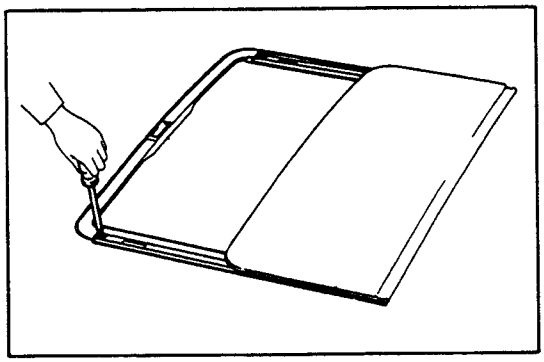
DISASSEMBLY OF SUN ROOF

(See page BO-61)

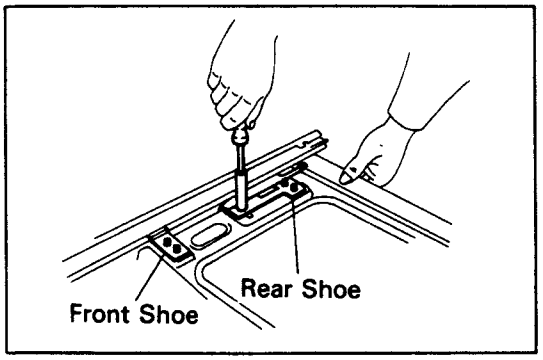
1. REMOVE SLIDING ROOF HEADLINING
   (a) Pry the four clips off the roof panel with a screwdriver.



   (b) Pull the sliding roof headlining rearward to remove it.



2. REMOVE GUIDE RAILS
   (a) Loosen the screws.
   (b) Pull the guide rail rearward to remove it.

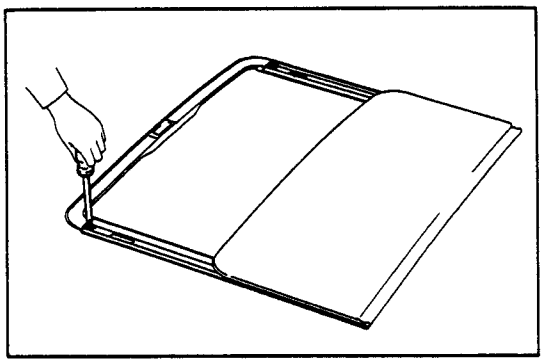


3. NOTE NUMBER OF SHIMS ON FRONT AND REAR SHOES
4. REMOVE FRONT SHOES
5. REMOVE REAR SHOES FROM SLIDING ROOF PANEL
6. REMOVE DRIVE CABLES FROM GUIDE CASING

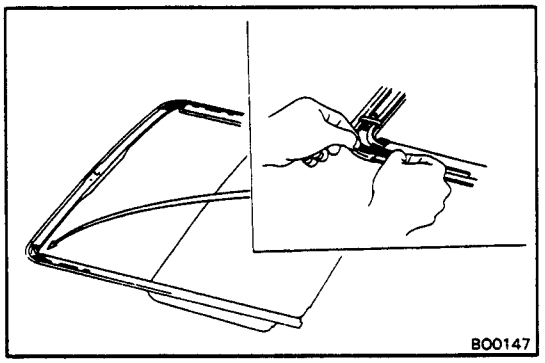
ASSEMBLY OF SUN ROOF

(See page BO-61)

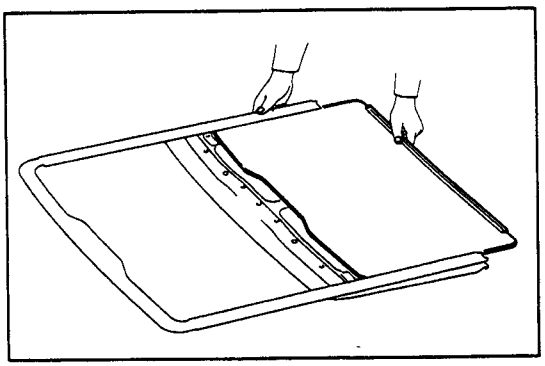
1. APPLY MP GREASE TO DRIVE CABLES
2. PLACE DRIVE CABLES INTO GUIDE CASING
3. INSTALL FRONT AND REAR SHOES ONTO ROOF PANEL



4. INSTALL GUIDE RAILS ON BOTH SIDES
   (a) Install both side guide rails through the rear and front shoes.
   (b) Install the guide rails with the screws.

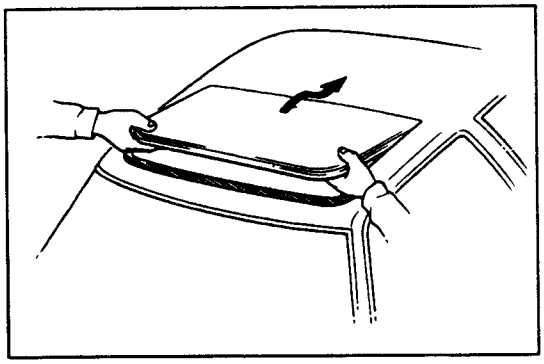


   (c) Use butyl tape to cover the cut portion of the weatherstrip at the connection between the guide case and guide rail.



5. ASSEMBLE SLIDING ROOF HEADLINING
   (a) Run the headlining through the guide rail.
   (b) Do not clip the headlining.

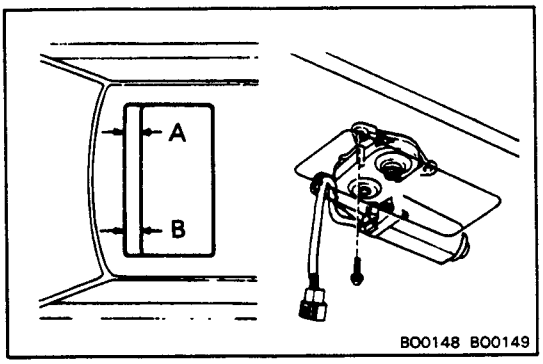
   NOTE: Secure the headlining for adjustment after assembly.

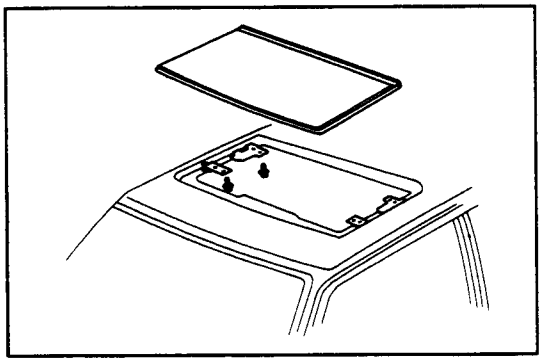


INSTALLATION OF SUN ROOF

(See page BO-61)

1. **INSTALL SLIDING ROOF PANEL WITH GUIDE RAIL ONTO ROOF**
   (a) Place the sliding roof with the guide rail onto the roof.
   (b) Tighten the guide rail and cover with the screws.
2. **INSTALL WIND DEFLECTOR**
3. **INSTALL DRIVE MOTOR**
   (a) Move the sliding roof by hand so the clearance between the left and right of the sliding roof and body are equal.
   (b) Install the drive motor into the roof.
4. **INSTALL CONTROL SWITCH AND COVER**
5. **ADJUST SLIDING ROOF OPERATION**





REMOVAL OF SLIDING ROOF PANEL

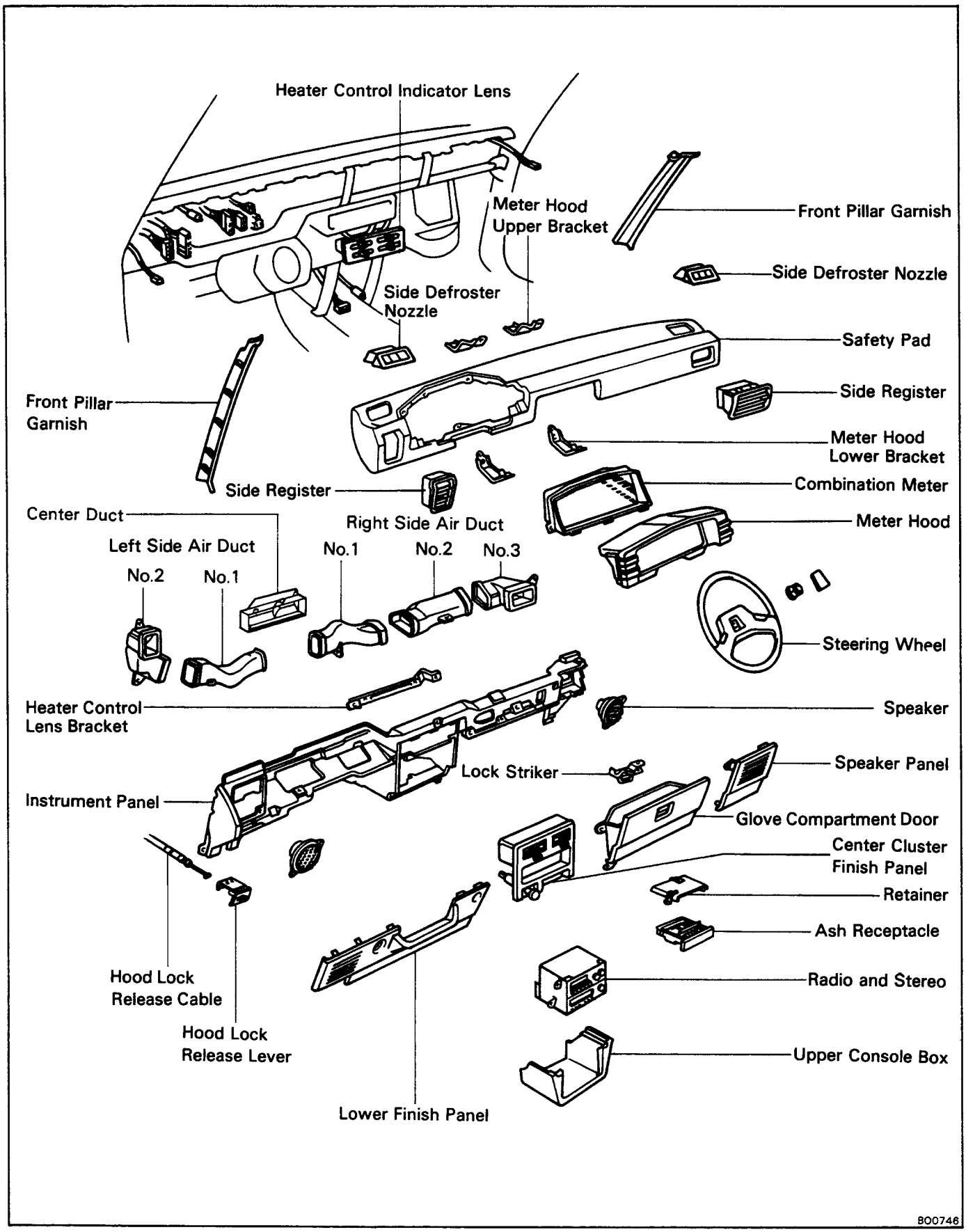
(See page BO-61)

TO REMOVE ONLY SLIDING ROOF PANEL

(a) Pull loose the clips and slide the headlining rearward.
(b) Remove the front and rear shoe mount bolts.
(c) Remove the roof panel.

SAFETY PAD

COMPONENTS

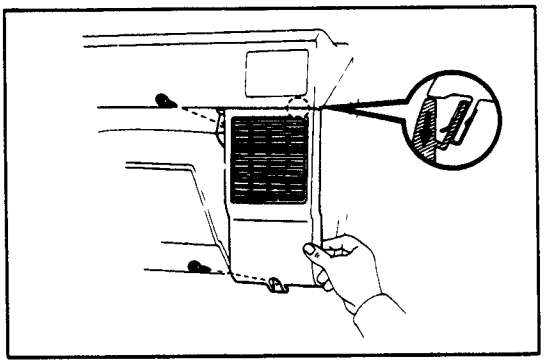


REMOVAL OF SAFETY PAD

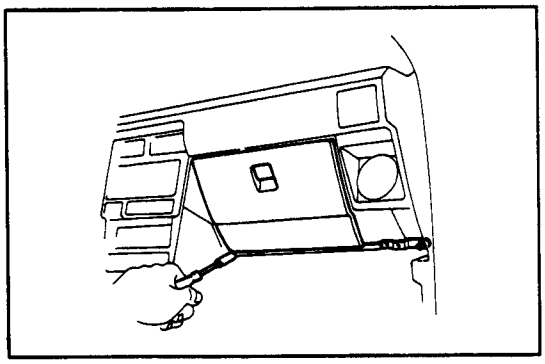
(See page BO-67)

1. **REMOVE STEERING WHEEL**

2. **REMOVE RIGHT AND LEFT FRONT PILLAR GARNISH**
(See step 1 on page BO-39)

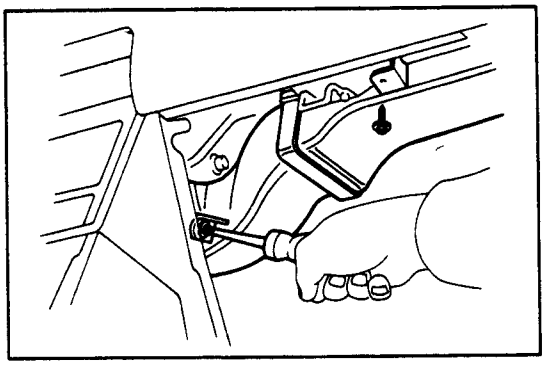


3. **REMOVE SPEAKER PANEL**
   (a) Remove the two screws.
   (b) Pull loose the clip and remove the panel.

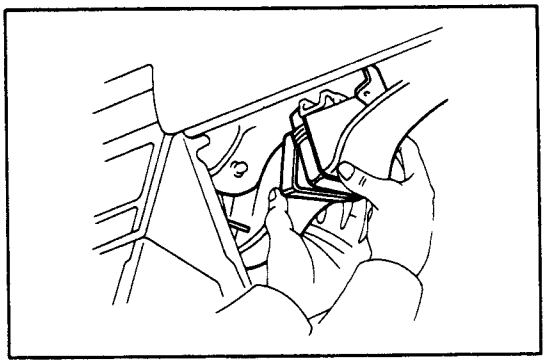


4. **REMOVE GLOVE COMPARTMENT DOOR**
   Remove the two bolts and compartment door with the holder.

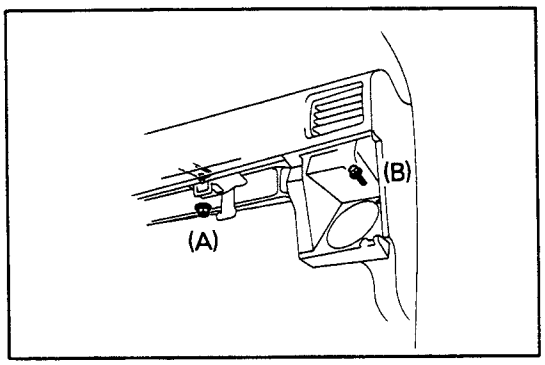
5. **DISCONNECT CONNECTOR FROM RIGHT SPEAKER**



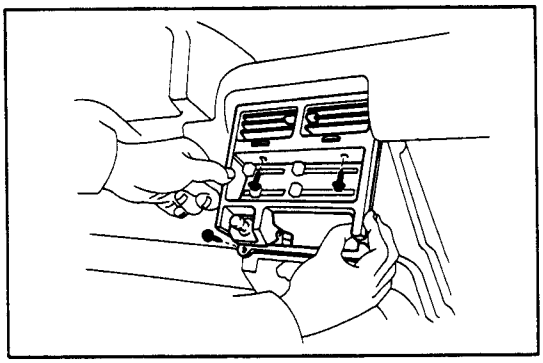
6. **REMOVE NO.1 AND NO.2 RIGHT SIDE AIR DUCTS**
   (a) Disconnect the heater control cable from the heater blower.
   (b) Remove the two screws.



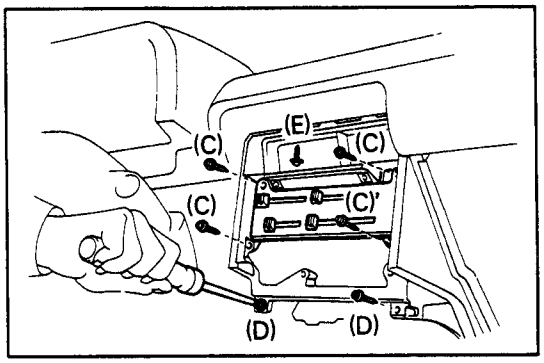
   (c) Remove the No.1 and No.2 ducts.



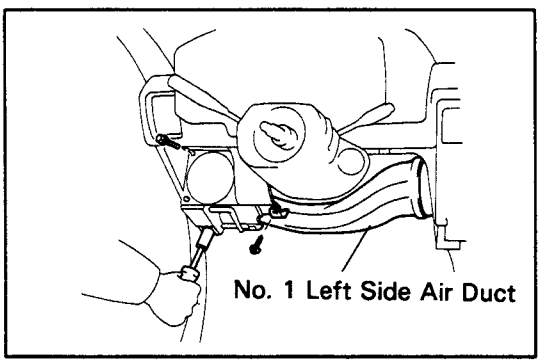
7. REMOVE SAFETY PAD MOUNT NUT (A)
8. REMOVE MOUNT BOLT (B) OF INSTRUMENT PANEL RIGHT SIDE
9. REMOVE UPPER CONSOLE BOX
10. REMOVE RADIO WITH STEREO
11. REMOVE ASH RECEPTACLE AND RETAINER



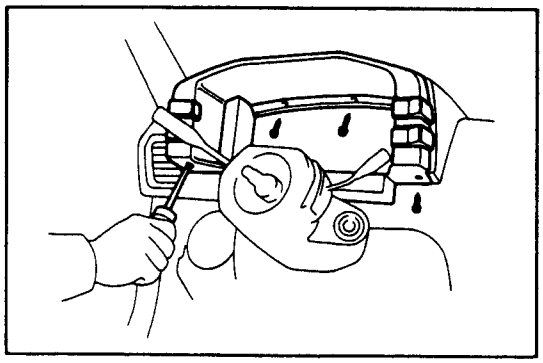
12. REMOVE CENTER CLUSTER FINISH PANEL
    (a) Remove the three panel mount screws.
    (b) Disconnect the connectors from the cigarette lighter and remove the panel.



13. DISCONNECT HEATER CONTROL INDICATOR LENS
    Remove the four screws (c) and disconnect the lens from the instrument panel.
14. (w/o RADIO AND STEREO)
    REMOVE TWO INSTRUMENT PANEL MOUNT SCREWS (D)
15. REMOVE CENTER DUCT MOUNT SCREW (E)
16. REMOVE LOWER FINISH PANEL
17. DISCONNECT CONNECTOR FROM LEFT SPEAKER
18. REMOVE HOOD LOCK RELEASE LEVER
    (a) Remove the two mount screws.
    (b) Disconnect the lever from the cable and remove it.



19. REMOVE NO. 1 LEFT SIDE AIR DUCT
    Remove the screw and duct.
20. REMOVE TWO MOUNTING BOLTS OF INSTRUMENT PANEL LEFT SIDE



21. REMOVE METER HOOD

(a) Remove the four mount screws.

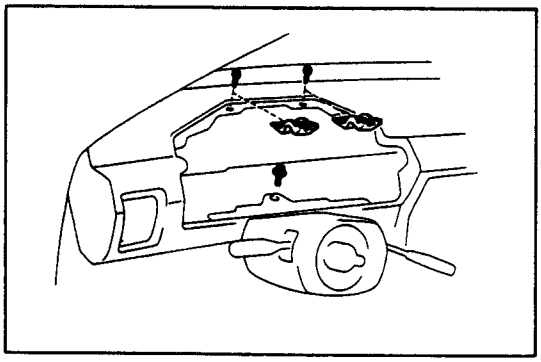
(b) Disconnect the connectors and remove the hood.

22. REMOVE COMBINATION METER

(a) Remove the four mount screws.

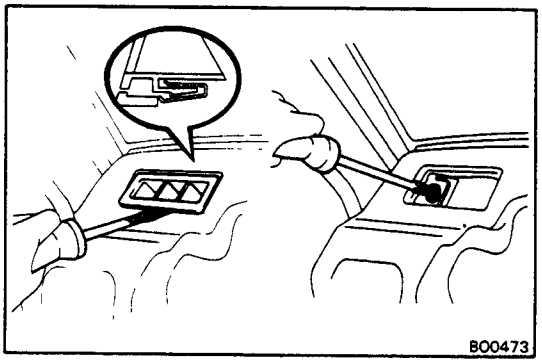
(b) Disconnect the speedometer cable.

(c) Disconnect the connectors and remove the meter.



23. REMOVE METER HOOD UPPER BRACKETS

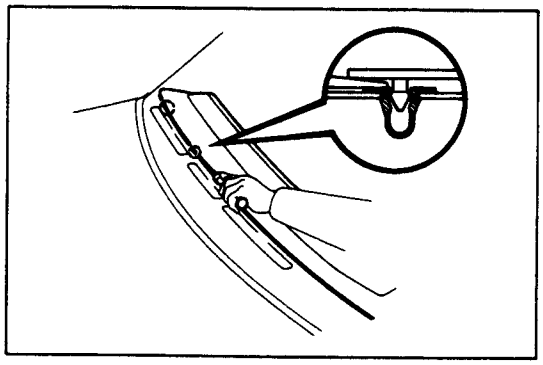
24. REMOVE SAFETY PAD MOUNT BOLT



25. REMOVE RIGHT AND LEFT SIDE DEFROSTER NOZZLES AND TWO SAFETY PAD MOUNT SCREWS

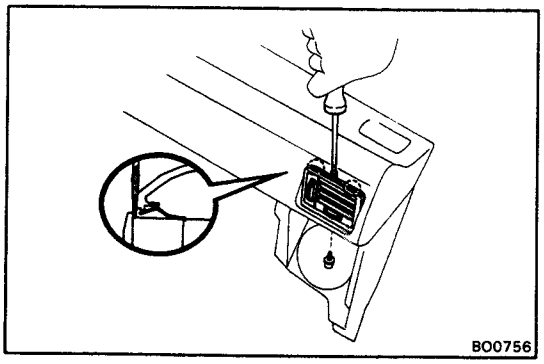
(a) Pry loose the clips with a screwdriver and remove the nozzles.

(b) Remove the two mount screws.



26. REMOVE SAFETY PAD AND INSTRUMENT PANEL ASSEMBLY

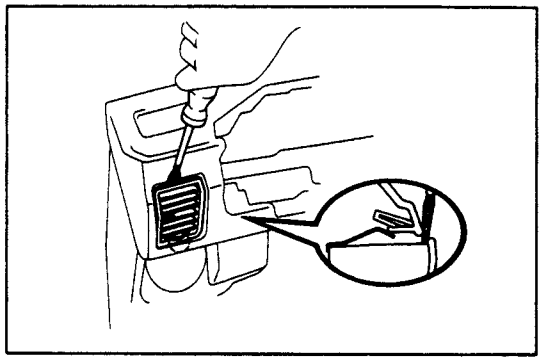
Pry loose the two clips with a screwdriver and remove the safety pad with the instrument panel.



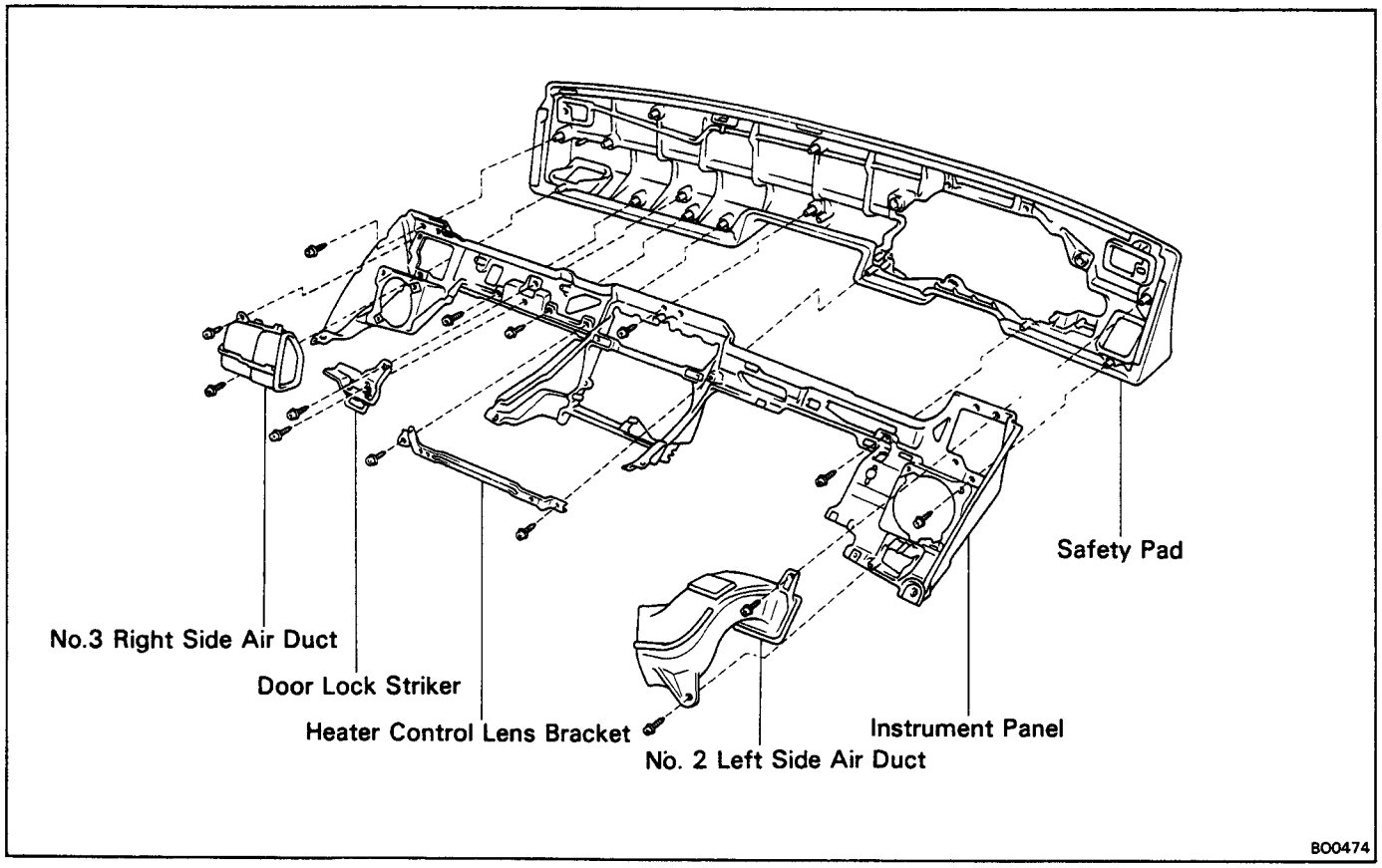
27. REMOVE RIGHT SIDE REGISTOR

(a) Remove the screw.

(b) Pry loose the two clips with a screwdriver and remove the registor.



28. **REMOVE LEFT SIDE REGISTOR**
    (a) Remove the mount screw.
    (b) Pry loose the clip with a screwdriver and remove the registor.
29. **REMOVE RIGHT AND LEFT SPEAKERS**
30. **REMOVE METER HOOD LOWER BRACKETS**
31. **REMOVE CLINOMETER**
32. **REMOVE RHOSTAT**
33. **(3A-C ENGINE)**
    REMOVE EMISSION CONTROL COMPUTER
34. **REMOVE FOLLOWING PARTS FROM SAFETY PAD:**
    (a) Glove compartment door lock striker
    (b) Heater control lens bracket
    (c) No.3 right side air duct
    (d) No.2 left side air duct
    (e) Instrument panel



INSTALLATION OF SAFETY PAD

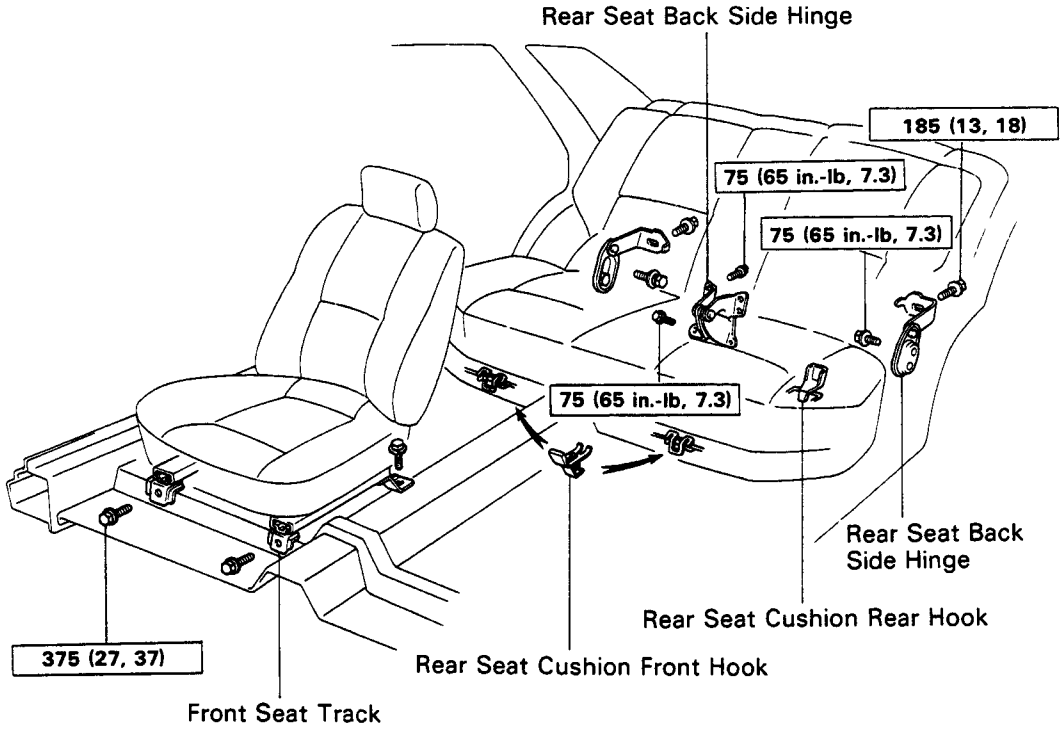
(See page BO-67)

INSTALL PARTS OF SAFETY PAD IN REVERSE SEQUENCE OF REMOVAL

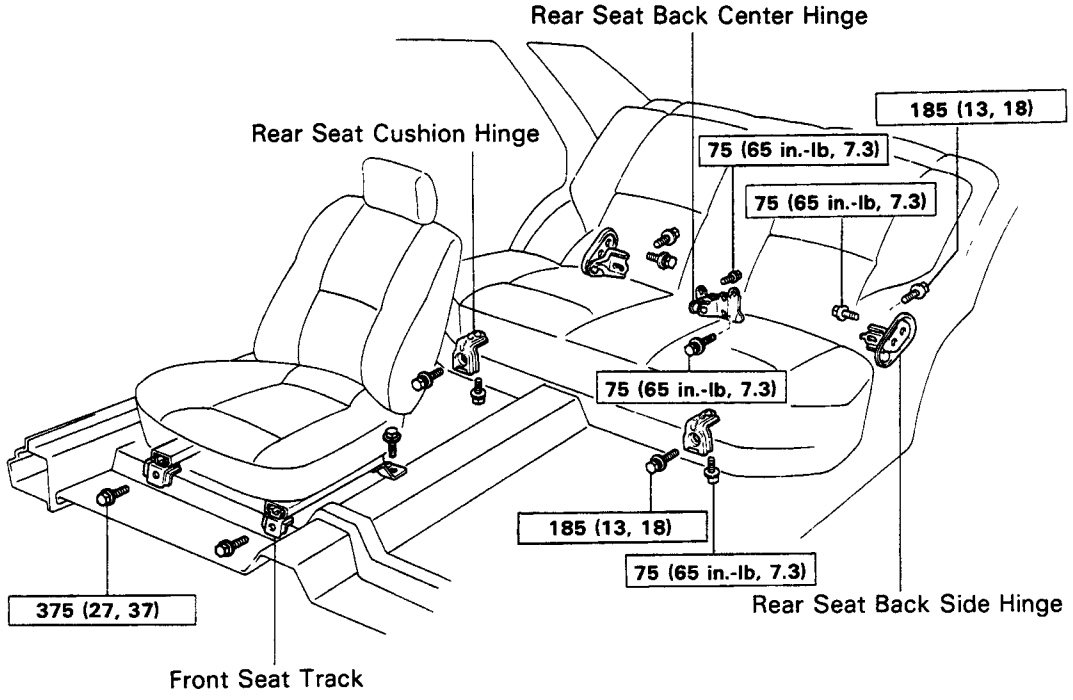
SEAT

COMPONENTS

Sedan (Standard Type) and Wagon 4WD

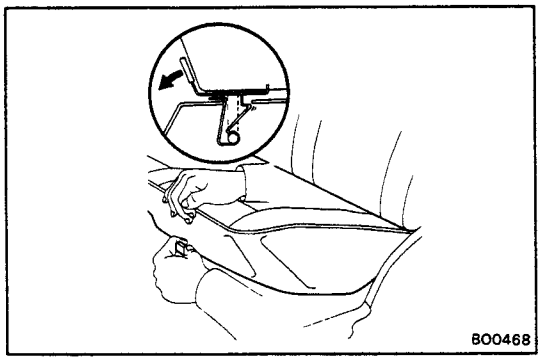


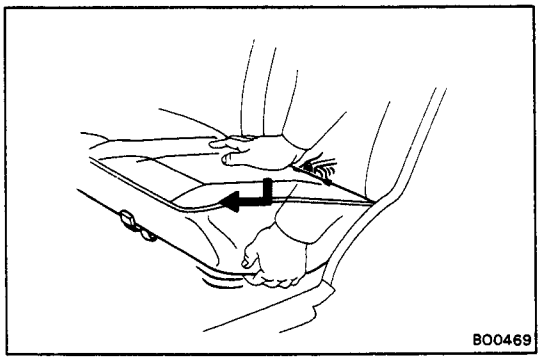
Sedan (ex. Standard Type) and Wagon FWD



kg-cm (ft-lb, N·m) : Tightening torque

B00466
B00467





REMOVAL OF REAR SEAT CUSHION [Sedan (Standard Type) and Wagon 4WD]

REMOVE REAR SEAT CUSHION

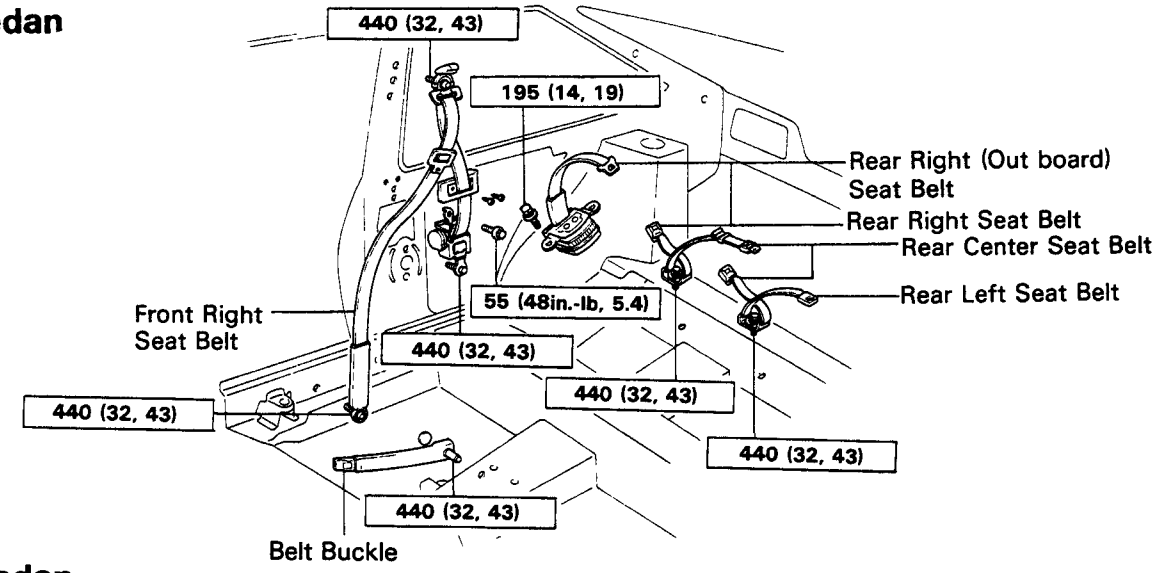
(a) Pull the front hook lever forward and pull the front side of the seat cushion upward. Disconnect the two front hooks from the body.

(b) Push down the rear side of the seat cushion and move it forward. Disconnect the two rear hooks from the seat cushion and remove the seat cushion.

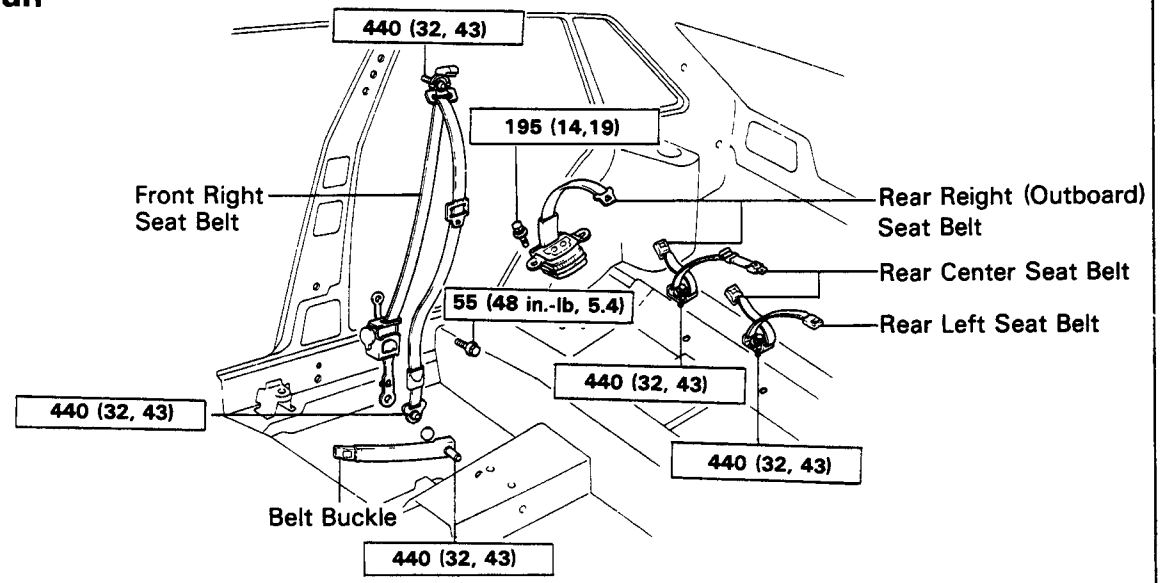
SEAT BELT

COMPONENTS

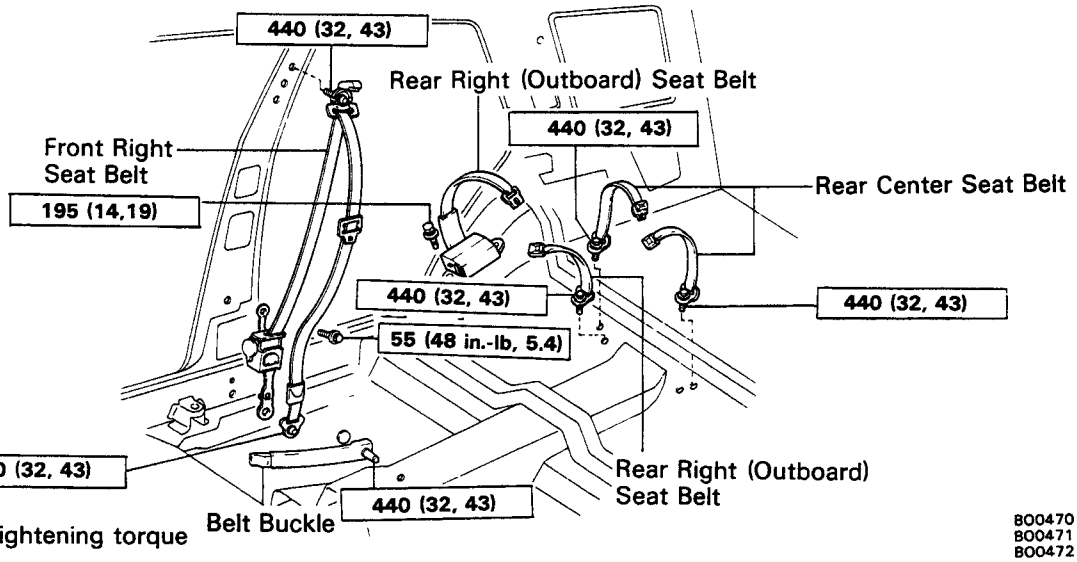
3-Door Sedan



5-Door Sedan

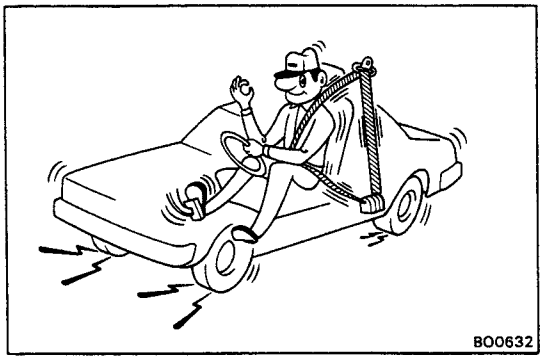


Wagon



kg-cm (ft-lb, N·m) : Tightening torque

B00470
B00471
B00472



FRONT SEAT BELT (Emergenecy Locking Retractor (ELR) Type)

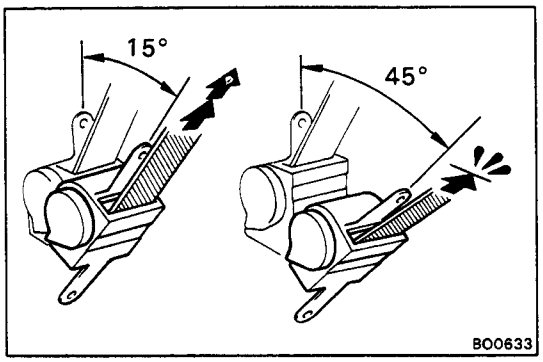
1. RUNNING TEST (IN SAFE AREA)

(a) Fasten the front seat belt.

(b) Drive the car at 10 mph (16 km/h) and make a very hard stop.

(c) Check that the belt is locked and cannot be extended at this time.

NOTE: Conduct this test in a safe area. If the belt does not lock, remove the belt mechanism assembly and conduct the following static check. Also, whenever installing a new belt assembly, verify the proper operation before installation.



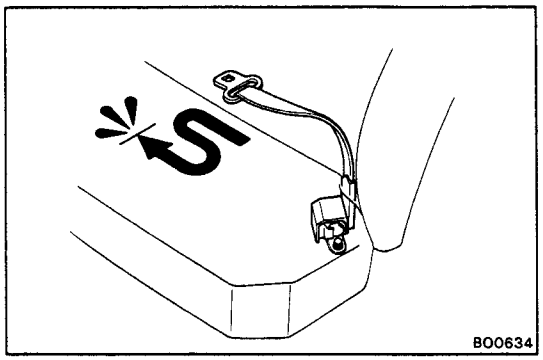
2. STATIC TEST

(a) Remove the locking retractor assembly.

(b) Tilt the retractor slowly.

(c) Verify that the belt can be pulled out at a tilt of 15 degress or less, and cannot be pulled out at over 45 degrees of tilt.

If a problem is found, replace the assemlby.



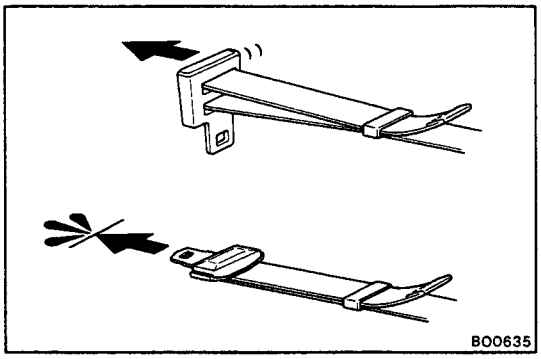
REAR OUTBOARD SEAT BELT (Automatic Locking Retractor (ALR) Type)

TESTING

(a) Pull out the belt, release it slightly and then pull it out again.

(b) Verify that the belt cannot be extended further.

If a problem is found, replace the assembly.



REAR CENTER SEAT BELT (Manual Type)

TESTING

(a) Adjust the belt to the proper length.

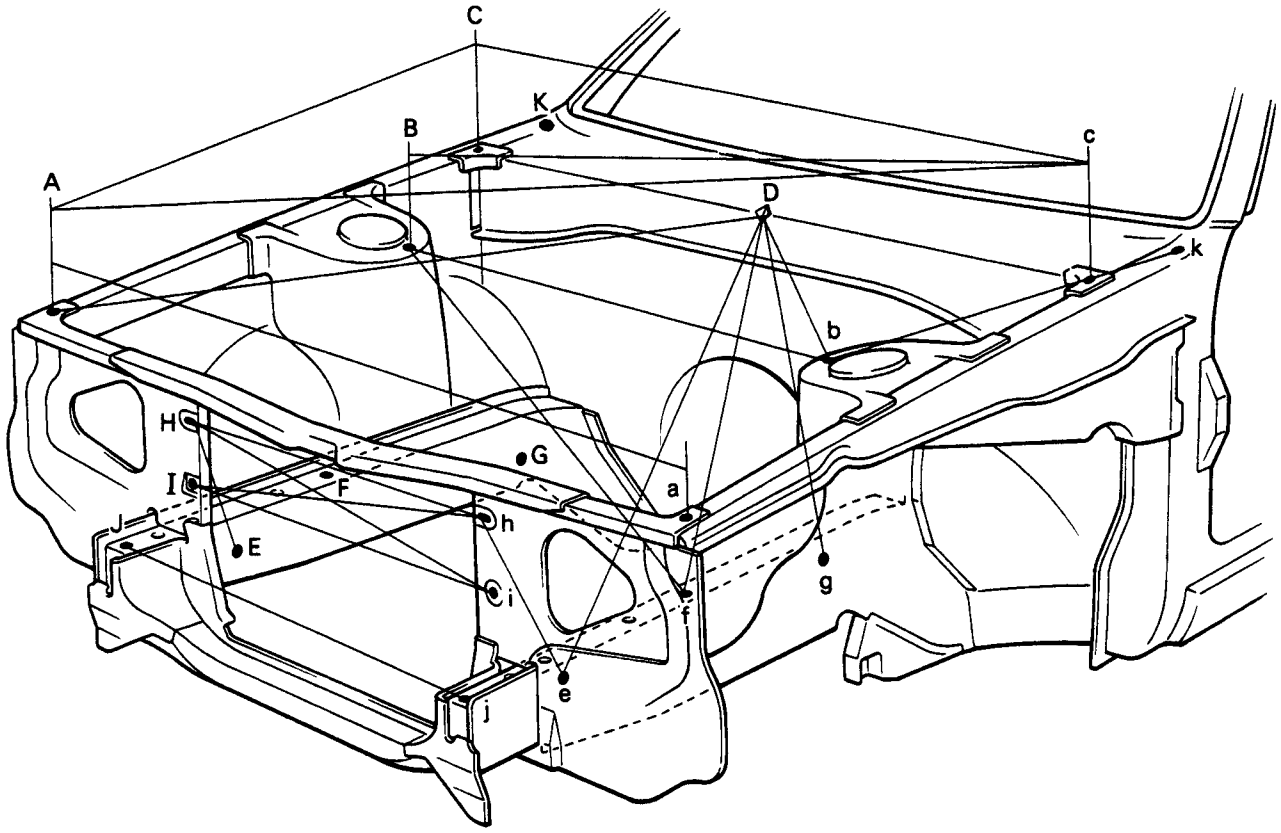
(b) Apply a firm load to the belt.

(c) Verity that the belt does not extend.

BODY DIMENSIONS

Symbol	Nomenclature		Hole dia. (mm)
A, a	Front fender front installation nut		6 ϕ
B, b	Front spring support inner hole		9.5 ϕ
C, c	Front fender rear installation nut		6 ϕ
D	Cowl top panel center mark		—
E, e	Front side member front standard hole		15 ϕ
F, f	Suspension member rear side upper installation hole		17 ϕ
G, g	Front side member rear standard hole		17 ϕ
H	Headlamp upper side right installation hole		7 x 13.5
h	Headlamp upper side left installation hole		7 x 13.5
I	Fan shroud installation nut		6 ϕ
i	Radiator support lower hole		8 ϕ
J, j	Front side member bumper front installation nut		RH 13 x 15 LH 11 ϕ
K, k	Cowl top side panel standard hole		9 ϕ
L, l	Front crossmember hole		15 ϕ
M, m	Suspension member front side lower installation hole		13 ϕ
N, n	Suspension member rear side lower installation hole		13 ϕ
O, o	Lower arm installation hole		12.5 ϕ
P, p	Lower arm bracket hole		15 ϕ
Q, q	Front side member extension front standard hole		15 ϕ
R, r	Front floor reinforcement rear standard hole		15 ϕ
S, s	2WD	Strut bar inner installation hole	12 ϕ
	4WD	Lower control link bracket inner hole	
T, t	Rear floor side member front standard hole		2WD 15 ϕ 4WD 13 ϕ
U, u	2WD	Rear floor crossmember standard hole	15 ϕ
	4WD	Upper control link bracket inner hole	12.5 ϕ
V, v	Rear floor side member rear standard hole		2WD 15 ϕ 4WD 13 ϕ
W	Back door opening frame location		2R
X	2WD	Rear floor pan bumper front installation hole	40 ϕ
	4WD	Rear floor pan right side location	2.5 R
x	2WD	Rear floor pan bumper front installation hole	4.0 ϕ
	4WD	Rear floor pan left side location	2.5R

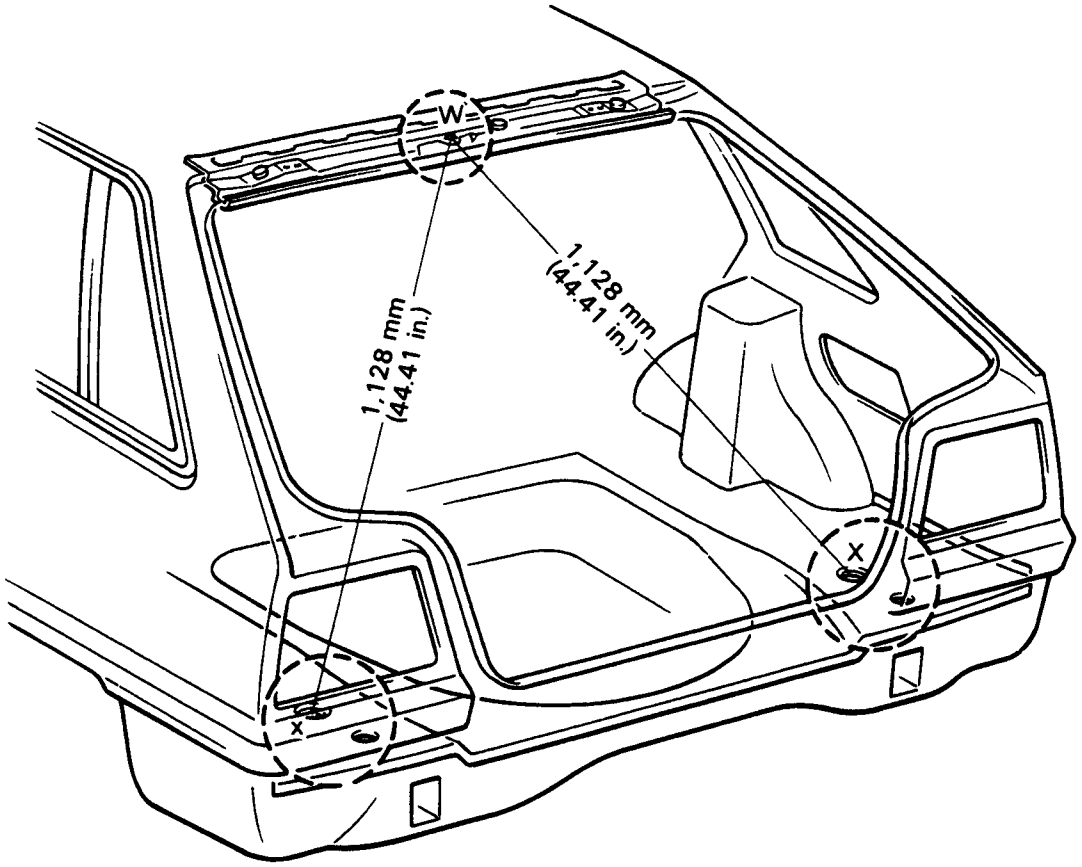
ENGINE COMPARTMENT

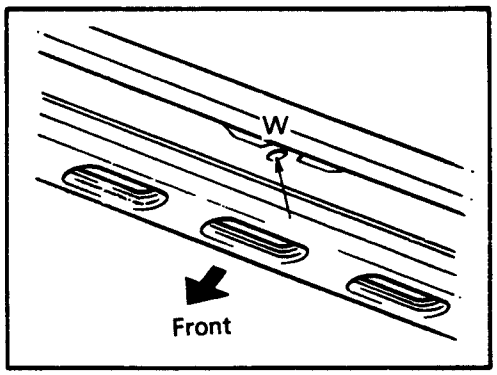


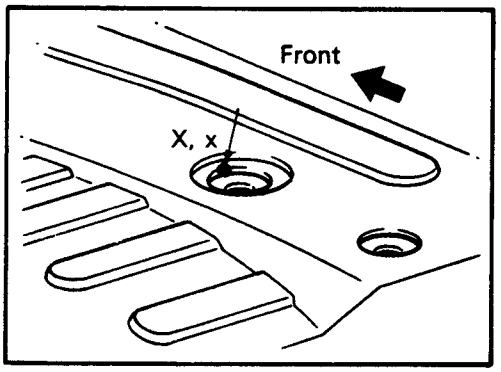
mm (in.)

A — a	A — C	A — c	A — D	B — b	B — c	B — f	b — c	b — D	C — c	c — k
1,278 (50.31)	709 (27.91)	1,464 (57.64)	938 (36.93)	895 (35.24)	1,110 (43.70)	956 (37.64)	289 (11.38)	489 (19.25)	1,283 (50.51)	199 (7.83)
D — e	D — f	D — g	E — H	e — h	H — h	H — i	h — I	I — i	J — j	
884 (34.80)	720 (28.35)	639 (25.16)	274 (10.79)	260 (10.24)	828 (32.60)	857 (33.74)	838 (32.99)	844 (33.23)	934 (36.77)	

LUGGAGE COMPARTMENT (Sedan)

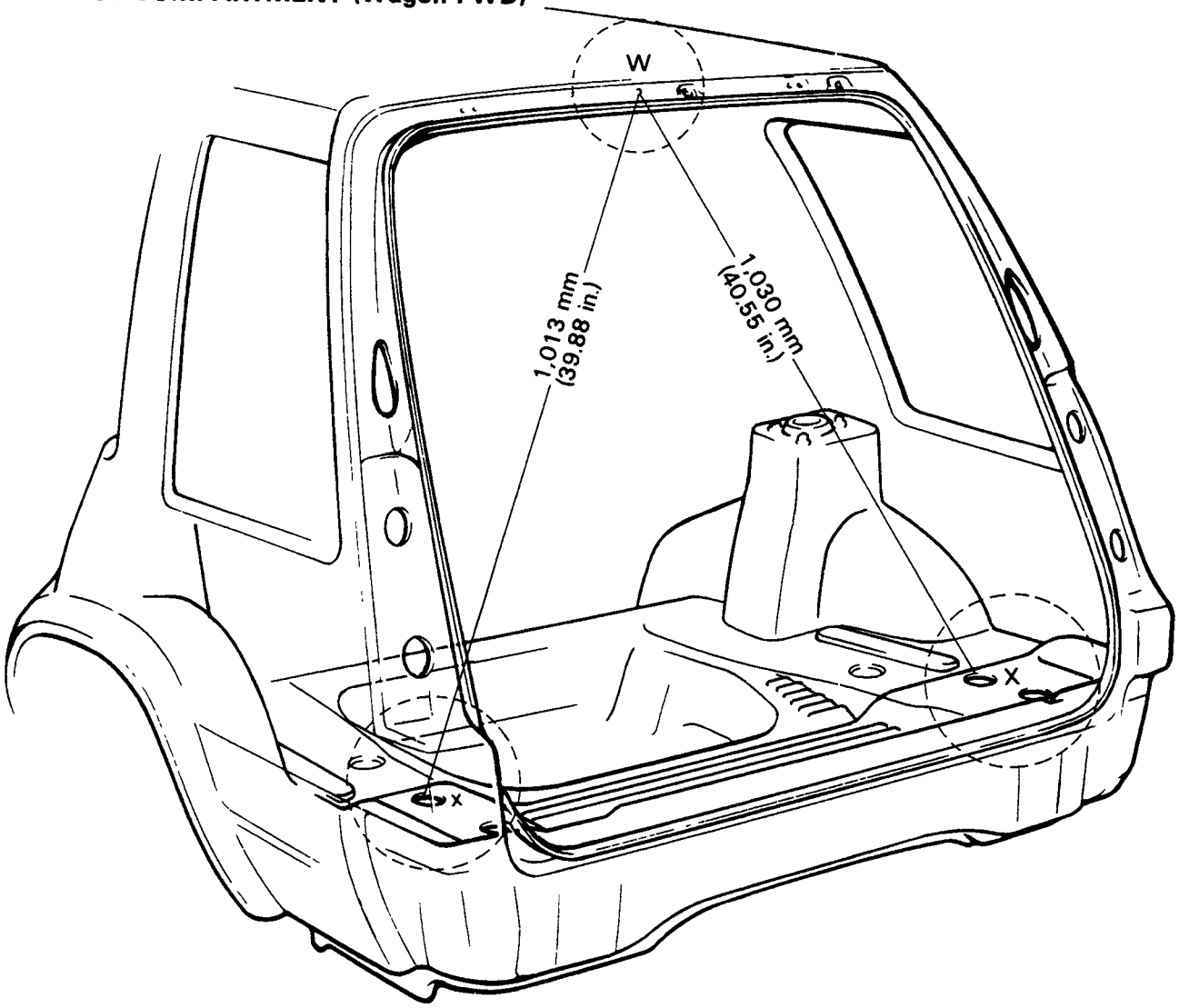


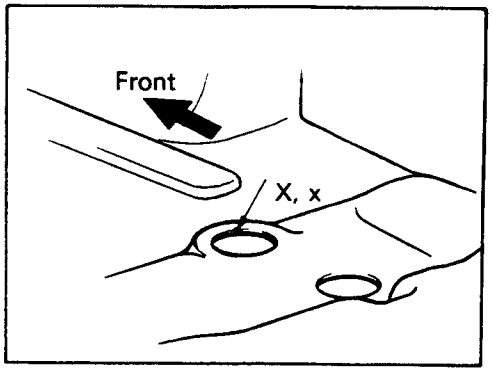


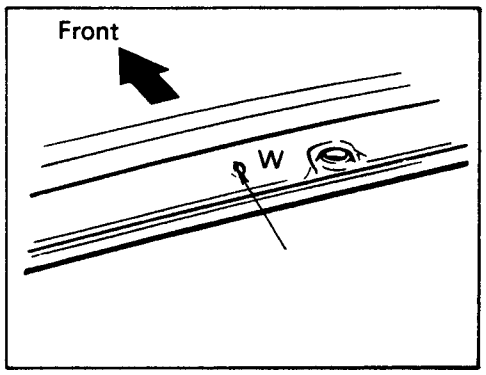


NOTE: The luggage compartment measurement is performed between the two dot-marked points as shown in the figure above.

LUGGAGE COMPARTMENT (Wagon FWD)



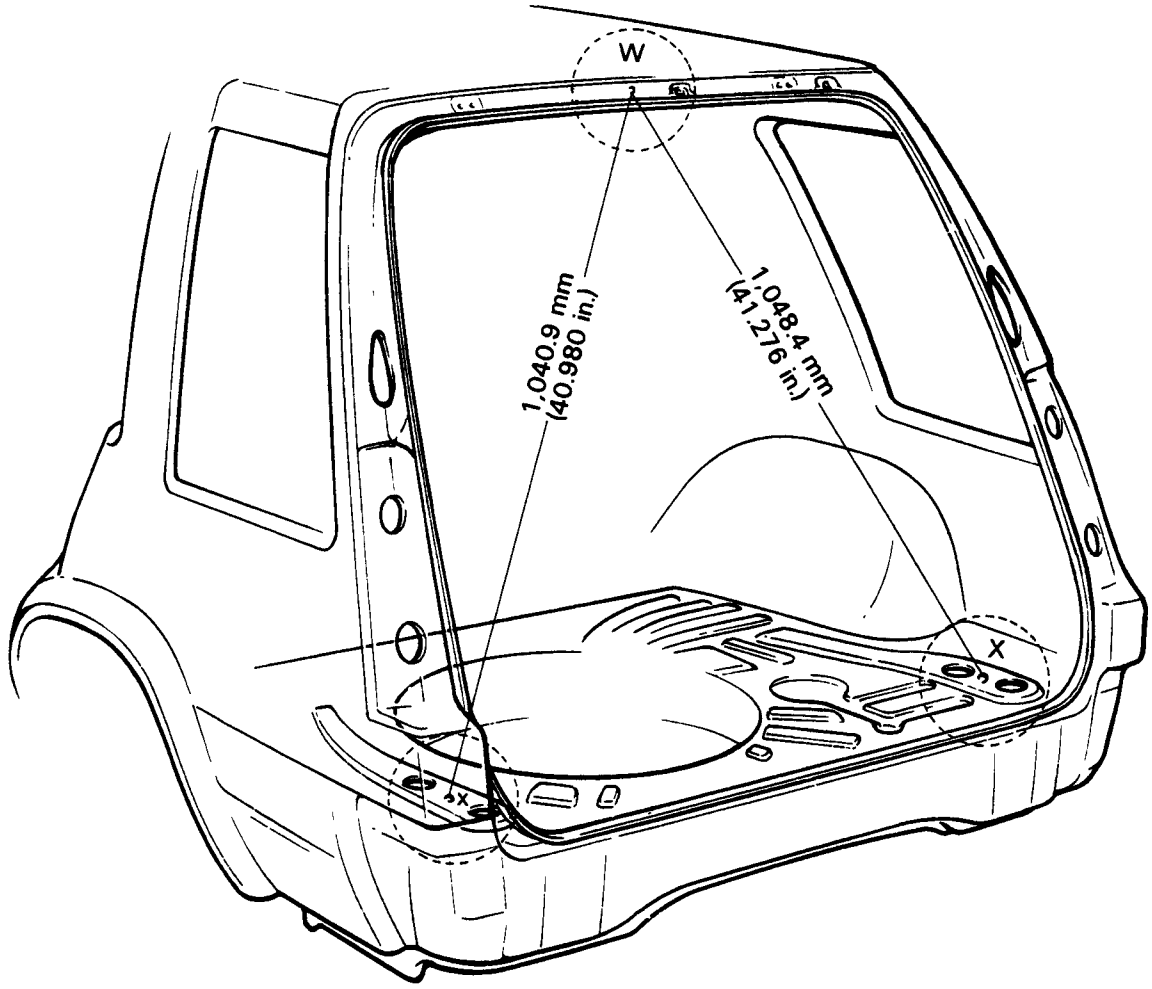


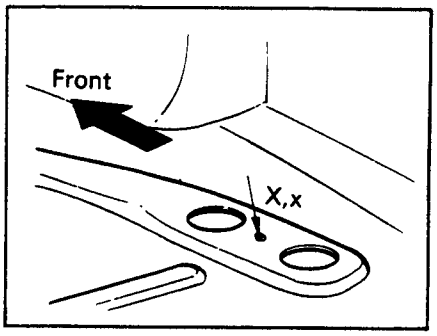


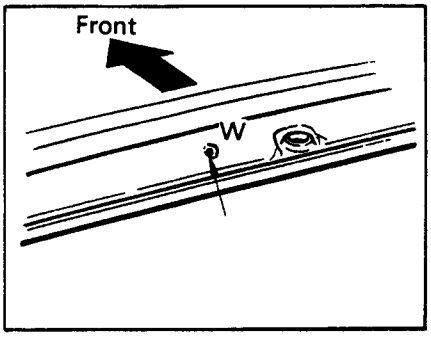
NOTE: The luggage compartment measurement is performed between the two dot-marked points as shown in the figure above.

B00056

LUGGAGE COMPARTMENT (Wagon 4WD)

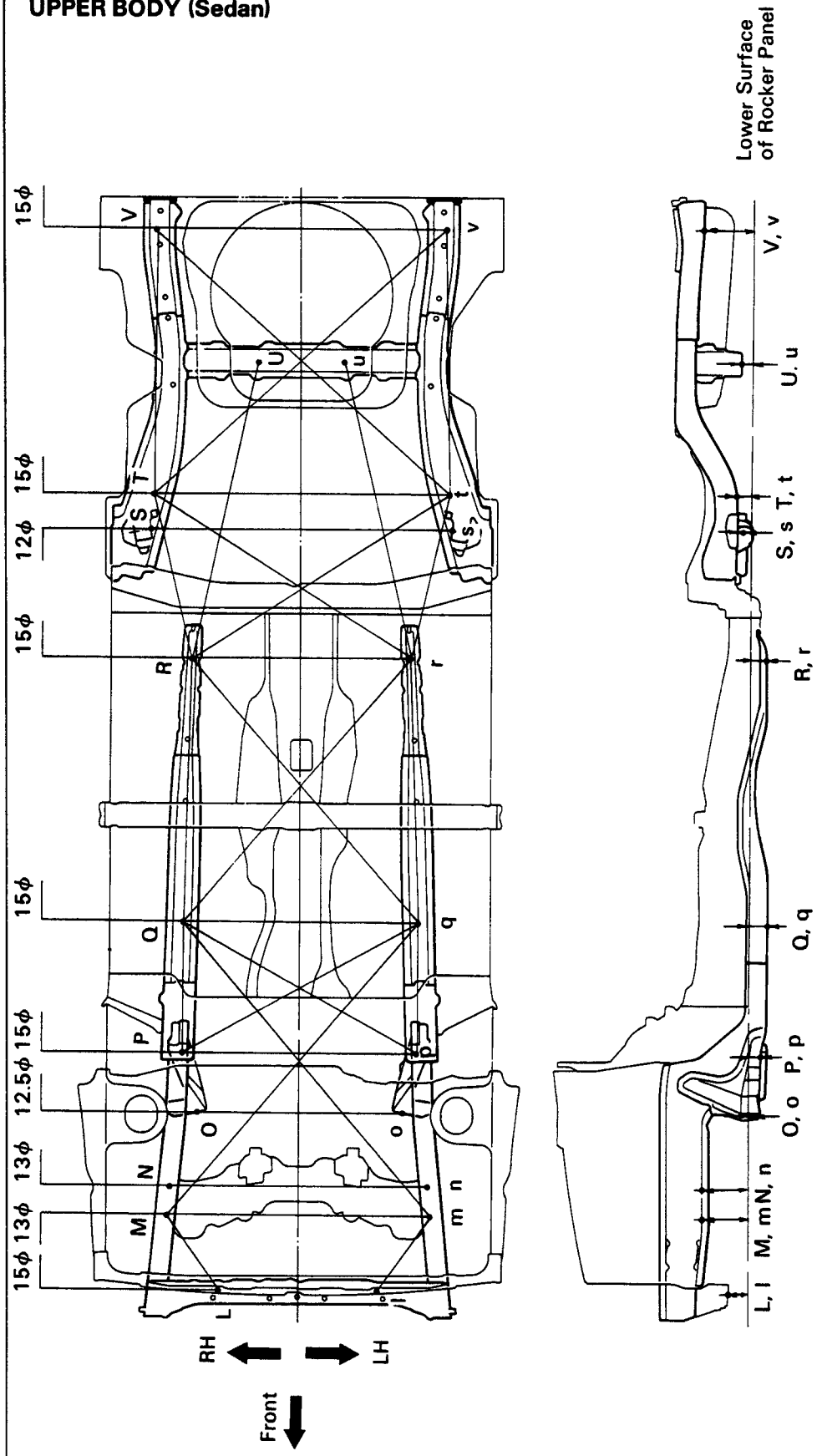






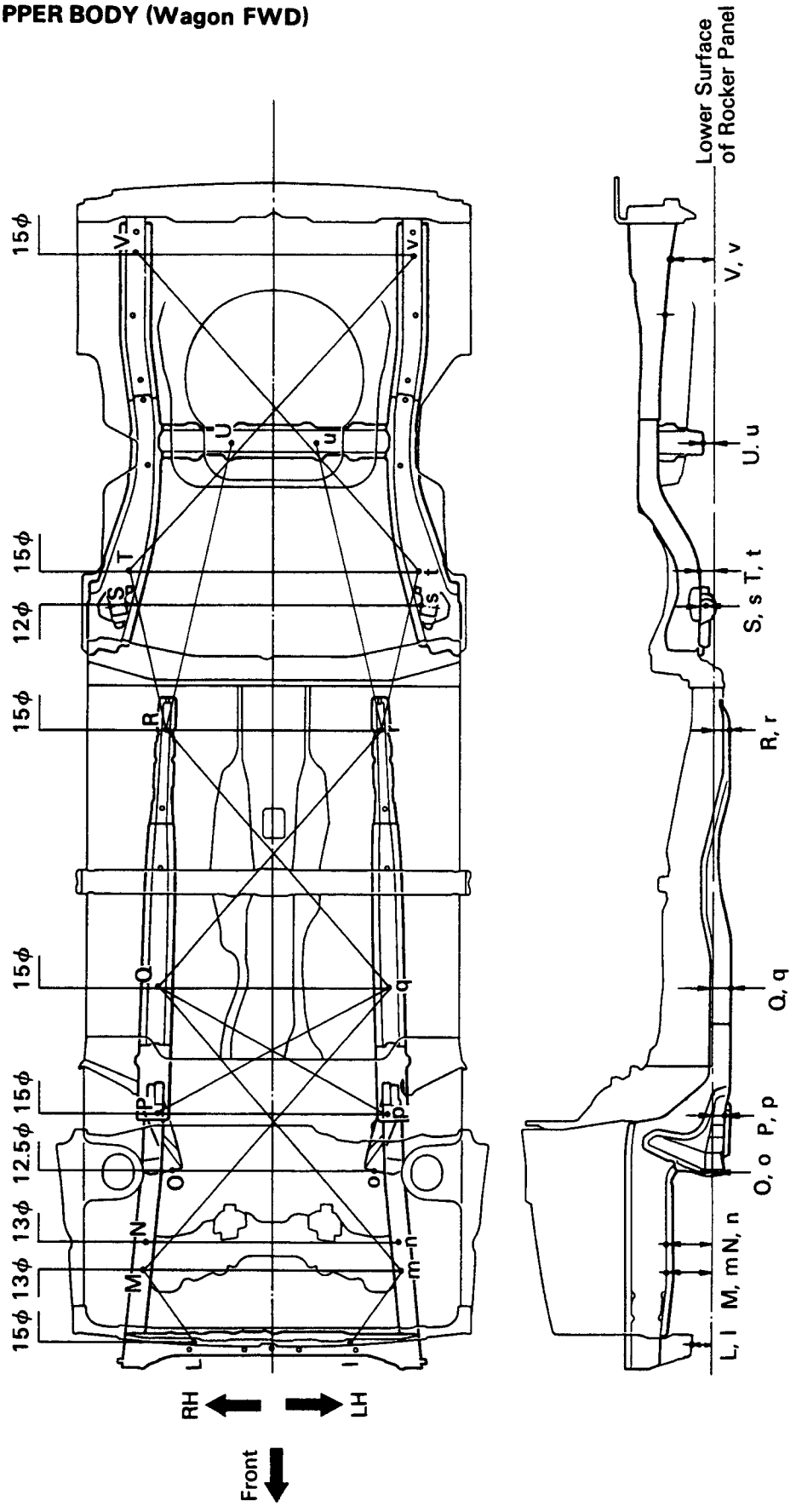
NOTE: The luggage compartment measurement is performed between the two dot-marked points as shown in the figure above.

UPPER BODY (Sedan)



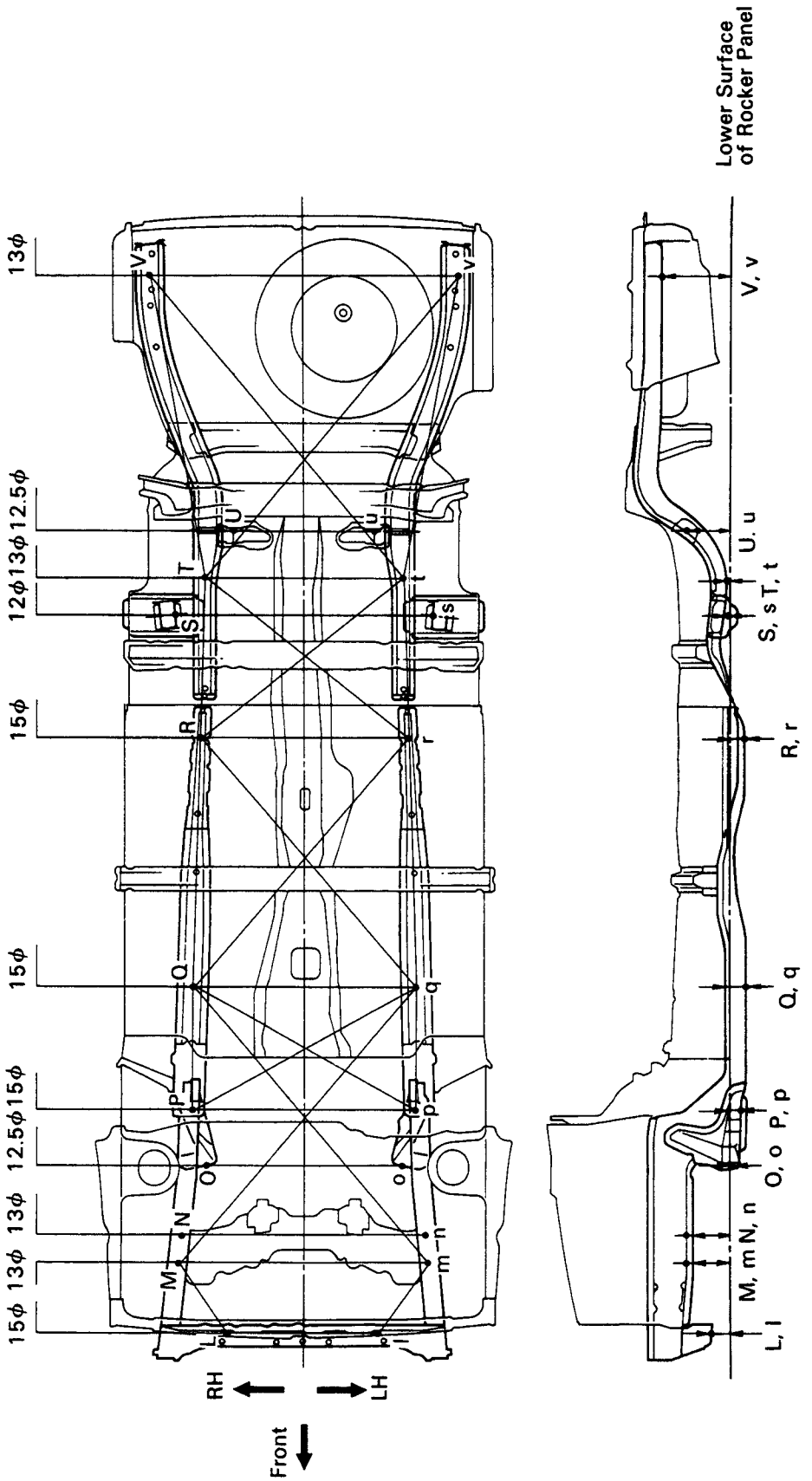
Point symbol	Reference length mm (in.)
L — M l — m	313 (12.32)
M — m	853 (33.58)
M — q m — Q	1,270 (50.00)
N — n	835 (32.87)
O — o	675 (26.57)
P — p	760 (29.92)
P — Q p — q	425 (16.73)
P — q p — Q	873 (34.37)
Q — q	764 (30.08)
Q — R q — r	870 (34.25)
Q — r q — R	1,141 (44.92)
R — r	714 (28.11)
R — T r — t	563 (22.17)
R — t r — T	1,002 (39.45)
R — U r — u	998 (39.29)
S — s	974 (38.35)
T — t	964 (37.95)
T — V t — v	873 (34.37)
T — v t — V	1,292 (50.87)
V — v	940 (37.01)
L, l	67 (2.64)
M, m	153 (6.02)
N, n	153 (6.02)
O, o	8 (0.31)
P, p	35 (1.38)
Q, q	55 (2.17)
R, r	49 (1.93)
S, s	30 (1.18)
T, t	49 (1.93)
U, u	39 (1.54)
V, v	167 (6.57)

UPPER BODY (Wagon FWD)



Point symbol	Reference length mm (in.)
L — M l — m	313 (12.32)
M — m	853 (33.58)
M — q m — Q	1,270 (50.00)
N — n	835 (32.87)
O — o	675 (26.57)
P — p	760 (29.92)
P — Q p — q	425 (16.73)
P — q p — Q	873 (34.37)
Q — q	764 (30.08)
Q — R q — r	870 (34.25)
Q — r q — R	1,141 (44.92)
R — r	714 (28.11)
R — T r — t	563 (22.17)
R — t r — T	1,002 (39.45)
R — U r — u	998 (39.29)
S — s	974 (38.35)
T — t	964 (37.95)
T — V t — v	1,096 (43.15)
T — v t — V	1,445 (56.89)
V — v	920 (36.22)
L, l	67 (2.64)
M, m	153 (6.02)
N, n	153 (6.02)
O, o	8 (0.31)
P, p	35 (1.38)
Q, q	55 (2.17)
R, r	49 (1.93)
S, s	30 (1.18)
T, t	49 (1.93)
U, u	39 (1.54)
V, v	163 (6.42)

UPPER BODY (Wagon 4WD)



Point symbol	Reference length mm (in.)
L — M l — m	313 (12.32)
M — m	853 (33.58)
M — q m — Q	1,270 (50.00)
N — n	835 (32.87)
O — o	675 (26.57)
P — p	760 (29.92)
P — Q p — q	425 (16.73)
P — q p — Q	873 (34.37)
Q — q	764 (30.08)
Q — R q — r	870 (34.25)
Q — r q — R	1,141 (44.92)
R — r	714 (28.11)
R — T r — t	583 (22.95)
R — t r — T	912 (35.91)
S — s	892 (35.12)
T — t	690 (27.17)
T — V t — v	1,082 (42.60)
T — v t — V	1,379 (54.29)
V — v	1,060 (41.73)
L, l	67 (2.64)
M, m	153 (6.02)
N, n	153 (6.02)
O, o	8 (0.31)
P, p	35 (1.38)
Q, q	55 (2.17)
R, r	49 (1.93)
S, s	5 (0.20)
T, t	11 (0.43)
V, v	244 (9.61)

AIR CONDITIONING SYSTEM

	Page
PRECAUTIONS	AC-2
TROUBLESHOOTING	AC-2
Checking of Refrigeration System with Manifold Gauge	AC-4
SPECIAL TOOLS AND EQUIPMENT	AC-8
AIR CONDITIONING SYSTEM CIRCUIT	AC-9
ON-VEHICLE INSPECTION	AC-10
REFRIGERATION SYSTEM	AC-11
Checking of Refrigerant Charge	AC-11
Installation of Manifold Gauge Set	AC-11
Discharging of Refrigeration System	AC-12
Evacuating and Charging of Refrigeration System	AC-12
Performance Test	AC-15
SYSTEM COMPONENTS	AC-17
COMPRESSOR	AC-18
CONDENSER	AC-31
RECEIVER	AC-32
COOLING UNIT	AC-32
REFRIGERANT LINES	AC-36
A/C SWITCH	AC-36
CONDENSER FAN MOTOR	AC-37
FAN RELAY	AC-37
THERMISTOR	AC-38
PRESSURE SWITCH	AC-38
AIR CONDITIONER AMPLIFIER	AC-39
VACUUM SWITCHING VALVE (VSV)	AC-40

PRECAUTIONS

1. **When handling refrigerant (R-12), the following precautions should be observed:**
   (a) Always wear eye protection.
   (b) Keep the refrigerant container (service drum) below 40°C (104°F).
   (c) Do not handle refrigerant in an enclosed area where there is an open flame.
   (d) Discharge refrigerant slowly when purging the system.
   (e) Be careful that liquid refrigerant does not get on your skin.

2. **If liquid refrigerant gets in the eyes or on the skin:**
   (a) Do not rub.
   (b) Wash the area with a lot of cool water.
   (c) Apply clean petroleum jelly to the skin.
   (d) Rush to a physician or hospital for immediate professional treatment.
   (e) Do not attempt to treat yourself.

3. **When tubing:**
   (a) Apply a few drops of compressor oil to the seats of the O-ring fittings.
   (b) Tighten the nut using two wrenches to avoid twisting the tube.
   (c) Tighten the O-ring fitting to the specified torque.

Tightening torque for O-ring fittings

Fitting size	Torque
3/8 in. Tube	135 kg-cm (10 ft-lb, 13 N·m)
1/2 in. Tube	225 kg-cm (16 ft-lb, 22 N·m)
5/8 in. Tube	325 kg-cm (24 ft-lb, 32 N·m)

TROUBLESHOOTING

Problem	Possible cause	Remedy	Page
No cooling or warm air	Magnetic clutch does not engage		
	(a) A/C fuse blown	Replace fuse and check for short	AC-9
	(b) Magnetic clutch faulty	Check magnetic clutch	AC-18
	(c) A/C switch faulty	Check switch	AC-36
	(d) Thermistor faulty	Check thermistor	AC-38
	(e) Air conditioner amplifier faulty	Check amplifier	AC-39
	(f) Wiring or ground faulty	Repair as necessary	AC-9
	(g) Refrigerant empty	Check refrigerant pressure	AC-4
	(h) Heater relay faulty	Check heater relay	AC-9
	(i) Circuit breaker faulty	Check circuit breaker	AC-9
	(j) Pressure switch faulty	Check pressure switch	AC-38
	Compressor does not rotate properly		
	(a) Drive belt loose or broken	Adjust or replace drive belt	AC-30
	(b) Compressor faulty	Check compressor	AC-22
	Expansion valve faulty	Check expansion valve	AC-34
	Leak in system	Leak test system	AC-13
	Fusible plug on receiver blown or clogged screen	Check receiver	AC-11

TROUBLESHOOTING (Cont'd)

Problem	Possible cause	Remedy	Page
No cooling or warm air (Cont'd)	Blower does not operate		
	(a) A/C and GAUGE fuses blown	Replace fuses and check for short	AC-9
	(b) A/C switch faulty	Check A/C switch	AC-36
	(c) Circuit breaker faulty	Check circuit breaker	AC-9
	(d) Main relay faulty	Check main relay	AC-9
	(e) Heater relay faulty	Check heater relay	AC-9
	(f) Blower motor faulty	Check blower motor	BE-31
	(g) Wiring faulty	Repair as necessary	AC-9
Cool air comes out intermittently	Magnetic clutch slipping	Check magnetic clutch	AC-18
	Expansion valve faulty	Check expansion valve	AC-34
	Wiring connection faulty	Repair as necessary	AC-9
	Excessive moisture in the system	Evacuate and charge system	AC-4
Cool air comes out only at high speed	Condenser clogged	Check condenser	AC-31
	Drive belt slipping	Adjust or replace drive belt	AC-30
	Compressor faulty	Check compressor	AC-22
	Insufficient or too much refrigerant	Check refrigerant charge	AC-5
	Air in system	Evacuate and charge system	AC-7
Insufficient cooling	Condenser clogged	Check condenser	AC-31
	Drive belt slipping	Check or replace drive belt	AC-30
	Magnetic clutch faulty	Check magnetic clutch	AC-18
	Compressor faulty	Check compressor	AC-18
	Expansion valve faulty	Check expansion valve	AC-34
	Thermistor faulty	Check thermistor	AC-38
	Air conditioner amplifier faulty	Check amplifier	AC-39
	Insufficient or too much refrigerant	Check refrigerant charge	AC-6
	Air or excessive compressor oil in system	Evacuate and charge system	AC-7
	Receiver clogged	Check receiver	AC-32
Insufficient velocity of cool air	Evaporator clogged or frosted	Clean evaporator fins or filters	AC-34
	Air leakage from cooling unit or air duct	Repair as necessary	AC-32
	Air inlet blocked	Repair as necessary	
	Blower motor faulty	Replace blower motor	

Checking of Refrigeration System with Manifold Gauge

This is a method in which the trouble is located by using a manifold gauge.

Read the manifold gauge pressure with the following established conditions:

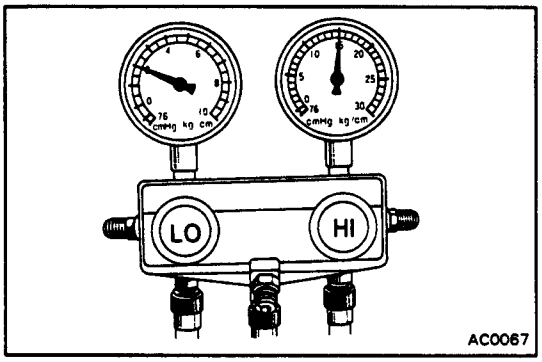
(a) Temperature at the air inlet 30 – 35 °C (86 – 95 °F)

(b) Engine running at 2,000 rpm

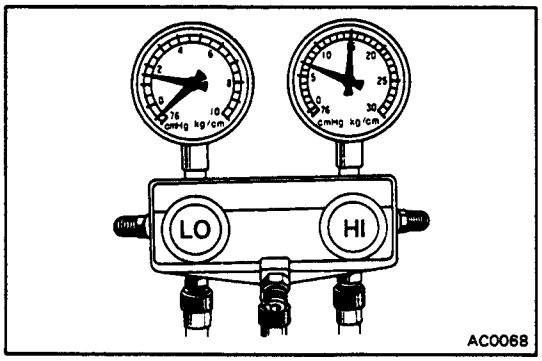
(c) Blower speed set at high

(d) Temperature control lever set at cool

NOTE: It should be noted that the gauge indications may vary slightly due to ambient temperature conditions.



AC0067



AC0068

1. NORMALLY FUNCTIONING REFRIGERATION SYSTEM

Gauge reading:

Low pressure side

1.5 – 2.0 kg/cm² (21 – 28 psi, 147 – 196 kPa)

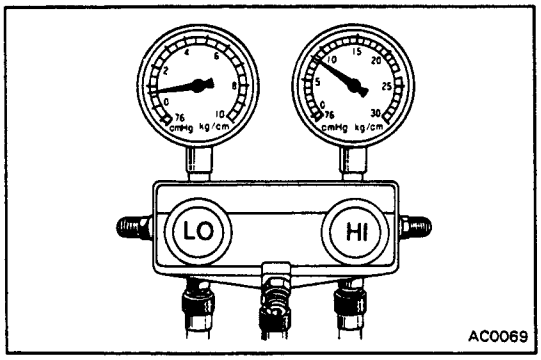
High pressure side

14.5 – 15.0 kg/cm² (206 – 213 psi, 1,422 – 1,471 kPa)

2. MOISTURE PRESENT IN REFRIGERATION SYSTEM

Condition: Periodically cools and then fails to cool

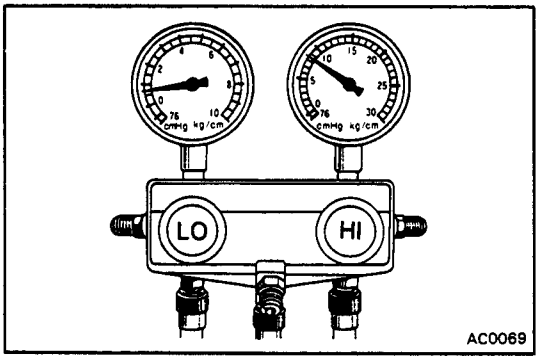
Symptom seen in refrigeration system	Probable cause	Diagnosis	Remedy
During operation, pressure at low pressure side sometimes becomes a vacuum and sometimes normal	Moisture entered in refrigeration system freezes at expansion valve orifice and temporarily stops cycle, but normal state is restored after a time when the ice melts	Drier in oversaturated state ↓ Moisture in refrigeration system freezes at expansion valve orifice and blocks circulation of refrigerant	(1) Replace receiver and drier (2) Remove moisture in cycle through repeated vacuum purging (3) Charge refrigerant to proper amount



3. INSUFFICIENT REFRIGERANT

Condition: Insufficient cooling

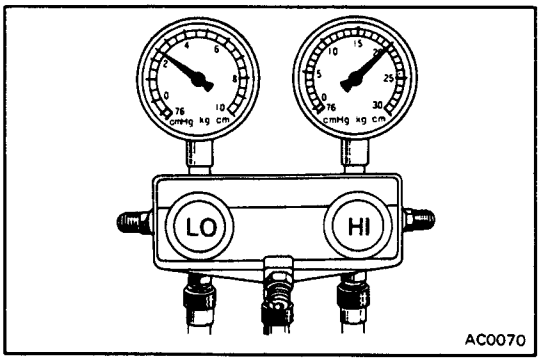
Symptom seen in refrigeration system	Probable cause	Diagnosis	Remedy
Pressure low at both low and high pressure sides Bubbles seen in sight glass Insufficient cooling performance	Gas leakage at some place in refrigeration system	Insufficient refrigerant in system ↓ Refrigerant leaking	(1) Check with leak tester and repair (2) Charge refrigerant to proper amount



4. POOR CIRCULATION OF REFRIGERANT

Condition: Insufficient cooling

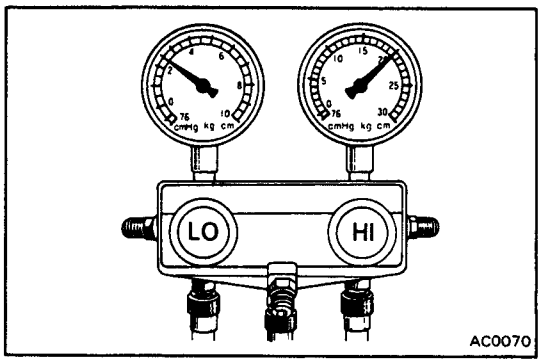
Symptom seen in refrigeration system	Probable cause	Diagnosis	Remedy
Pressure low at both low and high pressure sides Frost on tubes from receiver to unit	Refrigerant flow obstructed by dirt in receiver	Receiver clogged	Replace receiver



5. REFRIGERANT OVERCHARGE OR INSUFFICIENT COOLING OF CONDENSER

Condition: Does not cool sufficiently

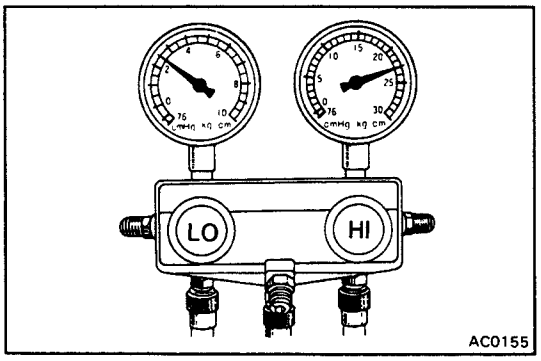
Symptom seen in refrigeration system	Probable cause	Diagnosis	Remedy
Pressures too high at both low and high pressure sides	Unable to develop sufficient performance due to excessive refrigerant in system	Excessive refrigerant in cycle → refrigerant overcharged	(1) Clean condenser (2) Check fan motor operation
	Condenser cooling insufficient	Condenser cooling insufficient → condenser fins clogged or fan motor faulty	(3) If (1) and (2) are in normal state, check amount of refrigerant ***Note:*** Vent out refrigerant through gauge manifold low pressure side by gradually opening valve.



6. EXPANSION VALVE IMPROPERLY MOUNTED/HEAT SENSING TUBE DEFECTIVE (OPENS TOO WIDE)

Condition: Insufficient cooling

Symptom seen in refrigeration system	Probable cause	Diagnosis	Remedy
Pressures too high at both low and high pressure sides	Trouble in expansion valve or heat sensing tube not installed correctly	Excessive refrigerant in low pressure piping ↓	(1) Check heat sensing tube installed condition
Frost or large amount of dew on piping at low pressure side	Refrigerant flow out of adjustment	Expansion valve opened too wide	(2) If (1) is normal, test expansion valve in unit Replace if defective

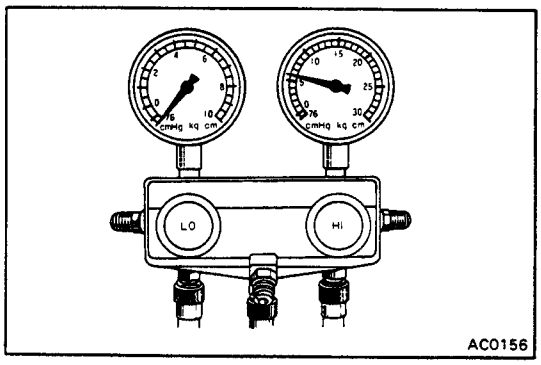


7. AIR PRESENT IN REFRIGERATION SYSTEM

Condition: Does not cool sufficiently

NOTE: These gauge indications are shown when the refrigeration system has been opened and the refrigerant charged without vacuum purging.

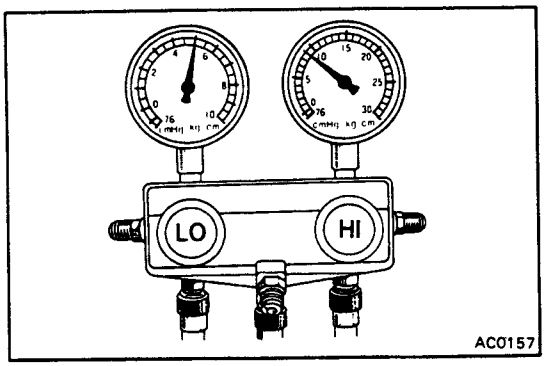
Symptom seen in refrigeration system	Probable cause	Diagnosis	Remedy
Pressures too high at both low and high pressure sides	Air entered refrigeration system	Air present in refrigeration system ↓ Insufficient vacuum purging	(1) Replace receiver and drier (2) Check compressor oil to see if dirty or insufficient (3) Vacuum purge and charge new refrigerant



8. REFRIGERANT DOES NOT CIRCULATE

Condition: Does not cool (Cools from time to time in some cases)

Symptom seen in refrigeration system	Probable cause	Diagnosis	Remedy
Vacuum indicated at low pressure side and very low pressure indicated at high pressure side Frost or dew seen on piping before and after receiver and drier or expansion valve	Refrigerant flow obstructed by moisture or dirt in refrigerant freezing or adhering to expansion valve orifice Refrigerant flow obstructed by gas leakage from expansion valve heat sensing tube	Expansion valve orifice clogged ↓ Refrigerant does not flow	Allow to stand for sometime and then restart operation to determine if trouble is caused by moisture or dirt. If caused by moisture refer to step 2 on page AC-4. If caused by dirt, remove expansion valve and clean off dirt by blowing with air. If unable to remove dirt, replace valve. Vacuum purge and charge new refrigerant to proper amount. For gas leakage from heat sensing tube, replace expansion valve.



9. INSUFFICIENT COMPRESSION

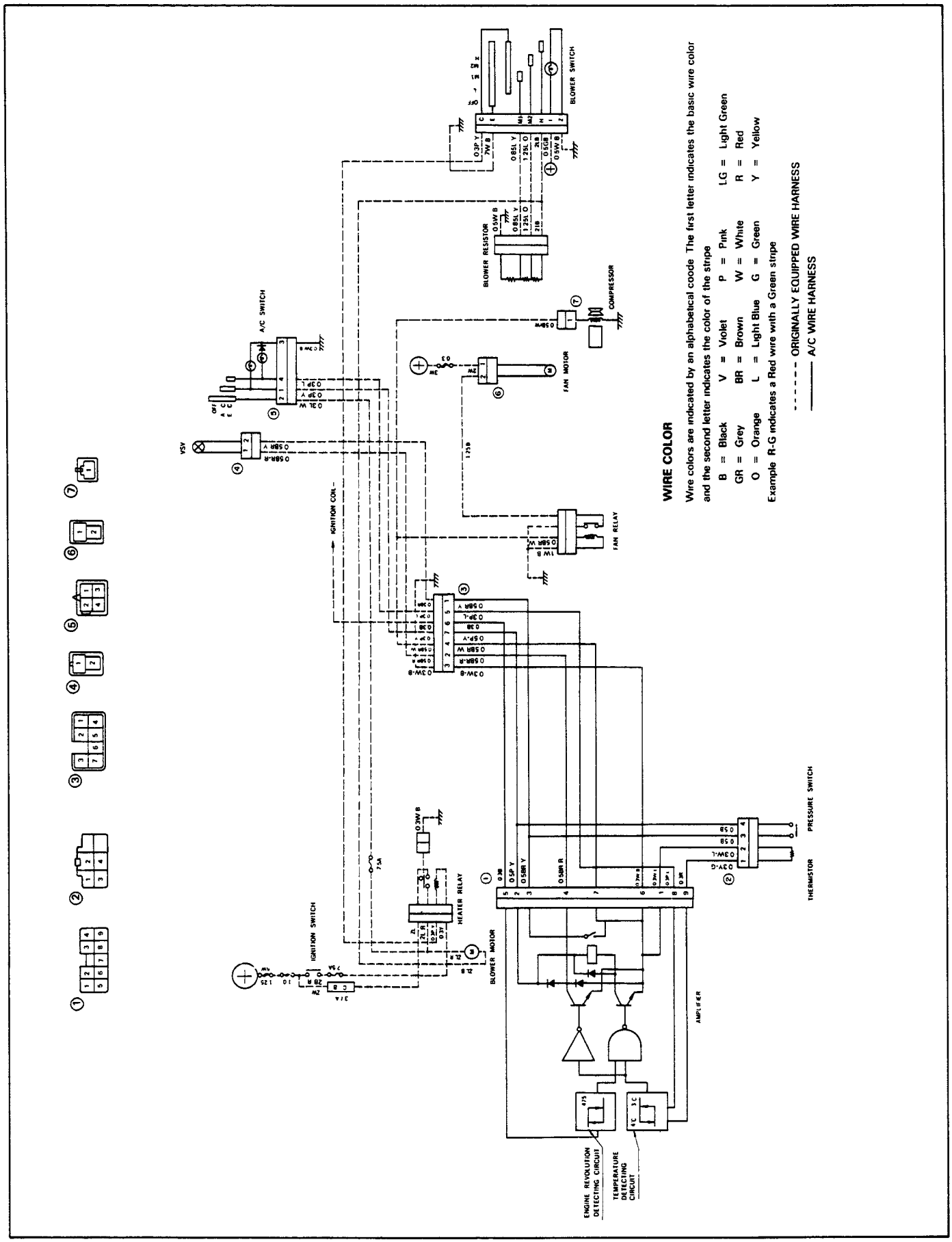
Condition: Does not cool

Symptom seen in refrigeration system	Probable cause	Diagnosis	Remedy
Pressure too high at low pressure side Pressure too low at high pressure side	Internal leak in compressor	Compression defective ↓ (Valves, sliding parts, piston, cylinder, gasket, connecting rod, etc.)	Repair or replace compressor

SPECIAL TOOLS AND EQUIPMENT

Tool	SST No.	Use
Manifold gauge set	07110-78010	To evacuate and charge system
Ohmmeter		To diagnosis electrical system
Testing nozzle	07115-71010	To test expansion valve
Magnetic clutch tool set	07110-77011	Includes the following 8 tools
Pressure plate remover	07112-71010	To remove pressure plate
Snap ring pliers	07114-84020	To remove pressure plate
Key remover	07112-45021	To remove key
Shaft plate remover	07112-15010	To remove shaft plate
Shaft seal remover	07114-15010	To remove shaft seal
Hexagon wrench set	07110-61050	To remove service valves and front housing
Shaft plate installing tool	07112-25010	To install shaft plate
Key press tool	07114-45010	To install key

AIR CONDITIONING SYSTEM CIRCUIT



ON-VEHICLE INSPECTION

1. CHECK CONDENSER FINS FOR BLOCKAGE OR DAMAGE

If the fins are clogged, clean them with pressurized water.

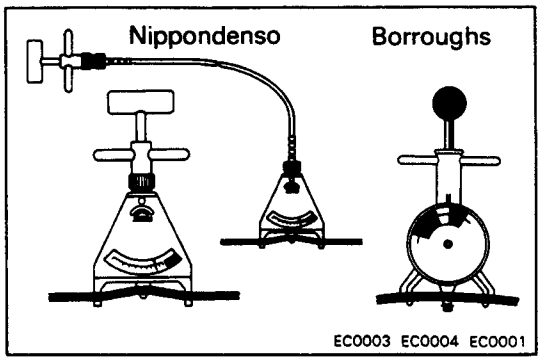
CAUTION: Be careful not to damage the fins.

2. CHECK DRIVE BELT TENSION

Using a belt tension gauge, check the drive belt tension.

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

Drive belt tension:
New belt 125 ± 25 lb
Used belt 80 ± 20 lb



3. START ENGINE

4. TURN ON A/C SWITCH

Check that the A/C operates at each position of the blower switch.

5. CHECK MAGNETIC CLUTCH OPERATION

6. CHECK THAT IDLE INCREASES

When the magnetic clutch engages, engine revolution should increase.

Standard idle up rpm: 900 — 1,000 rpm

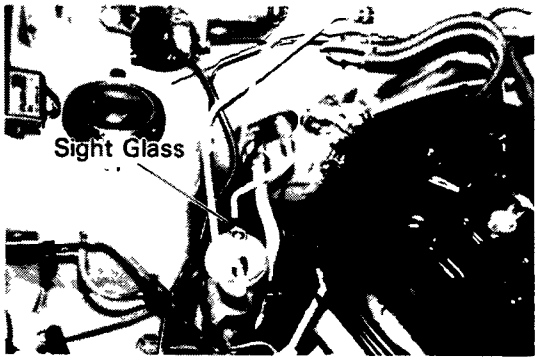
7. CHECK CONDENSER FAN MOTOR ROTATES

8. CHECK AMOUNT OF REFRIGERANT

If you can see bubbles in the sight glass, additional refrigerant is needed. (See page AC-11)

9. IF NO OR INSUFFICIENT COOLING, INSPECT FOR LEAKAGE

Using a gas leak tester, inspect each component of the refrigeration system. (See page AC-18)



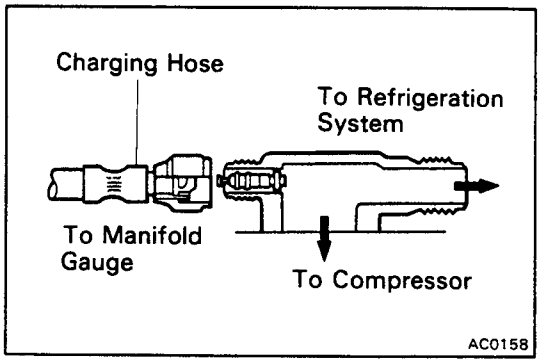
REFRIGERATION SYSTEM

Checking of Refrigerant Charge

1. **RUN ENGINE AT FAST IDLE**
2. **OPERATE AIR CONDITIONER AT MAXIMUM COOLING FOR A FEW MINUTES**
3. **CHECK AMOUNT OF REFRIGERANT**

   Observe the sight glass on the receiver.

Item	Symptom	Amount of refrigerant	Remedy
1	Bubbles present in sight glass	Insufficient	Check for leak with gas leak tester
2	No bubbles present in sight glass	None, sufficient or too much	Refer to items 3 and 4
3	No temperature difference between compressor inlet and outlet	Empty or nearly empty	Evacuate and charge system. Then check for leak with gas leak tester
4	Temperature between compressor inlet and outlet is noticeably different	Proper or too much	Refer to items 5 and 6
5	Immediately after the air conditioner is turned off, refrigerant in sight glass stays clear	Too much	Discharge the excess refrigerant to specified amount
6	When the air conditioner is turned off, refrigerant foams and then stays clear	Proper	—



Installation of Manifold Gauge Set

NOTE: Fittings for attaching the manifold gauge set are located on the compressor service valves.

1. **CLOSE BOTH HAND VALVES OF MANIFOLD GAUGE SET**
2. **INSTALL CHARGING HOSES OF GAUGE SET TO SERVICE VALVES**

   Connect the low pressure hose to the suction service valve and the high pressure hose to the discharge service valve. Tighten the hose nuts by hand.

   NOTE: Do not apply compressor oil to the seat of the connection.

Discharging of Refrigeration System

1. **CONNECT MANIFOLD GAUGE SET TO COMPRESSOR**

2. **PLACE FREE END OF CENTER HOSE IN A SHOP TOWEL**

3. **DISCHARGE SYSTEM**

   (a) Slowly open the high pressure hand valve to adjust the refrigerant flow. Do not open the valve very much.

   CAUTION: If refrigerant is allowed to escape too fast, compressor oil will be drawn out of the system.

   (b) Check the shop towel to make sure no oil is being discharged.

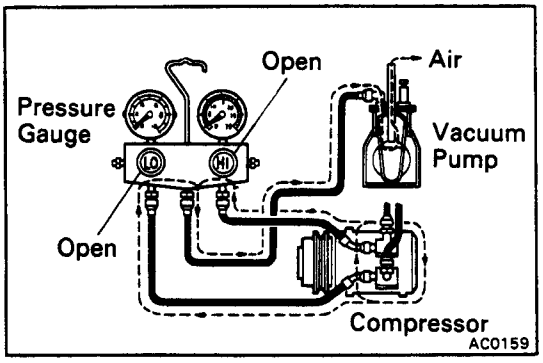
   If oil is present, partially close the hand valve.

   (c) After the manifold gauge reading drops below 3.5 kg/cm² (50 psi, 343 kPa), slowly open the low pressure valve.

   (d) As the system pressure drops, gradually open both high and low valves until both gauges read 0 kg/cm² (0 psi, 0 kPa).

Evacuating and Charging of Refrigeration System

NOTE:
- Whenever the air conditioning system has been exposed to the atmosphere, it must be evacuated.
- After installation of a component, the system should be evacuated for approximately 15 minutes. A component in service that has been opened for repair should be evacuated for 30 minutes.



1. **EVACUATE SYSTEM**

   (a) Connect the manifold gauge set. (See page AC-11)

   (b) Install the center hose of the gauge set to the vacuum pump inlet.

   (c) Run the vacuum pump, and then open both hand valves.

   (d) After about ten minutes, check that the low pressure gauge reads more than 600 mmHg (23.62 in. Hg, 80.0 kPa) of vacuum.

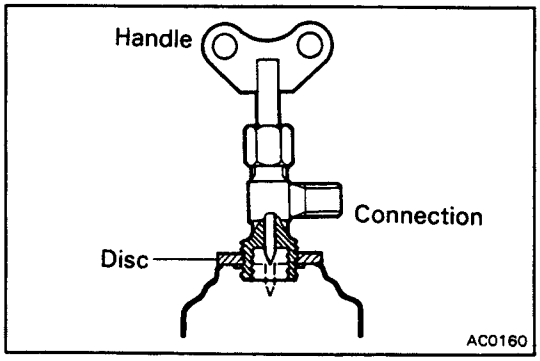
   If the reading is not more than 600 mmHg (23.62 in. Hg, 80.0 kPa), close both valves and stop the vacuum pump. Check the system for leaks and repair as necessary.

   If no leaks are found, continue evacuating the system.

   (e) After the low pressure gauge indicates more than 700 mmHg (27.56 in. Hg, 93.3 kPa) of vacuum, continue evacuating for 15 minutes.

   (f) Close both hand valves, and stop the vacuum pump. Disconnect the hose from the vacuum pump.

   The system is now ready for charging.



2. INSTALL REFRIGERANT CONTAINER TAP VALVE

CAUTION: Observe the precautions listed in the front of this section.

(a) Before installing the valve on the refrigerant container, turn the handle counterclockwise until the valve needle is fully retracted.

(b) Turn the disc counterclockwise until it reaches its highest position.

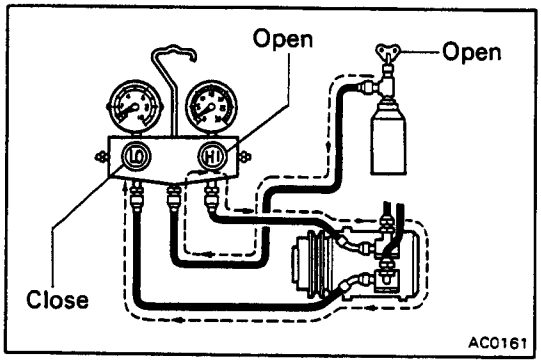
Screw down the valve on the refrigerant container.

(c) Connect the center hose to the valve fitting. Turn the disc fully clockwise by hand.

(d) Turn the handle clockwise to make a hole in the sealed tap.

(e) Turn the handle fully counterclockwise to fill the center hose with gas. Do not open the high and low pressure valves.

(f) Loosen the center hose nut connected to the center fitting of the manifold gauge until a hiss can be heard.
Allow air to escape for a few seconds, and then tighten the nut.



3. TEST SYSTEM FOR LEAKS

NOTE: After evacuating the system, check for leaks.

(a) Install the refrigerant can tap valve as described in step 2.

(b) Open the high pressure valve to charge the system with refrigerant vapor.

(c) When the low pressure gauge reads 1 kg/cm^2 (14 psi, 98 kPa) close the high pressure valve.

(d) Using a halide gas leak detector, propane torch, or electric leak detector, check the system for leaks.

If a leak is found, repair the faulty component or connection.

(e) After checking and repairing the system, perform the following:

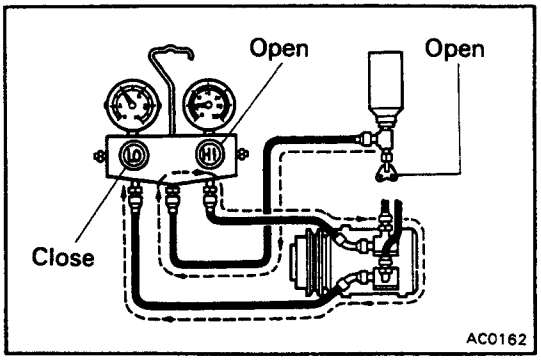
- Turn the container tap handle fully clockwise.
- Disconnect the center hose from the can valve fitting.
- Evacuate the system for at least 15 minutes.

4. CHARGE EMPTY SYSTEM (LIQUID)

NOTE: This step is to charge and empty system through the high pressure side with refrigerant in a liquid state. When the refrigerant container is held upside down, refrigerant will enter the system as a liquid.

CAUTION:

- **Never run the engine when charging the system through the high pressure side.**
- **Do not open the low pressure valve when the system is being charged with liquid refrigerant.**



(a) Close both high and low pressure valves completely after the system is evacuated.

(b) Install the refrigerant can tap valve as described in step 2.

(c) Open the high pressure valve fully, and keep the container upside down.

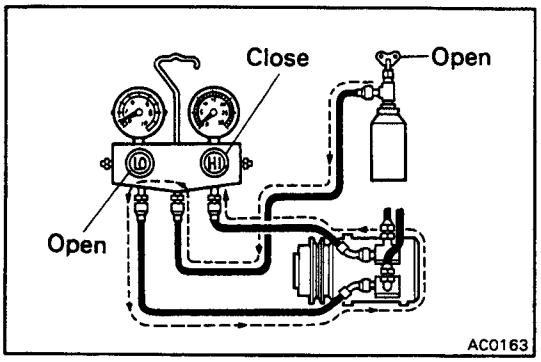
(d) Charge the system with more than one container (400 g, 0.9 lb) to the specified amount. Then, close the high pressure valve.

Specified amount: 650 – 750 g (1.4 – 1.7 lb)

NOTE:
- A fully charged system is indicated by the receiver sight glass being free of any bubbles.
- If the low pressure gauge does not show a reading, the system is clogged and must be repaired.

5. CHARGE EMPTY OR PARTIALLY CHARGED SYSTEM (VAPOR)

NOTE:
- This step is to charge the system through the low pressure side with refrigerant in a vapor state. When the refrigerant container is placed rightside up, refrigerant will enter the system as a vapor.
- Put the refrigerant container in a pan of warm water (maximum temperature 40°C or 140°F) to keep the vapor pressure in the container slightly higher than vapor pressure in the system.



(a) Install the refrigerant can tap valve as described in step 2.

(b) Open the low pressure valve. Adjust the valve so that the low pressure gauge does not read over 4.2 kg/cm² (60 psi, 412 kPa).

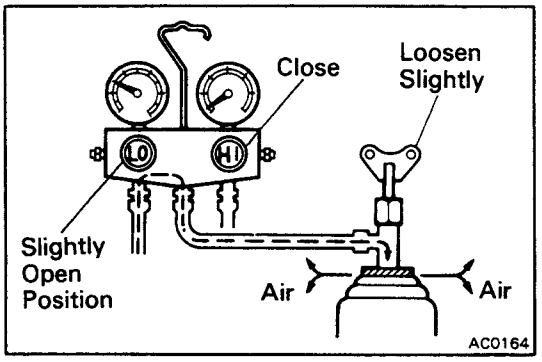
(c) Run the engine at fast idle, and operate the air conditioner.

CAUTION: Be sure to keep the container upright to prevent liquid refrigerant from being charged into the system through the suction side, resulting in possible damage to the compressor.

(d) Charge the system with more than one container (400 g, 0.9 lb) to the specified amount. Then, close the low pressure valve.

Specified amount: 650 – 750 g (1.4 – 1.7 lb)

NOTE: A fully charged system is indicated by the receiver sight glass being free of any bubbles.



6. **IF NECESSARY, CHARGE SYSTEM WITH ANOTHER CONTAINER**
   (a) When the refrigerant container is empty, close the pressure valves.
   (b) Remove the can tap valve from the container.
   (c) Attach the can tap valve to a new refrigerant container.
   (d) Purge the air from the center hose by barely opening the low pressure valve and loosening the valve disc.
   (e) Make a hole in the sealed tap of the new container and charge the system.

   CAUTION: Be careful not to overcharge the refrigerant as it could cause failure of the bearings and belt.

7. **WHEN SYSTEM IS FULLY CHARGED, DISCONNECT MANIFOLD GAUGE SET**
   (a) Close both low and high pressure valves.
   (b) Close the valve of the refrigerant container. If using one-pound containers of R-12, allow the remaining refrigerant to escape by slowly removing the charge line.
   (c) Turn off the engine.
   (d) Using a shop rag, quickly remove both hoses from the compressor service valves.

   WARNING: Care must be taken to protect eyes and skin when removing the high pressure hoses.
   (e) Put the cap nuts on the service valve fittings.

Performance Test

1. **INSTALL MANIFOLD GAUGE SET**
   (a) Close the HI and LO hand valves.
   (b) Connect the high pressure hose to the discharge service valve of the compressor.
   (c) Connect the low pressure hose to the suction service valve of the compressor.



2. **RUN ENGINE AND OPERATE AIR CONDITIONER**
   (a) Run the engine at 2,000 rpm.
   (b) Set the blower switch at HI, A/C switch ON, temperature control at COOL, and air flow control at VENT.
   (c) Keep all windows and doors open.

3. **POSITION THERMOMETERS**
   (a) Place a dry bulb thermometer in the cool air outlet.
   (b) Place a psychrometer close to the inlet of the cooling unit.

4. WAIT UNTIL AIR CONDITIONING SYSTEM STABILIZES

(a) Check that the reading on the high pressure gauge is 14.0 – 15.5 kg/cm² (199 – 220 psi, 1,373 – 1,520 kPa).

If the reading is too high, pour water on the condenser. If the reading is too low, cover the front of the condenser.

(b) Check that the reading on the bulb thermometer at the air inlet is 25 – 35 °C (77 – 95 °F).

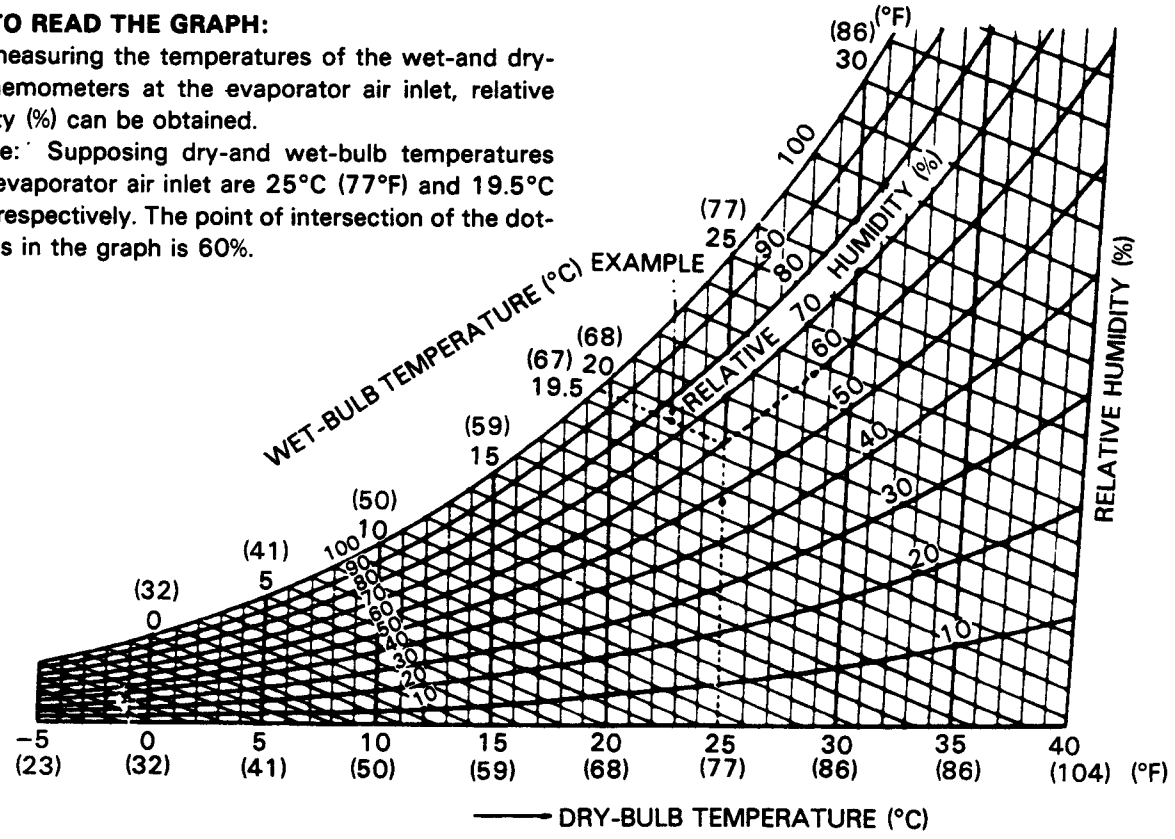
5. CHECK PERFORMANCE OF AIR CONDITIONING SYSTEM

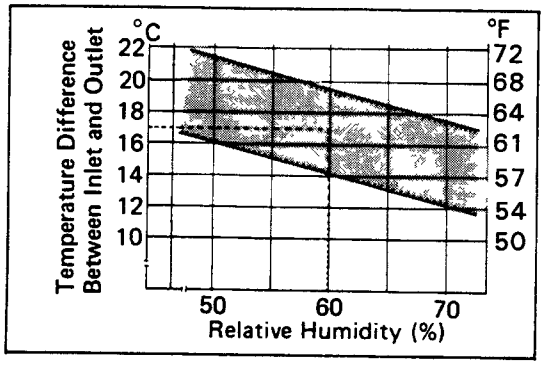
(a) Calculate the relative humidity from the psychrometric graph by comparing the wet and dry bulb readings of the psychrometer at the air inlet.

HOW TO READ THE GRAPH:

After measuring the temperatures of the wet-and dry-bulb themometers at the evaporator air inlet, relative humidity (%) can be obtained.

Example: Supposing dry-and wet-bulb temperatures at the evaporator air inlet are 25°C (77°F) and 19.5°C (67°F) respectively. The point of intersection of the dotted lines in the graph is 60%.



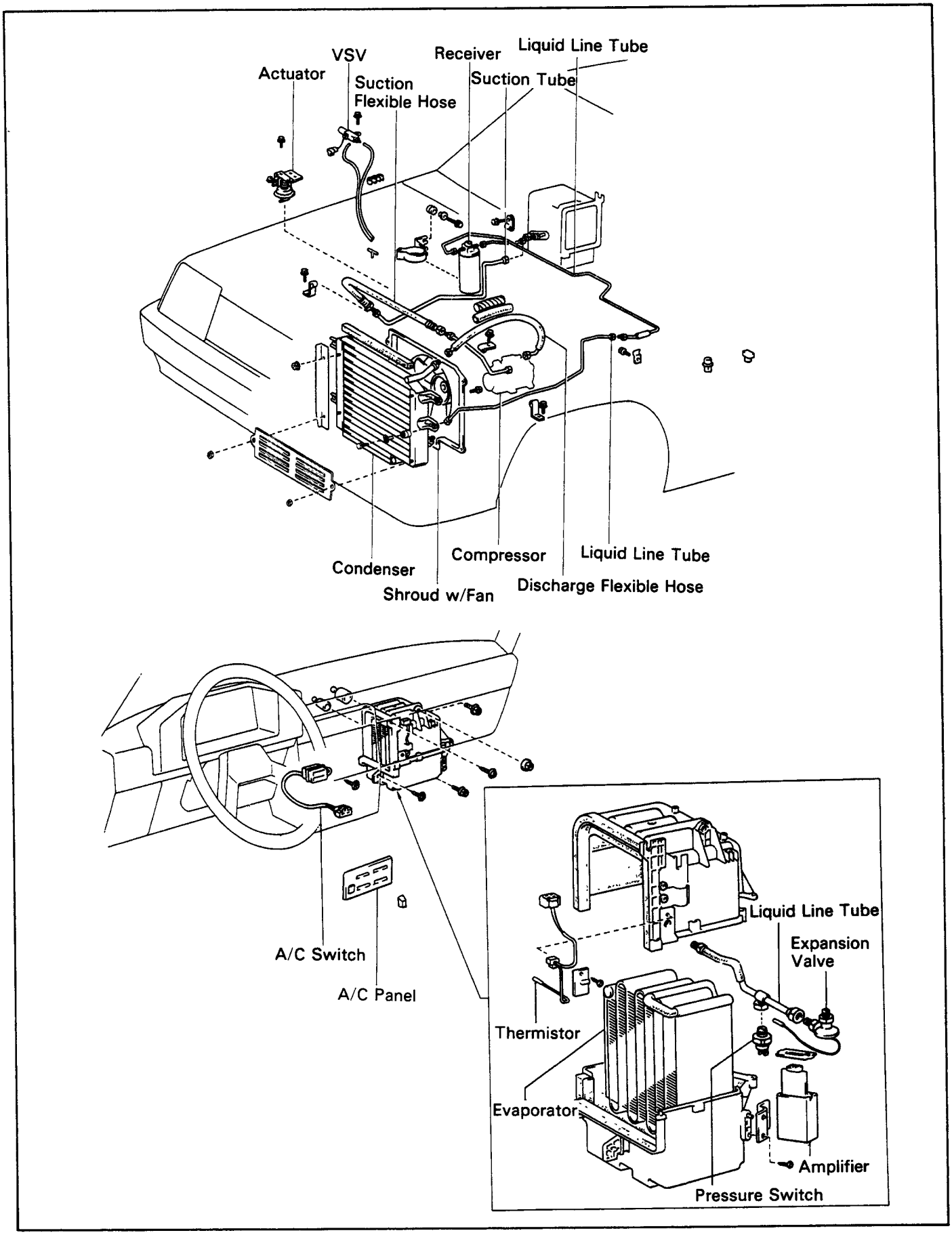


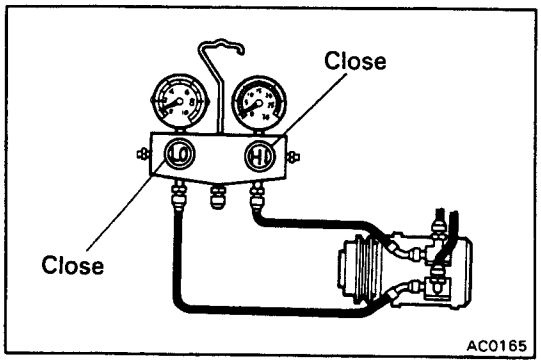
(b) Measure the dry bulb temperature at the cool air outlet, and calculate the difference between the inlet dry bulb and outlet dry bulb temperatures.

(c) Check that the intersection of the relative humidity and temperature difference is between the two hatched lines.

If the intersection is within the two lines, cooling performance is satisfactory.

SYSTEM COMPONENTS





COMPRESSOR

ON-VEHICLE INSPECTION

1. INSTALL MANIFOLD GAUGE SET

(a) Close the HI and LO hand valves.

(b) Connect the high pressure hose to the discharge service valve of the compressor.

(c) Connect the low pressure hose to the suction service valve of the compressor.

2. RUN ENGINE AT FAST IDLE

3. CHECK COMPRESSOR FOR FOLLOWING:

(a) High pressure gauge reading is not low and low pressure gauge reading is not higher than normal.

(b) Metallic sound.

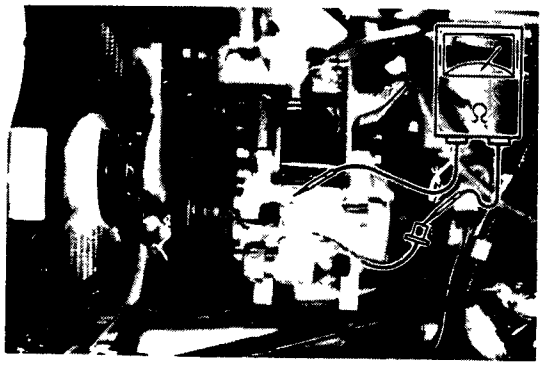
(c) Leakage from shaft seal.

If defects are found, repair the compressor.

4. CHECK MAGNETIC CLUTCH

(a) Inspect the pressure plate and the rotor for signs of oil.

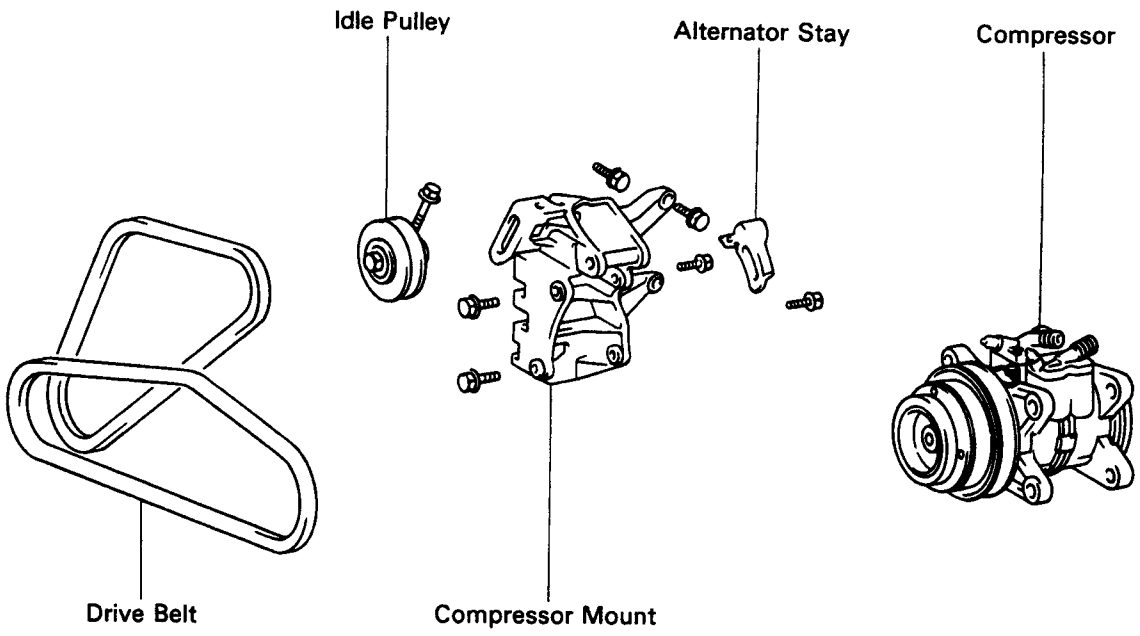
(b) Check the clutch bearings for noise and grease leakage.



(c) Using an ohmmeter, measure the resistance of the stator coil between the clutch lead wire and ground.

If the resistance is not within tolerance, replace the coil.

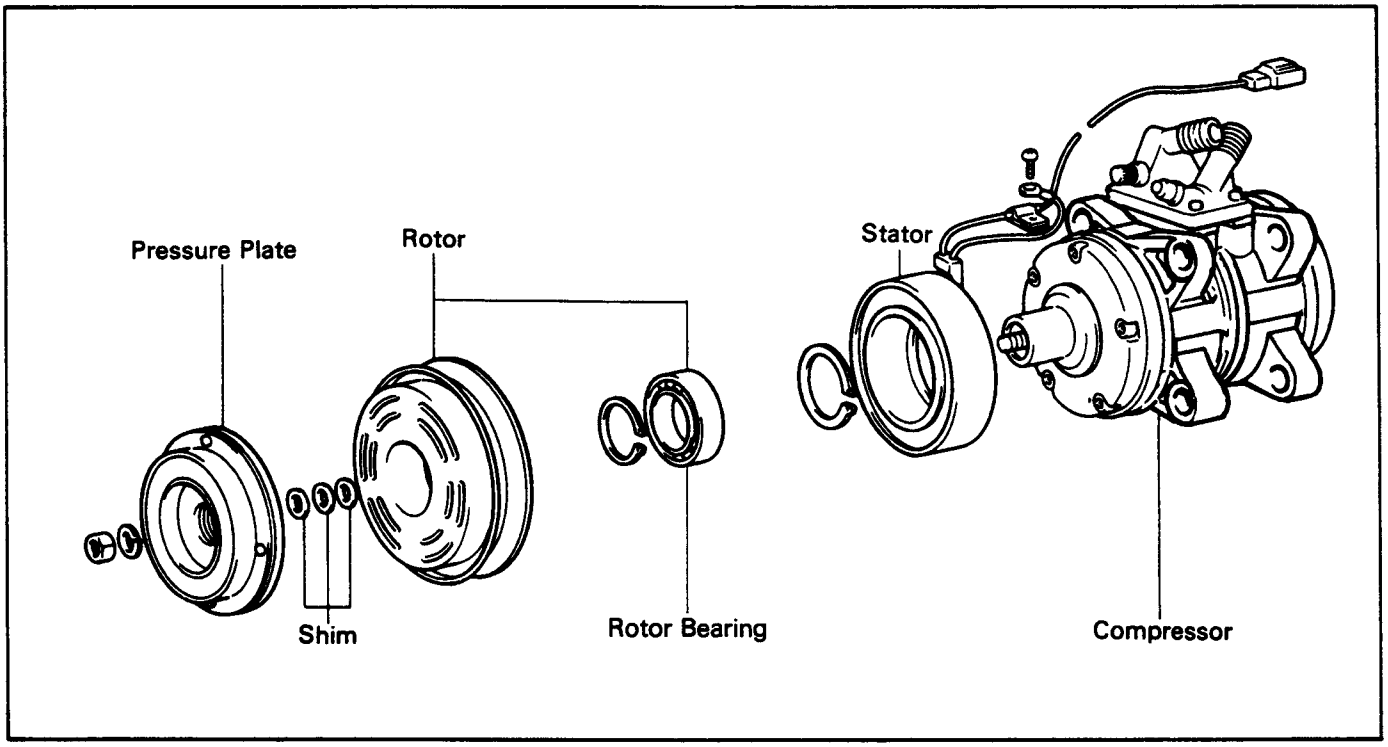
Standard resistance: 3.7 ± 0.2 Ω at 20°C (68°F)

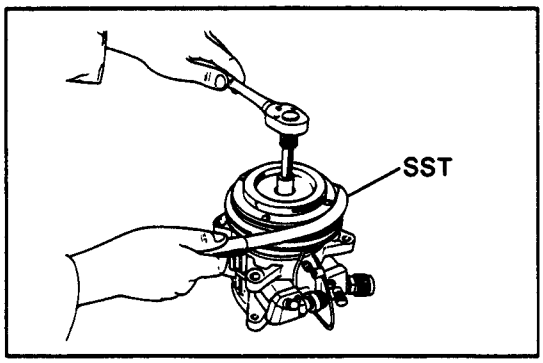


REMOVAL OF COMPRESSOR

1. **RUN ENGINE AT IDLE WITH AIR CONDITIONING ON FOR 10 MINUTES**
2. **DISCONNECT NEGATIVE CABLE FROM BATTERY**
3. **DISCONNECT CLUTCH LEAD WIRE FROM WIRING HARNESS**
4. **DISCHARGE REFRIGERANT FROM REFRIGERATION SYSTEM (See page AC-12)**
5. **DISCONNECT TWO FLEXIBLE HOSES FROM COMPRESSOR SERVICE VALVES**

   Cap the open fitting immediately to keep moisture out of the system.
6. **REMOVE COMPRESSOR**
   (a) Loosen the drive belt.
   (b) Remove the compressor mounting bolts and the compressor.

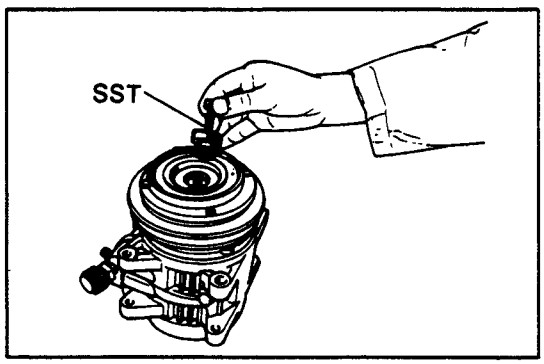




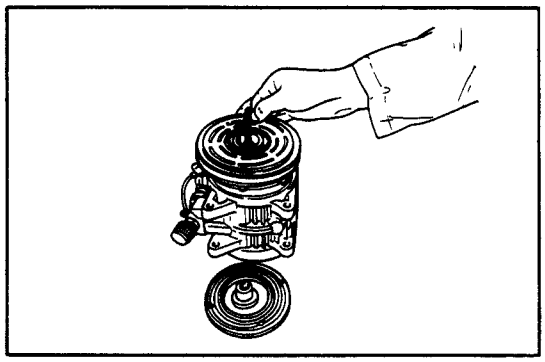
DISASSEMBLY OF MAGNETIC CLUTCH

1. **REMOVE PRESSURE PLATE**

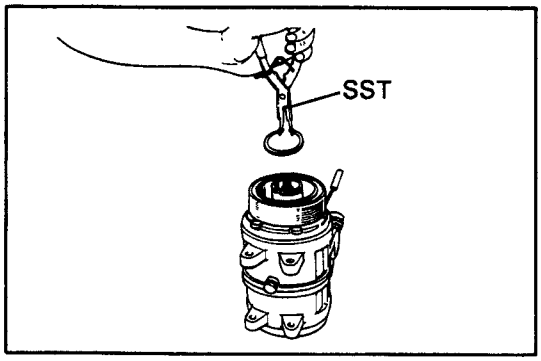
(a) Using SST and a socket, remove the shaft nut.
SST 07110-77011



(b) Using SST and a socket, remove the pressure plate.
SST 07112-71010



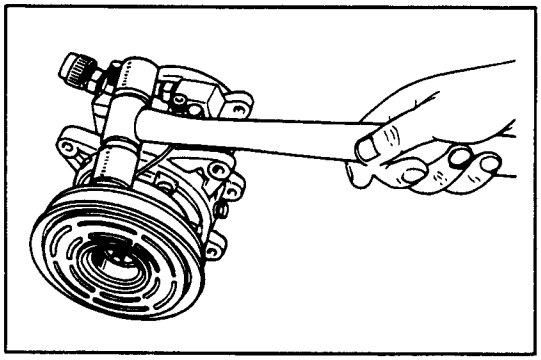
(c) Remove the shims from the shaft.



2. REMOVE ROTOR

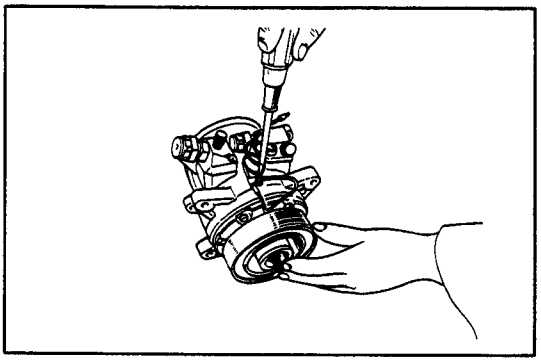
(a) Using SST, remove the snap ring.

SST 07114-84020



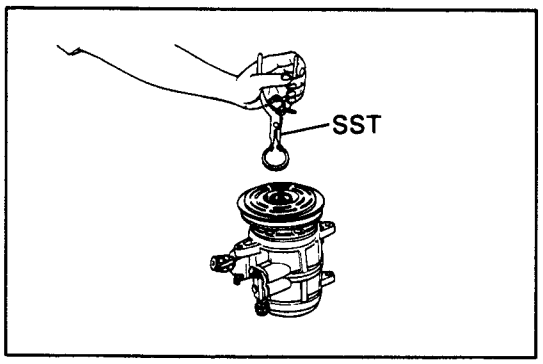
(b) Using a plastic hammer, tap the rotor off the shaft.

CAUTION: Be careful not to damage the pulley when tapping on the rotor.



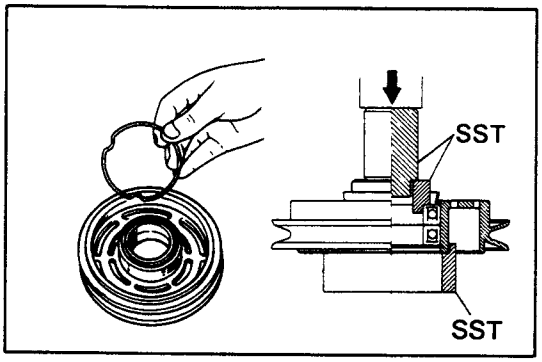
3. REMOVE STATOR

(a) Disconnect the stator lead wires from the compressor housing.



(b) Using SST, remove the snap ring and the stator.

SST 07114-84020



4. REMOVE ROTOR BEARINGS

NOTE: Press out the bearings only if they are to be replaced.

(a) Remove the bearing snap ring from the rotor.

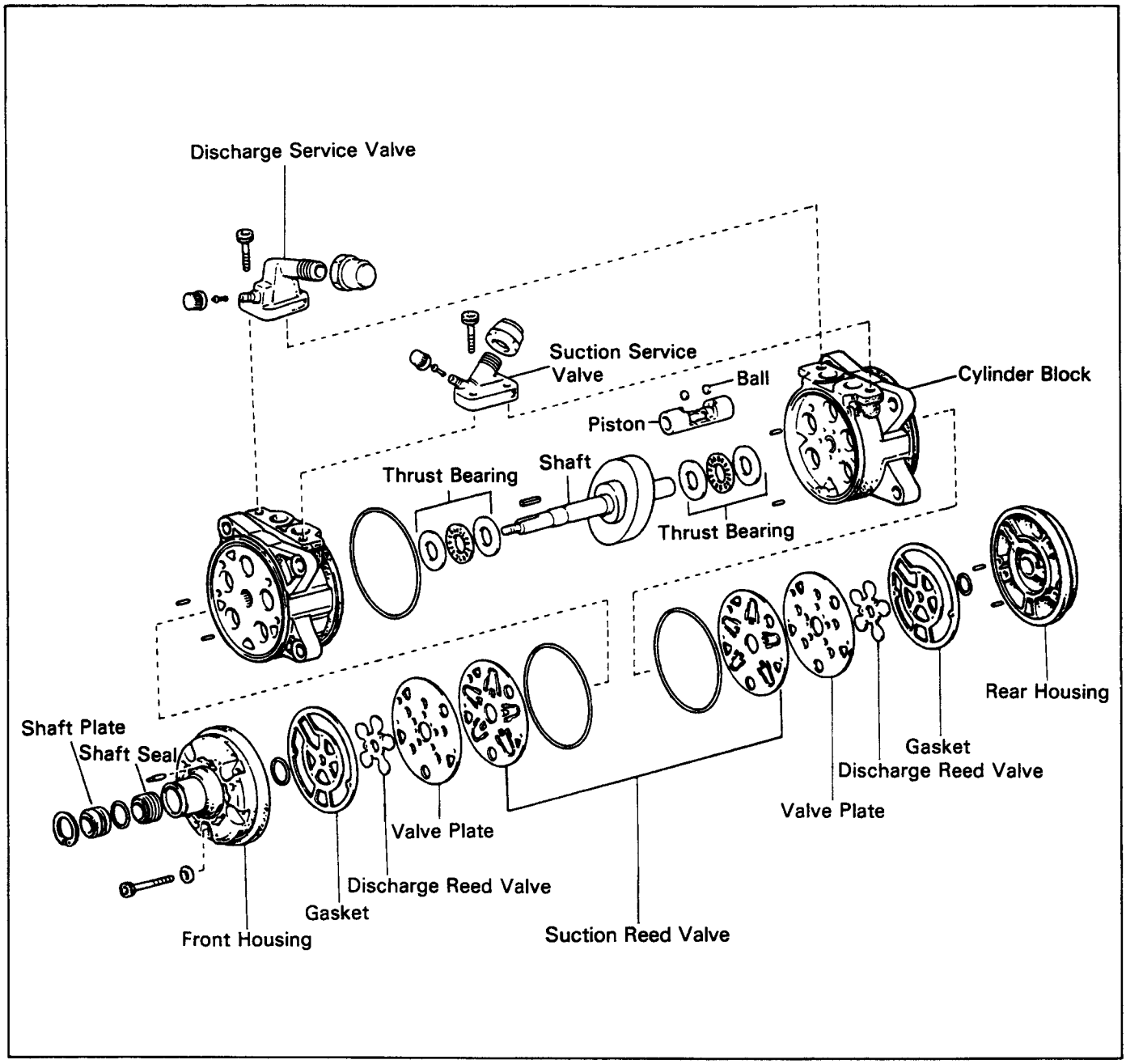
(b) Using SST, press out the two bearings.

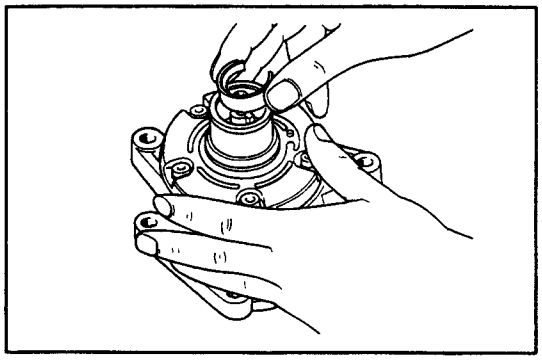
SST 07110-77011

5. **INSPECT PRESSURE PLATE AND ROTOR**

(a) Inspect the pressure plate and rotor surfaces for wear or scoring. Replace if necessary.

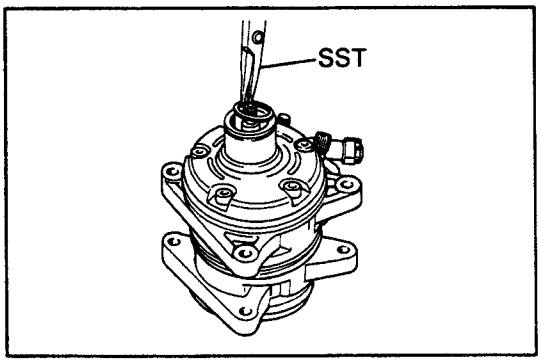
(b) Check the rotor bearings for wear or leakage of grease. Replace if necessary.





DISASSEMBLY OF COMPRESSOR

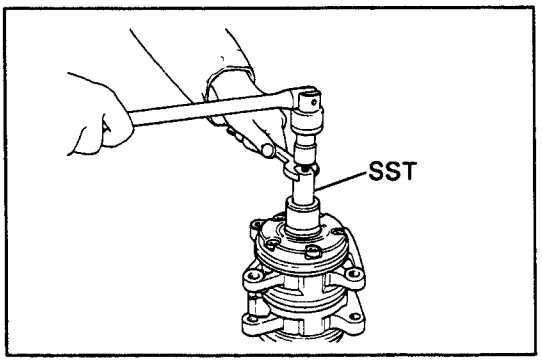
1. **REMOVE FELT**



2. REMOVE CIRCLIP

Using SST, remove the circlip.

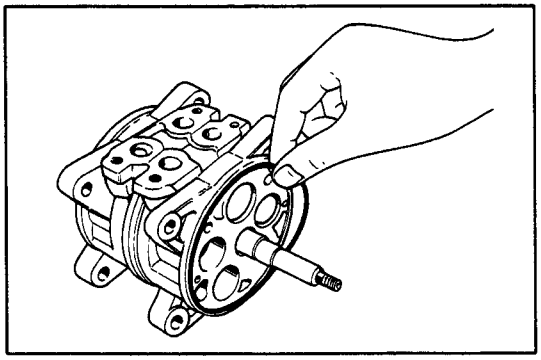
SST 07714-84020



3. REMOVE KEY

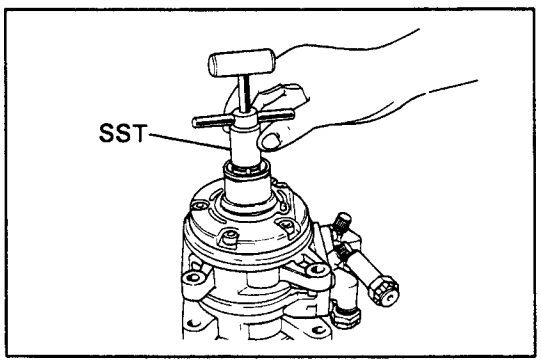
Remove the key from the shaft.

SST 07112-45021



4. APPLY COMPRESSOR OIL TO INNER BORE

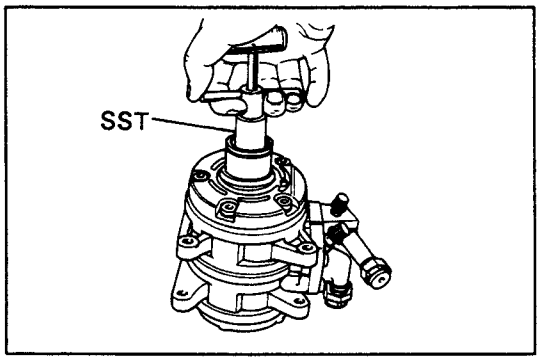
Apply compressor oil to the inner bore of the compressor.



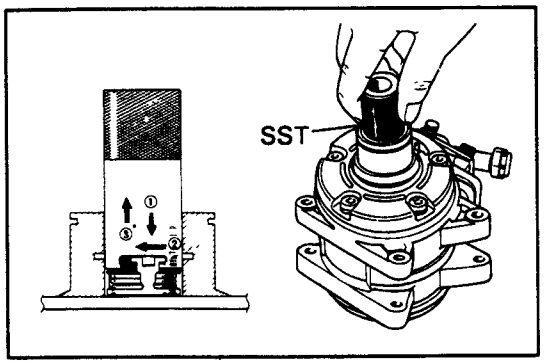
5. REMOVE SHAFT PLATE

(a) Insert SST against the shaft. Then push the holder ring downward.

SST 07112-15010



(b) Pull up the remover bar, and remove the shaft plate.

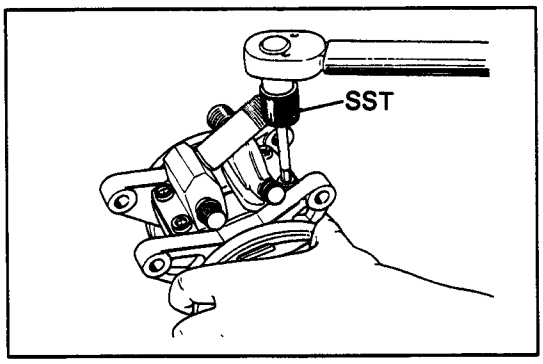


6. REMOVE SHAFT SEAL

Insert SST against the shaft, and turn it to the right while pressing on the remover.

Then remove the shaft seal.

SST 07114-15010

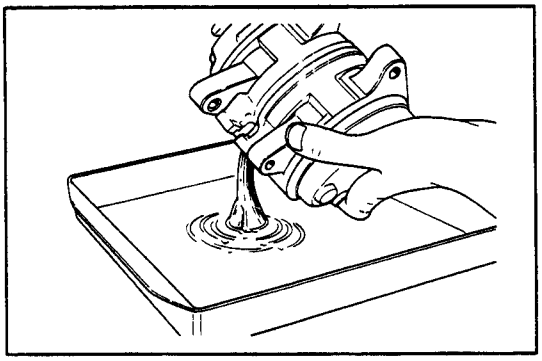


7. REMOVE TWO SERVICE VALVES

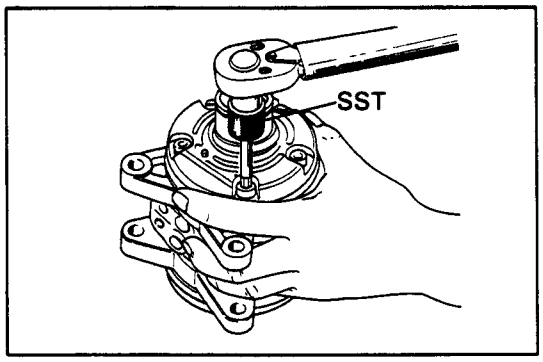
(a) Using SST, remove the bolts holding the two service valves.

SST 07110-61050

(b) Remove the O-rings from the service valves and discard them.



8. DRAIN OIL INTO CONTAINER

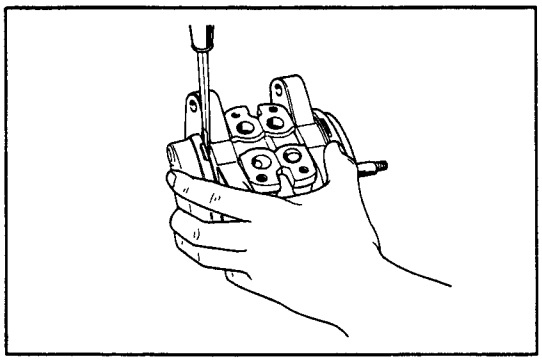


9. REMOVE FRONT HOUSING

(a) Using SST, remove the six through bolts.

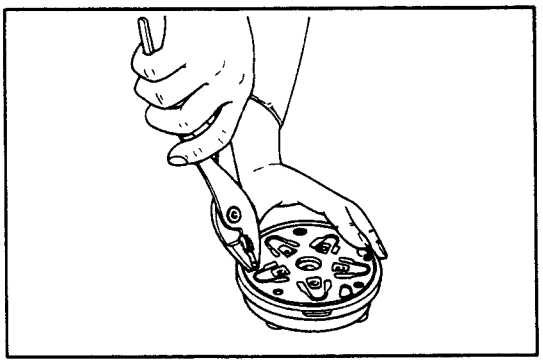
NOTE: Do not reuse the six washers.

SST 07110-61050



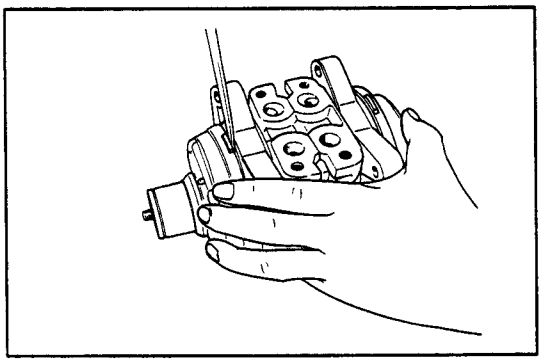
(b) Using a hammer and punch, remove the front housing by tapping on the protrusion.

CAUTION: Be careful not to scratch the sealing surface of the front housing.



10. REMOVE FRONT VALVE PLATE

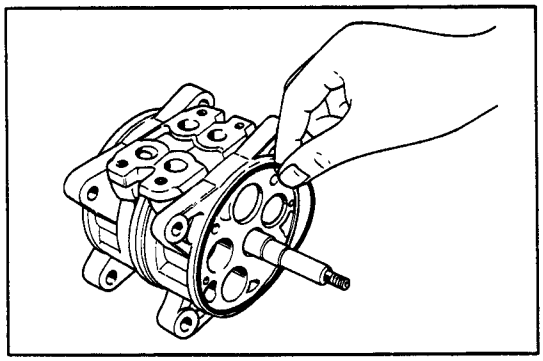
(a) Remove the two pins from the front housing. Discard the pins.



11. REMOVE REAR HOUSING

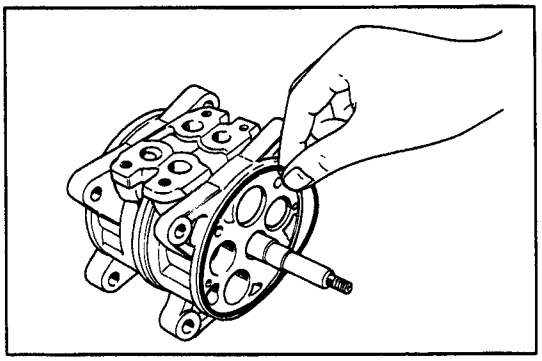
Using a hammer and punch, remove the rear housing by tapping on the protrusion.

CAUTION: Be careful not to scratch the sealing surface of the rear housing.



12. REMOVE FRONT AND REAR O-RINGS FROM CYLINDER BLOCK

Discard the O-rings.



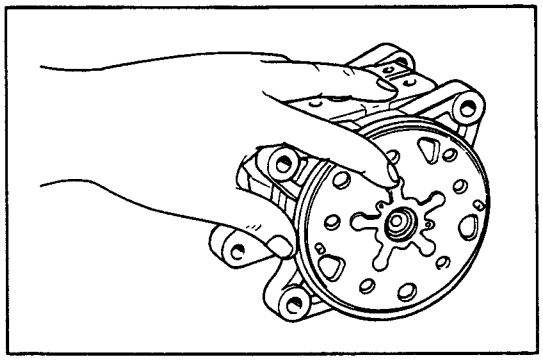
ASSEMBLY OF COMPRESSOR

(See page AC-22)

1. INSTALL REAR VALVE PLATE ON REAR CYLINDER

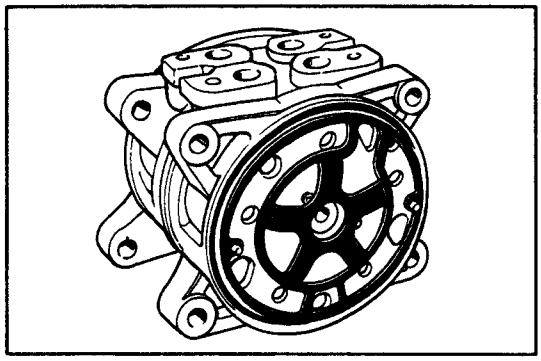
(a) Install two pins in the rear cylinder.

(b) Lubricate a new O-ring with compressor oil. Install the O-ring in the rear cylinder.



(c) Install the rear suction valve over the pins on the rear cylinder.

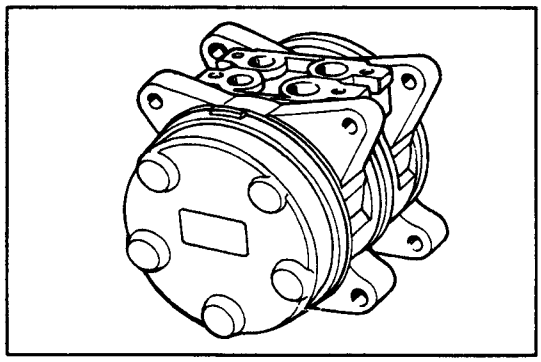
NOTE: The front and rear suction valves are identical.



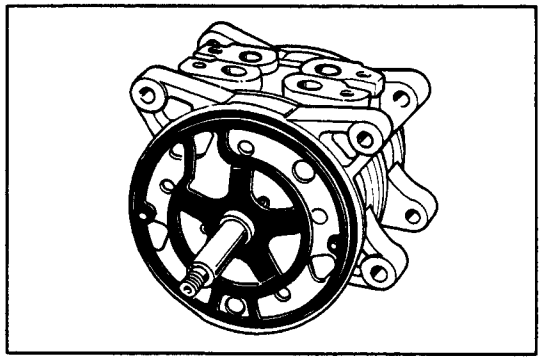
(d) Install the rear valve plate together with the discharge valve over the pins on rear cylinder.

NOTE: The rear valve plate is marked with an "R".

(e) Lubricate the gasket with compressor oil. Install the gasket on the valve plate.



2. INSTALL REAR HOUSING ON REAR CYLINDER



3. INSTALL FRONT VALVE PLATE ON FRONT CYLINDER

(a) Install two pins in the front cylinder.

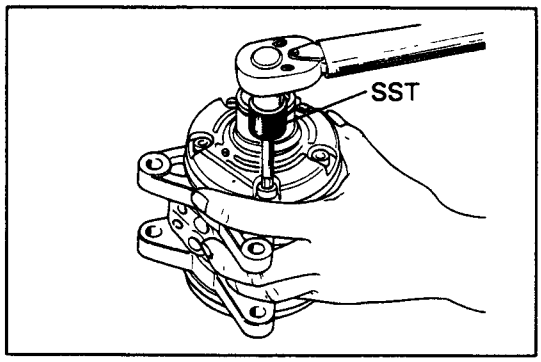
(b) Lubricate a new O-ring with compressor oil. Install the O-ring in the rear housing.

(c) Install the front suction valve over the pins on the front cylinder.

(d) Install the front valve plate together with the discharge valve over the pins on the front cylinder.

NOTE: The front valve plate is marked with an "R".

(e) Lubricate the gasket with compressor oil. Install the gasket on the valve plate.

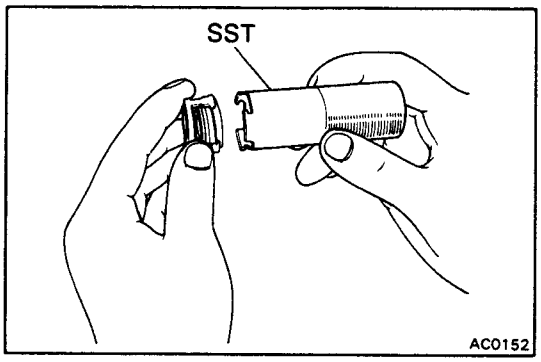


4. INSTALL FRONT HOUSING ON FRONT CYLINDER AND TIGHTEN SIX THROUGH BOLTS

Using SST and a torque wrench, gradually tighten the six through bolts in two or three passes.

SST 07110-61050

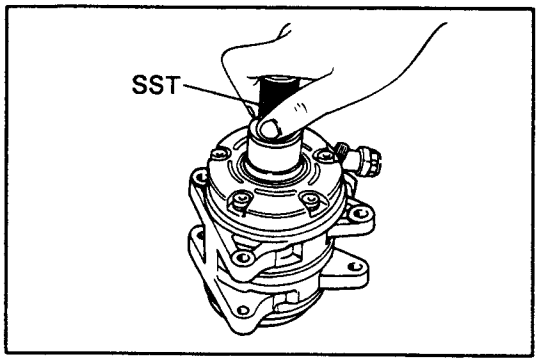
Torque: 260 kg-cm (19 ft-lb, 25 N·m)



5. INSTALL SHAFT SEAL

(a) Fit the shaft seal onto SST.

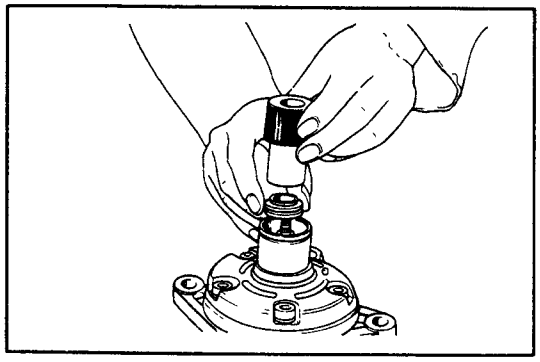
SST 07114-15010



(b) Apply oil to the bore.

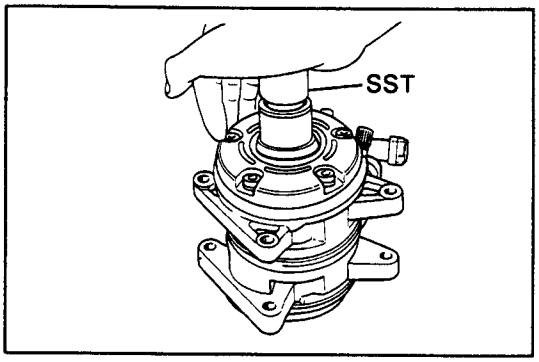
Insert SST, and turn it counterclockwise while lightly pressing in.
Then pull up the SST.

SST 07114-15010



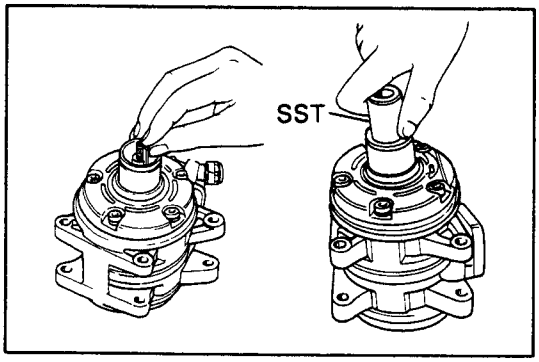
6. INSTALL SHAFT PLATE

(a) Put in the shaft plate.



(b) Press in SST.

SST 07112-25010

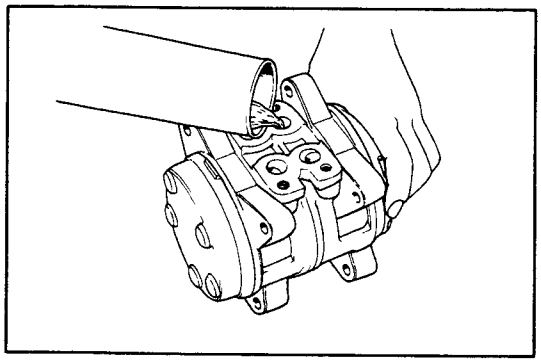


7. INSTALL KEY IN SHAFT GROOVE

Using SST and a plastic hammer, tap the key lightly.

SST 07114-45010

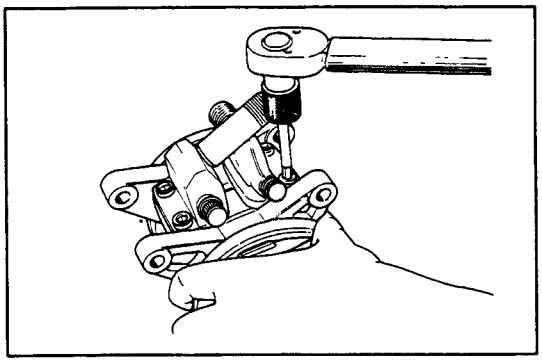
Place the felt inside the bore.
(See page AC-22)



8. POUR COMPRESSOR OIL INTO COMPRESSOR

Compressor oil: DENSOOIL 6, SUNISO No.5GS or equivalent

Compressor oil capacity: 60 – 100 cc (2.0 – 3.4 oz)



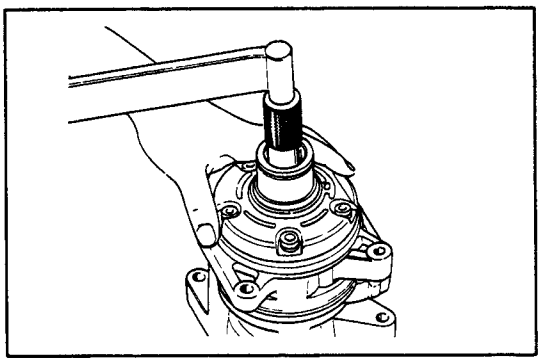
9. INSTALL SERVICE VALVES

(a) Lubricate new O-rings with compressor oil. Install the O-rings in the service valves.

(b) Install the service valves on the compressor. Using SST and a torque wrench, tighten the bolts.

Torque: 260 kg-cm (19 ft-lb, 25 N·m)

SST 07110-61050

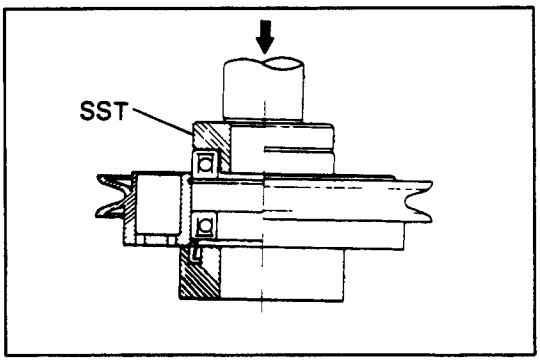


10. CHECK SHAFT ROTATING TORQUE

Torque: 30 kg-cm (26 in.-lb, 2.9 N·m)

ASSEMBLY OF MAGNETIC CLUTCH

(See page AC-20)

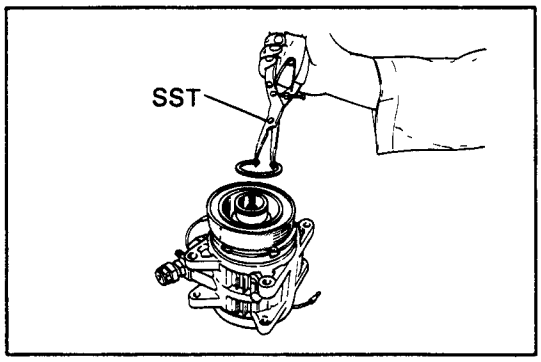


1. INSTALL TWO BEARINGS IN ROTOR

(a) Using SST, press a shield ring and two new bearings into the rotor boss until fully seated.

SST 07110-77011

(b) Install the bearing snap ring into the rotor groove.



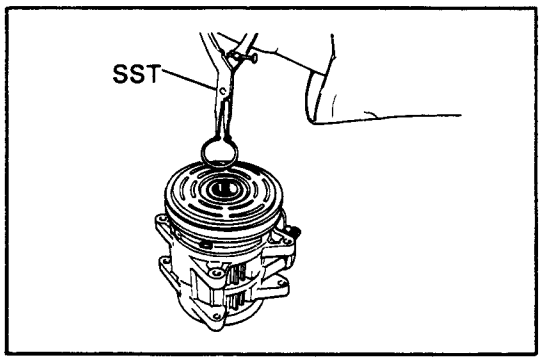
2. INSTALL STATOR

(a) Install the stator on the compressor.

(b) Using SST, install the snap ring.

SST 07110-77011

(c) Connect the stator lead wires to the compressor housing.

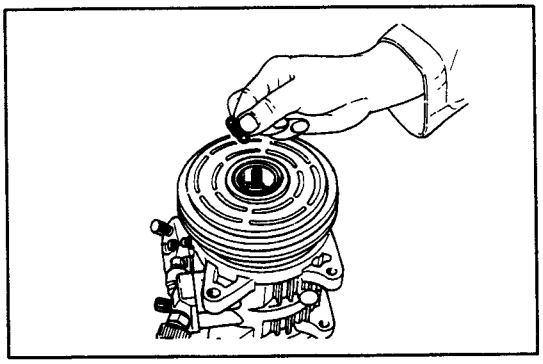


3. INSTALL ROTOR

(a) Install the rotor on the compressor shaft.

(b) Using SST, install the snap ring.

SST 07110-77011

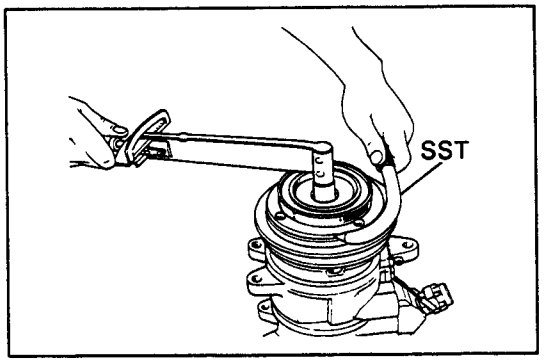


4. INSTALL PRESSURE PLATE

(a) Adjust the clearance between the pressure plate and rotor by putting the shims on the compressor shaft.

Standard clearance: 0.4 – 0.7 mm (0.016 – 0.028 in.)

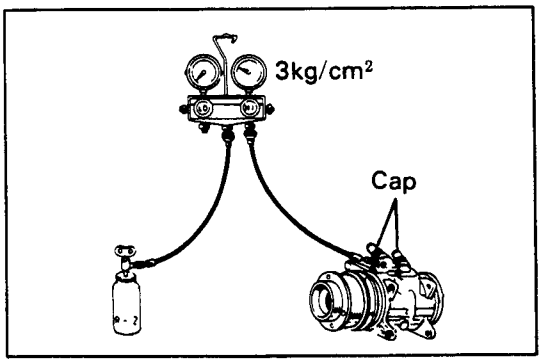
If the clearance is not within tolerance, add or reduce the number of shims to obtain the standard clearance.



(b) Using SST and a torque wrench, install the shaft nut.

Torque: 165 kg-cm (12 ft-lb, 16 N·m)

SST 07110-77011



PERFORMANCE TEST OF COMPRESSOR

1. PERFORM GAS LEAKAGE TEST

(a) Put caps on both service valves.

(b) Charge the compressor with refrigerant through the charge valve until the pressure is 3 kg/cm² (43 psi, 294 kPa).

(c) Using gas leak detector, check the compressor for leaks.

If leaks are found, check and replace the gasket, O-ring, or shaft seal.

2. FILL COMPRESSOR WITH CLEAN COMPRESSOR OIL

Remove the service valve and drain the compressor oil. Fill with new oil.

Compressor oil: DENSOOIL 6, SUNISO No. 5GS or equivalent

Compressor oil capacity: 60 – 100 cc (2.0 – 3.4 oz)

3. EVACUATE COMPRESSOR AND CHARGE WITH REFRIGERANT (See page AC-12)

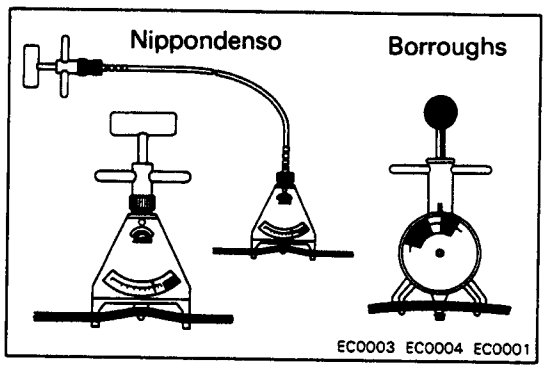
Make sure the caps are tight and free from moisture and contamination.

NOTE: When storing a compressor for an extended period, charge the compressor with refrigerant or dry nitrogen gas to prevent corrosion.

INSTALLATION OF COMPRESSOR

(See page AC-19)

1. **INSTALL COMPRESSOR WITH MOUNTING BOLTS**



2. **INSTALL DRIVE BELT**
   (a) Install the drive belt to the pulley.
   (b) Tighten the belt with adjusting bolts.

3. **CHECK DRIVE BELT TENSION**
   Using a belt tension gauge, check the drive belt tension.
   Belt tension gauge:
   Nippondenso BTG-20 (95506-00020) or
   Borroughs No. BT-33-73F
   Drive belt tension:
   New belt 125 ± 25 lb
   Used belt 80 ± 20 lb

4. **CONNECT TWO FLEXIBLE HOSES TO COMPRESSOR SERVICE VALVES**
   Torque: Discharge line 225 kg-cm (16 ft-lb, 22 N·m)
   Suction line 325 kg-cm (24 ft-lb, 32 N·m)

5. **CONNECT CLUTCH LEAD WIRE TO WIRING HARNESS**

6. **CONNECT NEGATIVE CABLE TO BATTERY**

7. **EVACUATE AND CHARGE REFRIGERATION SYSTEM (See page AC-12)**

CONDENSER

ON-VEHICLE INSPECTION

1. **CHECK CONDENSER FINS FOR BLOCKAGE OR DAMAGE**

   If the fins are clogged, wash them with water and dry with compressed air.

   CAUTION: Be careful not to damage the fins.

   If the fins are bent, straighten them with a screwdriver or pliers.

2. **CHECK CONDENSER FITTINGS FOR LEAKAGE**

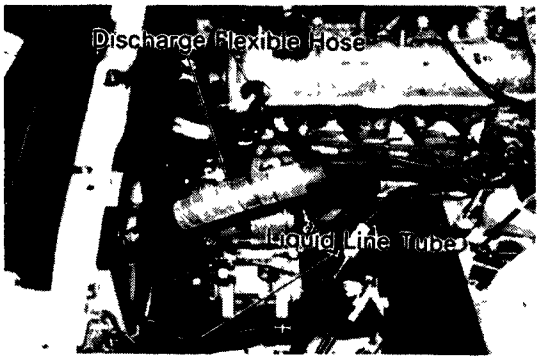
   Repair as necessary.

REMOVAL OF CONDENSER

(See page AC-17)

1. **DISCHARGE REFRIGERATION SYSTEM**
   (See page AC-12)

2. **REMOVE FRONT GRILLE AND HOOD LOCK BRACE**



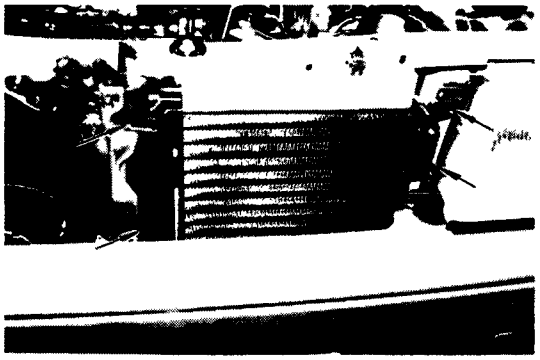
3. **DISCONNECT DISCHARGE FLEXIBLE HOSE FROM CONDENSER INLET FITTING**

4. **DISCONNECT LIQUID LINE TUBE FROM CONDENSER OUTLET FITTING**

   NOTE: Cap the open fittings immediately to keep moisture out of the system.

5. **REMOVE CONDENSER**

   Remove the four bolts.



INSTALLATION OF CONDENSER

(See page AC-17)

1. **INSTALL CONDENSER**

   Install the four bolts making sure the rubber cushions fit on the mounting flanges correctly.

2. **CONNECT LIQUID LINE TUBE AND DISCHARGE FLEXIBLE HOSE TO CONDENSER**

Torque:	**Liquid line tube**	**130 kg-cm (10 ft-lb, 13 N·m)**
	Discharge flexible hose	**225 kg-cm (16 ft-lb, 22 N·m)**

3. **INSTALL FRONT GRILLE AND HOOD LOCK BRACE**

4. **IF CONDENSER WAS REPLACED, ADD COMPRESSOR OIL TO COMPRESSOR**

   Add 40 — 50 cc (1.4 — 1.7 oz)

5. **EVACUATE, CHARGE AND TEST REFRIGERATION SYSTEM (See page AC-11)**

RECEIVER

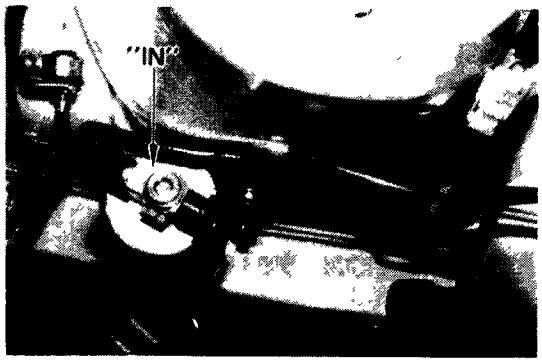
ON-VEHICLE INSPECTION

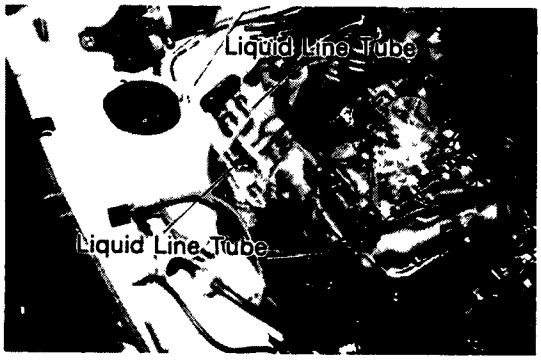
CHECK SIGHT GLASS, FUSIBLE PLUG AND FITTINGS FOR LEAKAGE

Use a gas leak tester. Repair as necessary.

REMOVAL OF RECEIVER

(See page AC-17)





1. **DISCHARGE REFRIGERATION SYSTEM**
   (See page AC-12)
2. **DISCONNECT TWO LIQUID LINE TUBES FROM RECEIVER**

   NOTE: Cap the open fittings immediately to keep moisture out of the system.
3. **REMOVE RECEIVER FROM RECEIVER HOLDER**

INSTALLATION OF RECEIVER

(See page AC-17)

1. **INSTALL RECEIVER IN RECEIVER HOLDER**

   NOTE: Do not remove the blind plugs until ready for connection.
2. **CONNECT TWO LIQUID LINE TUBES TO RECEIVER**

   Torque: 135 kg-cm (10 ft-lb, 13 N·m)
3. **IF RECEIVER WAS REPLACED, ADD COMPRESSOR OIL TO COMPRESSOR**

   Add 20 cc (0.7 oz)
4. **EVACUATE, CHARGE AND TEST REFRIGERATION SYSTEM** **(See page AC-12)**

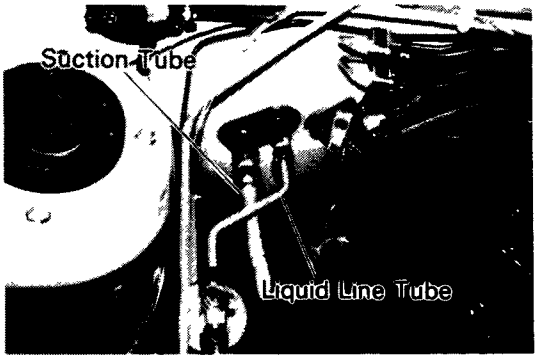
COOLING UNIT

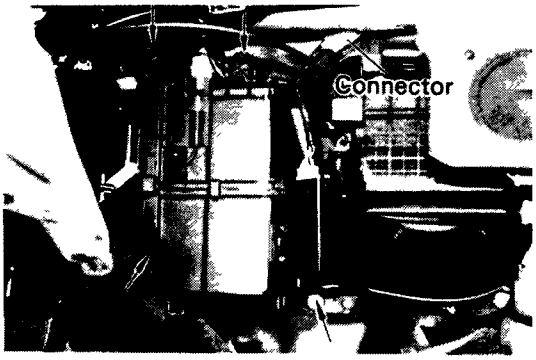
ON-VEHICLE INSPECTION OF EXPANSION VALVE

1. **CONNECT MANIFOLD GAUGE TO COMPRESSOR**
2. **CHECK EXPANSION VALVE OPERATION**
   (a) Run the engine at fast idle with the air conditioning on.
   (b) Check that the low pressure reading is between 0.5 – 5.0 kg/cm² (7 – 71 psi, 49 – 490 kPa).

   If the reading is too low, check and replace the expansion valve and/or receiver.

   If the reading is too high, tighten the remote bulb holders and/or replace the expansion valve.



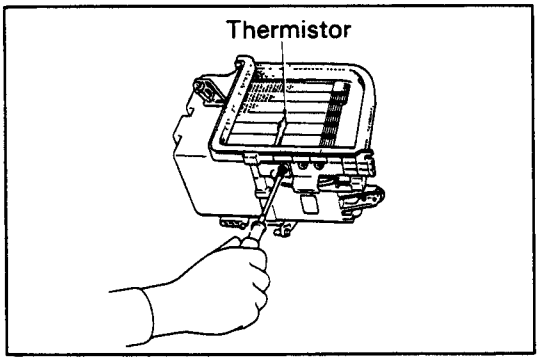


REMOVAL OF COOLING UNIT

1. **DISCONNECT NEGATIVE CABLE FROM BATTERY**
2. **DISCHARGE REFRIGERATION SYSTEM**
   (See page AC-12)
3. **DISCONNECT SUCTION TUBE FROM COOLING UNIT OUTLET FITTING**
4. **DISCONNECT LIQUID LINE TUBE FROM COOLING UNIT INLET FITTING**

   NOTE: Cap the open fittings immediately to keep moisture out of the system.
5. **REMOVE GROMMETS FROM INLET AND OUTLET FITTINGS**
6. **REMOVE FOLLOWING COMPONENTS:**
   (a) Glove box with undercover
   (b) Side air duct
7. **DISCONNECT FOLLOWING CONNECTORS:**
   (a) A/C switch connector
   (b) Connector connected to car harness
8. **REMOVE COOLING UNIT**

   Remove the three nuts and four bolts.
9. **REMOVE IDLING STABILIZER AMPLIFIER**
10. **REMOVE A/C WIRE HARNESS FROM COOLING UNIT**

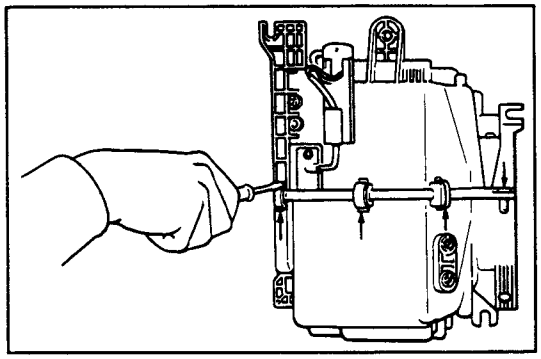


DISASSEMBLY OF COOLING UNIT

(See page AC-17)

1. **REMOVE THERMISTOR**

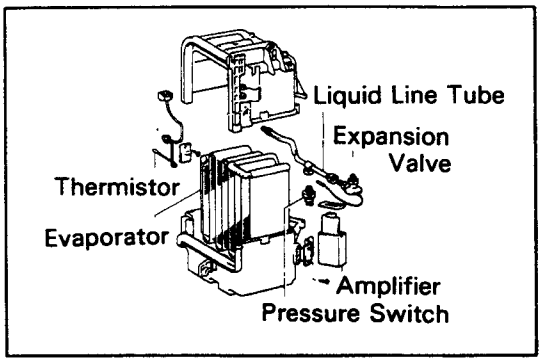
   Unscrew the tapping screw.



2. **REMOVE LOWER CASE**

   Using a screwdriver, remove the five clamps, and two screws.
3. **REMOVE UPPER CASE FROM EVAPORATOR**

   Remove the two screws.



4. **REMOVE COMPONENTS FROM EVAPORATOR**
   (a) Remove the heat insulator and the clamp from the outlet tube.
   (b) Disconnect the liquid line tube from inlet fitting of the expansion valve.
   (c) Disconnect the expansion valve from the inlet fitting of the evaporator.
   (d) Remove the pressure switch, if required.

Evaporator

INSPECTION OF EVAPORATOR

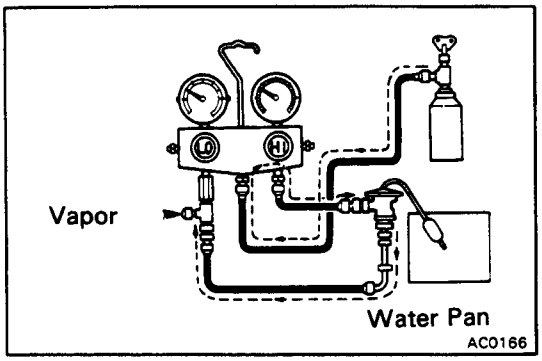
1. **CHECK EVAPORATOR FINS FOR BLOCKAGE**
   If the fins are clogged, clean them with compressed air.
   CAUTION: Never use water to clean the evaporator.

2. **CHECK FITTINGS FOR CRACKS OR SCRATCHES**
   Repair as necessary.

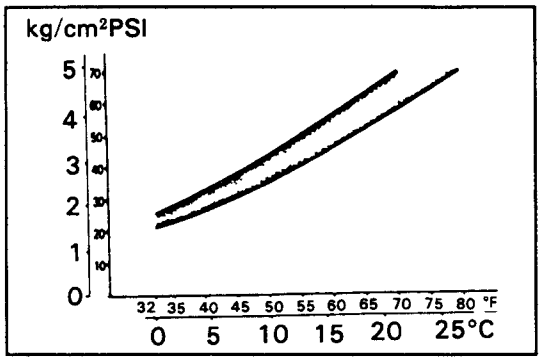
Expansion Valve

INSPECTION OF EXPANSION VALVE

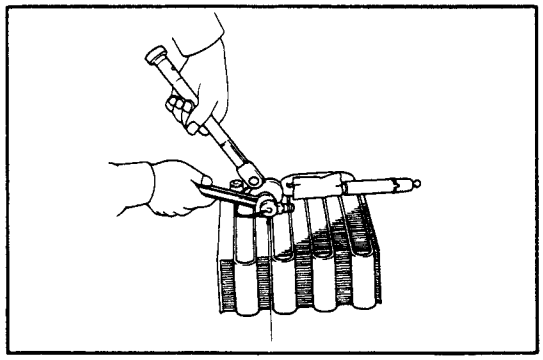
1. **CONNECT MANIFOLD GAUGE**
   Connect the manifold gauge set to the expansion valve and refrigerant container as shown.



2. **CHECK EXPANSION VALVE**
   (a) Close both manifold gauge hand valves.
   (b) Pierce the refrigerant container to release the pressure.
   (c) Open the high pressure hand valve and adjust the high side pressure to approximately 5.0 kg/cm² (71 psi, 490 kPa).
   (d) Dip the heat sensing tube of the expansion valve in a pan filled with water. While varying the temperature of the water, read the low pressure gauge and, at the same time, measure the temperature of the water with a thermometer.
   (e) Compare the two readings on the chart.



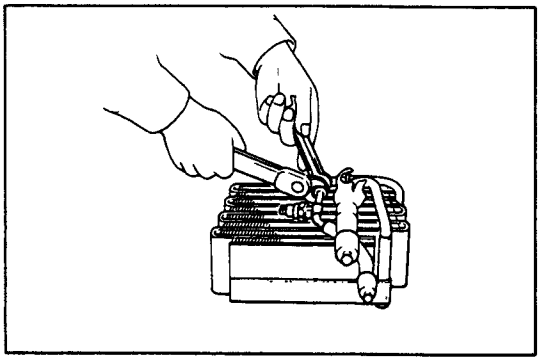
If the intersection is not between the two lines, replace the expansion valve.



ASSEMBLY OF COOLING UNIT

(See page AC-17)

1. **INSTALL COMPONENTS ON EVAPORATOR**
   (a) Connect the expansion valve to the inlet fitting of the evaporator. Torque the nut.
   Torque: 235 kg-cm (17 ft-lb, 23 N·m)
   NOTE: Be sure that the O-ring is positioned on the tube fitting.



(b) Connect the liquid line tube to the inlet fitting of the expansion valve. Torque the nut.

Torque: 135 kg-cm (10 ft-lb, 13 N·m)

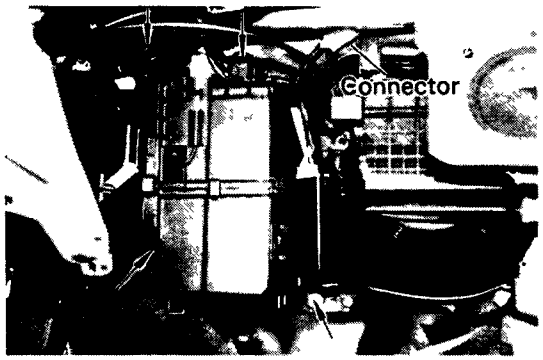
(c) Install the pressure switch, if removed.

Torque: 135 kg-cm (10 ft-lb, 13 N·m)

(d) Install the clamp and heat insulator to the outlet tube.

2. INSTALL UPPER AND LOWER CASES ON EVAPORATOR

3. INSTALL THERMISTOR



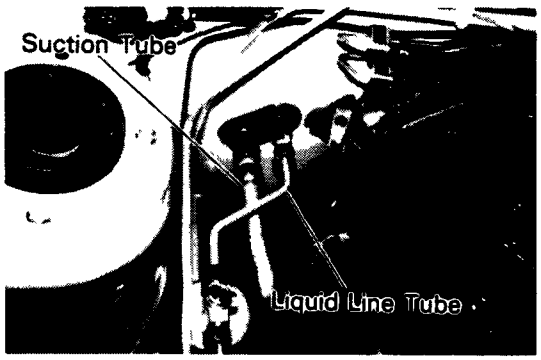
INSTALLATION OF COOLING UNIT

1. INSTALL A/C WIRE HARNESS TO COOLING UNIT

2. INSTALL COOLING UNIT

Install the cooling unit with the three nuts and four bolts.

CAUTION: Be careful not to pinch the wire harness while installing the cooling unit.



3. INSTALL GLOVE BOX

4. INSTALL GROMMETS ON INLET AND OUTLET FITTINGS

5. CONNECT LIQUID LINE TUBE TO COOLING UNIT INLET FITTINGS

Torque: 135 kg-cm (10 ft-lb, 13 N·m)

6. CONNECT SUCTION TUBE TO COOLING UNIT OUTLET FITTING

Torque: 325 kg-cm (24 ft-lb, 32 N·m)

7. IF EVAPORATOR WAS REPLACED, ADD COMPRESSOR OIL TO COMPRESSOR

Add 40 — 50 cc (1.4 — 1.7 oz)

8. CONNECT NEGATIVE CABLE TO BATTERY

9. EVACUATE, CHARGE AND TEST REFRIGERATION SYSTEM (See page AC-11)

REFRIGERANT LINES

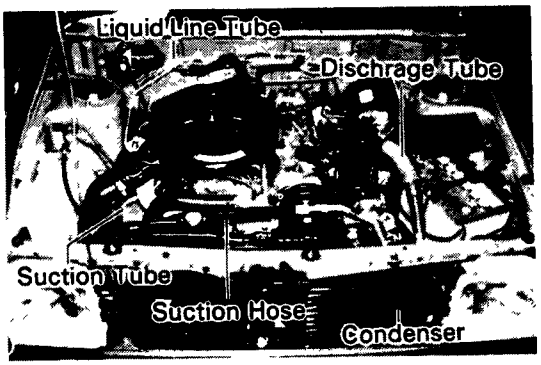
ON-VEHICLE INSPECTION

1. **INSPECT HOSES AND TUBES FOR LEAKAGE**

   Use a gas leak tester. Replace, if necessary.

2. **CHECK THAT HOSE AND TUBE CLAMPS ARE NOT LOOSE**

   Tighten or replace, as necessary.



REPLACEMENT OF REFRIGERANT LINES

(See page AC-17)

1. **DISCHARGE REFRIGERATION SYSTEM**
   (See page AC-12)

2. **REPLACE FAULTY TUBE OR HOSE**

   NOTE: Cap the open fittings immediately to keep moisture out of the system.

   Tightening torques for O-ring fittings

Fitting size	Torque
8/3 in. tube for liquid line	135 kg-cm (10 ft-lb, 13 N·m)
1/2 in. tube for discharge line	225 kg-cm (16 ft-lb, 22 N·m)
5/8 in. tube for suction line	325 kg-cm (24 ft-lb, 32 N·m)

3. **EVACUATE CHARGE AND TEST REFRIGERATION SYSTEM**
   (See page AC-11)

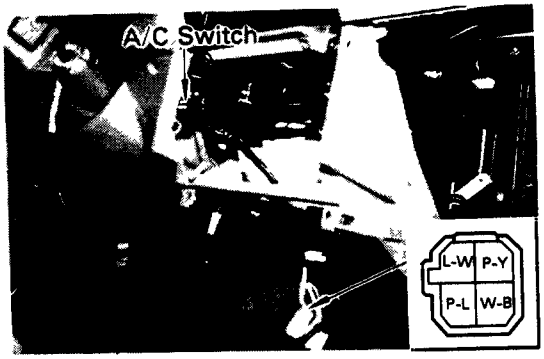
A/C SWITCH

ON-VEHICLE INSPECTION

1. **DISCONNECT NEGATIVE CABLE FROM BATTERY**

2. **REMOVE CENTER CLUSTER**

3. **DISCONNECT A/C SWITCH CONNECTOR**



Terminal / Switch Position	L-W	P-Y	P-L	W-B
OFF	Continuity		Some Resistance	
ECONO				
A/C	Continuity		Some Resistance	

4. **CHECK A/C SWITCH FOR CONTINUITY**

   Using an ohmmeter, check continuity between the terminals for each switch position shown in the table.

   If there is no continuity, replace the A/C switch.

5. **CONNECT A/C SWITCH CONNECTOR**

6. **INSTALL CENTER CLUSTER**

7. **CONNECT NEGATIVE CABLE TO BATTERY**

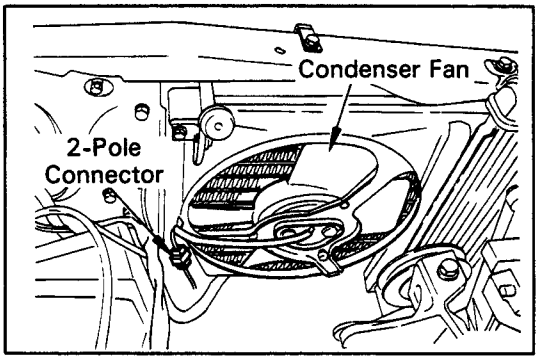
CONDENSER FAN MOTOR

(See page AC-17)

INSPECTION OF FUSIBLE LINK

1. DISCONNECT NEGATIVE CABLE FROM BATTERY
2. DISCONNECT FUSIBLE LINK
3. CHECK FUSIBLE LINK FOR CONTINUITY

   Using an ohmmeter, check continuity of the fusible link. If there is no continuity, replace the fusible link.



4. CONNECT FUSIBLE LINK
5. CONNECT NEGATIVE CABLE TO BATTERY

INSPECTION OF CONDENSER FAN MOTOR

1. DISCONNECT NEGATIVE CABLE FROM BATTERY
2. DISCONNECT CONNECTOR OF FAN MOTOR
3. CHECK FAN MOTOR

   (a) Apply 12V battery voltage to the connector using the wire harness.

   (b) Confirm smooth rotation of the motor within the specified current flow.

   Standard current: 6.7 ± 0.7 A

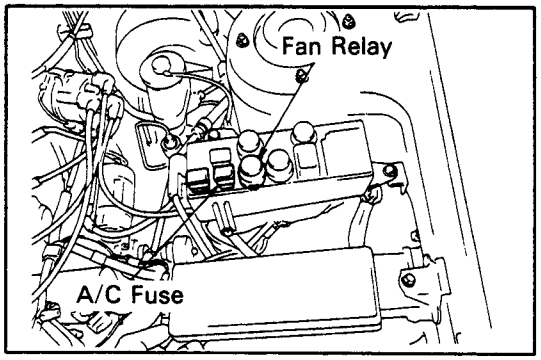
   If defective, replace the motor.

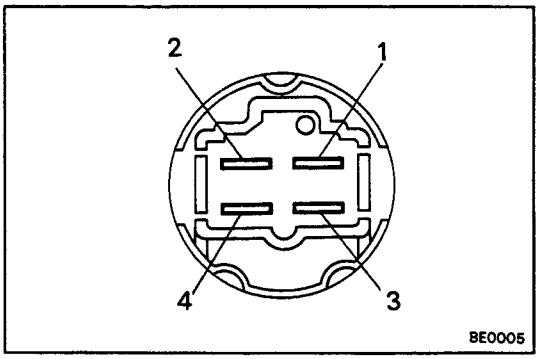
4. CONNECT CONNECTOR OF FAN MOTOR
5. CONNECT NEGATIVE CABLE TO BATTERY

FAN RELAY

INSPECTION OF FAN RELAY

1. REMOVE COVER OF RELAY BOX
2. REMOVE RELAY





3. CHECK FAN RELAY

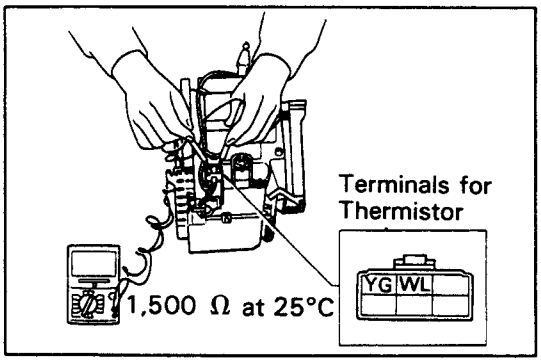
   Using an ohmmeter, check the continuity between terminals 2 and 4.

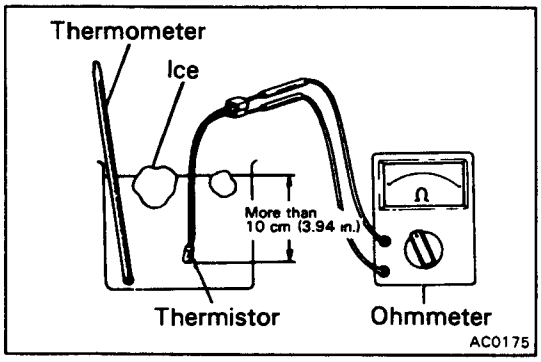
   Normal ..... No continuity

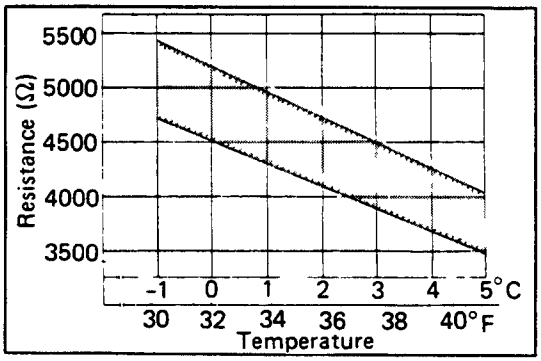
   When 12 volts applied across terminals 1 and 3

   Terminals 2 and 4 ..... Continuity

   If defective, replace the fan relay.







THERMISTOR (See page AC-17)

REMOVAL AND INSPECTION OF THERMISTOR

1. **DISCONNECT NEGATIVE CABLE FROM BATTERY**
2. **REMOVE GLOVE BOX AND UNDERCOVER**
3. **CHECK THERMISTOR INSTALLED OPERATION**

   Using an ohmmeter, measure the resistance at the connector.

   Resistance: 1,500 Ω at 25°C (77°F)
4. **REMOVE THERMISTOR**
   (a) Disconnect the connector.
   (b) Remove the screw and thermistor from the cooling unit.
5. **CHECK THERMISTOR OPERATION**
   (a) Place the thermistor in cold water. While varying the temperature of the water, measure the resistance at the connector and, at the same time, measure the temperature of the water with a thermometer.
   (b) Compare the two readings on the chart.

   If the intersection is not between the two lines, replace the thermistor.

INSTALLATION OF THERMISTOR

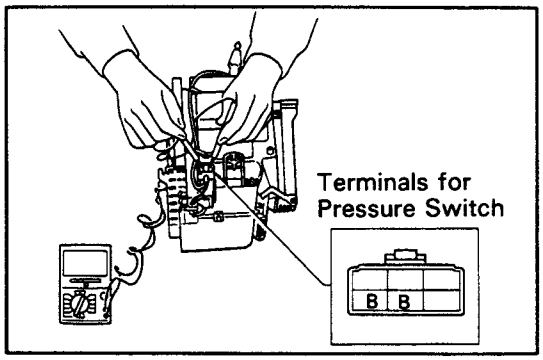
1. **INSTALL THERMISTOR**
   (a) Install the thermistor with the screw.
   (b) Connect the connector.
2. **INSTALL GLOVE BOX AND UNDERCOVER**
3. **CONNECT NEGATIVE CABLE TO BATTERY**

PRESSURE SWITCH (See page AC-17)

INSPECTION OF PRESSURE SWITCH

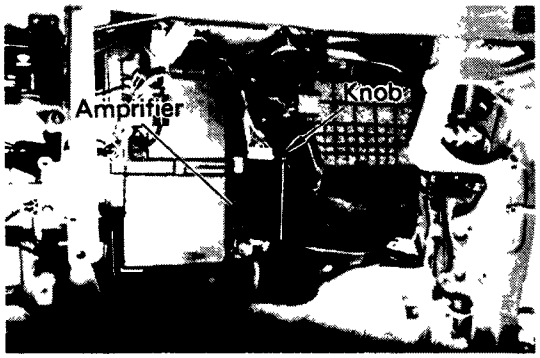
1. **CHECK REFRIGERANT PRESSURE**
   (a) Connect the hoses of the manifold gauge set to the compressor service valves and observe the gauge reading.
   (b) The gauge reading must be more than 2.1 kg/cm² (30 psi, 206 kPa) when the ambient temperature is higher than 0°C (32°F).

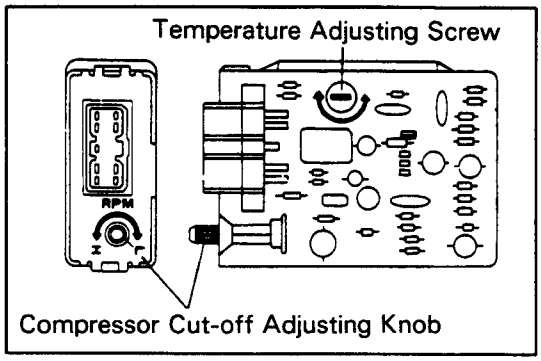
   If the pressure is less than 2.1 kg/cm² (30 psi, 206 kPa), charge the refrigerant. (See page AC-12)
2. **CHECK PRESSURE SWITCH**
   (a) Remove the glove box with the undercover.
   (b) Disconnect the lead wires of the pressure switch.
   (c) Check the continuity between the two terminals of the pressure switch with at ohmmeter.
   The ohmmeter must indicate zero ohm.

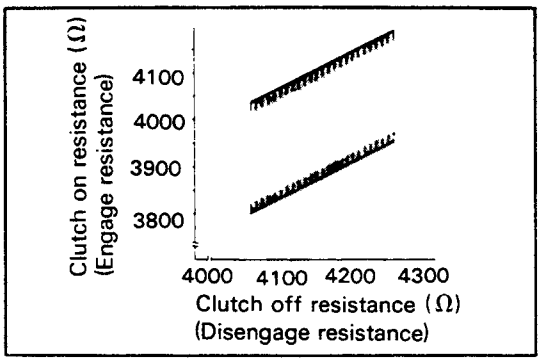


If there is no continuity, replace the pressure switch. (See page AC-17)

3. **REINSTALL PARTS IN REVERSE ORDER**







AIR CONDITIONER AMPLIFIER

INSPECTION OF AIR CONDITIONER AMPLIFIER

1. CHECK ENGINE SPEED DETECTING CIRCUIT

(a) Run the engine, and operate the air conditioner.

(b) Check that the magnetic clutch disengages at the specific engine revolution.

Cut-off rpm: 600 – 700 rpm

If the cut-out rpm is too high, turn the rpm knob clockwise to adjust.

If the cut-out rpm is too low, turn the rpm knob counterclockwise to adjust.

2. CHECK TEMPERATURE DETECTING CIRCUIT

(a) Remove the glove box with undercover.

(b) Disconnect the thermistor connector and connect variable resistor.

(c) Run the engine and operate the air conditioner to obtain maximum cooling.

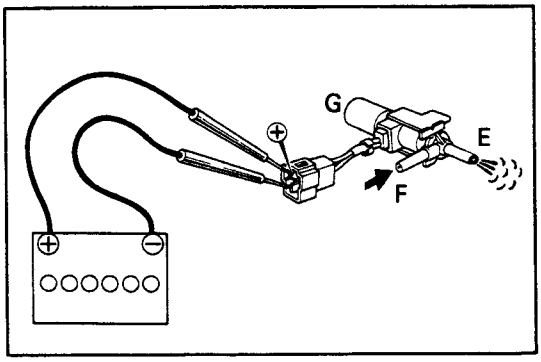
- Air Intake Control: RECIRC
- Air Flow Control: VENT
- Temperature Control: COOL
- Blower Control: HI

(d) Measure the resistance of the variable resistor when the magnetic clutch engages and disengages.

If the resistance is not between the two lines, adjust the amplifier.

If the cut-out or cut-in resistance is too high, turn the TEMP adjusting screw clockwise.

If the resistance is too low or the evaporator frosted, turn the TEMP adjusting screw counterclockwise until the magnetic clutch engages at the standard resistance.



VACUUM SWITCHING VALVE (VSV)

(See page AC-17)

INSPECTION OF VSV

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

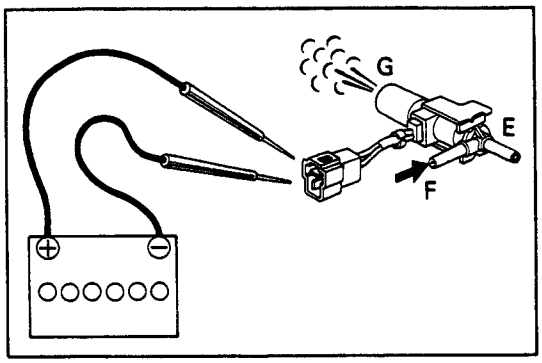
   (a) Connect the VSV terminals to the battery terminals as illustrated.

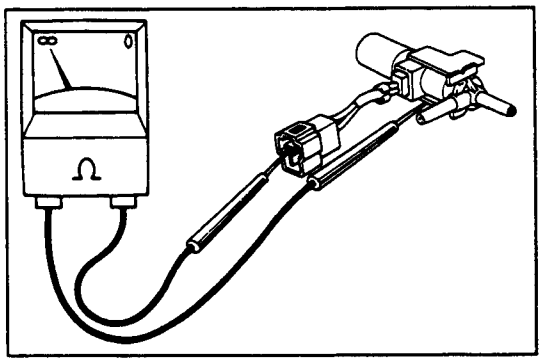
   (b) Blow into pipe "F" and check that air comes out of pipe "E".

   (c) Disconnect the battery.

   (d) Blow into pipe "F" and check that air comes out of filter "G".

   If a problem is found, replace the VSV.

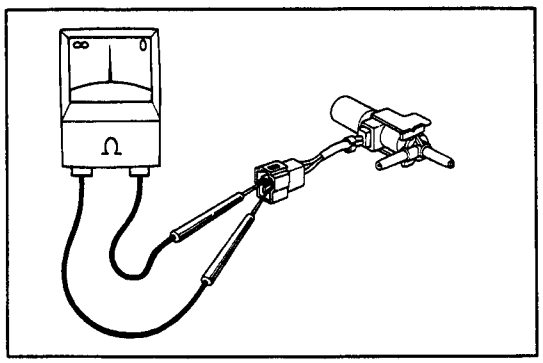




2. **CHECK FOR SHORT CIRCUIT**

   Using an ohmmeter, check that there is no continuity between each terminal and the VSV body.

   If there is continuity, replace the VSV.



3. **CHECK FOR OPEN CIRCUIT**

   Using an ohmmeter, measure the resistance between the two terminals.

   Resistance: 38 – 44 Ω (20°C or 68°F)

   If resistance is not within specification, replace the VSV.

SERVICE SPECIFICATIONS

	Page
MAINTENANCE	A-2
ENGINE MECHANICAL	A-3
FUEL SYSTEM	A-5
COOLING SYSTEM	A-6
LUBLICATION SYSTEM	A-6
IGNITION SYSTEM	A-6
STARTING SYSTEM	A-7
CHARGING SYSTEM	A-8
CLUTCH	A-8
MANUAL TRANSAXLE	A-9
AUTOMATIC TRANSAXLE	A-14
PROPELLER SHAFT	A-22
FRONT AXLE AND SUSPENSION	A-22
REAR AXLE AND SUSPENSION	A-24
BRAKE SYSTEM	A-26
STEERING	A-27
LUBRICANT	A-30

MAINTENANCE

Engine

Drive belt tension w/ Borroughs drive belt tension gauge No. BT-33-73F or Nippondenso BTG-20 (95506-00020)					
		New belt	125 ± 25 lb		
		Used belt	80 ± 20lb		
Coolant capacity (w/ Heater or air conditioner)			5.3 liters	5.6 US qts	4.7 Imp. qts
Engine oil capacity Drain and refill (w/ Oil filter change)			3.3 liters	3.5 US qts	2.9 Imp. qts
Spark plug			California & Canada 3A-C (ex. Wagon M/T)	Federal	3A & 3A-C (Canada Wagon M/T)
Type		ND	W16EXR-U11	W16EXR-U11	W16EXR-U
				W14EXR-U11	W14EXR-U
		NGK	BPR5EY11	BPR5EY11	BPR5EY
				BPR4EY11	BPR4EY
Gap			1.1 mm (0.043 in.)		0.8 mm (0.031 in.)
Valve clearance (hot)		IN	0.20 mm	0.008 in.	
		EX	0.30 mm	0.012 in.	
Idle speed		3A-C	4-speed M/T 550 rpm		
(w/ Cooling fan OFF and at Neutral)			5 or 6-speed M/T 650 rpm (w/o PS), 800 rpm (w/ PS)		
		3A	A/T 800 rpm (w/o PS), 900 rpm (w/ PS)		
			M/T 650 rpm (w/o PS), 800 rpm (w/ PS)		
			A/T 800 rpm (w/o PS), 900 rpm (w/ PS)		
Fast idle speed					
(w/ EGR system and Cooling fan OFF)		3A & 3A-C	3,000 rpm		
TP setting speed		3A-C	1,400 rpm		
(w/ EGR system and Cooling fan OFF)		3A	1,700 rpm (M/T), 1,400 rpm (A/T)		

Chassis

Front brake					
Pad thickness	Limit		1.0 mm	0.039 in.	
Disc thickness	Limit		10.0 mm	0.394 in.	
Disc runout	Limit		0.15 mm	0.0059 in.	
Rear brake					
Lining thickness	Limit		1.0 mm	0.039 in.	
Drum inside diameter	Limit	Sedan	181.0 mm	7.126 in.	
		Wagon	201.0 mm	7.913 in.	
Front axle and suspension					
Ball joint vertical play	Limit		0 mm	0 in.	
Rear axle and suspension					
Oil seal friction force (at hub bolt)			Approx. 400 g (0.9 lb, 3.9 N)		
Rear wheel bearing friction preload (turning)			400 – 1,000 g	0.9 – 2.2 lb	3.9 – 9.8 N

ENGINE MECHANICAL

Specifications

Intake manifold vacuum	at Idle speed				
		3A-C	450 mmHg (17.72 in.Hg, 60.0 kPa) or more		
		3A	430 mmHg (16.93 in.Hg, 57.3 kPa) or more		
Compression pressure	at 250 rpm	STD	1.25 kg/cm²	18 psi	123 kPa
		Limit	9.0 kg/cm²	128 psi	883 kPa
Differential of pressure between each cylinder			1.0 kg/cm² (14 psi, 98 kPa) or less		
Timing belt tension spring	Free length		38.4 mm		1.512 in.
	Installed tension	at 50.2 mm (1.976 in.)	3.83 kg	8 lb	37 N
Cylinder head	Cylinder block surface warpage	Limit	0.05 mm		0.0020 in.
	Manifold surface warpage	Limit	0.10 mm		0.0039 in.
	Valve seat Refacing angle		30°, 45°, 60°		
	Contacting angle		45°		
	Contacting width		1.2 – 1.6 mm		0.047 – 0.063 in.
Valve guide	Inner diameter		7.01 – 7.03 mm		0.2760 – 0.2768 in.
	Outer diameter	STD	11.540 – 11.551 mm		0.4543 – 0.4548 in.
		O/S 0.05	11.590 – 11.601 mm		0.4563 – 0.4567 in.
Valve	Valve overall length	STD IN	106.88 mm		4.2079 in.
		EX	106.78 mm		4.2039 in.
		Limit IN	106.38 mm		4.1882 in.
		EX	106.28 mm		4.1842 in.
	Valve face angle		44.5°		
	Stem diameter	IN	6.970 – 6.985 mm		0.2744 – 0.2750 in.
		EX	6.965 – 6.980 mm		0.2742 – 0.2748 in.
	Stem oil clearance	STD IN	0.025 – 0.060 mm		0.0010 – 0.0024 in.
		EX	0.030 – 0.065 mm		0.0012 – 0.0026 in.
		Limit IN	0.08 mm		0.0031 in.
		EX	0.10 mm		0.0039 in.
	Valve head edge thickness	Limit IN	0.5 mm		0.020 in.
		EX	1.0 mm		0.039 in.
Valve spring	Free length		44.6 mm		1.756 in.
	Installed tension	at 38.6 mm (1.520 in.)			
		STD	23.6 kg	52.0 lb	231 N
		Limit	21.0 kg	46.3 lb	206 N
	Squareness	Limit	2.0 mm		0.079 in.
Rocker arm and shaft	Shaft to arm clearance	STD	0.010 – 0.048 mm		0.0004 – 0.0019 in.
		Limit	0.06 mm		0.0024 in.
Intake and exhaust manifold	Manifold surface warpage	Limit	0.3 mm		0.012 in.

Specifications (Cont'd)

Camshaft	Thrust clearance		STD	0.08 – 0.18 mm	0.0031 – 0.0071 in.
			Limit	0.25 mm	0.0098 in.
	Journal oil clearance		STD	0.037 – 0.073 mm	0.0015 – 0.0029 in.
			Limit	0.1 mm	0.004 in.
	Journal diameter		STD	27.979 – 27.995 mm	1.1015 – 1.1022 in.
	Circle runout		Limit	0.06 mm	0.0024 in.
	Cam height	3A-C 4-speed M/T	STD IN & EX	39.03 – 39.04 mm	1.5366 – 1.5370 in.
			Limit IN & EX	38.73 mm	1.5248 in.
		Others	STD IN & EX	39.44 – 39.45 mm	1.5528 – 1.5531 in.
			Limit IN & EX	39.14 mm	1.5409 in.
Cylinder block	Warpage		Limit	0.05 mm	0.0020 in.
	Cylinder bore diameter		STD		
	Piston size	STD	STD	77.50 – 77.53 mm	3.0512 – 3.0524 in.
			Limit	77.73 mm	3.0602 in.
		O/S 0.50	Limit	78.23 mm	3.0799 in.
		O/S 0.75	Limit	78.48 mm	3.0898 in.
		O/S 1.00	Limit	78.73 mm	3.0996 in.
Piston and piston ring	Piston diameter		STD	77.39 – 77.42 mm	3.0468 – 3.0480 in.
			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.
	Piston to cylinder clearance			0.10 – 0.12 mm	0.0039 – 0.0047 in.
	Piston ring end gap		STD No. 1	0.20 – 0.47 mm	0.0079 – 0.00185 in.
			No. 2	0.20 – 0.52 mm	0.0079 – 0.0204 in.
			Oil	0.30 – 1.02 mm	0.0118 – 0.0402 in.
			Limit No. 1	1.07 mm	0.0421 in.
			No. 2	1.12 mm	0.0441 in.
			Oil	1.62 mm	0.0638 in.
	Piston ring land to 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.
Connecting rod and bearing	Thrust clearance		STD	0.15 – 0.25 mm	0.0059 – 0.0098 in.
			Limit	0.30 mm	0.0118 in.
	Rod bend		Limit	0.05 mm	0.0020 in.
	Rod twist		Limit	0.05 mm	0.0020 in.
Crankshaft	Thrust clearance		STD	0.020 – 0.185 mm	0.0008 – 0.0073 in.
			Limit	0.30 mm	0.0118 in.
	Thrust washer thickness		STD	2.440 – 2.490 mm	0.0961 – 0.0980 in.
	Main journal oil clearance		STD	0.030 – 0.065 mm	0.0012 – 0.0026 in.
			Limit	0.08 mm	0.0031 in.
	Crank pin oil clearance		STD	0.020 – 0.051 mm	0.0008 – 0.0020 in.
			Limit	0.08 mm	0.0031 in.
	Main journal diameter		STD	47.985 – 48.000 mm	1.8892 – 1.8898 in.
	Crank pin diameter		STD	39.985 – 40.000 mm	1.5742 – 1.5748 in.
	Circle runout		Limit	0.06 mm	0.0024 in.
	Main journal taper and out-of-round		Limit	0.02 mm	0.0008 in.
	Crank pin journal taper and out-of-round		Limit	0.02 mm	0.0008 in.

Tightening Torque

Tightening part	kg-cm	ft-lb	N·m
Camshaft timing pulley x Camshaft	475	34	47
Timing belt idler pulley x Cylinder block	375	27	37
Crankshaft pulley x Crankshaft	1,200	87	118
Camshaft bearing cap x Cylinder head	130	9	13
IIA drive gear x Camshaft	300	22	29
Rocker arm support x Cylinder head	250	18	25
Manifold x Cylinder head	250	18	25
Cylinder head x Cylinder block	600	43	59
Valve clearance adjusting screw lock nut	185	13	18
Main bearing cap x Cylinder block	600	43	59
Connecting rod cap x Connecting rod	500	36	49
Rear oil seal retainer x Cylinder block	95	82 in.-lb	9.3
Flywheel x Crankshaft	800	58	78
Drive plate x Crankshaft	650	47	64
Engine mounting insulator x Crossmember	450	33	44
Stiffener plate x Cylinder block	400	29	39
Stiffener plate x Transaxle case	400	29	39
Exhaust front pipe x Exhaust manifold	630	46	62
Water pump x Cylinder block	150	11	15
Oil pump x Cylinder block	220	16	22
Oil strainer x Cylinder block (Oil pump)	95	82 in.-lb	9.3
Oil pan x Cylinder block (Oil pump, Rear oil seal retainer)	55	48 in.-lb	5.4
Fuel pipe x Carbureter	250	18	25
Spark plug x Cylinder block	180	13	18
Engine oil drain plug x Oil pan	350	25	34

FUEL SYSTEM

Carburetor	Part No		
	3A-C (ex. Canada Wagon M/T)	21100 – 15340	
	3A-C (Canada Wagon M/T)	21100 – 15300	
	3A	21100 – 15290	
	Item	3A-C (ex. Canada Wagon M/T)	Others
	Float level Raised position	7.2 mm 0.283 in.	←
	Lowered position	1.67 – 1.99 mm (0.0657 – 0.0783 in.)	←
	Throttle valve full open angle		
	Primary	90° from horizontal plane	←
	Secondary	75° from horizontal plane	←
	Kick up clearance	0.16 mm	0.23 mm
	Secondary touch angle	45° from horizontal plane	←
	Fast idle angle	20° from horizontal plane	21° from horizontal plane
	Unloader angle	41° from horizontal plane	47° from horizontal plane

FUEL SYSTEM (Cont'd)

Carburetor	Item	3A-C (ex. Canada Wagon M/T)	Others
	Choke opener angle (3A-C only)	77° from horizontal plane	←
	Choke breaker angle 1st	38° from horizontal plane	39° from horizontal plane
	2nd	55° from horizontal plane	50° from horizontal plane
	Accelerating pump stroke	4.0 mm 0.157 in.	3.0 mm 0.118 in.
	Choke heater resistance at 20°C (68°F)	17 – 19 Ω	20 – 22 Ω
	Idle mixture adjusting screw presetting	Screw out 3 turns	Screw out 2 1/2 turns
	Idle speed	See page A-2	
	Fast idle speed	See page A-2	
	TP setting speed	See page A-2	
	Idle mixture speed	700 rpm	

COOLING SYSTEM

Coolant capacity w/ Heater or air conditioner			See page A-2
Radiator	Relief valve opening pressure	STD	0.75 – 1.05 kg/cm² (10.7 – 14.9 psi, 74 – 103 kPa)
		Limit	0.6 kg/cm² 8.5 psi 59 kPa
Thermostat	Valve opening temperature		
	Valve lift at 95°C (203°F)		8 mm or more 0.31 in or more

LUBRICATION SYSTEM

Oil pressure (normal operating temperature)			
	at Idle speed		More than 0.3 kg/cm² (4.3 psi, 29 kPa)
	at 3,000 rpm		2.5 – 5.0 kg/cm² (36 – 71 psi, 245 – 490 kPa)
Oil pump	Body clearance	STD	0.100 – 0.191 mm 0.0039 – 0.0075 in.
		Limit	0.20 mm 0.0079 in.
	Tip clearance		
	Driven gear to crescent	STD	0.058 – 0.310 mm 0.0023 – 0.0122 in.
		Limit	0.35 mm 0.0138 in.
	Driven gear to crescent	STD	0.107 – 0.248 mm 0.0042 – 0.0098 in.
		Limit	0.35 mm 0.0138 in.
	Side clearance	STD	0.025 – 0.075 mm 0.0010 – 0.0030 in.
		Limit	0.10 mm 0.0039 in.

IGNITION SYSTEM

Ignition timing	3A	5°BTDC @ Max. 950 rpm's
	3A-C (w/ Vacuum advancer OFF)	5°BTDC @ Max. 950 rpm's
	3A-C (w/ Vacuum advancer ON)	Approx. 13°BTDC @ Max. 950 rpm's
Firing order		1 – 3 – 4 – 2
High tension cord	Resistance Limit	25 kΩ/cord

IGNITION SYSTEM (Cont'd)

Ignition coil		3A-C (ex. Canada Wagon M/T)		Others	
	Primary coil resistance	0.4 – 0.5 Ω		1.2 – 1.5 Ω	
	Secondary coil resistance	7.7 – 10.4 kΩ		7.7 – 10.4 kΩ	
Distributor	Air gap	0.2 – 0.4 mm		0.008 – 0.016 in.	
	Pickup coil resistance	130 – 190 Ω			
	Distributor advance angle (Part No.)	Governor		Vacuum	
		Dis. rpm	Advance angle	mmHg (in.Hg, kPa)	Advance angle
	3A-C (ex. Canada Wagon) (19030-15060)	550	Advance begins	Main	
		800	3.0°	80 (3.15, 10.7)	begins
		1,417	5.4°	186 (7.32, 24.8)	7.7°
		2,600	11.5°	280 (11.02, 37.3)	13.0°
		3,000	11.1°		
				Sub	
				200 (7.87, 26.7)	begins
				260 (10.24, 34.7)	4.0°
	3A-C (Canada Wagon M/T) (19030-15040)	550	Advance begins	Main	
		800	3.0°	80 (3.15, 10.7)	begins
		1,339	5.1°	186 (7.32, 24.8)	7.7°
		2,600	11.5°	280 (11.02, 37.3)	13.0°
		3,000	11.2°		
				Sub	
				200 (7.87, 26.7)	begins
				260 (10.24, 34.7)	4.0°
	3A (19030-15030 M/T)	500	Advance begins	100 (3.94, 13.3)	begins
		800	3.0°	146 (5.75, 19.5)	3.4°
		1,339	5.1°	200 (7.87, 26.5)	6.5°
		2,600	11.5°		
		3,000	11.2°		
Spark plug	See page A-2				

STARTING SYSTEM

Conventional starter	Rated voltage and output power			12V 0.8 kw	
	No-load characteristic		Ampere	Less than 50A at 11V	
			rpm	More than 5,000 rpm	
	Armature shaft thrust clearance			0.05 – 0.60 mm	0.0020 – 0.0236 in.
	Brush	Length	STD	16 mm	0.63 in.
			Limit	10.5 mm	0.413 in.
	Spring installed load			1.02 – 1.38 kg (2.2 – 3.0 lb, 10 – 14 N)	
	Commutator	Outer diameter	STD	28 mm	1.10 in.
			Limit	27 mm	1.06 in.
		Undercut depth	STD	0.5 – 0.8 mm	0.020 – 0.031 in.
			Limit	0.2 mm	0.008 in.
		Runout	Limit	0.4 mm	0.016 in.
	Pinion end to stop collar clearance			0.1 – 4.0 mm	0.004 – 0.157 in.

STARTING SYSTEM (Cont'd)

Reduction type starter	Rated voltage and output power			12V 1.0 kw	
	No-load characteristic		Ampere	Less than 90A at 11.5V	
			rpm	More than 3,000 rpm's	
	Brush	Length	STD	13.0 mm	0.512 in.
			Limit	8.5 mm	0.335 in.
	Spring installed load			1.79 – 2.41 kg	
				(3.9 – 5.3 lb, 18 – 24 N)	
	Commutator	Outer diameter	STD	30 mm	1.18 in.
			Limit	29 mm	1.14 in.
		Undercut depth	STD	0.5 – 0.8 mm	0.020 – 0.031 in.
			Limit	0.2 mm	0.008 in.
		Runout	Limit	0.05 mm	0.0020 in.

CHARGING SYSTEM

Battery specific gravity	When fully charged at 20°C (68°F)		1.25 – 1.27	
Drive belt tension		New belt	125 ± 25 lb	
		Used belt	80 ± 20 lb	
	Item		w/o IC regulator	w/ IC regulator
Alternator	Rated output		50A	55A
	Brush exposed length	STD	12.5 mm 0.492 in.	10.5 mm 0.413 in.
		Limit	5.5 mm 0.217 in.	
	Rotor coil resistance		4.0 – 4.2 Ω	2.8 – 3.0 Ω
	Slip ring diameter	STD	32.5 mm 1.280 in.	14.2 – 14.4 mm (0.559 – 0.567 in.)
		Limit	32.1 mm 1.264 in.	14.0 mm 0.551 in.
Alternator regulator	Regulating voltage	w/o IC regulator	13.8 – 14.8V	
		w/ IC regulator	13.5 – 15.1V	

CLUTCH

Specifications

Pedal height (from floor asphalt sheet)			177 – 187 mm	6.97 – 7.36 in.
Pedal freeplay			2 – 28 mm	0.08 – 1.10 in.
Disc rivet head depth		Limit	0.3 mm	0.012 in.
Disc runout		Limit	0.8 mm	0.031 in.
Diaphragm spring out of alignment		Limit	0.5 mm	0.020 in.
Diaphragm spring finger wear	Depth	Limit	0.6 mm	0.024 in.
	Width	Limit	5.0 mm	0.197 in.
Flywheel runout		Limit	0.2 mm	0.008 in.

Tightening Torque

Tightening part	kg-cm	ft-lb	N·m
Clutch cover x Flywheel	195	14	19
Clutch pedal x Bracket	375	27	37
Clutch release fork x Fork lever	750	54	74

MANUAL TRANSAXLE

Specifications

Manual transmission (Z45,46,53,54F)	Gear thrust clearance	Extra low	STD	0.180 – 0.430 mm	0.0070 – 0.0169 in.
			Limit	0.50 mm	0.0197 in.
		1st	STD	0.150 – 0.275 mm	0.0059 – 0.0108 in.
			Limit	0.30 mm	0.0118 in.
		2nd & 3rd	STD	0.150 – 0.250 mm	0.0059 – 0.0098 in.
			Limit	0.30 mm	0.0118 in.
		4th	STD	0.020 – 0.240 mm	0.0008 – 0.0094 in.
			Limit	0.30 mm	0.0118 in.
		Counter 5th	STD	0.150 – 0.325 mm	0.0059 – 0.0128 in.
			Limit	0.40 mm	0.0157 in.
	Gear oil clearance	Extra low	STD	0.009 – 0.032 mm	0.0004 – 0.0013 in.
			Limit	0.04 mm	0.0016 in.
		1st	STD	0.009 – 0.062 mm	0.0004 – 0.0024 in.
			Limit	0.07 mm	0.0028 in.
		2nd & 3rd	STD	0.060 – 0.101 mm	0.0024 – 0.0040 in.
			Limit	0.11 mm	0.0043 in.
		4th	STD	0.015 – 0.035 mm	0.0006 – 0.0014 in.
			Limit	0.04 mm	0.0016 in.
		Counter 5th	STD	0.009 – 0.055 mm	0.0004 – 0.0022 in.
			Limit	0.06 mm	0.0024 in.
		Reverse idler	STD	0.055 – 0.092 mm	0.0022 – 0.0036 in.
			Limit	0.10 mm	0.0039 in.
	Output shaft				
	Circle runout		Limit	0.06 mm	0.0024 in.
	flange thickness		STD	4.24 – 4.54 mm	0.1669 – 0.1787 in.
			Limit	3.00 mm	0.1181 in.
	1st gear bearing inner race flange thickness		STD	4.175 – 4.275 mm	0.1643 – 0.1683 in.
			Limit	3.00 mm	0.1181 in.
	Synchronizer ring to gear clearance				
	5th and extra low		STD	0.7 – 1.3 mm	0.028 – 0.051 in.
			Limit	0.6 mm	0.024 in.
	Others		STD	0.9 – 1.5 mm	0.035 – 0.059 in.
			Limit	0.6 mm	0.024 in.
	Shift fork to hub sleeve clearance		Limit	1.0 mm	0.039 in.
	Oil pump drive shaft				
	Shaft stroke			6.0 mm	0.236 in.
	Input shaft snap ring thickness			2.10 – 2.15 mm	0.0827 – 0.0846 in.
				2.25 – 2.30 mm	0.0886 – 0.0906 in.
	Idler gear snap ring thickness			2.40 – 2.45 mm	0.0945 – 0.0965 in.
				2.45 – 2.50 mm	0.0965 – 0.0984 in.
	Counter gear rear snap ring thickness (Z45, 46, 53)			1.80 – 1.85 mm	0.0709 – 0.0728 in.
				1.95 – 2.00 mm	0.0768 – 0.0787 in.

Specifications (Cont'd)

Manual Transmission (Z45,46,53,54F) (Cont'd)	Counter gear rear snap ring thickness (Z54F)	1.925 – 1.975 mm	0.0758 – 0.0778 in.
		1.975 – 2.025 mm	0.0778 – 0.0797 in.
		2.025 – 2.075 mm	0.0797 – 0.0817 in.
		2.075 – 2.125 mm	0.0817 – 0.0837 in.
		2.125 – 2.175 mm	0.0837 – 0.0856 in.
		2.175 – 2.225 mm	0.0856 – 0.0876 in.
	1st gear bushing snap ring thickness	2.15 – 2.20 mm	0.0846 – 0.0866 in.
		2.20 – 2.25 mm	0.0866 – 0.0886 in.
		2.25 – 2.30 mm	0.0886 – 0.0906 in.
		2.30 – 2.35 mm	0.0906 – 0.0925 in.
		2.35 – 2.40 mm	0.0925 – 0.0945 in.
		2.40 – 2.45 mm	0.0945 – 0.0965 in.
		2.45 – 2.50 mm	0.0965 – 0.0984 in.
		2.50 – 2.55 mm	0.0984 – 0.1004 in.
		2.55 – 2.60 mm	0.1004 – 0.1024 in.
	Output shaft front bearing snap ring thickness	2.10 – 2.15 mm	0.0827 – 0.0846 in.
		2.15 – 2.20 mm	0.0846 – 0.0866 in.
		2.20 – 2.25 mm	0.0866 – 0.0886 in.
		2.25 – 2.30 mm	0.0886 – 0.0906 in.
		2.30 – 2.35 mm	0.0906 – 0.0925 in.
		2.35 – 2.40 mm	0.0925 – 0.0945 in.
		2.40 – 2.45 mm	0.0945 – 0.0965 in.
		2.45 – 2.50 mm	0.0965 – 0.0984 in.
		2.50 – 2.55 mm	0.0984 – 0.1004 in.
	Output shaft front snap ring thickness	2.10 – 2.15 mm	0.0827 – 0.0846 in.
		2.15 – 2.20 mm	0.0846 – 0.0866 in.
		2.20 – 2.25 mm	0.0866 – 0.0886 in.
		2.25 – 2.30 mm	0.0886 – 0.0906 in.
		2.30 – 2.35 mm	0.0906 – 0.0925 in.
		2.35 – 2.40 mm	0.0925 – 0.0945 in.
	Counter gear 5th gear snap ring thickness (for No. 3 clutch hub)	1.80 – 1.85 mm	0.0709 – 0.0728 in.
		1.85 – 1.90 mm	0.0728 – 0.0748 in.
		1.90 – 1.95 mm	0.0748 – 0.0768 in.
		1.95 – 2.00 mm	0.0768 – 0.0787 in.
		2.00 – 2.05 mm	0.0787 – 0.0807 in.
		2.05 – 2.10 mm	0.0807 – 0.0827 in.
		2.10 – 2.15 mm	0.0827 – 0.0846 in.
Differential	Drive pinion bearing preload (at Starting)		
	New bearing	5 – 10 kg-cm	
		(4.3 – 8.7 in.-lb, 0.5 – 1.0 N·m)	
	Reused bearing	3 – 5 kg-cm	
		(2.6 – 4.3 in.-lb, 0.3 – 0.5 N·m)	

Specifications (Cont'd)

Differential (cont'd)	Total preload (at Starting)	Add drive pinion bearing preload	
	New and reused bearing	3 – 5 kg-cm	
		(2.6 – 4.3 in.-lb, 0.3 – 0.5 N·m)	
	Drive pinion to ring gear bracklash	0.10 – 0.15 mm	0.0039 – 0.0059 in.
	Drive pinion rear bearing lock nut tightening range	1,500 – 3,700 kg-cm	
		(109 – 267 ft-lb, 147 – 362 N·m)	
	Side gear to side gear backlash	0.04 – 0.24 mm	0.0016 – 0.0094 in.
	(Hold one side gear and measure the backlash of the other)		
	Ring gear runout Limit	0.07 mm	0.0028 in.
	Ring gear installed temperature	90 – 110°C	194 – 230°F
	Side gear thrust washer thickness	1.48 – 1.52 mm	0.0583 – 0.0598 in.
		1.53 – 1.57 mm	0.0602 – 0.0618 in.
		1.58 – 1.62 mm	0.0622 – 0.0638 in.
		1.63 – 1.67 mm	0.0642 – 0.0657 in.
		1.68 – 1.72 mm	0.0661 – 0.0677 in.
		1.73 – 1.77 mm	0.0681 – 0.0697 in.
	Drive pinion adjusting plate washer thickness	1.50 mm	0.0591 in.
		1.53 mm	0.0602 in.
		1.56 mm	0.0614 in.
		1.59 mm	0.0626 in.
		1.62 mm	0.0638 in.
		1.65 mm	0.0650 in.
		1.68 mm	0.0661 in.
		1.71 mm	0.0673 in.
		1.74 mm	0.0685 in.
		1.77 mm	0.0697 in.
		1.80 mm	0.0709 in.
		1.83 mm	0.0720 in.
		1.86 mm	0.0732 in.
		1.89 mm	0.0744 in.
		1.92 mm	0.0756 in.
		1.95 mm	0.0768 in.
	Side washer thickness	2.62 mm	0.1031 in.
		2.65 mm	0.1043 in.
		2.68 mm	0.1055 in.
		2.71 mm	0.1067 in.
		2.74 mm	0.1079 in.
		2.77 mm	0.1091 in.
		2.80 mm	0.1102 in.

Specifications (Cont'd)

Differential (Cont'd)	Side washer thickness (Cont'd)	2.83 mm	0.1114 in.
		2.86 mm	0.1126 in.
		2.89 mm	0.1138 in.
		2.92 mm	0.1150 in.
		2.95 mm	0.1161 in.
		2.98 mm	0.1173 in.
		3.01 mm	0.1185 in.
		3.04 mm	0.1197 in.
		3.07 mm	0.1209 in.
		3.10 mm	0.1220 in.
		3.13 mm	0.1232 in.
		3.16 mm	0.1244 in.
		3.19 mm	0.1256 in.
		3.22 mm	0.1268 in.
		3.25 mm	0.1280 in.
		3.28 mm	0.1291 in.

Tightening Torque

Item	Tightening part	kg-cm	ft-lb	N·m
Transaxle	Transaxle case x Cylinder block	600	43	59
	Transaxle case x Starter	400	29	39
	Engine rear support member x Body	970	70	95
Manual transmission (Z45, 46, 53, 54F)	Transmission case x Transaxle case	250	18	25
	Transmission case cover x Transmission case	250	18	25
	Extension housing x Transmission case (Z45, 46, 53)	260	19	25
	Extension housing x Transfer adaptor (Z54F)	260	19	25
	Transmission case x Transfer adaptor (Z54F)	260	19	25
	Transfer case cover x Transfer adaptor (Z54F)	195	14	19
	Control shift lever retainer x Extension housing (Z54F)	195	14	19
	Output shaft front bearing retainer x Intermediate plate	130	9	13
	Output shaft rear bearing retainer x Transmission case	130	9	13
	Input shaft front bearing lock plate x Intermediate plate	130	9	13
	Counter gear plate x Counter gear (Z45, 46)	130	9	13
	Oil reciver x Transmission case	55	48 in.-lb	5.4
	Reverse shift arm pivot x Transmission case	300	22	29
	Reverse restrict pin plug x Extension housing (Z45, 46, 53)	410	30	40
	Reverse restrict pin plug x Transfer adaptor (Z54F)	410	30	40

Tightening Torque (Cont'd)

Item	Tightening part	kg-cm	ft-lb	N·m
Manual transmission (Z45, 46, 53, 54F)	Reverse restrict pin x Extension housing (Z54F)	410	30	40
	Shift fork x Shift fork shaft	185	13	18
	Shift lever housing x Select lever (Z54F)	340	25	33
	Oil pump cover x Extension housing (Z54F)	195	14	19
	Detent ball spring plug x Transmission case	220	16	22
	Detent ball spring plug x Reverse shift fork	220	16	22
	Detent ball spring plug x Transfer adaptor (Z54F)	250	18	25
	Transfer adaptor plug x Transfer adaptor (Z54F)	250	18	25
	No. 4 gear shift head x Shift fork shaft (Z54F)	125	9	12
	Gear shifting rod end x Select lever shaft (Z45, 46, 53)	195	14	19
	Shift lever housing Bracket x Extension housing (Z45, 46, 53F)	195	14	19
	Rear drive shift link lever x Transfer shift lever shaft (Z54F)	130	9	13
	Speedometer driven gear lock plate x Extension housing	55	48 in.-lb	5.4
	Filler plug x Transmission case	410	30	40
	Drain plug x Transmission case	410	30	40
Differential	Ring gear x Differential case	980	71	96
	Drive pinion x Drive pinion rear bearing	2,600	188	255
	Side bearing cap x Transaxle case	500	36	49
	Differential carrier cover x Transaxle case	130	9	13
	Oil reservoir x Transaxle case	55	48 in.-lb	5.4
	Filler plug x Transaxle case	410	30	40
	Drain plug x Transaxle case	300	22	29

AUTOMATIC TRANSAXLE (A55)

Specifications

Governor pressure		
Output shaft rpm (Vehicle speed reference)		
1,000	(29 km/h, 18 mph)	1.2 – 1.8 kg/cm² (17 – 26 psi, 118 – 177 kPa)
1,800	(52 km/h, 32 mph)	1.8 – 2.4 kg/cm² (26 – 34 psi, 177 – 235 kPa)
3,500	(101 km/h, 63 mph)	3.8 – 5.0 kg/cm² (54 – 71 psi, 373 – 490 kPa)
Line pressure		
At idling rpm	"D" range	4.0 — 4.6 kg/cm² (57 – 65 psi, 392 – 451 kPa)
	"R" range	7.5 – 8.5 kg/cm² (107 – 121 psi, 735 – 834 kPa)
At stall	"D" range	9.3 – 11.3 kg/cm² (132 – 161 psi, 912 – 1,108 kPa)
	"R" range	17.7 – 20.2 kg/cm² (252 – 287 psi, 1,736 – 1,981 kPa)
Throttle pressure	"D" and "R" range	
At idling rpm		0 – 0.3 kg/cm² (0 – 4.3 psi, 0 – 29 kPa)
At stall		7.7 – 8.3 kg/cm² (110 – 118 psi, 755 – 814 kPa)
Engine stall revolution	"D" and "R" range	
	3A-C	2,050 – 2,350 rpm
	3A	2,100 – 2,400 rpm
Time lag	"N" range → "D" range	Less than 1.2 seconds
	"N" range → "R" range	Less than 1.5 seconds
Engine idle speed (w/Cooling fan and A/C OFF)		
	"N" range w/o PS	800 rpm
	w/ PS	900 rpm
Front clutch input shaft thrust play		0.24 – 0.96 mm 0.0094 – 0.0378 in.
Input shaft thrust play		0.10 – 0.70 mm 0.0039 – 0.0276 in.
Output shaft thrust play		0.31 – 1.53 mm 0.0122 – 0.0602 in.
Driven sprocket thrust clearance		0.11 – 0.69 mm 0.0043 – 0.0272 in.
Throttle lever thrust clearance		Less than 0.5 mm (0.020 in.)
Drive plate runout	Limit	Less than 0.20 mm (0.0079 in.)
Torque converter deflection	Limit	Less than 0.30 mm (0.0118 in.)

Specifications (Cont'd)

Shift point schedule km/h (mph)	Differential gear ratio	"D" range (throttle valve fully open)				"L" range
		1 → 2	2 → 3	3 → 2	2 → 1	2 → 1
	3.583	42 – 58 (26 – 36)	96 – 110 (60 – 68)	88 – 103 (55 – 64)	33 – 49 (21 – 30)	35 – 51 (22 – 32)

Valve spring mm (in.)		Free length	Coil outside diameter	No. Coils	Wire diameter	Color
	Regulator valve	55.80 (2.1968)	18.10 (0.7126)	8.5	1.6 (0.063)	Non
	Valve body					
	1-2 shift valve	26.00 (1.0236)	5.15 (0.2028)	14.5	0.5 (0.020)	Non
	Low-coast valve	36.50 (1.4370)	8.60 (0.3386)	16	1.2 (0.047)	Non
	2-3 shift valve	22.10 (0.8701)	6.40 (0.2520)	9.5	0.6 (0.024)	Non
	Detent regulator	27.40 (1.0787)	8.00 (0.3150)	10	1.0 (0.039)	Non
	Throttle valve					
	Front	30.03 (1.1823)	8.55 (0.3366)	8.9	0.9 (0.035)	Non
	Rear	27.50 (1.0827)	7.40 (0.2913)	10.25	0.6 (0.024)	Non
	Accumulator					
	Front	67.00 (2.6378)	17.80 (0.7008)	12.5	2.3 (0.091)	White
	Rear	38.42 (1.5126)	14.03 (0.5524)	10	2.03 (0.0799)	Non
	Governor valve	19.60 (0.7717)	9.40 (0.3701)	6	0.80 (0.0315)	Non
	T/C check ball valve	26.20 (1.0315)	6.60 (0.2598)	14	0.60 (0.0236)	Non
	Priming valve	28.50 (1.1220)	6.30 (0.2480)	14.5	0.65 (0.0256)	Non

Clutch piston return spring (C_1, C_2)	Free length	28.90 mm	1.1378 in.
	Coil outside diameter	8.00 mm	0.315 in.
	No. of coils	12	

Brake piston return spring (B_1, B_2, B_3)		B_1, B_2		B_3	
	Free length	16.12 mm	0.6346 in.	26.17 mm	1.0303 in.
	Coil outside diameter	8.00 mm	0.0315 in.	7.90 mm	0.3110 in.
	No. of coils	6		9	

Clutch and brake piston stroke	Front clutch	2.37 – 3.42 mm	0.0933 – 0.1346 in.
	Rear clutch	0.90 – 1.50 mm	0.0354 – 0.0591 in.
	No. 1 brake	0.65 – 1.30 mm	0.0256 – 0.0512 in.
	No. 2 brake	0.93 – 1.72 mm	0.0366 – 0.0677 in.
Brake clearance	No. 3 brake	10.04 – 11.30 mm	0.3953 – 0.4449 in.

Specifications (Cont'd)

Oil pump	Side clearance	STD	0.02 – 0.05 mm	0.0008 – 0.0020 in.	
	Body clearance	STD	0.07 – 0.15 mm	0.0028 – 0.0059 in.	
	Tip clearance (Driven gear)	STD	0.11 – 0.14 mm	0.0043 – 0.0055 in.	
Bushing bore mm (in.)	Bushing name		Length	Finished bore	Bore limit
	Stator support	Front	9.75 (0.3839)	16.000 – 16.018 (0.6299 – 0.6306)	16.068 (0.6326)
	Oil pump body		13.46 (0.5299)	38.125 – 38.150 (1.5010 – 1.5020)	38.200 (1.5039)
	Front support		10.75 (0.4232)	31.038 – 31.063 (1.2220 – 1.2230)	31.113 (1.2249)
	Front clutch drum		9.75 (0.3839)	22.025 – 22.046 (0.8671 – 0.8680)	22.096 (0.8699)
	Front planetary ring gear flange		6.55 (0.2579)	30.025 – 30.051 (1.1821 – 1.1831)	30.101 (1.1851)
	Sun gear	Front	9.75 (0.3839)	22.025 – 22.046 (0.8671 – 0.8680)	22.096 (0.8699)
		Rear	9.75 (0.3839)	22.025 – 22.046 (0.8671 – 0.8680)	22.096 (0.8699)
	Center support		65.68 (2.5858)	36.386 – 36.411 (1.4325 – 1.4335)	36.461 (1.4355)
	Transmission case		10.75 (0.4232)	32.025 – 32.050 (1.2608 – 1.2618)	32.100 (1.2638)

Tightening Torque

Tightening part	kg-cm	ft-lb	N·m
Transaxle x Transmission	195	14	19
Extension housing	195	14	19
Neutral start switch (bolt)	130	9	13
Neutral start switch (nut)	70	61 in.-lb	6.9
Drive plate	650	47	64
Torque converter	185	13	18
Oil pump	185	13	18
Center support	260	19	25
Valve body	55	48 in.-lb	5.4
Oil pan	75	65 in.-lb	7.4
Oil pump cover bolt	185	13	18
Front support	195	14	19
No. 3 valve body cover bolt	55	48 in.-lb	5.4
Accumulator piston cover	55	48 in.-lb	5.4
Governor pressure adapter	55	48 in.-lb	5.4
Cooler pipe union nut x Union or elbow	350	25	34
Testing plug	75	65 in.-lb	7.4
Parking lock pawl bracket	75	65 in.-lb	7.4
Oil pan drain plug	300	22	29
Union x Transaxle case	220	16	22
Elbow x Transmission case	220	16	22

AUTOMATIC TRANSAXLE (A55F)

Specifications

Governor pressure		
Output shaft rpm (Vehicle speed reference)		
1,000	(27 km/h, 17 mph)	1.2 – 1.8 kg/cm² (17 – 26 psi, 118 – 177 kPa)
1,800	(49 km/h, 31 mph)	1.8 – 2.4 kg/cm² (26 – 34 psi, 177 – 235 kPa)
3,500	(95 km/h, 59 mph)	4.2 – 5.0 kg/cm² (60 – 71 psi, 412 – 490 kPa)
Line pressure		
At idling rpm	"D" range	4.0 – 4.6 kg/cm² (57 – 65 psi, 392 – 451 kPa)
	"R" range	7.5 – 8.5 kg/cm² (107 – 121 psi, 735 – 834 kPa)
At stall	"D" range	9.3 – 11.3 kg/cm² (132 – 161 psi, 912 – 1,108 kPa)
	"R" range	17.7 – 20.2 kg/cm² (252 – 287 psi, 1,736 – 1,981 kPa)
Throttle pressure	"D" and "R" range	
At idling rpm		0 – 0.3 kg/cm² (0 – 4.3 psi, 0 – 29 kPa)
At stall		7.7 – 8.3 kg/cm² (110 – 118 psi, 755 – 814 kPa)
Rear servo piston operation pressure		
4WD change-over switch	OFF	0 kg/cm² (0 psi, 0 kPa)
	ON	1.7 – 2.3 kg/cm² (24 – 33 psi, 167 – 226 kPa)
Engine stall revolution	"D" and "R" range	
	3A-C	2,050 – 2,350 rpm
Time lag	"N" range → "D" range	Less than 1.2 seconds
	"N" range → "R" range	Less than 1.5 seconds
Engine idle speed (w/Cooling fan and A/C OFF)		
"N" range	w/o PS	800 rpm
	w/ PS	900 rpm
Front clutch input shaft thrust play		0.24 – 0.96 mm 0.0094 – 0.0378 in.
Input shaft thrust play		0.10 – 0.70 mm 0.0039 – 0.0276 in.
Output shaft thrust play		0.31 – 1.53 mm 0.0122 – 0.0602 in.
Driven sprocket thrust clearance		0.11 – 0.69 mm 0.0043 – 0.0272 in.
Throttle lever thrust clearance		Less than 0.5 mm (0.020 in.)
Drive plate runout	Limit	Less than 0.20 mm (0.0079 in.)
Torque converter deflection	Limit	Less than 0.30 mm (0.0118 in.)

Specifications (Cont'd)

Shift point schedule km/h (mph)	Differential gear ratio	"D" range (throttle valve fully open)				"L" range
		1 → 2	2 → 3	3 → 2	2 → 1	2 → 1
	3.909	37 – 53 (23 – 33)	86 – 101 (53 – 63)	81 – 96 (50 – 60)	32 – 48 (20 – 30)	29 – 45 (18 – 28)

Valve spring mm (in.)		Free length	Coil outside diameter	No. Coils	Wire diameter	Color
	Regulator valve	55.80 (2.1968)	18.10 (0.7126)	8.5	1.6 (0.063)	Non
	Valve body					
	1-2 shift valve	26.00 (1.0236)	5.15 (0.2028)	14.5	0.5 (0.020)	Non
	Low-coast valve	36.50 (1.4370)	8.60 (0.3386)	16	1.2 (0.047)	Non
	2-3 shift valve	22.10 (0.8701)	6.40 (0.2520)	9.5	0.6 (0.024)	Non
	Detent regulator	27.40 (1.0787)	8.00 (0.3150)	10	1.0 (0.039)	Non
	Throttle valve					
	Front	30.03 (1.1823)	8.55 (0.3366)	8.9	0.9 (0.035)	Non
	Rear	27.50 (1.0827)	7.40 (0.2913)	10.25	0.6 (0.024)	Non
	Accumulator					
	Front	67.00 (2.6378)	17.80 (0.7008)	12.5	2.3 (0.091)	White
	Rear	38.42 (1.5126)	14.03 (0.5524)	10	2.03 (0.0799)	Non
	Governor valve	19.60 (0.7717)	9.40 (0.3701)	6	0.80 (0.0315)	Non
	T/C check ball valve	26.20 (1.0315)	6.60 (0.2598)	14	0.60 (0.0236)	Non
	Priming valve	28.50 (1.1220)	6.30 (0.2480)	14.5	0.65 (0.0256)	Non
	Rear valve body					
	No. 1	31.80 (1.2520)	5.35 (0.2106)	20.7	0.55 (0.0217)	Non
	No. 2	48.00 (1.8898)	7.50 (0.2953)	15.3	0.70 (0.0276)	Non
	Governor valve	19.60 (0.7717)	9.40 (0.3701)	6	0.80 (0.0315)	Non
Rear servo Piston	Return	56.00 (2.2047)	7.40 (0.2913)	19.1	1.0 (0.039)	Non
	Cushion	34.00 (1.3386)	7.40 (0.2913)	11.9	0.9 (0.035)	Non

Clutch piston return spring (C_1, C_2)	Free length	28.90 mm	1.1378 in.
	Coil outside diameter	8.00 mm	0.315 in.
	No. of coils	12	

Brake piston return spring (B_1, B_2, B_3)		B_1, B_2		B_3	
	Free length	16.12 mm	0.6346 in.	26.17 mm	1.0303 in.
	Coil outside diameter	8.00 mm	0.0315 in.	7.90 mm	0.3110 in.
	No. of coils	6		9	

Specifications (Cont'd)

Clutch and brake piston stroke	Front clutch	2.37 – 3.42 mm	0.0933 – 0.1346 in.
	Rear clutch	0.90 – 1.50 mm	0.0354 – 0.0591 in.
	No. 1 brake	0.65 – 1.30 mm	0.0256 – 0.0512 in.
	No. 2 brake	0.93 – 1.72 mm	0.0366 – 0.0677 in.
	Rear servo piston	10 mm	0.39 in.
Brake clearance	No. 3 brake	10.04 – 11.30 mm	0.3953 – 0.4449 in.
Oil pump	Side clearance STD	0.02 – 0.05 mm	0.0008 – 0.0020 in.
	Body clearance STD	0.07 – 0.15 mm	0.0028 – 0.0059 in.
	Tip clearance (Driven gear) STD	0.11 – 0.14 mm	0.0043 – 0.0055 in.

Bushing bore mm (in.)

Bushing name		Length	Finished bore	Bore limit
Stator support	Front	9.75 (0.3839)	16.000 – 16.018 (0.6299 – 0.6306)	16.068 (0.6326)
Oil pump body		13.46 (0.5299)	38.125 – 38.150 (1.5010 – 1.5020)	38.200 (1.5039)
Front support		10.75 (0.4232)	31.038 – 31.063 (1.2220 – 1.2230)	31.113 (1.2249)
Front clutch drum		9.75 (0.3839)	22.025 – 22.046 (0.8671 – 0.8680)	22.096 (0.8699)
Front planetary ring gear flange		6.55 (0.2579)	30.025 – 30.051 (1.1821 – 1.1831)	30.101 (1.1851)
Sun gear	Front	9.75 (0.3839)	22.025 – 22.046 (0.8671 – 0.8680)	22.096 (0.8699)
	Rear	9.75 (0.3839)	22.025 – 22.046 (0.8671 – 0.8680)	22.096 (0.8699)
Center support		65.68 (2.5858)	36.386 – 36.411 (1.4325 – 1.4335)	36.461 (1.4355)
Transmission case		10.75 (0.4232)	32.025 – 32.050 (1.2608 – 1.2618)	32.100 (1.2638)

Diameter mm (in.)

Rear output clutch sleeve guide outside (Rear servo piston and sliding part)	84.69 – 84.73 (3.3342 – 3.3358)
Rear servo piston inside (Sleeve guide and sliding part)	85.00 – 85.04 (3.3465 – 3.3480)
Rear servo piston outside (Extension housing and sliding part)	113.79 – 113.82 (4.4799 – 4.4811)
Extension housing inside (Piston oil seal ring and sliding part)	114.00 – 114.04 (4.4882 – 4.4898)
Rear servo piston inside (Extension housing and sliding part)	82.30 – 82.34 (3.2402 – 3.2417)
Extension housing outside (Rear servo piston and sliding part)	81.89 – 81.92 (3.2240 – 3.2252)
Extension housing bushing inside	32.006 – 32.031 (1.2601 – 1.2611)

Tightening Torque

Tightening part	kg-cm	ft-lb	N·m
Rear mounting x Extension housing	425	31	42
Engine x Transaxle (14 mm head bolt)	375	27	37
(17 mm head bolt)	650	47	64
Rear mounting x Body	425	31	42
Stiffener plate	350	25	34
Propeller shaft x Differential companion flange	430	31	42
Center bearing bracket x Body	410	30	40
Cooler pipe x Transmission	350	25	34
Exhaust front pipe x Converter	440	32	43
Exhaust front pipe x Exhaust flange	630	46	62
Exhaust pipe clamp	195	14	19
Front suspension member support x Body	490	35	48
Steering knuckle x Lower arm	820	59	80
Steering knuckle x Shock absorber	1,450	105	142
Brake caliper x Steering knuckle	970	70	95
Tie rod end x Steering knuckle	500	36	49
Wheel bearing lock nut	1,900	137	186
Acclerator linkage turnbuckle lock nut	55	48 in.-lb	5.4
Transaxle x Transmission	195	14	19
Extension housing	195	14	19
Neutral start switch (bolt)	130	9	13
Neutral start switch (nut)	70	61 in.-lb	6.9
Drive plate	650	47	64
Torque converter	185	13	18
Torque converter cover (14 mm bolt)	240	17	24
(10 mm bolt)	55	48 in.-lb	5.4
Rear valve body	55	48 in.-lb	5.4
Oil pan	75	65 in.-lb	7.4
Oil pan drain plug	300	22	29
Testing plug	75	65 in.-lb	7.4
4WD change-over solenoid	55	48 in.-lb	5.4
Speedometer sleeve lock plate	55	48 in.-lb	5.4
Rear servo piston x Bearing retainer	50	43 in.-lb	4.9

PROPELLER SHAFT

Specifications

Spider bearing axial play		0 mm	0 in.
Runout	Limit	0.8 mm	0.031 in.

Tightening Torque

Tightening part		kg-cm	ft-lb	N·m
Intermediate shaft x Center bearing x Joint flange				
	1st	1,850	134	181
	2nd	Loosen nut		
	3rd	300	22	29
Propeller shaft x Intermediate shaft		430	31	42
Propeller shaft x Differential companion flange		430	31	42
Center bearing bracket x Body		375	27	37

FRONT AXLE AND SUSPENSION

Specifications

Cold tire inflation pressure	Model	Tire size		Inflation pressure kg/cm² (psi, kPa)	
				Front and Rear	
	FWD	145 SR 13	3A-C 4-Speed M/T	2.2 (32, 220)	
			Others	2.0 (28, 200)	
		155 SR 13		1.8 (26, 180)	
		165/70 SR 13		1.8 (26, 180)	
	4WD	155 SR 13		2.0 (28, 200)	
		175/70 SR 13		1.8 (26, 180)	

		Item		Sedan	Wagon
Front wheel alignment	FWD	Vehicle height			
		145 SR 13	Front	203.0 (7.992)	———
			Rear	287.0 (11.299)	———
		155 SR 13	Front	208.0 (8.189)	207.0 (8.150)
			Rear	292.0 (11.496)	308.5 (12.146)
		165/70 SR 13	Front	204.0 (8.032)	———
			Rear	288.0 (11.339)	———
		Toe-in		−1 ± 1 mm (−0.04 ± 0.04 in.)	←
		Camber Left-right error		10′ ± 30′ 30′ or less	5′ ± 30′ 30′ or less
		Steering axis inclination Left-right error		12°30′ ± 30′	12°35′ ± 30′
		Caster w/o PS w/ PS Left-right error		1°10′ ± 30′ 2°40′ ± 30′	0°45′ ± 30′ 2°15′ ± 30′
		Side slip		3.0 mm/m (0.118 in./3.3 ft)	

Specifications (Cont'd)

Front wheel alignment (cont'd)	Model	Item	Sedan	Wagon
	FWD (Cont'd)	Wheel angle Inside wheel w/o PS	36°20' ± 1°	36°13' ± 1°
		Inside wheel w/ PS	35°50' ± 1°	35°47' ± 1°
		Outside wheel w/o PS	32°40' ± 1°	32°58' ± 1°
		Outside wheel w/ PS	32°55' ± 1°	32°50' ± 1°
		at 20° w/o PS	21°30'	21°25'
		at 20° w/ PS	21°05'	21°05'
	4WD	Vehicle height 155 SR 13 Front	234.4 (9.228)	
		155 SR 13 Rear	273.0 (10.748)	
		175/70 SR 13 Front	235.4 (9.268)	
		175/70 SR 13 Rear	274.0 (10.787)	
		Toe-in	−1 ± 1 mm (−0.04 ± 0.04 in.)	
		Camber	40' ± 30'	
		Left-right error	30' or less	
		Steering axis inclination	11°50' ± 30'	
		Left-right error	30' or less	
		Caster	2°25' ± 30'	
		Left-right error	30' or less	
		Side slip	3.0 mm/m (0.118 in./3.3 ft)	
		Wheel angle Inside wheel w/o PS	36°30' ± 1°	
		Inside wheel w/ PS	36°20' ± 1°	
		Outside wheel w/o PS	33°15' ± 1°	
		Outside wheel w/ PS	33°20' ± 1°	
		at 20° w/o PS	21°15'	
		at 20° w/ PS	21°05'	

Front axle and suspension	Disc Wheel lateral runout	Limit	1.2 mm (0.047 in.) or less	
	Hub bearing axial direction play	Limit	0.05 mm	0.0020 in.
	Drive shaft length	RH	620 mm	24.41 in.
		LH	722 mm	28.43 in.
	Drive shaft length between	RH and LH	193 mm	7.60 in.
	Ball joint vertical play	Limit	0 mm	0 in.
	Ball joint rotation condition		8 – 25 kg-cm (6.9 – 21.7 in.-lb, 0.8 – 2.5 N·m)	

Tightening Torque

Tightening part	kg-cm	ft-lb	N·m
Front suspension member x Body	900	65	88
Steering knuckle x Lower arm	820	59	80
Steering knuckle x Shock absorber	1,450	105	142
Steering knuckle x Disc brake caliper	970	70	95
Tie rod end x Steering knuckle	600	43	59
Wheel bearing lock nut	1,900	137	186
Suspension support x Body	240	17	24
Suspension support x Shock Absorber	500	36	49
Lower arm x Ball joint	800	59	80
Stabilizer bar x Lower arm	1,075	78	105
Lower arm x Body	1,150	83	113
Stabilizer bracket	440	32	43

REAR AXLE AND SUSPENSION

Specifications (FWD)

Rear wheel alignment	Camber	Sedan	−5′ ± 30′
		Wagon	−10′ ± 30′
	Left-right error		30′ or less
	Toe-in		0 ± 1 mm 0 ± 0.04 in.
	Side slip		3.0 mm/m (0.118 in./3.3 ft) or less
Rear axle and suspension	Oil seal frictional force (at hub bolt)		Approx. 400 g (0.9 lb, 3.9 N)
	Rear wheel bearing preload (while turning)		In addition to oil seal friction force 400 – 1,000 g (0.9 – 2.2 lb, 3.9 – 9.8 N)

Tightening torque (FWD)

Tightening part	kg-cm	ft-lb	N·m
Axle carrier x Shock absorber	1,450	105	142
Axle carrier x Axle shaft (Sedan)	820	59	80
Wheel bearing x Axle shaft	1,250	90	123
Axle carrier x Axle hub (Wagon)	820	59	80
Suspension support x Body	240	17	24
Suspension support x Shock absorber	500	36	49
No. 1 suspension arm x Axle carrier	890	64	87
No. 1 suspension arm x Body	890	64	87
No. 2 suspension arm x Axle carrier	890	64	87
No. 2 suspension arm x Body	890	64	87
Strut rod x Axle carrier	890	64	87
Strut rod x Body	890	64	87

Specifications (4WD)

Rear axle	Rear axle shaft bearing inner retainer installing temperature	150°C	302°F
	Rear axle shaft runout Limit	1.5 mm	0.059 in.
	Rear axle shaft flange runout Limit	0.1 mm	0.004 in.
	Oil seal drive in depth	5.6 mm	0.220 in.
	End gasket thickness	0.3 mm	0.012 in.
Differential	Drive pinion bearing preload at Starting		
	New bearing	6.5 – 12.5 kg-cm	
		(5.6 – 10.9 in.-lb, 0.6 – 1.2 N·m)	
	Reused bearing	4 – 7 kg-cm	
		(3.5 – 6.1 in.-lb, 0.4 – 0.7 N·m)	
	Total preload at Starting	In addition to drive pinion preload	
		2 – 4 kg-cm	
		(1,7 – 3.5 in.-lb, 0.2 – 0.4 N·m)	
	Drive pinion to ring gear backlash	0.10 – 0.15 mm	0.0039 – 0.0059 in.
	Pinion gear to side gear backlash	0.02 – 0.15 mm	0.0008 – 0.0059 in.
	Ring gear runout Limit	0.07 mm	0.0028 in.
	Companion flange runout Limit Radial	0.10 mm	0.0039 in.
	Limit Lateral	0.10 mm	0.0039 in.
	Ring gear installing temperature	100°C	212°F
	Oil seal drive in depth	1.0 mm	0.039 in.
	Side gear thrust washer thickness	1.50 mm	0.0591 in.
		1.55 mm	0.0610 in.
		1.60 mm	0.0630 in.
		1.65 mm	0.0650 in.
		1.70 mm	0.0669 in.
		1.75 mm	0.0689 in.
	Drive pinion adjusting plate washer thickness	2.24 mm	0.0882 in.
		2.27 mm	0.0894 in.
		2.30 mm	0.0906 in.
		2.33 mm	0.0917 in.
		2.36 mm	0.0929 in.
		2.39 mm	0.0941 in.
		2.42 mm	0.0953 in.
		2.45 mm	0.0965 in.
		2.48 mm	0.0976 in.
		2.51 mm	0.0988 in.
		2.54 mm	0.1000 in.
		2.57 mm	0.1012 in.
		2.60 mm	0.1024 in.
		2.63 mm	0.1035 in.
		2.66 mm	0.1047 in.

Tightening Torque (4WD)

Tightening part	kg-cm	ft-lb	N·m
Bearing retainer x Backing plate	670	48	66
Drive pinion x Companion flange	1,475	107	145
Ring gear x Differential case	985	71	97
Side bearing cap x Differential carrier	600	43	59
Side bearing adjusting nut lock x Side bearing Cap	55	48 in.-lb	5.4
Differential carrier x Axle housing	315	23	31
Filler plug x Axle housing	500	36	49
Drain plug x Axle housing	500	36	49
Shock absorber x Body	250	18	25
Shock absorber x Rear axle housing	375	27	37
Lateral control rod x Rear axle housing	650	47	64
Lateral control rod x Body			
Stabilizer bar x Link	310	22	30
Stabilizer bar bracket x Axle housing	375	27	37
Upper control arm x Rear axle housing	1,200	87	118
Upper control arm x Body	1,200	87	118
Lower control arm x Rear axle housing	1,200	87	118
Lower control arm x Body	1,200	87	118

BRAKE SYSTEM

Specifications

Brake pedal	Pedal height (from floor asphalt sheet)		184 – 194 mm	7.24 – 7.64 in.
	Pedal freeplay		3 – 6 mm	0.12 – 0.24 in.
	Pedal reserve distance at 50 kg (110.2 lb, 490 N)		More than 90 mm (3.54 in.)	
Brake booster	Booster push rod to piston clearance			
		at Idling vacuum	0.1 – 0.5 mm	0.004 – 0.020 in.
		at No vacuum	0.60 – 0.65 mm	0.0236 – 0.0256 in.
		w/ SST	0 mm	0 in.
Front brake	Disc thickness	STD	11.0 mm	0.433 in.
		Limit	10.0 mm	0.394 in.
	Disc runout	Limit	0.15 mm	0.0059 in.
	Pad thickness	STD	10.0 mm	0.394 in.
		Limit	1.0 mm	0.039 in.
Rear brake	Drum inside diameter Sedan	STD	180.0 mm	7.087 in.
		Limit	181.0 mm	7.126 in.
	Wagon	STD	200.0 mm	7.874 in.
		Limit	201.0 mm	7.913 in.

BRAKE SYSTEM (Cont'd)

Specifications

	Lining thickness	STD	4.0 mm	0.157 in.
		Limit	1.0 mm	0.039 in.
	Shoe to parking brake shoe lever clearance		0 – 0.35 mm	0 – 0.0138 in.
	Parking brake shoe lever shim thickness			
			0.2 mm	0.008 in.
			0.3 mm	0.012 in.
			0.4 mm	0.016 in.
			0.5 mm	0.020 in.
			0.6 mm	0.024 in.
			0.9 mm	0.035 in.
	Drum to shoe clearance		0.6 mm	0.024 in.
Parking brake	Lever travel	at 20 kg (44.1 lb, 196 N)		
		Sedan	5 – 8 clicks	
		Wagon	6 – 8 clicks	

Tightening Torque

Tightening part	kg-cm	ft-lb	N·m
Master cylinder x Piston stopper bolt	100	7	10
Master cylinder x Check valve	450	33	44
Master cylinder x Brake booster	130	9	13
Master cylinder x Reservoir	17.5	15.2 in.-lb	1.7
Brake booster x Body	130	9	13
Front brake cylinder installation bolt	255	18	25
Front disc brake torque plate x Steering knuckle	900	65	88
Wheel cylinder x Barking plate	100	7	10
Brake tube union nut	155	11	15
Flexible hose x Front brake cylinder	235	17	23
Bleeder plug	85	74 in.-lb	8.3

STEERING

Specifications

Steering	Steering wheel freeplay	Limit	30 mm	1.18 in.
	Steering rack ronout	Limit	0.3 mm	0.012 in.
	Pinion preload	at Turning	1.5 – 2.5 kg-cm	
			(1.3 – 2.2 in.-lb, 0.15 – 0.24 N·m)	
	Total preload	at Turning Max.	10 – 13 kg-cm	
			(8.7 – 11.3 in.-lb, 1.0 – 1.2 N·m)	
		Min.	5 kg-cm	4.3 in.-lb 0.5 N·m
	Tie rod length		289 mm	11.38 in.

Specifications (Cont'd)

Power steering	Drive belt tension (w/ Borroughs drive belt tension gauge No. BT-33-73F)				
		New belt		125 ± 25 lb	
		Used belt		80 ± 20 lb	
	Oil level rise		Limit	5 mm	0.20 in.
	Oil pressure	at Idle speed		55 kg/cm²	782 psi 5,394 kPa
	Oil pressure difference at 1,000 rpm and 3,000 rpm speed			Less than 5 kg/cm² (71 psi, 490 kPa)	
	Steering effort		Limit	5.5 kg	12.1 lb 5.4 N
	Vane pump rotor shaft to bushing clearance				
			STD	0.01 – 0.03 mm	0.0004 – 0.0012 in.
			Limit	0.07 mm	0.0028 in.
	Vane plate	Height	Limit	8.1 mm	0.319 in.
		Width	Limit	1.797 mm	0.0707 in.
		Length	Limit	14.988 mm	0.5901 in.
	Vane pump rotor to vane plate clearance		Limit	0.028 mm	0.0011 in.
	Flow control valve spring			47 – 50 mm	1.85 – 1.97 in.
	Vane pump rotor shaft rotating torque				
			Limit	2.8 kg-cm	2.4 in.-lb 0.3 N·m
	Steering rack runout		Limit	0.3 mm	0.012 in.
	Control valve shaft total preload				
			at Turning	8 – 13 kg-cm	
				(6.9 – 11.3 kg-cm, 0.8 – 1.2 N·m)	
	Tie rod length			279 mm	10.98 in.

Tightening Torque

	Tightening part	kg-cm	ft-lb	N·m
Steering main shaft	Upper bracket x Column tube	195	14	19
	Tilt lever x Adjusting nut	240	17	24
	Tilt lever seration attachment x Adjusting nut	240	17	24
	Column tube x Instrument panel	260	19	25
	Steering wheel x Main shaft	350	25	34
	Siding yoke x Main shaft	360	25	34
	Siding yoke x Steering pinion	360	25	34
Steering gear housing	Pinion bearing adjusting screw lock nut	1,150	83	113
	Rack guide spring cap lock nut	700	51	69
	Rack end x Rack	850	61	83
	Rack gear housing bracket x Body	590	43	58
	Tie rod end x Knuckle dram	600	43	59

Tightening Torque (Cont'd)

	Tightening part	kg-cm	ft-lb	N·m
Power steering	Power steering pump front housing x Rear housing	475	34	47
	Power steering pump front housing x Pressure port union	700	51	69
	Power steering pump x Bracket	375	27	37
	Power steering pump x Front stay	375	27	37
	Power steering pump rotor shaft x Drive pulley	445	32	44
	Return hose clamp bolt	40	35 in.-lb	3.9
	Rack housing x Cylinder	1,700	123	167
	Rack cylinder x Stopper nut	1,200	87	118
	Control valve x Rack housing	250	18	25
	Control valve shaft x Half lock nut	250	18	25
	Rack housing cap x Rack housing	600	43	59
	Rack guide spring cap lock nut	650	47	64
	Turn pressure tube union nut	150	11	15
	Pressure hose union nut	450	33	44
	Return hose union nut	450	33	44

LUBRICANT

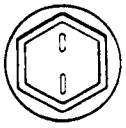
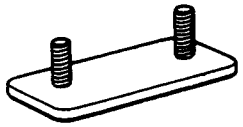
Item	Capacity			Classification
	Liters	US qts	Imp. qts	
Engine oil				API grade SF or SF/CC, multigrade viscosity and fuel-efficient oil
Dry fill	3.7	3.9	3.3	
Drain and refill				
w/ Oil filter change	3.3	3.5	2.9	
w/o Oil filter change	3.0	3.2	2.6	
Transaxle oil FWD	3.3	3.5	2.9	API GL-4 GL-5 hypoid gear oil
4WD	3.9	4.1	3.4	Above −18°C (0°F) SAE 75W -90, 80W -90 or 90 Below −18°C (0°F) SAE 75W -90, 80W -90 or 80W
A/T fluid				ATF DEXRON II
Dry fill FWD	4.5	4.8	4.0	
4WD	6.5	6.9	5.7	
Drain and refill FWD	2.2	2.3	1.9	
4WD	4.2	4.4	3.7	
Differential oil FWD (w/ AT)	0.95	1.0	0.8	API GL-5 hypoid gear oil Above −18°C (0°F)SAE 90
4WD	1.0	1.1	0.9	Below −18°C (0°F)SAE 80W or 80W-90
Steering gear housing grease	———			Molybdenum disulphide lithium base, NLGI No. 2
Power steering fluid				ATF DEXRON II or DEXRON
Pump	350 cc	21.4 cu in.		
Total	800 cc	48.8 cu in.		
Ball joint grease	———			Molybdenum disulphide lithium base, NLGI No. 1 or No. 2
Wheel bearing grease	———			Lithium base multipurpose, NLGI NO. 2
Brake fluid	———			SAE J1703, DOT 3
Antifreeze	———			Anti-rust grade ethlyene-glycol base coolant

STANDARD BOLT TIGHTENING TORQUE

Page
STANDARD BOLT TIGHTENING TORQUE B-2

STANDARD BOLT TIGHTENING TORQUE

HOW TO DETERMINE BOLT STRENGTH

	Mark	Class		Mark	Class
Hexagon head bolt	 Bolt head No. 4– 5– 6– 7–	4T 5T 6T 7T	Stud bolt		4T
	 No mark	4T			
Hexagon flange bolt w/Washer hexagon bolt	 No mark	4T			6T
Hexagon head bolt	 Two protruding lines	5T			
Hexagon flange bolt w/Washer haxagon bolt	 Two protruding lines	6T	Welded bolt		4T
Hexagon head bolt	 Three protruding lines	7T			

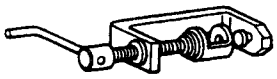
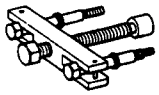
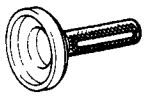
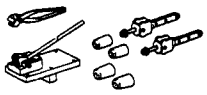
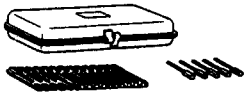
SPECIFIED TORQUE FOR STANDARD BOLTS

Class	Diameter mm	Pitch mm	Tightening torque					
			Hexagon head bolt			Hexagon flange bolt		
			kg-cm	ft-lb	N·m	kg-cm	ft-lb	N·m
4T	6	1	55	48 in.-lb	5.4	60	52 in.-lb	5.9
	8	1.25	130	9	13	145	10	14
	10	1.25	260	19	25	290	21	28
	12	1.25	480	35	47	540	39	53
	14	1.5	760	55	75	850	61	83
	16	1.5	1,150	83	113		—	
5T	6	1	65	56 in.-lb	6.4		—	
	8	1.25	160	12	16		—	
	10	1.25	330	24	32		—	
	12	1.25	600	43	59		—	
	14	1.5	930	67	91		—	
	16	1.5	1,400	101	137		—	
6T	6	1	80	69 in.-lb	7.8	90	78 in.-lb	8.8
	8	1.25	195	14	19	215	16	21
	10	1.25	400	29	39	440	32	43
	12	1.25	730	53	72	810	59	79
	14	1.5		—		1,250	90	123
7T	6	1	110	8	11	120	9	12
	8	1.25	260	19	25	290	21	28
	10	1.25	530	38	52	590	43	58
	12	1.25	970	70	95	1,050	76	103
	14	1.5	1,500	108	147	1,700	123	167
	16	1.5	2,300	166	226		—	

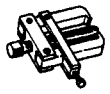
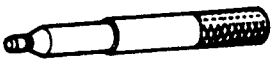
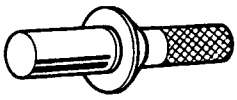
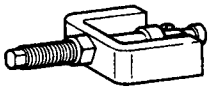
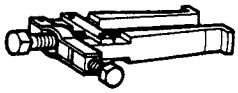
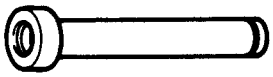
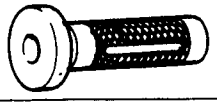
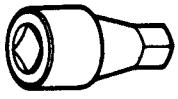
SST AND SSM

	Page
SST (SPECIAL SERVICE TOOLS)	C-2
SSM (SPECIAL SERVICE MATERIALS)	C-8

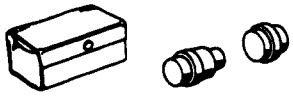
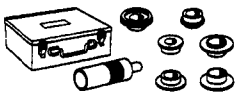
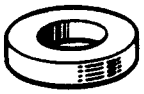
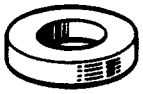
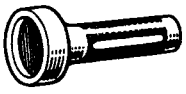
SST (SPECIAL SERVICE TOOLS)

Illustration	• Part No.	• Part Name	EM	FU	CO	LU	ST	CH	CL	MT	AT	PR	FA	RA	BR	SR	BO
	09032-00100	(Oil Pan Seal Cutter)				●											
	09201-60011	(Valve Stem Guide Remover & Replacer)	●							●	●						
	09202-43013	(Valve Spring Compressor)	●														
	09213-31021	(Crankshaft Pulley Puller)	●														
	09213-70010	(Crankshaft Pulley Holding Tool)	●														
	09221-25018	(Piston Pin Remover & Replacer)	●														
	09223-41020	(Crankshaft Rear Oil Seal Replacer)	●								●						
	09223-46011	(Crankshaft Front Oil Seal Replacer)								●							
	09228-22020	(Oil Filter Wrench)				●							●	●			
	09230-00010	(Radiator Service Tool Set)			●												
	09236-00101	(Water Pump Overhaul Tool Set)			●												
	09240-00014	(Carburetor Adjusting Gauge Set)		●													
	09240-00020	(Wire Gauge Set)		●													
	09285-76010	(Injection Camshaft Bearing Cone Replacer)					●	●									

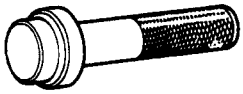
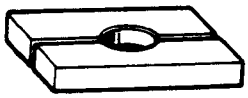
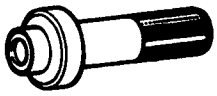
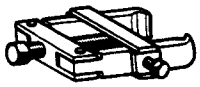
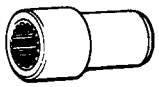
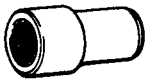
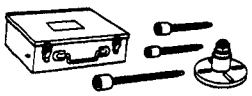
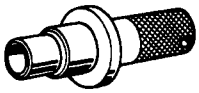
SST (SPECIAL SERVICE TOOLS) (Cont'd)

Illustration	• Part No.	• Part Name	EM	FU	CO	LU	ST	CH	CL	MT	AT	PR	FA	RA	BR	SR	BO
	09286-46011	(Injection Pump Spline Shaft puller)					●	●									
	09301-36010	(Clutch Guide Tool)							●								
	09302-20021	(Clutch Diaphragm Spring Hight No. 2 Gauge)							●								
	09303-35011	(Input Shaft Front Bearing Puller)							●								
	09304-12012	(Input Shaft Front Bearing Replacer)								●							
	09304-30012	(Input Shaft Front Bearing Replacer)							●	●							
	09304-47010	(Input Shaft Front Bearing Replacer)								●						●	
	09307-12010	(Extension Housing Bushing Replacer)								●	●						
	09308-00010	(Oil Seal Puller)								●	●		●	●			
	09308-10010	(Oil Seal Puller)								●				●			
	09309-35010	(Transmission Rear Bearing Replacer)											●				
	09310-35010	(Countershaft Bearing Replacer)											●	●			
	09310-36021	(Countershaft Bearing Puller)								●							
	09313-30021	(Detent Ball Plug Socket)								●							

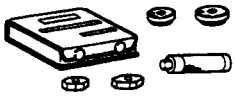
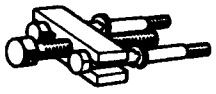
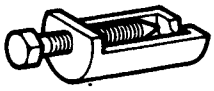
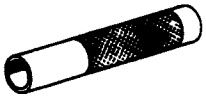
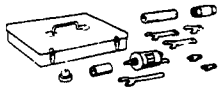
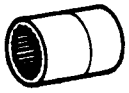
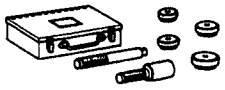
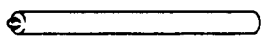
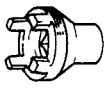
SST (SPECIAL SERVICE TOOLS) (Cont'd)

Illustration • Part No. • Part Name	EM	FU	CO	LU	ST	CH	CL	MT	AT	PR	FA	RA	BR	SR	BO
 09315-00010 (Clutch Release Bearing Remover & Replacer)							●								
 09316-60010 (Transmission & Transfer Bearing Replacer)									●		●	●			
 09325-12010 (Transmission Oil Plug)								●	●	●					
 09330-00020 (Companion Flange Holding Tool)	●									●		●			
 09333-00012 (Clutch Diaphragm Spring Aligner)							●								
 09350-20013 (TOYOTA Automatic Transmission Tool Set)									●						
 09502-10012 (Differential Side Bearing Puller)								●				●			
 09504-00011 (Differential Side Bearing Adjusting Nut Wrench)												●			
 09504-22010 (Differential Side Washer Remover & Replacer)								●							
 09506-30011 (Differential Drive Pinion Bearing Cone Replacer)								●	●						
 09515-20010 (Rear Axle Shaft Bearing Replacer)								●				●			
 09515-21010 (Rear Axle Shaft Bearing Replacer)														●	
 09515-30010 (Rear Wheel Bearing Replacer)								●							
 09515-35010 (Rear Wheel Bearing Replacer)											●				

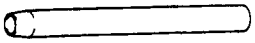
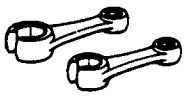
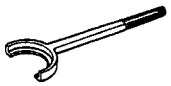
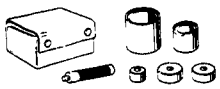
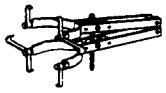
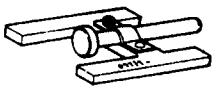
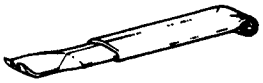
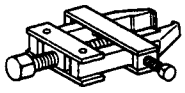
SST (SPECIAL SERVICE TOOLS) (Cont'd)

Illustration • Part No. • Part Name	EM	FU	CO	LU	ST	CH	CL	MT	AT	PR	FA	RA	BR	SR	BO
 09517-12010 (Rear Axle Shaft Oil Seal Replacer)												●			
 09517-30010 (Rear Axle Shaft Oil Seal Replacer)				●											
 09520-00031 (Rear Axle Shaft Puller)												●			
 09527-20011 (Rear Axle Shaft Bearing Remover)												●			
 09554-30011 (Differential Oil Seal Replacer)												●			
 09556-12010 (Drive Pinion Front Bearing Remover)												●			
 09556-16010 (Differential Drive Pinion Holding Tool)								●							
 09556-16020 (Differential Drive Pinion Holding Tool)								●							
 09557-22022 (Companion Flange Remover & Replacer)												●			
 09563-16010 (Differential Plug)											●				
 09564-16010 (Drive Pinion Lock Nut Wrench)								●							
 09608-12020 (Front Hub & Drive Pinion Bearing Replacer Set)												●			
 09608-16010 (Rear Hub Bearing Tool Set)												●			
 09608-20011 (Front Hub & Drive Pinion Bearing Tool Set)								●				●			

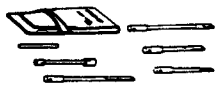
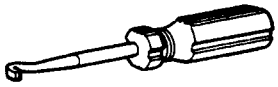
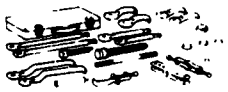
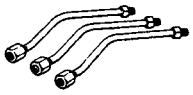
SST (SPECIAL SERVICE TOOLS)(Cont'd)

Illustration	• Part No.	• Part Name	EM	FU	CO	LU	ST	CH	CL	MT	AT	PR	FA	RA	BR	SR	BO
	09608-30011	Front Hub & Drive Pinion Bearing Tool Set								●	●						
	09608-30021	Front Hub Bearing Replacer Set								●							
	09609-20011	Steering Wheel Puller														●	
	09610-20012	(Pitman Arm Puller)											●			●	
	09612-10092	Steering Gear Housing Overhaul Tool Set								●						●	
	09612-22011	Tilt Handle Bearing Replacer								●							
	09612-24012	Steering Gear Housing Overhaul Tool Set														●	
	09616-00010	Steering Worm Bearing Adjusting Socket														●	
	09617-16010	Cylinder Set Nut Wrench														●	
	09620-30010	Steering Gear Box Replacer Set														●	
	09628-62011	(Ball Joint Puller)														●	
	09630-24013	Steering Rack Oil Seal Tool Set														●	
	09631-12020	(Handle)														●	
	09631-16010	Cylinder End Stopper Nut Wrench														●	

SST (SPECIAL SERVICE TOOLS) (Cont'd)

Illustration	• Part No.	• Part Name	EM	FU	CO	LU	ST	CH	CL	MT	AT	PR	FA	RA	BR	SR	BO
	09631-16020	(Steering Rack A Cover)														●	
	09631-22020	(Power Steering Hose Nut 14 x 17 Wrench)														●	
	09636-20010	(Upper Ball Joint Dust Cover Replacer)												●			
	09648-16010	(Drive Shaft Remover & Replacer)											●				
	09703-30010	(Brake Shoe Return Spring Tool)													●		
	09710-14012	(Rear Suspension Bushing Tool Set)												●			
	09710-30020	(Suspension Bushing Tool Set)								●							
	09726-32010	(Rear Suspension Bushing Remover and Replacer)											●	●			
	09727-22032	(Front Coil Spring Compressor)											●	●			
	09737-00010	(Brake Booster Push Rod Gauge)													●		
	09751-36011	(Brake Tube Union Nut 10 x 12 Wrench)												●	●		
	09806-30010	(Windshield Moulding Remover)															●
	09812-00010	(Door Hinge Set Bolt Wrench Set)															●
	09820-00021	(Alternator Rear Bearing Puller)						●									

SST (SPECIAL SERVICE TOOLS) (Cont'd)

Illustration • Part No. • Part Name	EM	FU	CO	LU	ST	CH	CL	MT	AT	PR	FA	RA	BR	SR	BO
 09820-63010 (Alternator Pulley Set Nut Wrench Set)						●									
 09860-11011 (Carburetor Drive Set)		●													
 09921-00010 (Spring Tension Tool)								●	●						
 09950-00020 (Bearing Remover)								●	●			●			
 09950-20015 (Universal Puller)								●			●	●			
 09992-00093 (Oil Pressure Gauge Set)									●						
 09992-00130 (Oil Pressure Gauge Adapter)									●						

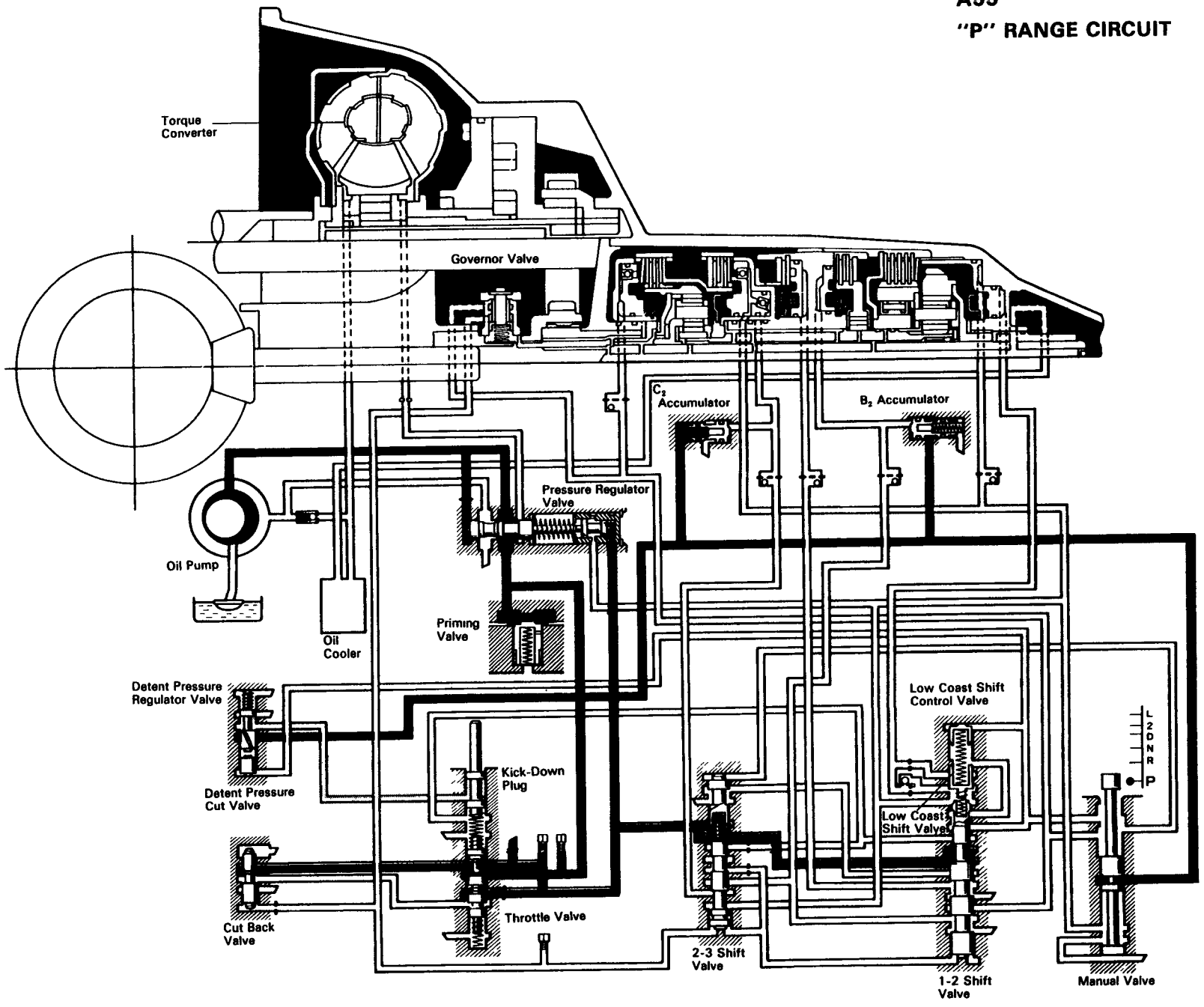
SSM (SPECIAL SERVICE MATERIALS)

Part Name	Part No.	Sec.	Use, etc.
Seal packing No. 102	08826-00080	EM	Engine oil pan
Super Adhesive	08850-00051	BO	Side body moulding
Windshield glass adhesive set No. 15	08850-00070	BO	Windshield glass [0 – 15°C]
Windshield glass adhesive set No. 35	08850-00080	BO	Windshield glass [15 – 35°C]
Windshield glass adhesive set No. 45	08850-00090	BO	Windshield glass [35 – 45°C]
Dam kit	04562-30030	BO	Windshield glass
THREE CEMENT B	08833-00030	BO	Windshield glass, rear window glass and quarter window glass

AUTOMATIC TRANSMISSION HYDRAULIC CIRCUIT

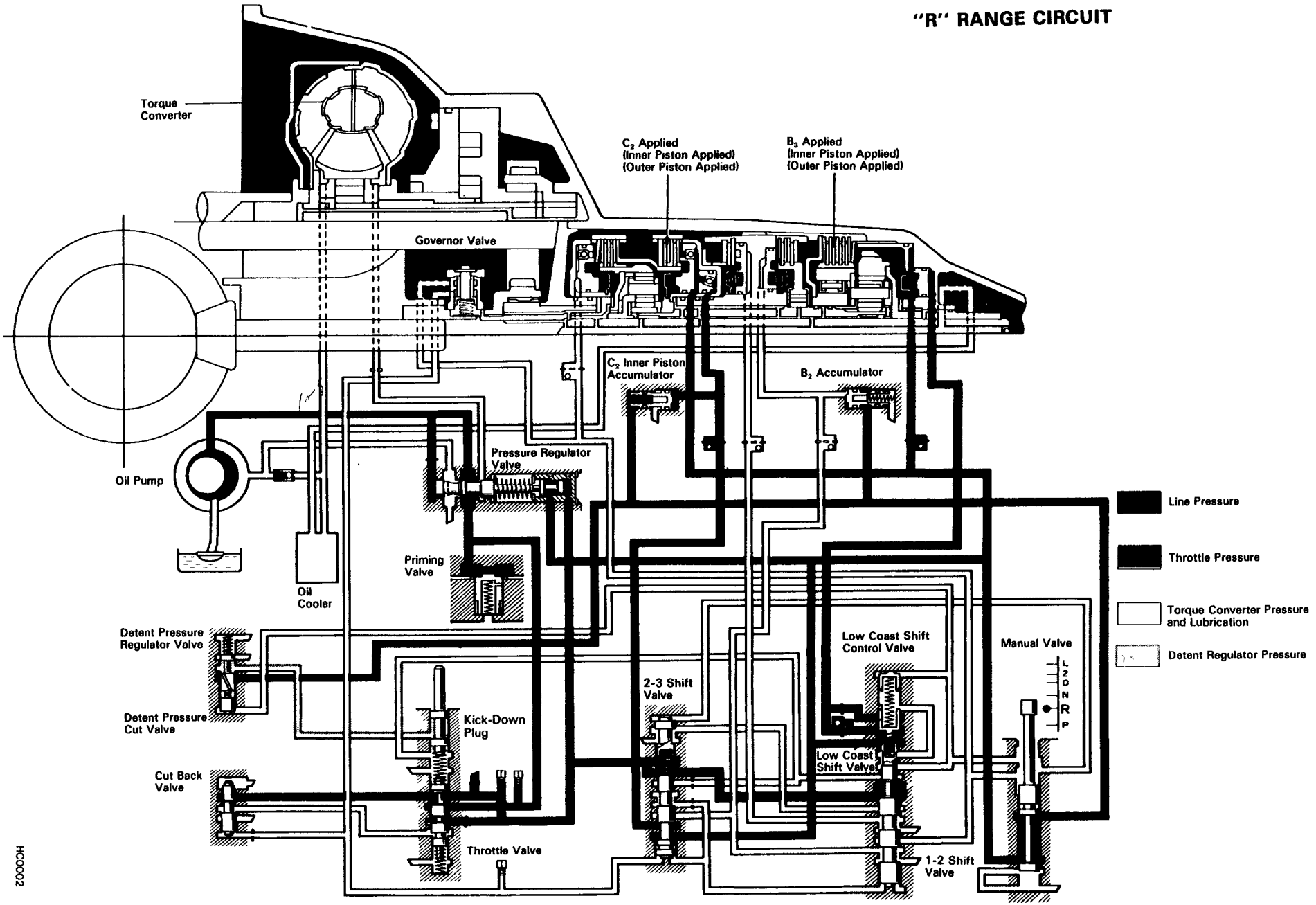
	Page
A55 HYDRAULIC CIRCUIT	D-2
A55F 4WD CHANGE-OVER MECHANISM HYDRAULIC CIRCUIT	D-10

A55
"P" RANGE CIRCUIT



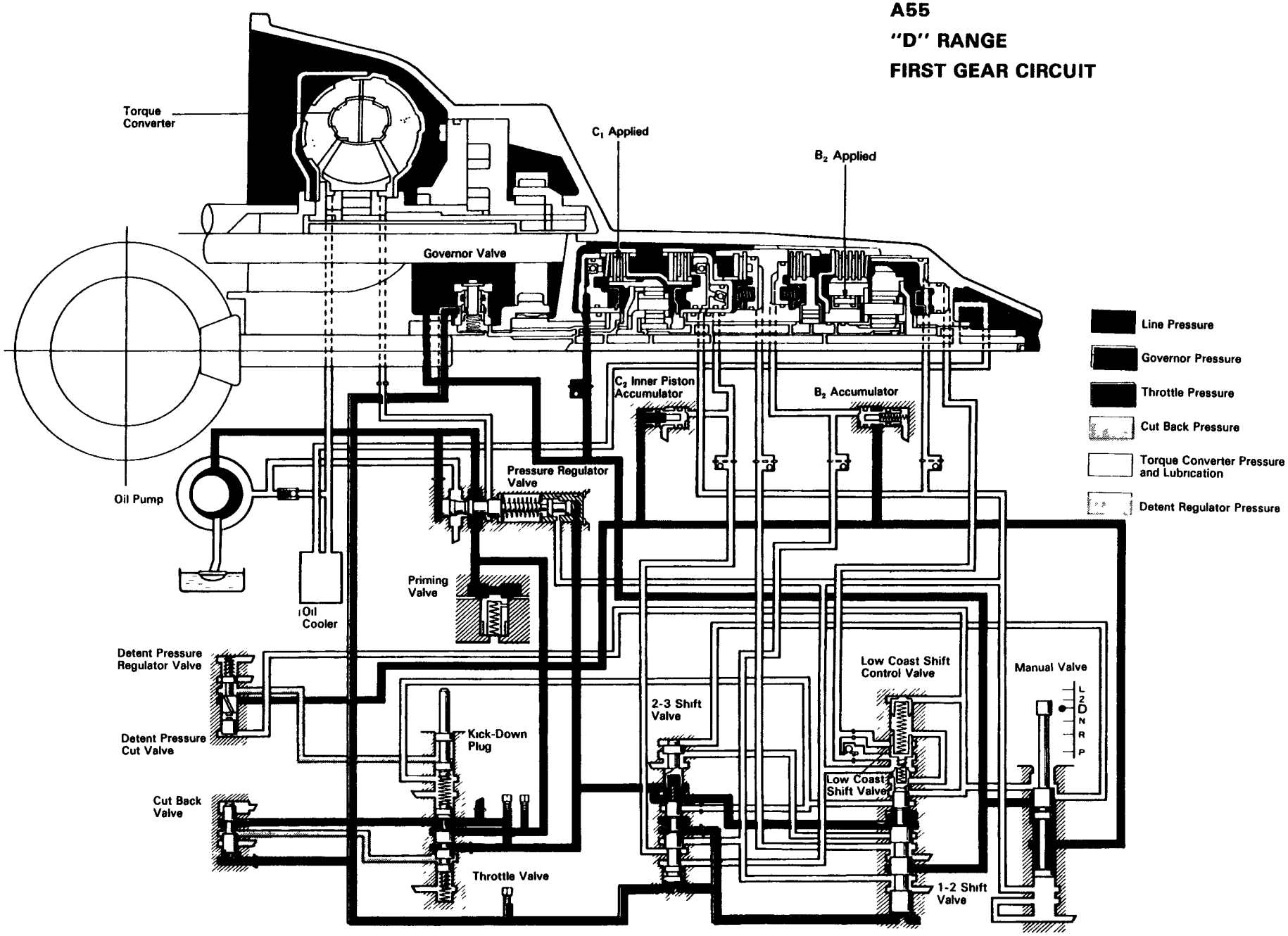
HC0001

A55
"R" RANGE CIRCUIT



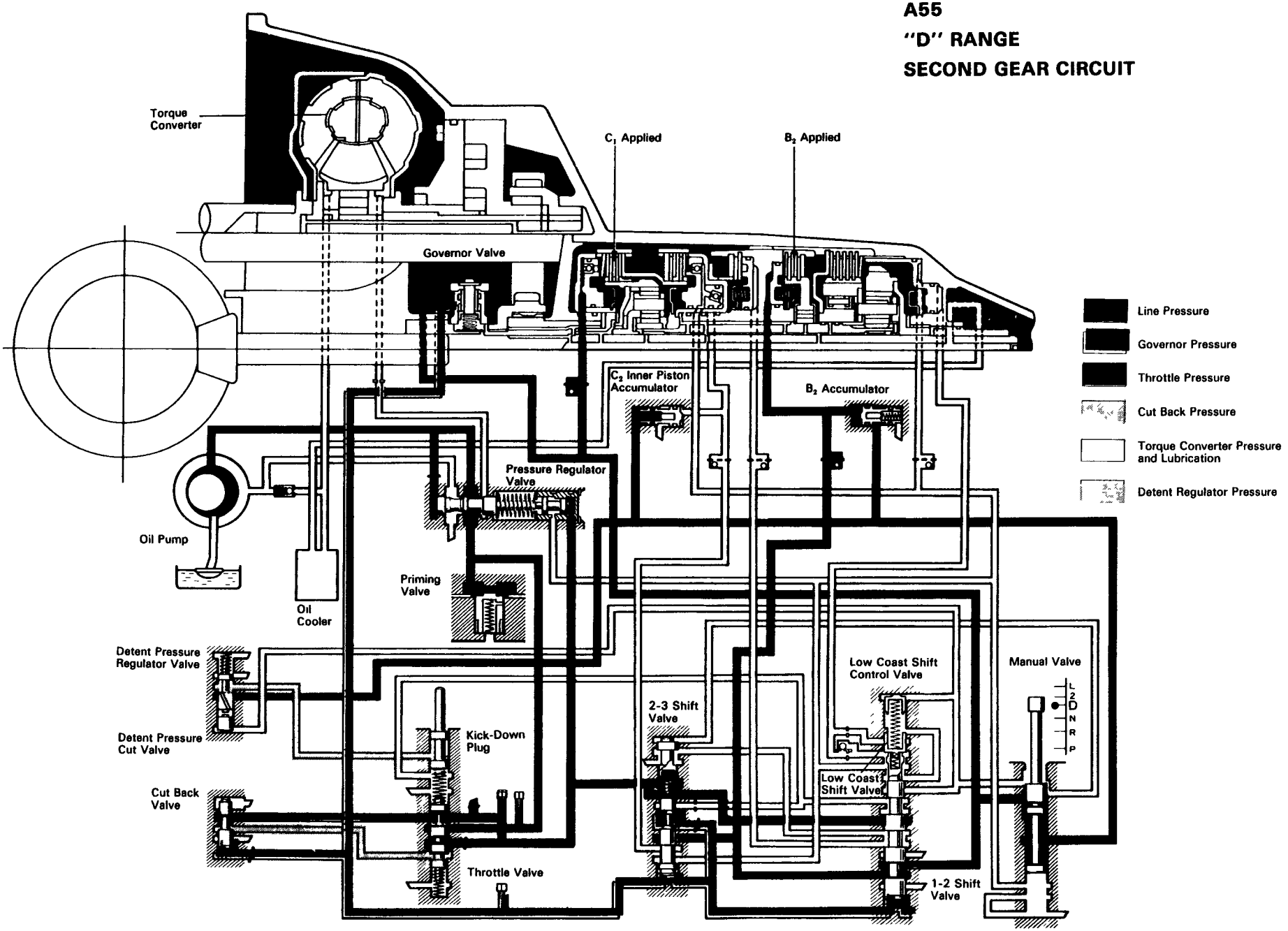
HCO002

A55
"D" RANGE
FIRST GEAR CIRCUIT



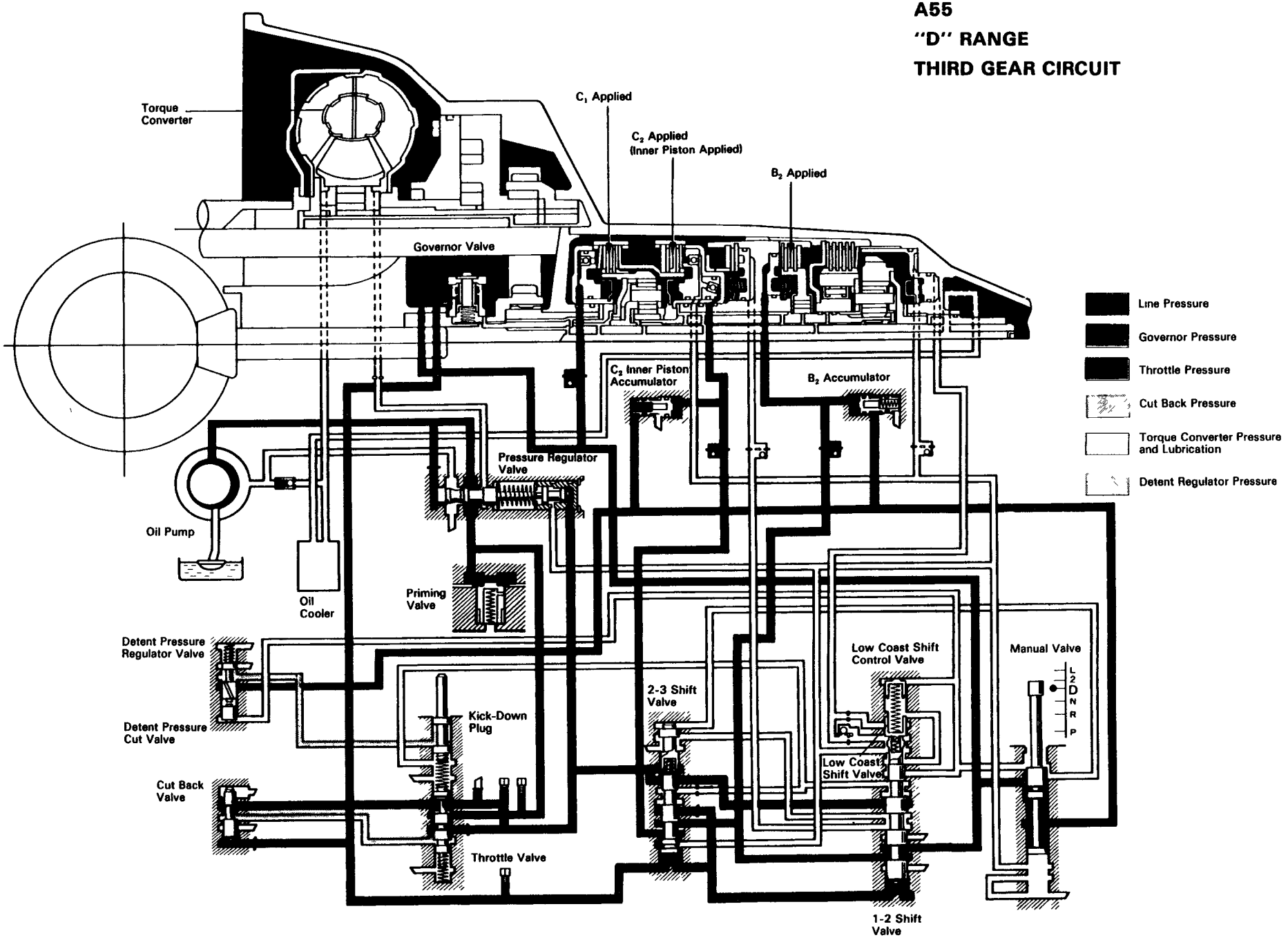
HC0003

A55
"D" RANGE
SECOND GEAR CIRCUIT



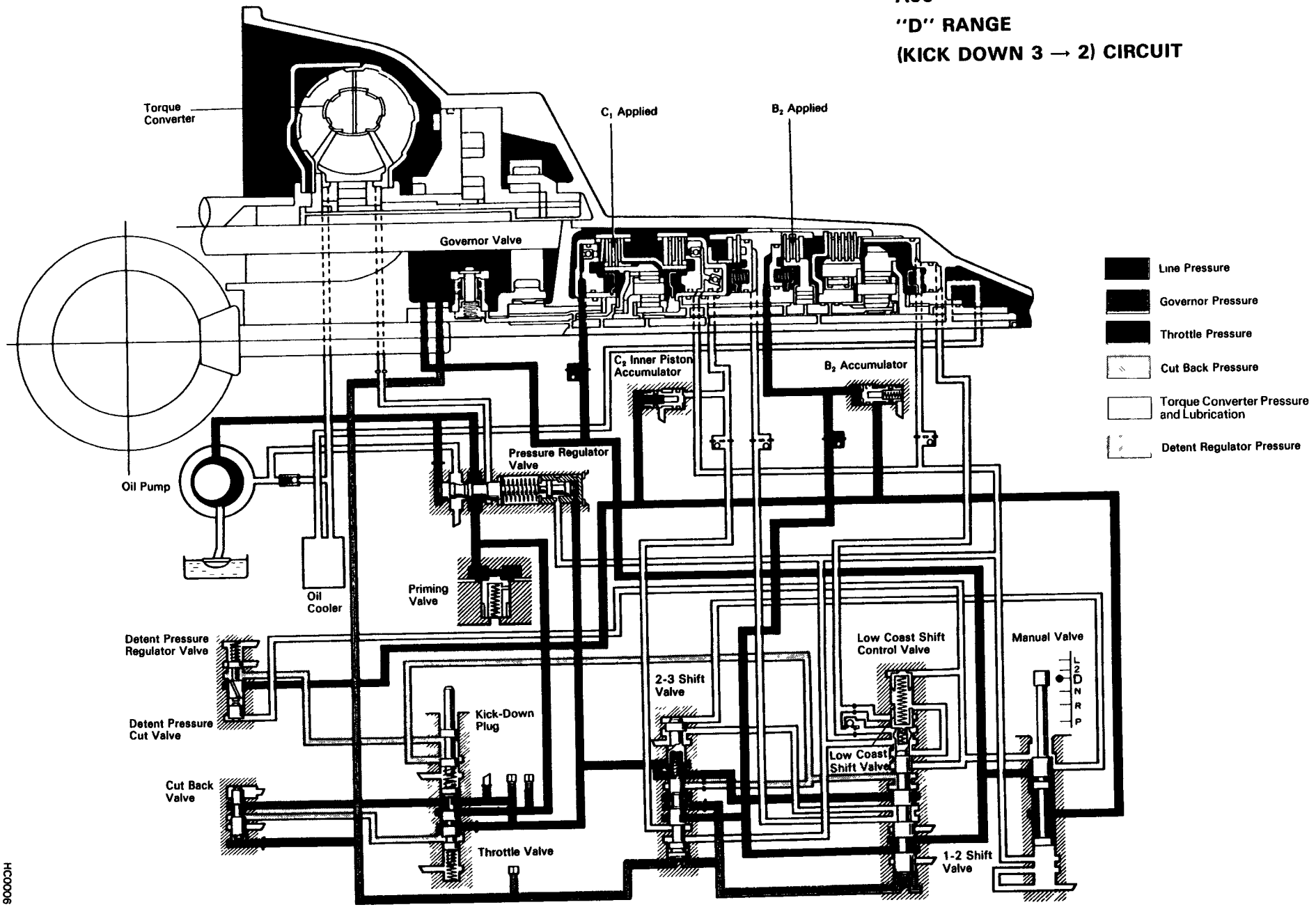
HC0004

A55
"D" RANGE
THIRD GEAR CIRCUIT



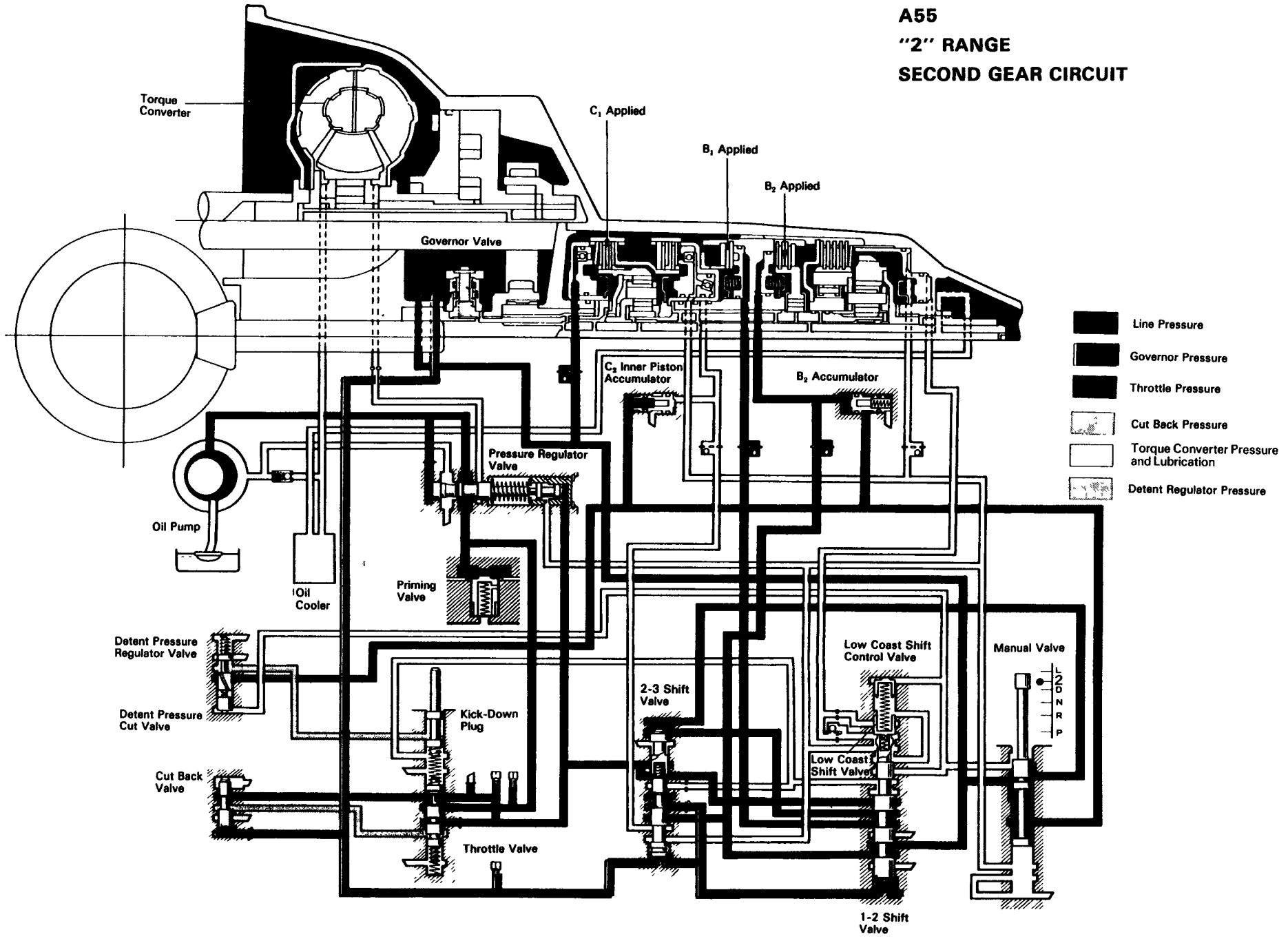
HC0005

A55
"D" RANGE
(KICK DOWN 3 → 2) CIRCUIT



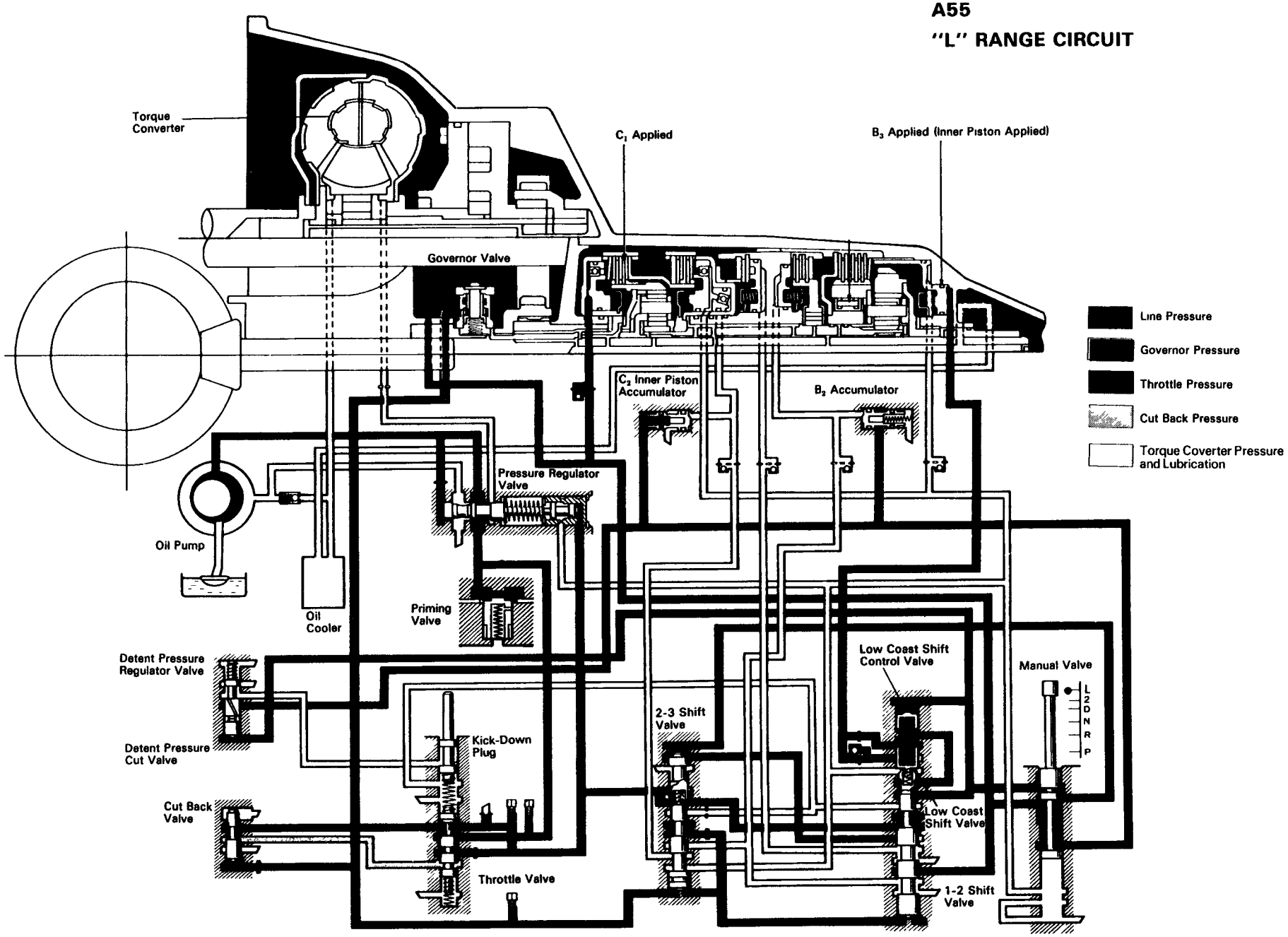
HC0006

A55
"2" RANGE
SECOND GEAR CIRCUIT



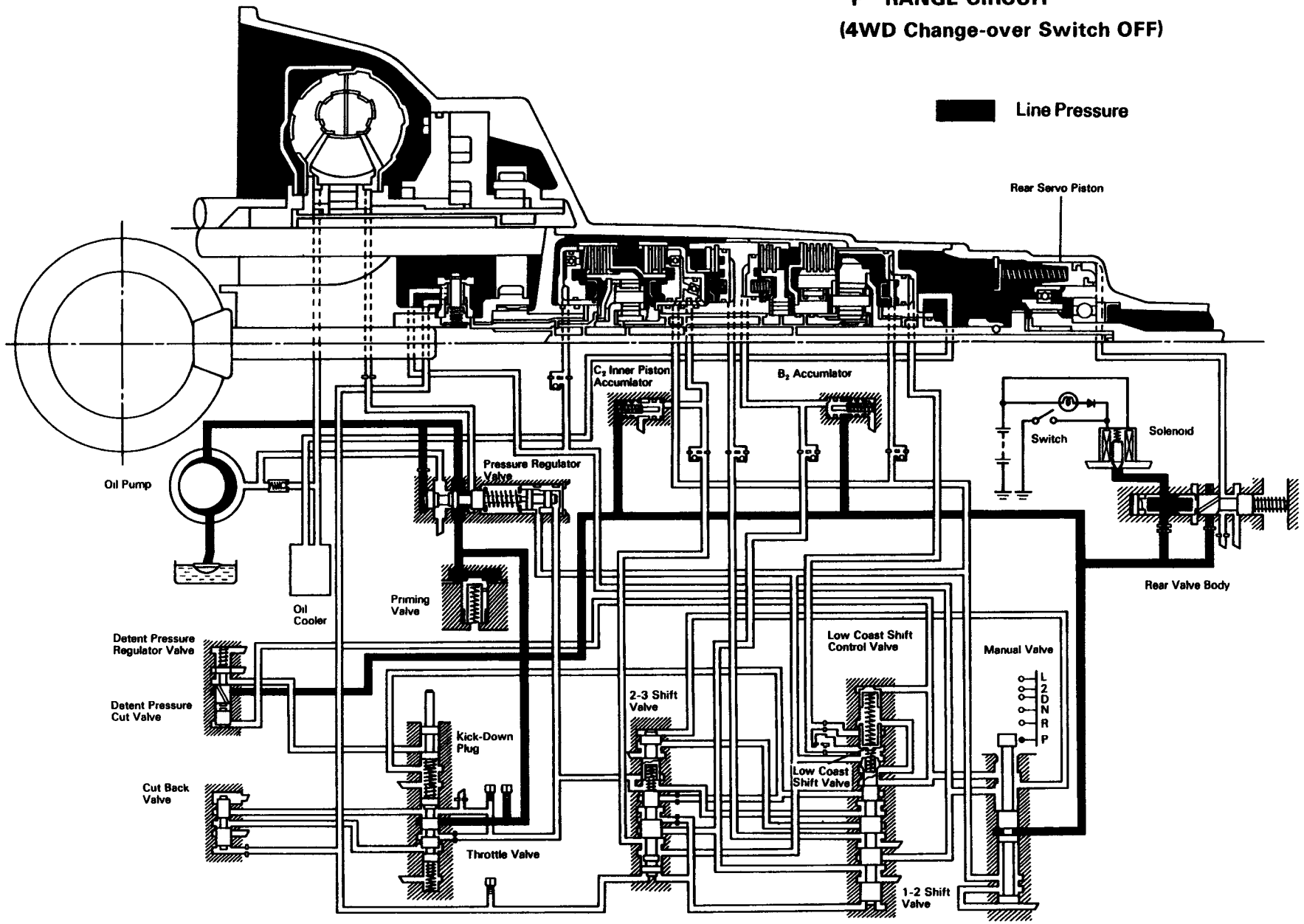
HC-0007

A55
"L" RANGE CIRCUIT

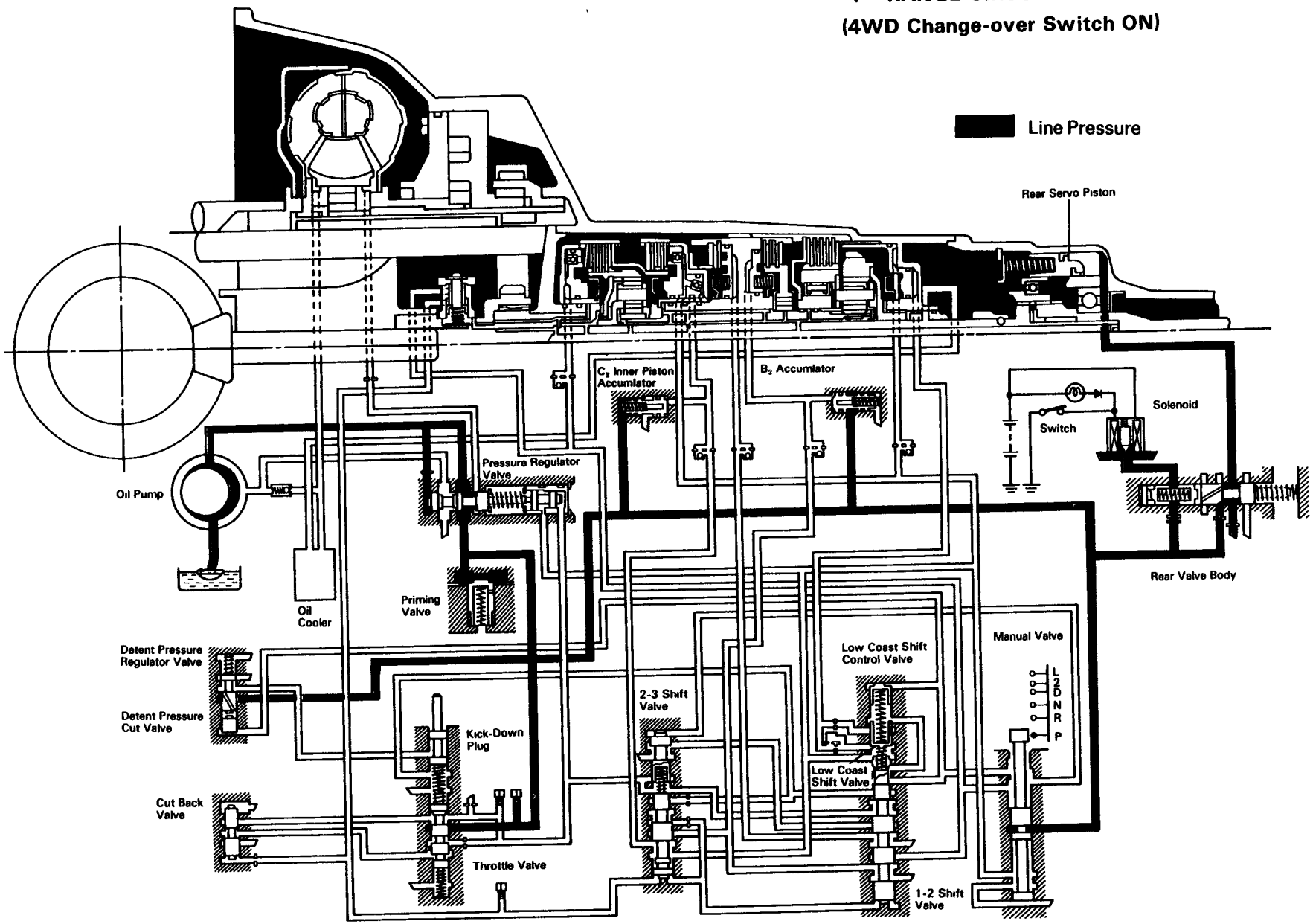


HC0008

A55F
"P" RANGE CIRCUIT
(4WD Change-over Switch OFF)



A55F
"P" RANGE CIRCUIT
(4WD Change-over Switch ON)



ELECTRICAL WIRING DIAGRAMS

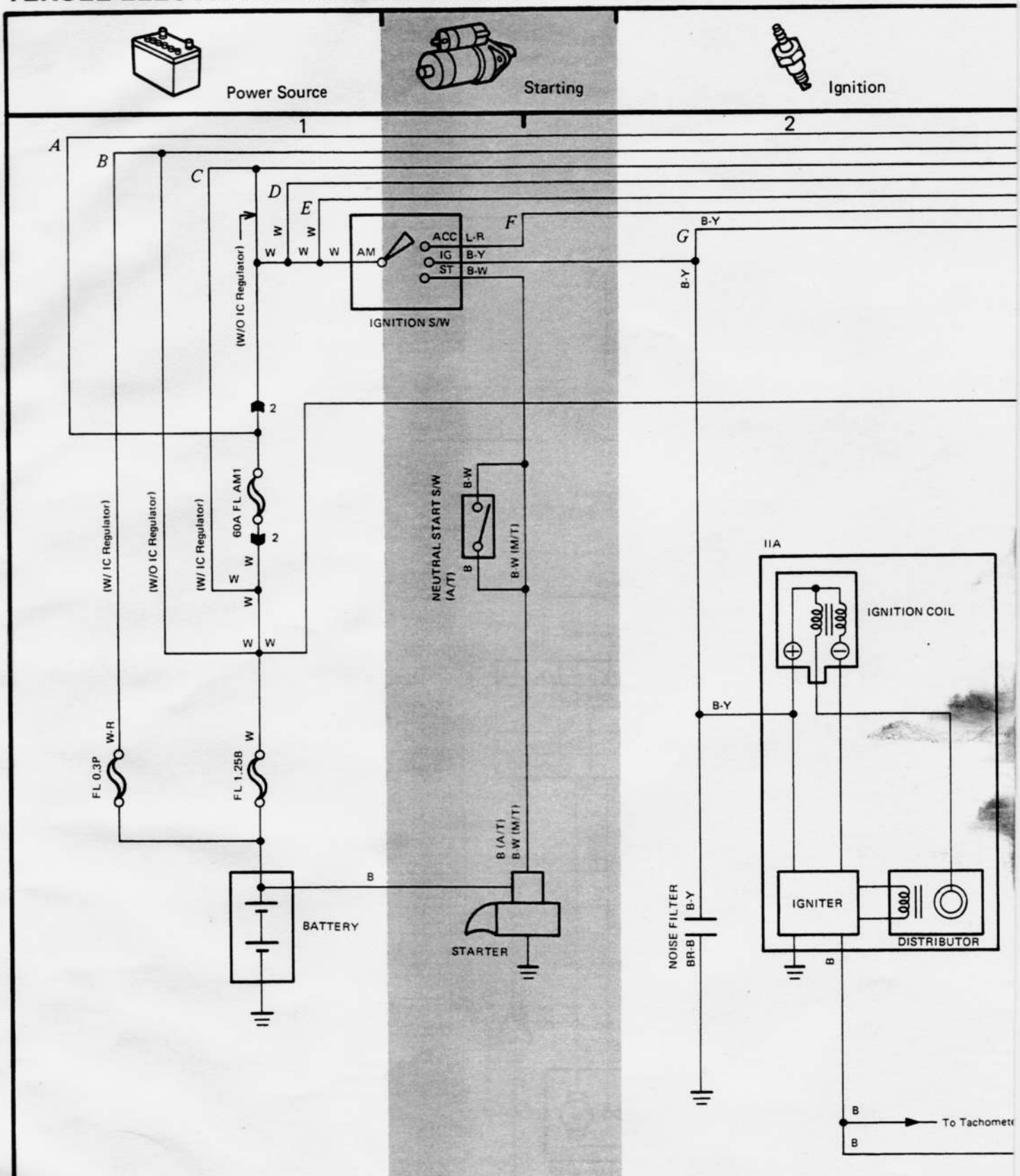
SYSTEM INDEX

TERCEL

1985 Model (Page 1 to Page 3)

SYSTEMS		LOCATION	SYSTEMS		LOCATION
Air Conditioner, Cooler and Heater		1-7	Stop Lights		2-7
Back-up Lights		2-3	Sun Roof		2-5
Charging		1-4	Taillights and Illumination		3-1
Cigarette Lighter		3-5	Turn Signal and Hazard		2-6
Clock		3-5	Unlock and Seat Belt Warning		2-4
Combination Meter		2-2			
Emission Control		1-5			
Front Wiper and Washer		2-8			
Headlights		3-3			
Horn		2-7			
Ignition		1-2			
Interior Lights		3-4			
Power Source		1-1			
Radiator Fan		1-3			
Radio and Tape Player		3-6			
Rear Window Defogger		2-4			
Rear Wiper and Washer		2-7			
Starting		1-1			

TERCEL ELECTRICAL WIRING DIAGRAM – 1985 Model (Page 1 to Page 3)

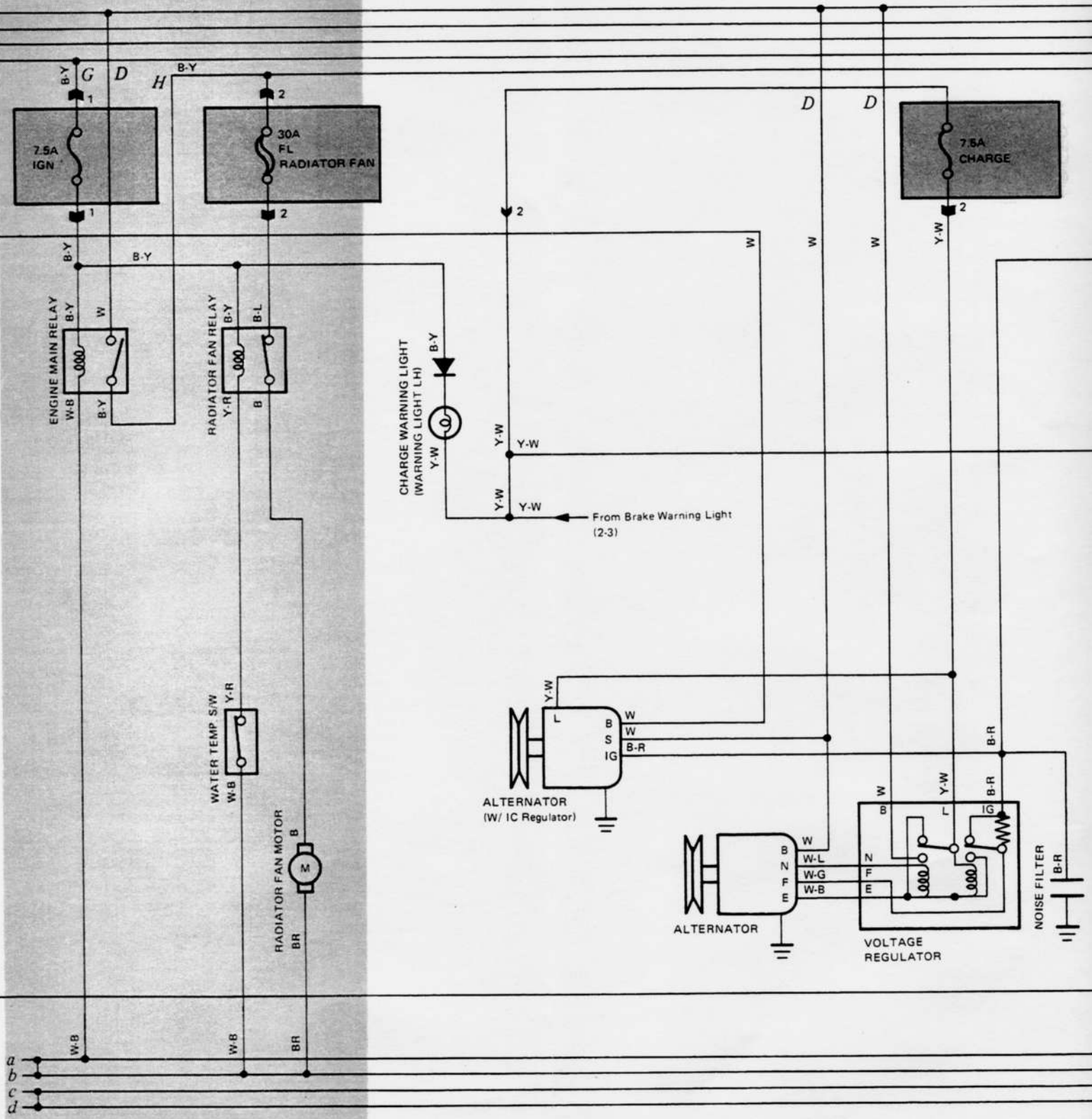


Radiator Fan

Charging

3

4



(2-1)

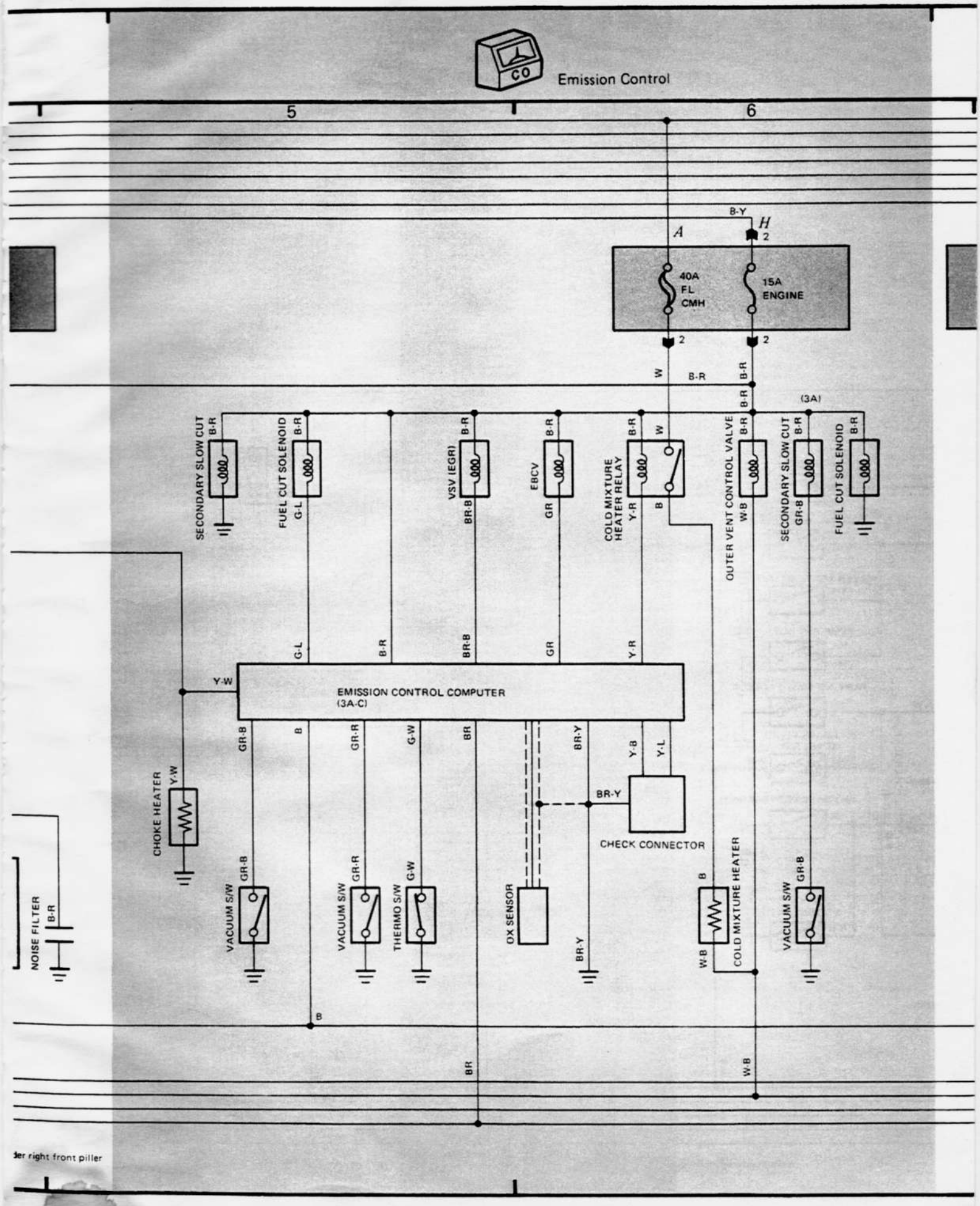
a
b
c
d

of radiator

b = Located on right baffle side of radiator

c = Located under left front piller

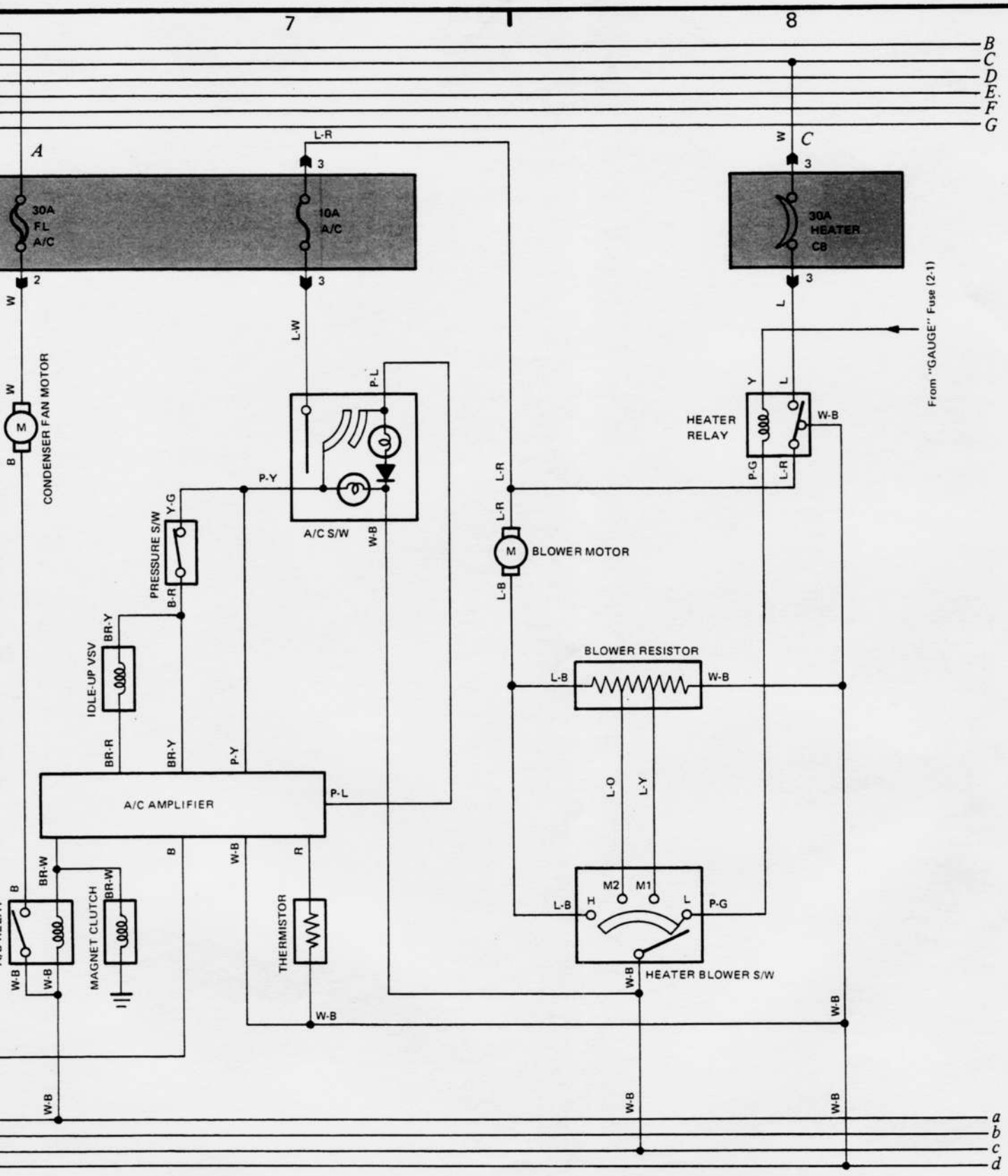
d = Located under right front pille



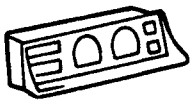
...er right front piller



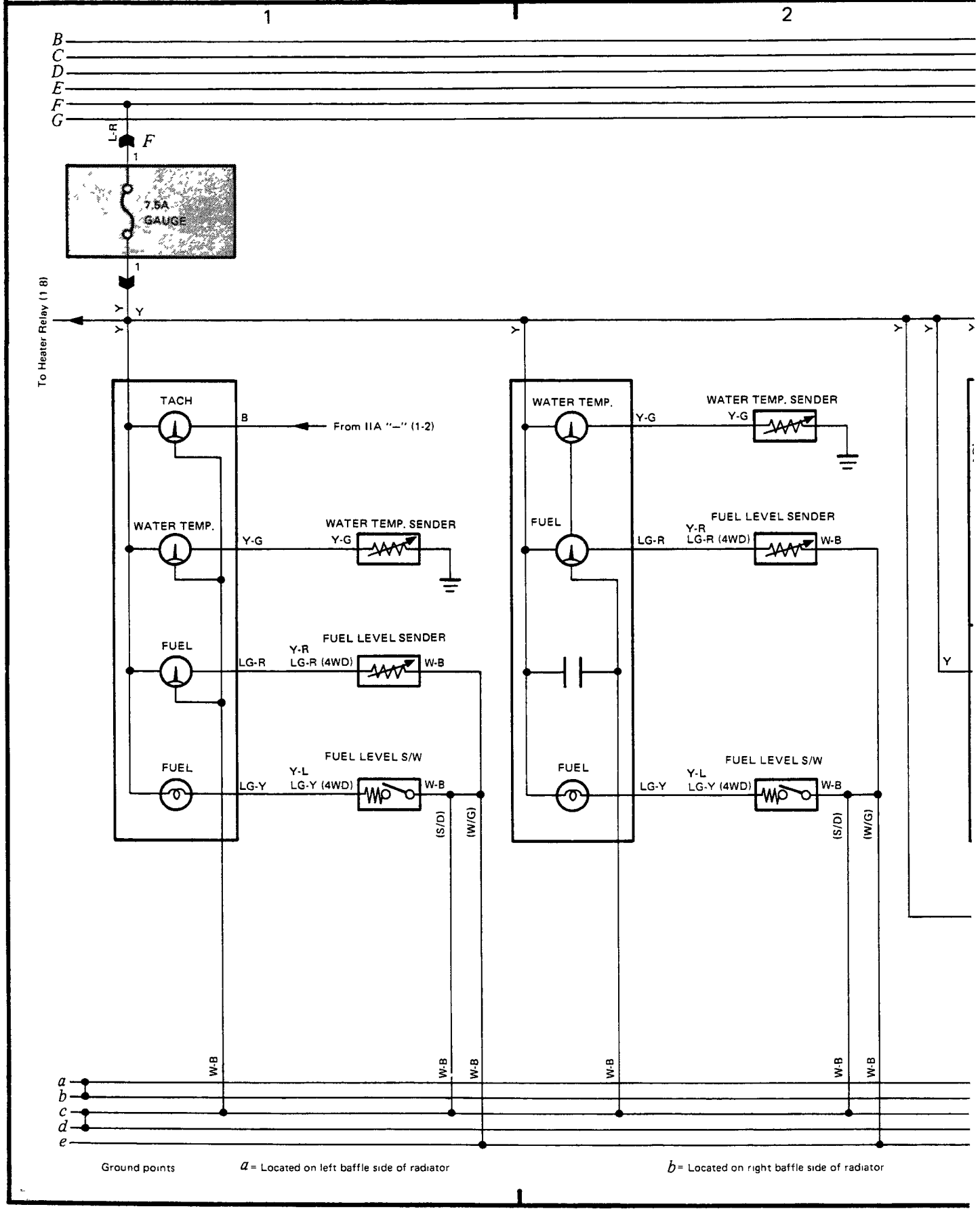
Air Conditioner, Cooler and Heater

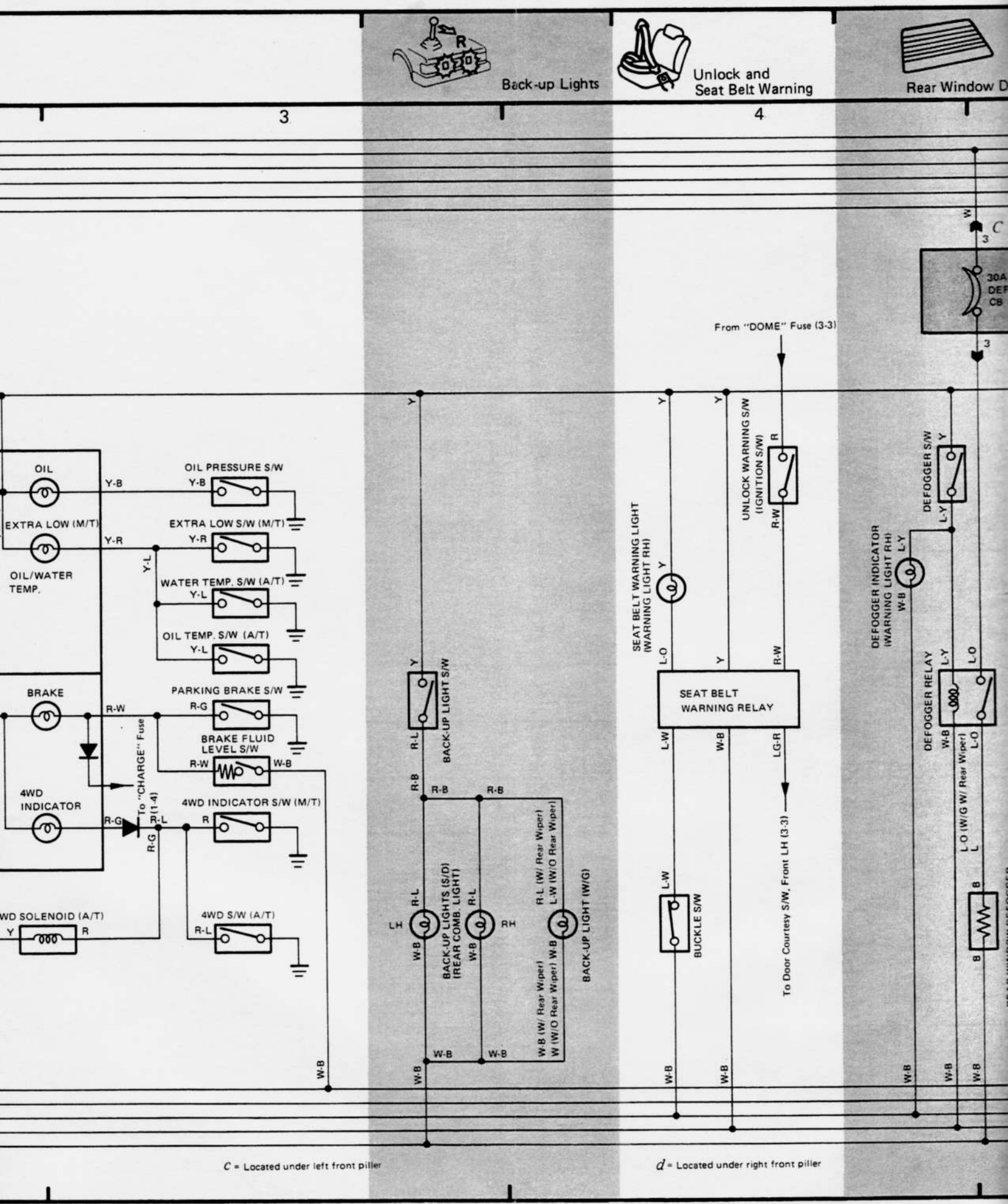


2 TERCEL (Cont'd)



Combination Meter




Back-up Lights
Unlock and Seat Belt Warning
Rear Window D
3
4
OIL
OIL PRESSURE S/W
Y-B
EXTRA LOW (M/T)
EXTRA LOW S/W (M/T)
Y-R
OIL/WATER TEMP.
Y-L
WATER TEMP. S/W (A/T)
OIL TEMP. S/W (A/T)
BRAKE
PARKING BRAKE S/W
R-W
R-G
BRAKE FLUID LEVEL S/W
W-B
4WD INDICATOR
To "CHARGE" Fuse
R-L
4WD INDICATOR S/W (M/T)
R
WD SOLENOID (A/T)
Y
4WD S/W (A/T)
BACK-UP LIGHT S/W
BACK-UP LIGHTS (S/D) (REAR COMB. LIGHT)
LH
RH
R-B
R-L (W/ Rear Wiper)
L-W (W/O Rear Wiper)
W-B (W/ Rear Wiper)
W (W/O Rear Wiper) W-B
BACK-UP LIGHT (W/G)
From "DOME" Fuse (3-3)
SEAT BELT WARNING LIGHT (WARNING LIGHT RH)
L-O
SEAT BELT WARNING RELAY
L-W
BUCKLE S/W
UNLOCK WARNING S/W (IGNITION S/W)
R-W
To Door Courtesy S/W, Front LH (3-3)
DEFOGGER S/W
L-Y
DEFOGGER INDICATOR (WARNING LIGHT RH)
DEFOGGER RELAY
L-O (W/G W/ Rear Wiper)
C
30A
DEF
C8
c = Located under left front piller
d = Located under right front piller

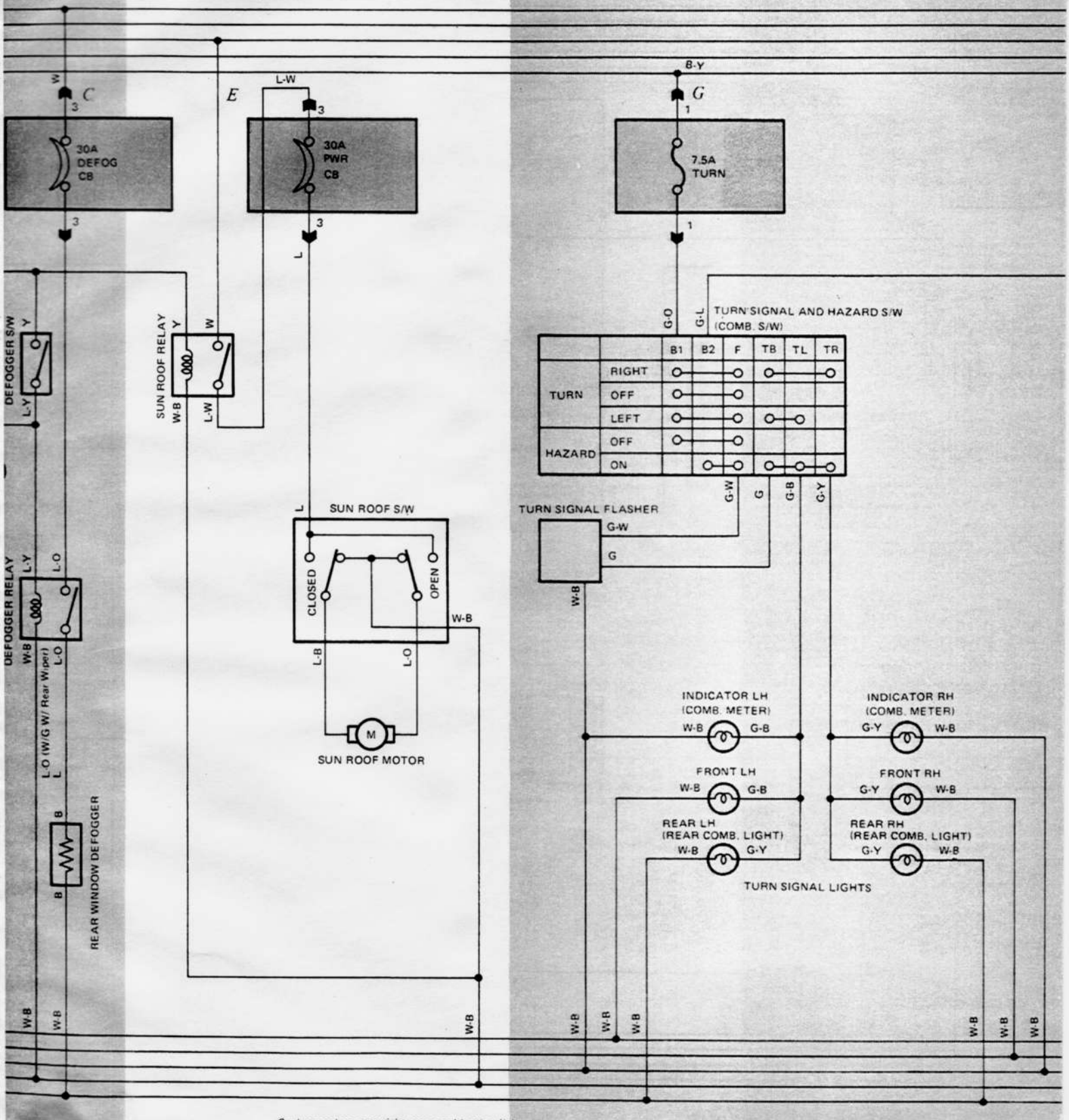
ear Window Defogger

Sun Roof

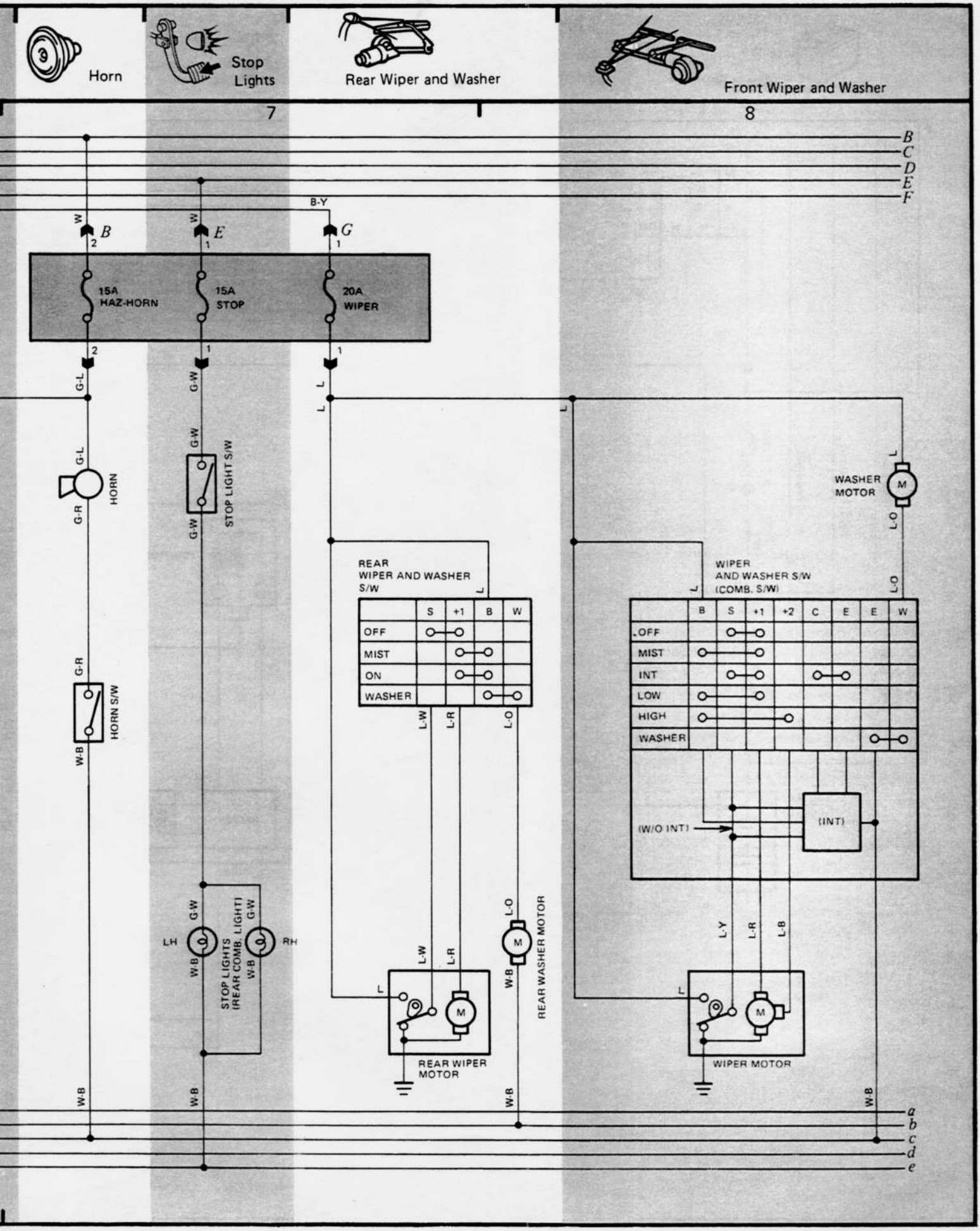
Turn Signal and Hazard

5

6



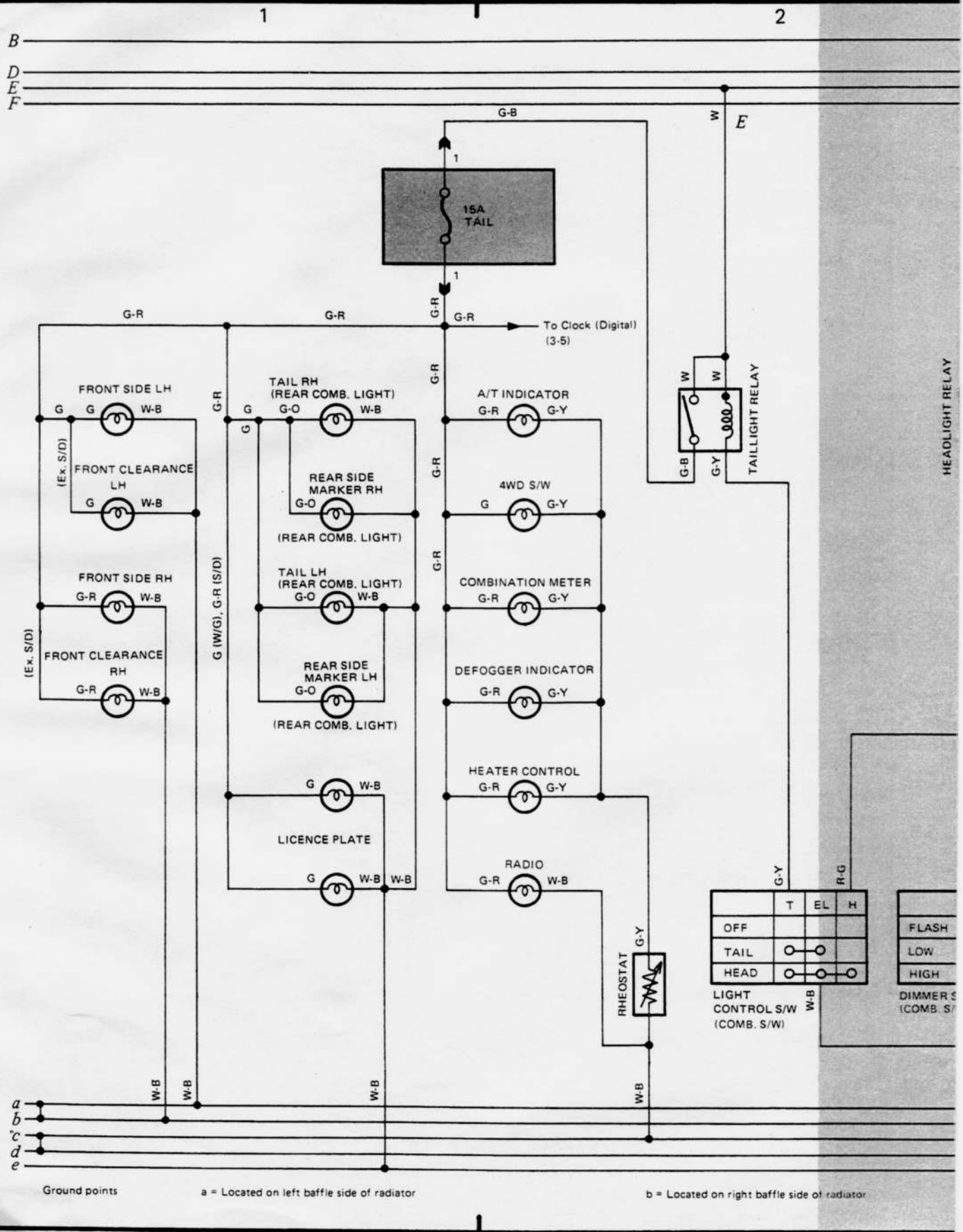
e = Located on near right rear combination light


Horn
Stop Lights
Rear Wiper and Washer
Front Wiper and Washer
7
8
B
C
D
E
F
B-Y
W
B
E
G
15A HAZ-HORN
15A STOP
20A WIPER
G-L
G-W
L
HORN
G-R
STOP LIGHT S/W
HORN S/W
W-B
REAR WIPER AND WASHER S/W
S
+1
B
W
OFF
MIST
ON
WASHER
L-W
L-R
L-O
WASHER MOTOR
M
WIPER AND WASHER S/W (COMB. S/W)
+2
C
E
INT
LOW
HIGH
(W/O INT)
(INT)
L-Y
L-B
LH
RH
STOP LIGHTS (REAR COMB. LIGHT)
REAR WASHER MOTOR
REAR WIPER MOTOR
WIPER MOTOR
a
b
c
d
e

TERCEL (Cont'd)



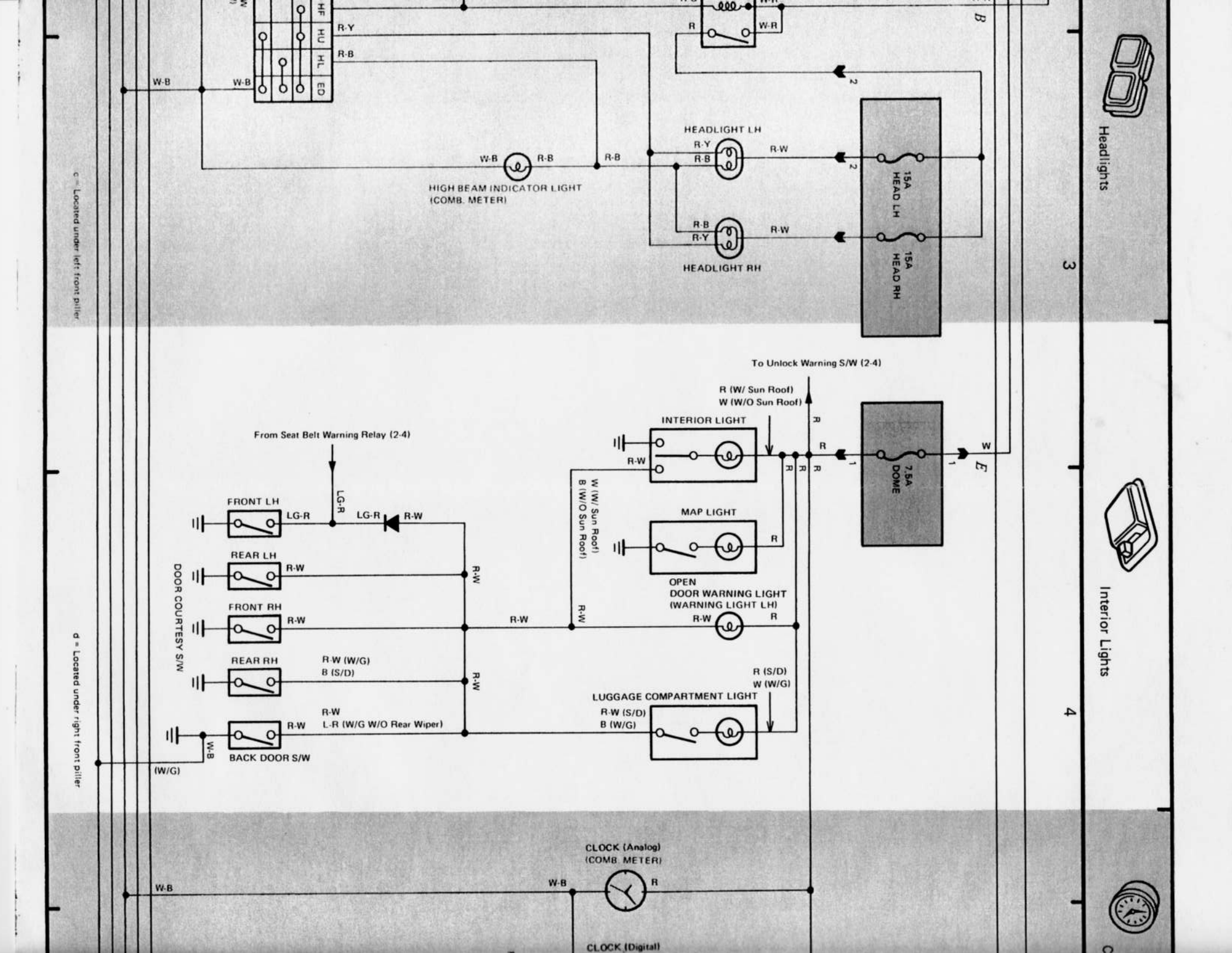
Taillights and Illumination



Ground points

a = Located on left baffle side of radiator

b = Located on right baffle side of radiator


Headlights
3
Interior Lights
4
HF
HU
HL
ED
W-B
R-Y
R-B
R
W-R
2
HEADLIGHT LH
R-Y
R-B
R-W
HEADLIGHT RH
R-B
R-Y
R-W
HIGH BEAM INDICATOR LIGHT
(COMB. METER)
15A
HEAD LH
15A
HEAD RH
To Unlock Warning S/W (2-4)
R (W/ Sun Roof)
W (W/O Sun Roof)
INTERIOR LIGHT
R-W
MAP LIGHT
OPEN
DOOR WARNING LIGHT
(WARNING LIGHT LH)
7.5A
DOME
W (W/ Sun Roof)
B (W/O Sun Roof)
From Seat Belt Warning Relay (2-4)
FRONT LH
LG-R
REAR LH
R-W
FRONT RH
R-W
REAR RH
R-W (W/G)
B (S/D)
BACK DOOR S/W
R-W
L-R (W/G W/O Rear Wiper)
DOOR COURTESY S/W
LUGGAGE COMPARTMENT LIGHT
R-W (S/D)
B (W/G)
R (S/D)
W (W/G)
(W/G)
c = Located under left front pillar
d = Located under right front pillar
CLOCK (Analog)
(COMB. METER)
CLOCK (Digital)

Headlights

Interior Lights

3

4

B

E

15A HEAD LH

15A HEAD RH

7.5A DOME

HEADLIGHT LH

HEADLIGHT RH

HIGH BEAM INDICATOR LIGHT (COMB. METER)

To Unlock Warning S/W (2-4)

R (W/ Sun Roof)
W (W/O Sun Roof)

INTERIOR LIGHT

MAP LIGHT

OPEN DOOR WARNING LIGHT (WARNING LIGHT LH)

LUGGAGE COMPARTMENT LIGHT

R (S/D)
W (W/G)

R-W (S/D)
B (W/G)

W (W/ Sun Roof)
B (W/O Sun Roof)

CLOCK (Analog) (COMB. METER)

From Seat Belt Warning Relay (2-4)

FRONT LH

REAR LH

FRONT RH

REAR RH

BACK DOOR S/W

R-W (W/G)
B (S/D)

R-W
L-R (W/G W/O Rear Wiper)

DOOR COURTESY S/W

HF HU HL ED

S/W

c = Located under left front piller

d = Located under right front piller

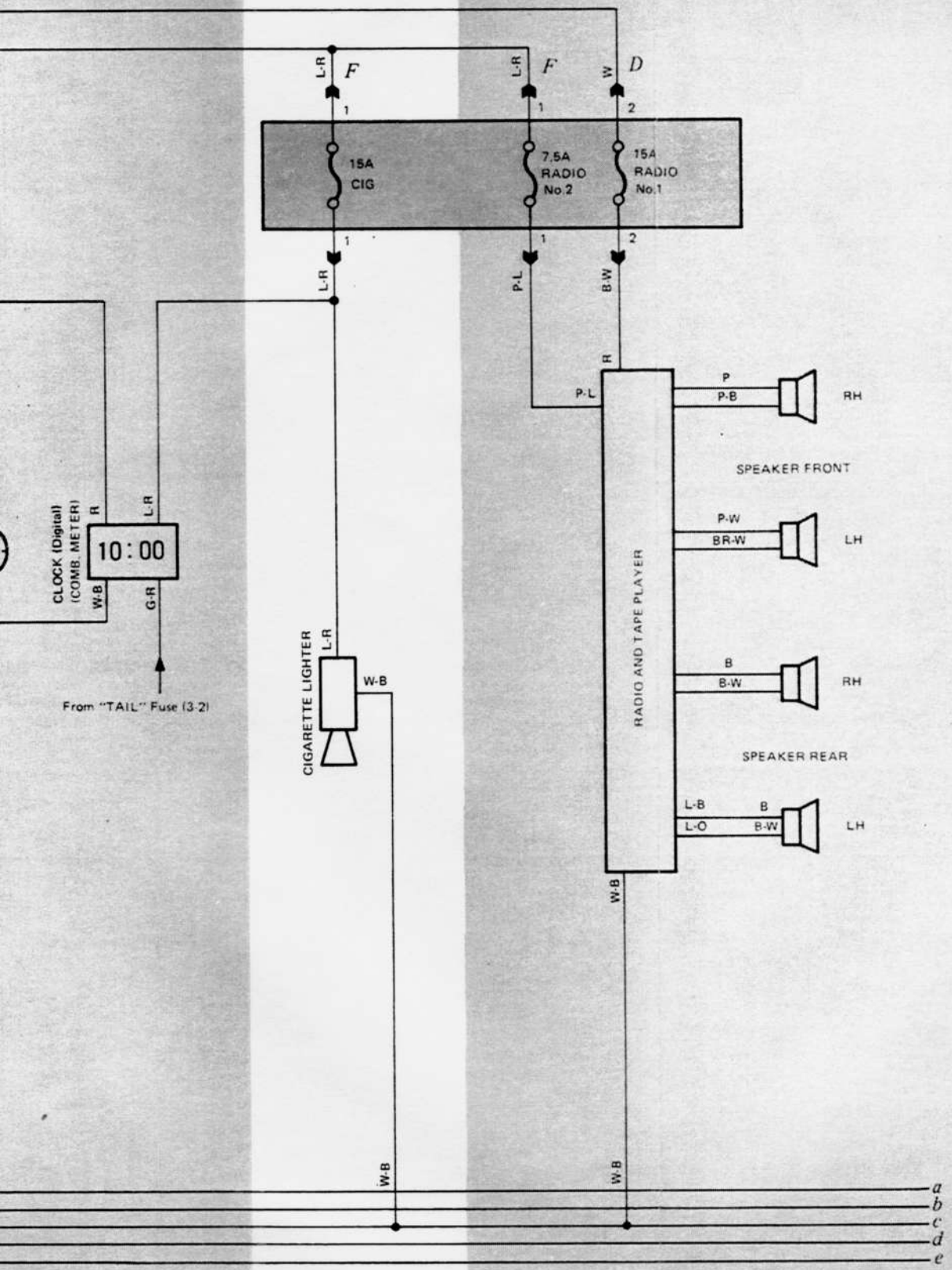
Clock

Cigarette Lighter

Radio and Tape Player

5

6



e = Located on near right rear combination light